Appendix D

Short-Term Analysis of Refinery Costs and Supply

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As a result of the new regulations issued by the U.S. Environmental Protection Agency (EPA) for ultra-low-sulfur diesel fuel (ULSD) the U.S. refining industry faces two major challenges: to meet the more stringent specifications for diesel product, and to keep up with demand by producing more diesel product from feedstocks of lower quality. Some refineries in the United States and Europe currently have the capability to produce some diesel product containing less than 10 ppm sulfur, and there is no question that diesel fuel with less than 10 ppm sulfur can be produced with current technology.

U.S. refiners have demonstrated that meeting the EPA target specification of 500 ppm sulfur (1993 reduction from 5,000 ppm to 500 ppm) was easier than anticipated. The primary methods used were upgrading existing hydrotreater units by adding extra reactor volume and building new units. In contrast, the proposed change from 500 to 15 ppm represents a new and far more challenging task for the industry, because the remaining sulfur (less than 500 ppm) is likely to be contained in compounds that are difficult to desulfurize, such as 4,6–dimethyldibenzothiophene (often described as sterically hindered sulfurcontaining molecules). Furthermore, to meet growing demand for diesel fuel, some refineries will have to increase capacity, which may involve treating lower quality feedstocks (cracked distillates) that require more severe and costly process conditions.

The implications of producing ULSD are complex, not only from a unit-specific standpoint but also from a refinery standpoint. Each refinery has unique circumstances, such as existing hydrodesulfurization units, source of crude, diesel blend components, and hydrogen availability. Producing ULSD is a significant decision for most refiners, and the incremental cost per barrel could vary dramatically across the range of individual refiners. In addition, it is uncertain whether further restrictions on diesel quality will be imposed in the future. Some refiners may decide to discontinue producing highway diesel and produce only non-road diesel and heating oil as distillate products. Such decisions, coupled with increasing demand for diesel fuel, could heighten the potential for a diesel shortage in 2006.

This appendix provides details of the methods used to estimate the short-term cost per gallon to manufacture ULSD meeting the EPA sulfur specifications for 2006 and examines the variations in cost for different U.S. refineries. The analysis results in a cost curve indicative of the cost that may be incurred by U.S. refiners to produce the new fuel at various supply levels.

Estimating Components of the Distillate Blend Pool

The initial step of the analysis was to analyze the potential economics of producing ULSD for each refinery. Using input and output data submitted to the Energy Information Administration (EIA) by refiners, the current components of the distillate blend pool were estimated and allocated to the current production of highway diesel, non-road diesel, and heating oil. Volumes and sulfur content of straight-run distillate, fluid catalytic cracker (FCC) light cycle oil (LCO), coker distillate, and hydrocracker distillate were estimated on the basis of the gravity and sulfur content of crude feeds, input volumes to the FCC, coker, and hydrocracker units, and the fraction of the FCC feed that is hydrotreated.

The estimates for volumes of full-range straight-run distillate, LCO from the FCC, and coker distillate were adjusted according to reported refinery data. Because kerosene and jet fuel are made from the straight-run distillate and hydrocracked material, those distillate pool components were reduced accordingly. If a hydrocracker was available at a refinery, volumes of LCO and coker distillate were allocated to the hydrocracker by comparing available distillate boiling range components to distillate product volumes. A final adjustment was made, based on the relative production of gasoline and distillate products.

The initial estimate of straight-run distillate volume for a given refinery was based on a typical cut point range for a crude oil with the gravity of the crude oil charged to that refinery. If the available distillate pool volumes exceeded the distillate product produced, the volume of the straight-run distillate component was reduced, based on the typical variation in distillation cut points. (The light end of the kerosene boiling range material may be included in the reformer feed for gasoline production, and the heavy end (high end) of the boiling range may be included in the FCC feedstock. Either or both of these adjustments will reduce the straight-run distillate volume.) The adjustments resulted in estimated distillate pool volumes approximately equal to the reported volumes of distillate production. The distillate pool components were then allocated to the production of highway diesel, non-road diesel, and heating oil.

Allocating Blend Pool Components to Distillate Products

Specifications for the various diesel and heating oil products determine how refiners allocate the distillate component to the products. In 1997, the American Petroleum Institute (API) and National Petrochemical and Refining Association published a survey of blend patterns used by U.S. refiners in 1996 for gasoline and distillate products.[163] The compositions of the distillate products for Petroleum Administration for Defense Districts (PADDs) I-IV reported in the API/NPRA survey for 1996 are summarized in Table D1.

According to the API/NPRA survey, the fraction of cracked stocks (LCO and coker distillate) is about one-third of the total for both highway and non-road diesel fuels. PADD II has the highest percentage of cracked stock components: 34.7 percent for highway diesel and 27.3 percent for non-road diesel. Only PADDs I and III have significant production of heating oil, and the cracked stock content is 44.7 percent in PADD I and 40.9 percent in PADD III. While highway diesel has a lower sulfur limit than non-road diesel, both have the same minimum cetane number requirement of 40, which limits the fraction of cracked stock that can be included in either product. Cracked stocks are poor-quality diesel blend components, because of their high aromatics content and low cetane numbers (Table D2).

A refiner cannot consider options for producing ULSD without considering the impact on other diesel and heating oil products. Thus, while cracked stocks have a combination of high aromatics and higher sulfur that make them difficult materials to convert to ULSD, for most refiners it is not possible to shift more of these cracked stocks to non-road diesel because of the non-road cetane requirement. A few refiners in PADDs I and III could potentially allocate more cracked stocks to heating oil, but as the relative volumes in Table D1 indicate, this would help only a small number of refiners.

The EPA analysis of the feasibility of producing ULSD[164] discussed the difficulty of desulfurizing cracked stocks compared to straight-run distillate to meet ULSD standards. Commentary indicated that, if hydrocracking capacity were available, some cracked stock could be sent to the hydrocracker. In estimating the distillate pool components as described above, the volume balances indicated that in many refineries with hydrocrackers, the LCO was likely being consumed as hydrocracker feed. The EPA also suggested that, because non-road diesel fuel has an average cetane number of 44.4, more cracked stock could be allocated to non-road diesel and still achieve the 40 minimum standard.

In analyzing each specific refinery, EIA found that refineries fall into three groups with respect to cracked stocks. One group has a relatively small fraction of cracked stocks (such as those with hydrocrackers) and hence produces highway and non-road diesel fuels with relatively high cetane. For a second group, cetane constraints offer little chance for allocating more cracked stocks to non-road diesel. The third group, using heavy crude oil feeds to produce large volumes of cracked stocks from FCC units and cokers, must treat distillate

Table D1. API/NPRA Survey of Distillate Product Compositions, 1996

Region	Product	Product Components (Percent by Volume)				Total Volume (Million Barrels)
		Straight-Run Distillate	Cracked Light Cycle Oil	Cracked Coker Distillate	Hydrocracked Distillate	
PADD I	Highway Diesel	67.7	16.5	0.0	15.8	12.1
	Heating Oil	54.2	44.7	0.0	1.1	10.4
PADD II	Highway Diesel	62.7	28.8	5.9	2.6	59.9
	Heating Oil	66.9	11.6	21.5	0.0	2.1
	Non-Road Diesel	72.7	27.3	0.0	0.0	19.2
PADD III	Highway Diesel	66.0	18.8	10.7	4.5	104.5
	Heating Oil	57.8	29.6	11.3	1.3	6.5
	Non-Road Diesel	56.9	12.8	3.2	27.1	28.9
PADD IV	Highway Diesel	71.0	22.6	4.2	2.2	11.0
	Non-Road Diesel	80.9	19.1	0.0	0.0	2.1

Note: The survey included reports from 9 PADD I refineries, 25 PADD II refineries, 42 PADD III refineries, and 12 PADD IV refineries and accounted for 80 percent of the volume that EIA reported was produced in that period.

Source: *Final Report: 1996 American Petroleum Institute/National Petrochemical and Refining Association Survey of Refining Operations and Product Quality* (July 1997).

[163] *Final Report: 1996 American Petroleum Institute/National Petrochemical and Refining Association Survey of Refining Operations and Product Quality* (July 1997).

[164] U.S. Environmental Protection Agency, *Regulatory Impact Analysis: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Requirements*, EPA420-R-00-026 (Washington, DC, December 2000), Chapter IV, web site www.epa.gov/otaq/regs/hd2007/frm/ria-iv.pdf.

components to reduce aromatics and improve cetane in order to produce acceptable products.

In the longer term, increased movement of cracked distillates between refineries could occur, with more undercutting of cracked stock to remove the high-aromatic, high-sulfur material at the high end of the boiling range. Such industry optimization avenues would take time to establish, however, because they are based on component price differentials that may grow over time to provide incentives for such activities. During the transition period starting in 2006, based on past experience, it is assumed that most refiners would base their strategies on analyses of specific refinery situations. Possible exceptions are multiple refineries within a single company system having logistical connections that permit practical and economical movement of refinery streams.

Identifying Refinery Options for Producing ULSD

The objective of this step of the analysis was to generate estimates of the incremental cost for each refinery to produce ULSD. The incremental cost will vary for each refinery, depending on the volume of ULSD produced; the type of blend components from which it is produced; the sulfur, aromatics, and boiling range content of those blend components; whether the refinery can revamp an existing hydrotreater or must build a new one; and the cost for catalyst, hydrogen, and other requirements to produce the ULSD. Moreover, each refinery must decide how much ULSD it will produce in 2006. Because the volume of ULSD produced will affect the incremental cost of production, the incremental cost of ULSD production for each refinery was first estimated at current production levels, assuming both the revamp of a current hydrotreating unit and the addition of a new unit. Then, additional options for reducing or expanding the refinery's ULSD production were estimated.

Several factors may cause a refiner to maintain, contract, or expand highway diesel production when the ULSD regulation takes effect in 2006. Maintaining current production of highway diesel has the appeal of keeping the refinery production in balance with current distillate markets sales for the company. Either increasing or decreasing the highway diesel production will mean finding markets for more highway diesel, more heating oil, or more non-road diesel products. Reducing ULSD production may result in a lower per barrel incremental cost for ULSD production.

ULSD production requires added hydrogen usage in the distillate hydrotreater, thereby increasing hydrogen consumption per unit of distillate feed. Some refiners may choose to reduce feed input in order to continue to operate within existing hydrogen supply constraints and avoid building new hydrogen production capacity. Reducing hydrotreater throughput may also enhance the practicality of revamping a current hydrotreater to avoid building a new unit. The 1996 API/NPRA survey showed that at the 500 ppm sulfur limit level, about 15 percent of untreated material was placed in highway diesel in PADDs I-IV. Producing ULSD will require that all the diesel product must be hydrotreated. This means that some refiners who seek to revamp will be working with a unit that has less capacity than indicated by current highway production. Some additional capacity may be made available by increasing the utilization rates of existing units that are currently operating at lower utilization rates.

If a refiner has to build a new hydrotreater, expansion of highway diesel production is an obvious consideration.

Table D2. Cetane Number of Light Cycle Oil From Some World Crude Oils

Crude Oil	Source	Gravity (Degrees API)	Sulfur Content (Percent by Weight)	Cetane Number: Straight-Run Diesel	Cetane Number: Light Cycle Oil at 60 Percent Conversion	Cetane Number: Light Cycle Oil at 80 Percent Conversion
[illegible]	Abu Dhabi	39	[illegible]	58	[illegible]	[illegible]
[illegible]	Saudi Arabia	34	[illegible]	59	[illegible]	[illegible]
[illegible]	Nigeria	[illegible]	0.2	[illegible]	[illegible]	[illegible]
[illegible]	North Sea	37	0.3	[illegible]	[illegible]	[illegible]
Maya	Mexico	22	3.3	47	[illegible]	[illegible]
Boscan	Venezuela	10	5.5	[illegible]	[illegible]	[illegible]
North Slope	Alaska	[illegible]	1.0	[illegible]	[illegible]	[illegible]
[illegible]	Louisiana	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
West Texas Sour	Texas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Note: [illegible] vacuum gas oil was cracked at [illegible] percent or 80 percent [illegible] conversion. [illegible] database.

Source: [illegible] Diesel Fuel Demand: A Challenge to Quality [illegible]

9304

Expansion can provide economies of scale for a new unit and may mean lower costs per unit; however, if new hydrogen production capacity is required, the cost per unit may be higher. There is also the risk of having to find additional markets for the added highway diesel production.

The EPA analysis[165] and a study by Charles River Associates, Inc., and Baker and O'Brien, Inc. (CRA/BOB)[166] have attempted to determine which refineries could be revamped; however, it is highly uncertain which refineries have hydrotreaters that could be revamped and maintain current production volumes. The present study also makes such an estimate, using a rationale similar to that used in the CRA/BOB analysis. The process construction literature for the past decade was reviewed for distillate hydrotreater projects, and it was assumed that revamps would be more likely for refineries that carried out major distillate projects in the 1990s, especially those that installed new units. It was also assumed that revamps would be practical for refineries using a small percentage of cracked stock to produce ULSD. In addition, it was assumed that new units would be built at refineries with current hydrotreater capacity less than their highway diesel production (although revamps would also be feasible at reduced production levels).

Estimating Costs for Individual Refineries

A semi-empirical model was developed to size and cost new and revamped distillate hydrotreating plants for production of ULSD. Sulfur removal was predicted using a kinetic model tuned to match the limited literature data available on deep distillate desulfurization. Correlations were used in the model to relate hydrogen consumption, utility usage, etc., to the three major constituents of the distillate pool: straight-run distillate, light cycle oil, and coker gas oil.

Model Assumptions

New ULSD Unit

- Sulfur removal from the existing refinery distillate pool, utilizing a dual-reactor hydrodesulfurization unit with interstage H_2S removal.
- Hydrogen consumption includes hydrogen required to desulfurize the distillate pool to 7 ppm and to saturate aromatics and olefins in the distillate.
- Cost estimates include capital for a new hydrotreating plant, sulfur plant, and expansion of utilities. Depending on the feedstock, the model decides whether or not to construct a new hydrogen plant.
- Operating costs include utilities, maintenance, catalyst and chemicals makeup and natural gas used for hydrogen generation. A small credit is taken for the sale of the sulfur byproduct.

Revamped ULSD Unit

- Sulfur removal from the existing refinery diesel pool, utilizing existing hydrodesulfurization unit with a new second-stage reactor and interstage H_2S removal.
- Incremental hydrogen consumption for revamp based on decreasing the sulfur level from 500 ppm to 7 ppm.
- Cost estimates include capital for new hydrotreating reactor, heater, heat exchanger, H_2S absorber, and expansion of utilities. Existing refinery sulfur and hydrogen plants are assumed to have sufficient excess capacity to handle increased throughputs. Depending on the feedstock, the model decides whether of not to construct a new hydrogen plant.
- Operating costs include incremental utilities, maintenance, catalyst and chemical makeup, and natural gas used for hydrogen generation. No credit is taken for the sale of the additional sulfur byproduct.

Model Description

The ULSD model considers hydrotreating three different types of refinery feeds: straight-run distillate from the atmospheric column, LCO from the FCC, and coker gas oil from the coker. The model is in a spreadsheet format and contains Visual Basic coded functions for some complex calculations. It consists of seven main sections: (1) Economic Factors, (2) Refinery Input Data, (3) Manual Variables, (4) Hydrotreater Kinetics, (5) Hydrotreater Plant, (6) Hydrogen Plant, and (7) Sulfur Plant. The model consists of seven Microsoft Excel® worksheets: a raw data worksheet that contains refinery-specific information used by the other worksheets, five refinery scenario worksheets that contain the detailed step-by-step calculations for the revamp and new unit cost projections, and a summary worksheet.

Model Options

The costs to produce ULSD for five investment options are estimated from the compiled data for each refinery. Costs vary for each refinery, depending on the volume of ULSD produced, the blend components from which it is produced, the sulfur, aromatics, and boiling range of the blend components, whether the refinery can revamp an existing hydrotreater or must build a new one, and the cost of the catalyst, hydrogen, etc. required to

[165] U.S. Environmental Protection Agency, *Regulatory Impact Analysis: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Requirements*, EPA420-R-00-026 (Washington, DC, December 2000).

[166] Charles River Associates, Inc., and Baker and O'Brien, Inc., *An assessment of the Potential Impacts of Proposed Environmental Regulations on U.S. Refinery Supply of Diesel Fuel*, CRA No. D02316-00 (August 2000).

produce ULSD. The volume of ULSD a refiner decides to produce will affect the cost. For each refinery, the cost for ULSD production is estimated at current production levels, both assuming the addition of a new hydrotreating unit and assuming the revamping of an existing hydrotreating unit (options 1 and 2 below). Three additional options are considered (reductions from current highway diesel production assuming new and revamped hydrotreater units and increases from current production assuming new units) to find the most economical production levels for individual refineries.

Option 1 (Baseline New Hydrotreater): This "business-as-usual" option is modeled using the current refinery production capacities for highway and non-road diesel. The model estimates the cost to produce highway and non-road diesel at the proposed sulfur limits (7 ppm and 5,000 ppm, respectively) while maintaining the same hydrotreater throughput. A new hydrotreater plant is estimated.

Option 2 (Baseline Revamped Hydrotreater): This option is identical to Option 1 except that the existing hydrotreater plant is assumed to be revamped. The revamp option considers the cost of installing an additional hydrotreater reactor (not an entire plant) and interstage amine scrubber. The additional reactor is sized to decrease the existing diesel sulfur content from 500 ppm to 7 ppm.

Options 3 and 4 (Reduced ULSD New and Revamp Hydrotreater): These options consider the cost impacts of decreasing highway diesel production and increasing non-road diesel production. Because ULSD production will require more hydrogen consumption (especially for refineries with lower quality feedstocks), reducing ULSD production may permit the refinery to operate within existing hydrogen capacity and avoid the necessity of building a costly new hydrogen plant. Furthermore, reducing hydrotreater throughput may also enhance the practicality of revamping the current hydrotreater and avoiding the need to invest in a new unit.

Option 5: Increased ULSD New Hydrotreater: This option considers expanding highway diesel production while decreasing non-road diesel production; thus increasing throughput to the hydrotreater and creating the need for a new hydrotreater. A particular refiner might consider this option for several reasons: (1) the refinery has a high volume of cracked stocks, and a new hydrotreater plant is needed anyway; (2) a new unit may provide economies of scale and lower per-unit production cost; (3) there may be a perceived opportunity to expand highway diesel production as demand increases and "challenged" refineries discontinue diesel production. A corresponding revamp case was not considered, because it was assumed that current refineries were at maximum production rate with existing equipment, and both new hydrotreater and hydrogen plants would be needed.

Worksheet Environment

Economic Factors: The capital charge factor is assumed to be 12.0 percent (corresponding to a 5.2-percent after-tax rate of return on investment), contingency 20.0 percent, on-site maintenance 4.0 percent, off-site maintenance 2.0 percent, taxes and insurance 1.5 percent (included in the capital charge factor), and miscellaneous 0.6 percent, all as a percentage of capital investment. Sensitivity cases using a 17.2-percent capital charge were also analyzed.

Refinery Input Data: The cost model requires two input data sets for each scenario. The first set of input data is the baseline data, consisting of the current refinery diesel capacities from which all scenarios are developed. The baseline data consist of the API gravity, highway and non-road diesel blend component flow rates, and sulfur content of each stream to the hydrotreater. The second set of input data contains the blend component flow rates for the optional expanded or reduced hydrotreater.

Manual Variables: Some variables are not available in the original refinery-by-refinery specific database and require some engineering judgment and estimation. Whether or not the FCC feed is hydrotreated affects the hydrogen consumption for desulfurizing the LCO stream. Pretreatment of the FCC feed results in products (LCO in this case) with higher API gravities (lower sulfur and aromatic content), which will in turn require less hydrogen to remove the remaining sulfur during hydrotreating. The geographic location factor is utilized in the cost estimates for each refinery process; the location basis used in the model is the U.S. Midwest. The pressure input (in pounds per square inch absolute [psi]) affects both the kinetic and hydrotreater portions of the model. It is assumed that the maximum pressure for the revamp options is 650 psi, and the average length-of-run pressure for the new hydrotreater options is 900 psi. The estimated process temperature has a direct impact on the kinetic performance.

Hydrotreater Kinetics: The kinetic model used in this study has the general form:

$$-dS/dt = kS^{n}P_{H_2}/(1 + K_2S_0).$$

An Arrhenius form is used for the temperature dependence of k. For the Langmuir-Henshelwood factor, it is assumed that sulfur species in the feed and H_2S are equally strongly absorbed on catalyst sites. The constants in the equation were fit using the best available data from the literature. The best fit was obtained with n equal to 1.5. The equation was integrated to give space

velocity as a function of feed properties and operating conditions. The value of *k* used reflects the higher severity required to process cracked feedstocks. When two reactors are used in series with interstage H_2S removal, the intermediate sulfur level is adjusted to give approximately equal space velocities in the two reactors. When utilized for the revamp situations, the intermediate sulfur level (500 ppm) is manually placed in the kinetic model, and only the second space velocity is used for hydrotreater cost estimating.

Hydrotreater Plant: The total on-site capital cost estimate for a new hydrotreater plant (see Chapter 3) consists of three parts: a two-reactor system (in series) with interstage H_2S stripping, hydrogen makeup compressors, and remaining on-site capital equipment. The cost of the reactor system and makeup compressors are a function of the percent of cracked stocks present in the hydrotreater feed pool, whereas the cost of the remaining on-site equipment is a function of capacity. The combined flow rates, space velocities calculated from the kinetic model, and pressure are used to size each reactor, with the restrictions that the reactor length-to-diameter ratio must be greater than or equal to 5, and the diameter must be less than or equal to 15 feet. The cost of each reactor is a function of the wall thickness and reactor weight. Next, the hydrogen makeup compressor costs are calculated based on the hydrogen consumption. The remaining on-site capital for a new plant (inside battery limit [ISBL] equipment) is estimated by using vendor data supplied in a recent NPC study as a basis (30,000 barrels per stream day, $1,200 per barrel per stream day). Figure D1 shows the predicted ISBL costs for each refinery studied, using a basis of $1,200 per barrel per stream day, and a best-fit curve through the data. Differences in capital costs at a given capacity level are the result of variations in the fractions of the different types of feeds (e.g., straight run versus cracked stocks) and the sulfur level of the feed to the hydrotreater.

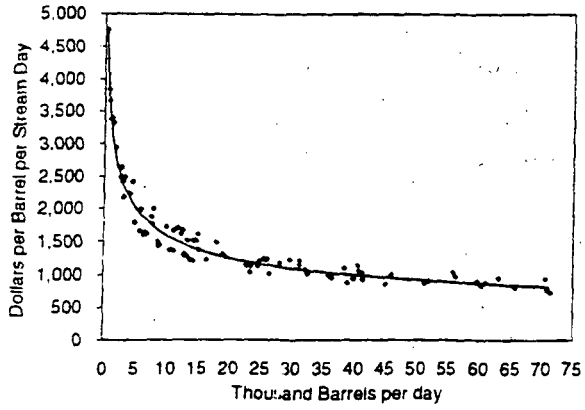
In the view of many refiners with whom discussions were held, an estimate of $1,600 per barrel per stream day is believed to be a more representative ISBL investment cost to produce ULSD. Therefore, the model was rerun using a basis of $1,600 per barrel per stream day for a unit with 30,000 barrels per stream day capacity. Figure D2 shows the relation of vendor-supplied data to the model results for both ISBL baseline costs ($1,200 per barrel per stream day and $1,600 per barrel per stream day).

The revamped hydrotreater on-site capital portion of the model utilizes only the space velocity calculated for the second reactor used to lower the diesel pool sulfur content from 500 ppm (manually specified) to 7 ppm. The revamped hydrotreater capital cost includes only an additional reactor, heater, and separator and assumes that the existing inside battery limit equipment will remain unchanged.

The on-site capital costs for the new and revamped hydrotreater plants include the initial catalyst charge. The off-site capital cost for a new plant is assumed to be 45 percent of the on-site capital cost, and the off-site capital cost for a revamped plant is assumed to be 30 percent of the on-site capital cost.

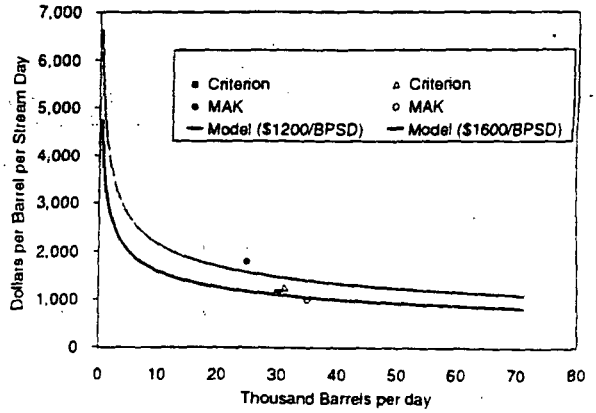
Hydrotreater Catalyst: Catalyst cost (in dollars per barrel) is a function of space velocities and is calculated assuming a 2-year life, with CoMo in the first reactor and NiMo in the second reactor. CoMo is more reactive in removing sulfur from the less challenging sulfur-containing molecules. Below 500 ppm, however, the sulfur present is more likely to be contained in sterically hindered molecules and is more difficult to remove using a CoMo catalyst (Figure D3). In contrast, NiMo has higher activity on more challenging sulfur-containing molecules. Published data have shown that the costs of both catalysts are approximately $10 per pound, including royalty.

Figure D1. Cost Curve for Ultra-Low-Sulfur Diesel ($1,200 Baseline ISBL Costs)



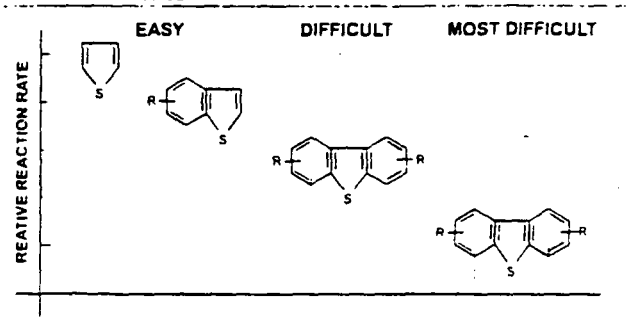
Source: National Energy technology Laboratory.

Figure D2. Cost Curve for Ultra-Low-Sulfur Diesel ($1,200 and $1,600 Baseline ISBL Costs)



Source: National Energy technology Laboratory.

Figure D3. Impact of Sulfur Species on Reaction Rate



Source: Energy Information Administration, Office of Integrated Analysis and Forecasting.

Hydrotreater Utilities: The main utilities for the hydrotreater plant included in the model are power, steam, cooling water, and fuel. All utility requirements were estimated from published correlations or actual data. The revamp option utility requirements are the incremental utilities to remove the remaining sulfur present in the diesel. The incremental additional power was estimated to be 40 percent of the existing power usage due to additional hydrogen consumption and potentially higher system pressure drops.

Hydrotreater Yields and Energy Content: The volume and weight percent yields of ULSD produced by the distillate hydrotreater can vary considerably, depending on the fraction of cracked stocks in the feed and the level of aromatics saturation. An average yield and energy content were estimated for this study, based on the Criterion data in a June 2000 study by the National Petroleum Council.[167] The yield of hydrotreater product in the distillate boiling range was assumed to be 98 percent by weight, and the API gravity was assumed to increase by 2 numbers, which means that the volume yield was 99.2 percent. There was also a small increase in the Btu content of the product on a weight basis (98.2 percent of the feed energy content in 98.0 weight percent of the feed). The energy content declines on a volume basis, because the heat content of the product is 0.989 times the heat content of the feed on a volume basis.

Hydrogen Plant: The same hydrogen consumption and hydrogen plant cost estimation methodologies are used for both the new and revamp cases. The goal of the hydrogen plant portion of the model is to determine the hydrogen consumption and associated costs to reduce the current sulfur level (500 ppm) down to 7 ppm, whether it is a new or revamp situation (see Table 6 in Chapter 6). The incremental H_2 is calculated as the difference between the baseline H_2 consumption (for highway diesel at 500 ppm sulfur and non-road diesel at 5,000 ppm) and the predicted required H_2 consumption (highway diesel at 7 ppm, non-road at 5,000 ppm). If the incremental H_2 consumption value is greater than 25 percent of the baseline H_2 capacity, then the model calculates the H_2 costs based on a new plant.

Simple nonlinear correlations based on the flow rate and sulfur concentration of each cut, including the non-road streams to the hydrotreater, were developed using data compiled from multiple sources. The H_2 consumption correlations are as follows:

Straight-run highway baseline:

$$SCF\ H_2 = SR\ Flowrate * (((120 * SRSulPercent) + 40) + 50)$$

Straight-run highway required:

$$SCF\ H_2 = SR\ Flowrate * (((120 * SRSulPercent) + 40) + 50 + 50)$$

Straight-run non-road baseline and required:

$$SCF\ H_2 = SR\ NonHighway\ Flowrate * ((120 * SRSulPercent) + 40)$$

LCO highway baseline:

$$SCF\ H_2 = LCO\ Flowrate * (((150 * LCOSulPercent) + 40) + 150)$$

LCO and coker distillate highway required:

$$SCF\ H_2 = LCO\ Flowrate * (((150 * LCOSulPercent) + 40) + 150 + 650)$$

LCO and coker distillate non-road baseline and required:

$$SCF\ H_2 = LCO\ NonHighway\ Flowrate * ((150 * LCOSulPercent) + 40)$$

After the total baseline, required, and incremental hydrogen capacities are calculated, the model then decides whether to build a new hydrogen plant. If the existing H_2 plants capacity is determined to be sufficient (no build), only the variable cost associated with the required capacity is calculated. If a new H_2 plant is necessary, the on-site capital cost is estimated (scaled) using published data (60 million standard cubic feet per day plant at $50 million). The off-site capital cost is assumed to be 40 percent of the on-site capital cost. The total hydrogen cost per barrel of distillate treated includes the cost of the natural gas feed to the hydrogen plant.

Sulfur Plant: The new sulfur plant estimates are based on the amount of sulfur removed from the diesel pool and are a function of whether the FCC feed was pre-treated, the flow rate and percent sulfur of each stream, and the API gravity of the crude. The estimate

[167] National Petroleum Council, *U.S. Petroleum Refining: Assuring the Adequacy and Affordability of Cleaner Fuels* (June 2000)

includes an interstage H_2S absorber for the new unit case. The on-site capital, off-site capital, and fixed and variable operating costs are calculated by scaling off published data. The only difference in the total sulfur cost on a per barrel basis is the credit from the sale of the sulfur at $27.50 per long ton. The revamp case assumes that the existing sulfur plant can handle the additional 500 ppm sulfur removed from the diesel stream. The sulfur section of the revamp worksheet calculates the cost of an additional absorber, which is a function of the overall flow rate to the hydrotreater and the hydrogen recirculation rate. In the sample cases, the sulfur costs ranged from $0.08 to $0.55 per barrel.

Appendix E

Model Results

Appendix E

Model Results

This appendix provides mid-term projections for end-use prices and total supplies of ultra-low-sulfur diesel fuel (ULSD), based on the Energy Information Administration's (EIA's) National Energy Modeling System (NEMS) Petroleum Market Module (PMM). Historical data for 1999 prices and supplies of highway diesel (500 ppm sulfur) are also provided for comparison (Tables E1 and E2).

The projected end-use (pump) prices are lower than the current prevailing prices for highway diesel fuel for several reasons. The end-user prices include crude oil costs, processing costs, taxes, and marketing costs.[168] Therefore, variations in the costs and taxes affect the projected end-user prices. The reference case, the Regulation case, and all sensitivity cases were based on mid-term projections for world crude oil prices used in *Annual Energy Outlook 2001 (AEO2001)*. After the steep increase in world crude oil prices in 1999 and 2000, EIA projected that crude oil prices would decline initially (through 2003), then slowly increase through 2020.[169] EIA's *Weekly Petroleum Status Report* for March 23, 2001, estimated the February 2001 price at $24.60 per barrel ($0.577 per gallon) in 1999 dollars for U.S. imported crude oil. In comparison, NEMS projects a world crude oil price of $21.37 per barrel ($0.509 per gallon) in 2010 (in 1999 dollars). The lower 2010 oil price projections from *AEO2001* thus account for a difference of 6.8 cents per gallon in the projected end-use prices for ULSD.

In addition, the end-use diesel prices include a nominal Federal tax of $0.24 per gallon in 1999, which decreases in value (in real terms) in the forecast years. The differential in Federal taxes between 1999 and 2010 is about 4 cents per gallon. The PMM reference case projects an end-use price of $1.238 per gallon in 2010. After upward adjustment to account for the differentials in world crude oil price and Federal taxes (a total of 10.8 cents), the end-use price would be $1.346 per gallon at the current world crude oil price level.

The U.S. prices of most petroleum fuel products fluctuate between seasons and in response to world crude oil prices. The higher-than-normal diesel prices in 2000 and in the early part of 2001 reflect the low distillate inventory and high world crude oil prices. Since February 2001, the average price of U.S. highway diesel has been dropping steadily, to a level around $1.40 per gallon. According to the *Weekly Petroleum Status Report* for March 23, 2001, the average U.S. price of highway diesel was $1.338 per gallon (in 1999 dollars), comparable to the price projection of $1.346 per gallon from the PMM.

[168] Energy Information Administration, *Annual Energy Outlook 2001*, DOE/EIA-0383(2001) (Washington, DC, December 2000), Figure 112.

[169] Energy Information Administration, *Annual Energy Outlook 2001*, DOE/EIA-0383(2001) (Washington, DC, December 2000), Figure 88.

Table E1. End-Use Prices and Total Supplies of Highway Diesel, 1999 and 2007-2015, Assuming 5-Percent Return on Investment

Analysis Case	1999	2007	2008	2009	2010	2011	2015	2007-2010 Average	2011-2015 Average
End-Use Prices of Highway Diesel (1999 Cents per Gallon)[a]									
Reference (500 ppm)	114.0	121.6	122.3	123.0	123.6	124.1	124.3	122.6	124.3
Regulation (ULSD)	NA	128.6	129.0	129.5	130.4	131.3	129.4	129.4	129.7
Higher Capital Cost (ULSD)	NA	129.4	129.9	130.5	131.2	132.2	130.1	130.3	130.5
2/3 Revamp (ULSD)	NA	128.9	129.2	129.9	130.7	131.7	129.7	129.7	130.0
10% Downgrade (ULSD)	NA	129.0	129.4	129.9	130.8	133.2	130.0	129.8	130.7
4% Efficiency Loss (ULSD)	NA	128.6	129.0	129.5	130.5	131.4	129.6	129.4	130.0
1.8% Energy Loss (ULSD)	NA	128.9	129.3	129.6	130.5	131.5	129.5	129.6	129.8
Severe (ULSD)	NA	130.4	130.7	131.4	132.2	134.8	131.1	131.2	131.7
No Imports (ULSD)	NA	130.2	130.4	130.8	131.6	132.9	130.5	130.8	131.1
Total Highway Diesel Supplied (Million Barrels per Day)									
Reference									
Total (500 ppm)	**2.43**	**3.09**	**3.15**	**3.21**	**3.27**	**3.32**	**3.55**	**3.18**	**3.43**
Regulation									
500 ppm	2.43	0.70	0.71	0.72	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.40	2.45	2.50	3.02	3.40	3.63	2.59	3.51
Total	**2.43**	**3.10**	**3.16**	**3.22**	**3.28**	**3.40**	**3.63**	**3.19**	**3.51**
Higher Capital Cost									
500 ppm	2.43	0.70	0.71	0.72	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.40	2.45	2.50	3.02	3.40	3.63	2.59	3.51
Total	**2.43**	**3.10**	**3.16**	**3.22**	**3.28**	**3.40**	**3.63**	**3.19**	**3.51**
2/3 Revamp									
500 ppm	2.43	0.70	0.71	0.72	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.40	2.45	2.50	3.02	3.40	3.63	2.59	3.51
Total	**2.43**	**3.10**	**3.16**	**3.22**	**3.28**	**3.40**	**3.63**	**3.19**	**3.51**
10% Downgrade									
500 ppm	2.43	0.70	0.71	0.72	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.40	2.45	2.50	3.02	3.61	3.85	2.59	3.72
Total	**2.43**	**3.10**	**3.16**	**3.22**	**3.28**	**3.61**	**3.85**	**3.19**	**3.72**
4% Efficiency Loss									
500 ppm	2.43	0.70	0.71	0.72	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.40	2.45	2.50	3.03	3.42	3.65	2.59	3.53
Total	**2.43**	**3.10**	**3.16**	**3.22**	**3.29**	**3.42**	**3.65**	**3.19**	**3.53**
1.8% Energy Loss									
500 ppm	2.43	0.71	0.72	0.73	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.42	2.47	2.52	3.06	3.45	3.68	2.62	3.55
Total	**2.43**	**3.13**	**3.19**	**3.25**	**3.32**	**3.45**	**3.68**	**3.22**	**3.55**
Severe									
500 ppm	2.43	0.71	0.72	0.73	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.42	2.47	2.52	3.07	3.67	3.92	2.62	3.79
Total	**2.43**	**3.13**	**3.19**	**3.25**	**3.33**	**3.67**	**3.92**	**3.22**	**3.79**
No Imports									
500 ppm	2.43	0.70	0.71	0.72	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.40	2.45	2.50	3.02	3.40	3.63	2.59	3.51
Total	**2.43**	**3.10**	**3.16**	**3.22**	**3.28**	**3.40**	**3.63**	**3.19**	**3.51**

[a]Highway diesel prices (both 500 ppm and ULSD) include Federal and State taxes but exclude county and local taxes.

NA = not available.

Sources: **1999:** Energy Information Administration, *Petroleum Supply Annual 1999*, Vol. 1, DOE/EIA-0340(99)/1 (Washington, DC, June 2000). **Projections:** National Energy Modeling System, runs DSUREF.D043001B, DSU7PPM.D043001A, DSU7HC.D043001A, DSU7INV.D043001A, DSU7DG10.D043001A, DSU7TRN.D043001A, DSU7BTU.D043001A, DSU7ALL.D050101A, and DSU7IMP0.D043001A.

Table E2. End-Use Prices and Total Supplies of Highway Diesel, 1999 and 2007-2015. Assuming 10-Percent Return on Investment

Analysis Case	1999	2007	2008	2009	2010	2011	2015	2007-2010 Average	2011-2015 Average
End-Use Prices of Highway Diesel (1999 Cents per Gallon)[a]									
Reference with 10% Return on Investment: 500 ppm	114.0	121.9	122.5	123.0	123.8	124.4	125.4	123.3	124.3
Regulation with 10% Return on Investment: ULSD	NA	129.8	130.0	130.5	131.5	132.4	134.1	130.6	135.7
Total Highway Diesel Supplied (Million Barrels per Day)									
Reference with 10% Return on Investment									
Total (500 ppm)	2.43	3.10	3.16	3.22	3.27	3.33	3.56	3.19	3.44
Regulation with 10% Return on Investment									
500 ppm	2.43	0.70	0.71	0.73	0.26	0.00	0.00	0.60	0.00
ULSD	0.00	2.41	2.46	2.50	3.02	3.41	3.64	2.60	3.51
Total	2.43	3.11	3.17	3.23	3.28	3.41	3.64	3.20	3.52

[a]Highway diesel prices (both 500 ppm and ULSD) include Federal and State taxes but exclude county and local taxes.

NA = not available.

Sources: **1999:** Energy Information Administration, *Petroleum Supply Annual 1999*, Vol. 1, DOE/EIA-0340(99)/1 (Washington, DC, June 2000). **Projections:** National Energy Modeling System, runs DSUREF10.D043001A and DSUTPRM10.D043001A.

"Macauley, Molly" <Macauley@rff.org> on 05/22/2001 04:25:00 PM

To: MaryBeth Zimmerman/EE/DOE@DOE
cc: "Toman, Mike" <Toman@rff.org>
Subject RE: Follow-up to this morning

The project referenced below can be properly considered an approach to "measuring the contribution of investments in remewable energy: consumer welfare gains." As such, it is conceivably a planning tool and has been used as such at NASA and DoC.

-----Original Message-----
From: MaryBeth.Zimmerman@ee.doe.gov
[mailto:MaryBeth.Zimmerman@ee.doe.gov]
Sent: Tuesday, May 22, 2001 4:17 PM
To: Macauley, Molly; Toman, Mike; Gruenspecht, Howard; Newell, Richard
Cc: Sam.Baldwin@ee.doe.gov; Buddy.Garland@ee.doe.gov;
Philip.Patterson@ee.doe.gov; Phillip.Tseng@ee.doe.gov;
Michael.York@ee.doe.gov; Tom.Kimbis@ee.doe.gov;
Darrell.Beschen@ee.doe.gov; Tina.Kaarsberg@ee.doe.gov;
Eldon.Boes%NRELExchange@ee.doe.gov;
Bill.Babiuch%NRELExchange@ee.doe.gov;
Larry.Goldstein%NRELExchange@ee.doe.gov; Jerry.Dion@ee.doe.gov;
Kenneth.Friedman@ee.doe.gov; Peggy.Podolak@ee.doe.gov;
Ellyn.Krevitz@ee.doe.gov
Subject: Follow-up to this morning

I wanted to thank you again for coming by today and discussing area of possible
areas of research. The timing was perfect, following up on the NEP release, for
identifying areas of analytical need and opportunity. I apologize again for having to leave a bit early, but I am pleased we finally got a chance to have
everyone in the room together.

Phil Tseng and I would like to get back to you soon regarding Planning office
analysis needs. I would also like to get copies of the quarterly reports from
the work that Molly Macauley is doing for us from the competitive solicitation
so we can discuss that in more detail. I have concerns about describing the approach as a budget decision tool at its apparent current point of

application
to these programs and technologies, but I'll need to learn more.

I hope you got a good sense of the items we are most interested in. The way EERE is structured, we can fund analysis through my office (Planning, Analysis,
and Evaluation), or through any of the sector offices. The lead analysts for each sector are:

Buildings:	Jerry Dion (586-9470)
Industry:	Ken Friedman (586-0379) or Peggy Podolak (586-6430)
Power:	Tina Kaarsberg (586-3802) [at the meeting]
Transportation	Phil Patterson (586-9121) [at the meeting]
Federal	Ellyn Krevitz (586-4740)

Phil Tseng, Darrell Beschen, and Mike York are in the Planning office. Tim Kimbis is from TMS and on-site with us full time for on-the-spot analysis. For
your information, I've cc:ed everyone from EERE & NREL who were present.

192

Kelliher, Joseph

From: Dave Nevius [redacted]
Sent: Tuesday, May 08, 2001 2:55 PM
To: Elena_S._Melchert@ovp.eop.gov%internet
Cc: Kelliher, Joseph; dcook@nerc.com%internet; lstuntz@sdsatty.com%internet; bnolan@nerc.com%internet
Subject: Re: Please provide citations

Elena
From NERC's annual "Electricity Supply & Demand" reports:

Existing U.S. Transmission Miles, 230 kV and above, AC and DC:

Dec 31, 1989 - 146,595 miles
Dec 31, 1999 - 157,810 miles

This represents only a 0.74% average annual increase in transmission mileage over this period.

This compares to average annual increases in peak demand of 2.67%, in net
energy for load of 2.13%, and in installed generating capacity of 0.86%.

Let me know if you need anything else.

Dave

At 01:45 PM 5/8/01, you wrote:
>Sirs: can you please verify and provide citation for the followoing
>statement?
>
>"....transmission cpapacity has increased by only 0.8percent annually since
>1989..."
>Thanks!
>Elena Subia Melchert
>Office of the Vice President
>National Energy Policy Development Group
>Washington, D.C.
>202/456-5348

(b)(5)

---------- Attachments ----------
Extracted NEP Program Review Discussion Paper.wpd: 16774 bytes
- Renamed to "NEP Program Review Discussion Paper0.wpd" to preserve uniqueness -

CN=Tom Kimbis/OU=EE/O=DOE>---<CN=MaryBeth Zimmerman/OU=EE/O=DOE@DOE>---<05/22/2001 05:37:43 PM>---<NEP Chart
---------- Message body ----------
Here is the latest version of our NEP Recommendation Summary Chart.
---------- Attachments ----------
Extracted NEP EVENT CHART.xls: 98816 bytes
- Renamed to "NEP EVENT CHART1.xls" to preserve uniqueness

CN=MaryBeth Zimmerman/OU=EE/O=DOE>---<macauley@rff.org;toman@rff.org;gruenspecht@rff.org;newell@rff.org>---<Follow-up to this morning
---------- Message body ----------
I wanted to thank you again for coming by today and discussing area of possible areas of research. The timing was perfect, following up on the NEP release, for identifying areas of analytical need and opportunity. I apologize again for having to leave a bit early, but I am pleased we finally got a chance to have everyone in the room together. Phil Tseng and I would like to get back to you soon regarding Planning office analysis needs. I would also like to get copies of the quarterly reports from the work that Molly Macauley is doing for us from the competitive solicitation so we can discuss that in more detail. I have concerns about describing the approach as a budget decision tool at its apparent current point of application to these programs and technologies, but I'll need to learn more. I hope you got a good sense of the items we are most interested in. The way EERE is structured, we can fund analysis through my office (Planning, Analysis, and Evaluation), or through any of the sector offices. The lead analysts for each sector are: Buildings: Jerry Dion (586-9470) Industry: Ken Friedman (586-0379) or Peggy Podolak (586-6430) Power: Tina Kaarsberg (586-3802) [at the meeting] Transportation Phil Patterson (586-9121) [at the meeting] Federal Ellyn Krevitz (586-4740) Phil Tseng, Darrell Beschen, and Mike York are in the Planning office. Tim Kimbis is from TMS and on-site with us full time for on-the-spot analysis. For your information, I've cc:ed everyone from EERE & NREL who were present.

CN=Michael McCabe/OU=EE/O=DOE>---<CN=MaryBeth Zimmerman/OU=EE/O=DOE@DOE>---<05/22/2001 12:06:30 PM>---<Re: URGENT!!! Hydrogen Act box
---------- Message body ----------
No, I haven't received it. Also, I talked to Doug Faulkner earlier today. Apparently he has the fact sheet and used it in a 10:00 meeting this morning with the Secretary. I asked him (via email) to send me a copy. I haven't received it yet. If you receive it first, please send me a copy since I'm sure Abe would like a copy as well. Michael MaryBeth Zimmerman 05/22/2001 11:40 AM To: Michael McCabe/EE/DOE@DOE cc: Subject: URGENT!!! Hydrogen Act box Did Bill Parks get you the Hydrogen Act fact sheet? No one in OPT could remember a Hydrogen text box for the NEP, but they told m

RELEASE

RELEASE

RECOMMENDATION TO ENHANCE US NUCLEAR ENERGY RD&D

The Need for Long-term R&D

The Nuclear Energy Research Advisory Committee (NERAC), formed in compliance with the Federal Advisory Committee Act (FACA), has recommended that DOE pursue nuclear energy RD&D programs to:

- revitalize U.S. nuclear energy supply,
- re-instate effective radio-isotope production for medicine and industry,
- increase basic nuclear research, and
- re-build the physical and human infrastructure needed for these purposes

Roadmap for Expanded Nuclear Power Capability

NERAC has also been charged to oversee DOE's development of a Roadmap defining:

- the goals of both a long- and short-term nuclear energy R&D program,
- the technology gaps that need to be closed to reach those goals,
- advanced nuclear power plant candidates with potential for short term (by 2020) and long term (by 2050) deployment,
- appropriate resource requirements and time frames, and
- criteria to measure progress toward the goals.

Goals for Future Nuclear Power Plants

The three primary, and their subsidiary, goals for new nuclear power plants are:

- Sustainability, providing
  - -free energy with essentially no air pollution or greenhouse gas emissions
  - a stable and abundant fuel supply
  - minimum amounts of radioactive waste
  - a reduced long-term stewardship burden
  - route to weapons proliferation.
- Improved safety and reliability, assuring
  - equal or better plant availability factors (>90%) than today
  - reduced chance of accidental fuel damage
  - need for emergency response.
- Economic competitiveness against other energy sources, including
  - a full life-cycle cost advantage
  - a comparable level of financial risk.

These criteria will allow screening down to a small number of candidates on which to place primary focus and resources. Safety, environmental, and non-proliferation goals and criteria, along with cost competitiveness, are of key importance in assuring successful deployment. Of these, NERAC has recommended that internationally accepted methods of assessment and standards for proliferation resistance should be more fully developed, building on the existing international non-proliferation regime. This need is of particular importance for development of acceptable advanced plant candidates slated for long-term deployment that recycle to maximize the use of nuclear fuel.

Industrial and International Cooperation

Two common themes in the NERAC recommendations are:

- industry and DOE, with its national labs, should enter into cost-share partnering, especially for the nuclear power plants slated for near term deployment, and
- international cooperation should be fostered to assure global development consistent with U. S. policies on safety , the environment, and proliferation resistance.

Doe has engaged U.S. industry, and those of its overseas allies with on-going nuclear energy programs, in the development of the Roadmap.

Recommendations to Strengthen Nuclear Energy RD&D

- Strengthen the NERI program to foster innovative nuclear power concepts.
- Strengthen the NEPO program, cost-shared with industry, to assure the continued effective operation of present plants
- Strengthen the university program to develop a new generation of nuclear engineers and scientists.
- Expand long-term R&D by an additional $280 million annually by 2005
- Implement the roadmap by developing a vigorous program to demonstrate the most promising of these technologies. This will require substantial additional funding and will involve a concerted interaction with industry

Re-building the Nuclear Energy Infrastructure

NERAC has advised that to achieve the goals and meet the needs outlined above will require re-building the U.S. nuclear energy infrastructure, both in human skills and facilities. Re-building is required also for national security and the long-term stewardship of defense nuclear materials and facilities as well as the effective management of radioactive wastes and spent fuels from both civilian and defense sectors. A fundamental starting point is the training of qualified personnel in our universities.

This re-building, coupled with the implementation of the RD&D programs recommended above, will entail substantial funding increases and enhanced priority within the federal government and industry, without which the nation's energy needs and national security will not be achieved.
Contact:

16-1

Williams, Ronald L

From: Kelliher, Joseph
Sent: Sunday, February 25, 2001 10:59 AM
To: Anderson, Margot
Subject: regional information


tmp.htm


Sum 2001 preliminary assessmen...

(b)(5)

----Original Message----
From: Dave Nevius [mailto:dave.nevius@nerc.com]
Sent: Thursday, February 22, 2001 2:11 PM
To: Kelliher, Joseph
Cc: Conti, John; lstuntz@sdsatty.com%internet; lou.leffler@nerc.com%internet; mike.gent@nerc.com%internet; dcook@nerc.com%internet; timg@nerc.com%internet
Subject: Fwd: FW: White House National Energy Policy Development Group(NEPDG)

Joe
One of our folks (Lou Leffler - another PSE&G alumni) got the inquiry below from a Jerry Swiggett of GIS Enterprises. (I think Jerry knows Lou from when Jerry consulted for SAIC -- they were doing some work together on Critical Infrastructure Protection stuff.)

The kind of info Jerry is asking for, on behalf of Andrew and the NEPDG, is exactly what we want to come talk with you about. In fact, we've already put together a preliminary assessment of Summer 2001 (attached), which we made available to Kyle McSlarrow. We will not have final projections of summer conditions until late March, but this is our best (not for attribution) assessment of expected conditions.

Of course, we are already underway with our 10-year assessment as well, which gets into more detail about key issues affecting reliability. Last year's 2000-2009 Reliability Assessment is on our web site. John Conti of DOE staff has been working with our Reliability Assessment Subcommittee for the past several years and is well versed on the issues and the projections. I think he was invited up to brief the Secretary the other day. Not sure if you were involved.

Bottom line is we would really like to come down and visit as soon as you are clear of your budget work. Let me know when you think that will be and what kinds of things you'd like to hear about from us. I see from Mr. Swiggett's letter that you may be looking for information about technology solutions, line losses (not sure why) and generally things that could be done quickly, by Executive Order. (Too bad the President can't make reliability standards enforceable by Executive Order.) Let me know what you need and we will do our very best to provide it.

Also, do you recommend we funnel information through Mr. Swiggett or deal directly with you?

Now you're busy. Hope you're having fun. Hope to talk with you soon.

Dave
(609) 452-8060 work

(609) 915-3062 cell
home](b)(6)

>From: "Michehl R. Gent" <mgent@nerc.com>
>To: "David R. Nevius" <dave.nevius@nerc.com>
>Subject: FW: White House National Energy Policy Development Group(NEPDG)
>Date: Thu, 22 Feb 2001 13:11:42 -0500
>X-Mailer: Microsoft Outlook IMO, Build 9.0.2416 (9.0.2911.0)
>Importance: Normal
>
>
>
>——Original Message——
>From: Lou Leffler [mailto:lou.leffler@nerc.com]
>Sent: Thursday, February 22, 2001 10:59 AM
>To: Gene; Lou; Mike G
>Subject: FW: White House National Energy Policy Development Group(NEPDG)
>
>
>22 Feb 01
>Mike and Gene,
>
>Jerry Swiggett was a contact from SAIC about a year ago. I don't know what
>NEPDG is, other that the name: White House National Energy Policy
>Development Group. Do we want to know any more about this?
>
>lou.
>++++++++++++++++++++++
>
>
>——Original Message——
>From: Jerry Swiggett [mailto:gisent@ix.netcom.com]
Sent: Wednesday, February 21, 2001 14:54
To: Leffler, Lou
>Subject: White House National Energy Policy Development Group(NEPDG)
>
>
>Lou,
>
>I have gotten involved with Vice President Dick Cheney's NEPDG from the
>perspective of assisting Andrew Lundquist (NEPDG Director) secure some
>factual information and data on critical power issues. One of the most
>pressing issues, as you are well aware, is the capacity and reliability of
>the domestic elctric power transmission grid. The NEPDG will be developing
>both a "snapshot" of the current energy situation and a longer term report
>on things that can make a positive difference.
>
>I have taken the liberty of bringing you to Lundquist's attention as a
>nationally recognized expert in the power grid area. Lundquist is open to
>receiving a brief white paper (2-4 pages) from you on current grid
>limitations and weaknessess but more importantly, on what steps can be
>taken over the next year or two to improve the grid performance. He is
>very interested in factual data on power loss over distances, technologies
>like superconducting transmission systems or other more realistic
>enhancements or regulatory mods that the President can enact through
>Executive Orders.
>
>If you are possibly interested in responding to this invitation please let
>me know and I will work with you to get your ideas and data properly
bmitted.

ope all is well with you and NERC.
>

>Jerry
>
>
>Gerald E. Swiggett
>President
>GIS Enterprises, Inc.
>8403 Arlington Blvd., Ste. 100
>Fairfax, VA 22031
>(703)876-6800/0515 fax

] (b)(6)

170

Joe
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The kind of info Jerry is asking for, on behalf of Andrew and the NEPDG, is exactly what we want to come talk with you about. In fact, we've already put together a preliminary assessment of Summer 2001 (attached), which we made available to Kyle McSlarrow. We will not have final projections of summer conditions until late March, but this is our best (not for attribution) assessment of expected conditions.

Of course, we are already underway with our 10-year assessment as well, which gets into more detail about key issues affecting reliability. Last year's *2000-2009 Reliability Assessment* is on our web site. John Conti of DOE staff has been working with our Reliability Assessment Subcommittee for the past several years and is well versed on the issues and the projections. I think he was invited up to brief the Secretary the other day. Not sure if you were involved.

Bottom line is we would really like to come down and visit as soon as you are clear of your budget work. Let me know when you think that will be and what kinds of things you'd like to hear about from us. I see from Mr. Swiggett's letter that you may be looking for information about technology solutions, line losses (not sure why) and generally things that could be done quickly, by Executive Order. (Too bad the President can't make reliability standards enforceable by Executive Order.) Let me know what you need and we will do our very best to provide it.

Also, do you recommend we funnel information through Mr. Swiggett or deal directly with you?

I know you're busy. Hope you're having fun. Hope to talk with you soon.

Dave
(609) 452-8060 work

(b)(6)

From: "Michehl R. Gent" <mgent@nerc.com>
To: "David R. Nevius" <dave.nevius@nerc.com>
Subject: FW: White House National Energy Policy Development Group(NEPDG)
Date: Thu, 22 Feb 2001 13:11:42 -0500
X-Mailer: Microsoft Outlook IMO, Build 9.0.2416 (9.0.2911.0)
Importance: Normal

-----Original Message-----
From: Lou Leffler [mailto:lou.leffler@nerc.com]
Sent: Thursday, February 22, 2001 10:59 AM
To: Gene; Lou; Mike G
Subject: FW: White House National Energy Policy Development Group(NEPDG)

22 Feb 01
Mike and Gene,

Jerry Swiggett was a contact from SAIC about a year ago. I don't know what NEPDG is, other that the name: White House National Energy Policy Development Group. Do we want to know any more about this?

lou.

-----Original Message-----

From: Jerry Swiggett
Sent: Wednesday, February 21, 2001 14:54
To: Leffler, Lou
Subject: White House National Energy Policy Development Group(NEPDG)

Lou,

I have gotten involved with Vice President Dick Cheney's NEPDG from the perspective of assisting Andrew Lundquist (NEPDG Director) secure some factual information and data on critical power issues. One of the most pressing issues, as you are well aware, is the capacity and reliability of the domestic elctric power transmission grid. The NEPDG will be developing both a "snapshot" of the current energy situation and a longer term report on things that can make a positive difference.

I have taken the liberty of bringing you to Lundquist's attention as a nationally recognized expert in the power grid area. Lundquist is open to receiving a brief white paper (2-4 pages) from you on current grid limitations and weaknessess but more importantly, on what steps can be taken over the next year or two to improve the grid performance. He is very interested in factual data on power loss over distances, technologies like superconducting transmission systems or other more realistic enhancements or regulatory mods that the President can enact through Executive Orders.

If you are possibly interested in responding to this invitation please let me know and I will work with you to get your ideas and data properly submitted.

Hope all is well with you and NERC.

Jerry

Gerald E. Swiggett
President
GIS Enterprises, Inc.
8403 Arlington Blvd., Ste. 100
Fairfax, VA 22031
(703)876-6800/0515 fax

(b)(6)

Preliminary Assessment of Summer 2001 Electricity Supply Conditions February 5, 2001

NERC publishes (May and November) seasonal assessments of the reliability of bulk electricity supply in North America. The Summer 2001 assessment will be published May 15. It will be based on updated supply and demand projections.

The information in this preliminary assessment relies on preliminary information and judgment, and is subject to change when the updated projections come in. As a result, nothing in this report should be publicly attributed to NERC. Also, as a general caveat on any assessment like this, even those areas that are expected to have adequate generation and transmission for the coming summer could experience problems if extraordinary weather or equipment outages occur.

The primary areas of concern for Summer 2001, as we see them now, are:

California and the Pacific Northwest

The California Independent System Operator (CAL-ISO) indicated in November 2000 that 2001 Summer demands could exceed available resources at the time of peak by 253 MW (mild temps) to 4,152 MW (hot temps). These projections include imports of 4,500 MW from outside the ISO, 1,421 MW of new generation, continued operation of CAL-ISO's 44,050 MW of existing generation (except for any generator maintenance outages and deratings due to low water conditions at hydro facilities), and a provision for required operating reserves. (Interruptible demands have not be subtracted from the demand forecast, but that may be academic since all of the hours of interruption allowed under these contracts were used up during the month of January.)

In the northern part of the state, hydro-powered electric generators will be limited by low water levels, as will imports from the Pacific Northwest.

California has an internal transmission constraint that limits how much power can be moved from the southern to northern portions of the state. Therefore, most of the reliability problems are expected to occur in northern California.

The Pacific Northwest is also heavily dependent upon hydro-powered electric generation. Stream flows and reservoir levels are at critically low levels. The key hydro indicator in the Northwest is runoff at the Dalles dam on the Columbia River. Current flow is about 65% of normal, and this will be the 4th worst year on record unless they get heavy spring rains. The Pacific Northwest should be able to meet its own customer demand unless weather is extremely hot, but will not be able to supply California with energy as they typically do.

Southeastern United States

Conditions in the Southeast are expected to be much the same as the last two summers – extremely tight. A number of new generators are planned to be added by the summer. However, there may be problems delivering the energy from some of these generators to the demand centers because the transmission system additions needed to connect these generators into the transmission system are lagging the construction of generators. Some existing generators are scheduled to be out of service this spring for maintenance to add emissions related equipment. This has the potential to reduce available resources at a critical time of the year.

Texas

Texas projects adequate capacity margins, but there are still some causes for concern in the state. Texas forecasts about 8,000 MW of new generation being added for the summer, but about 2,500 MW of this new generation is in an area of West Texas that prevents it from being delivered widely throughout Texas due to limitations in the transmission system. Some of the new generation is on the border between Texas and the southeastern United States and may not be used to serve the customers of Texas.

Texas experienced prolonged, extreme temperatures last summer, which required some generators to run many more hours than normal. This could lead to increased generator breakdowns this summer (like California experienced this winter).

A retail access pilot program is scheduled to commence on June 1, 2001 in Texas, and the ten power system operating centers (Control Areas) will be consolidated into a single center. Because June is a time of heavy electrical demand in Texas, this situation bears careful watching.

The Northeast

The northeastern United States experienced a very cool summer last year. If temperatures had been normal, it is very likely that New York and New England would have experienced serious electricity supply problems. While conditions have improved in this region since last summer, it is still susceptible to shortages if customer demand exceeds expectations due to abnormally hot weather, or if a significant number of generators are unexpectedly out of service.

Last summer, New York City experienced some minor supply shortages due to a lack of sufficient transmission into the city. About 440 MW of new generation will be added in distributed locations around New York City by Summer 2001, which should help alleviate this condition and contribute resources to serving total demand in the state.

Comments on
2/21/draft

To: Joe Kelliher, DOE
586-7210

From: Ray Squitieri, Treasury
622-1301 phone
-1294 fax

Comments on
2/21/draft

To: Joe Kelliher, DOE
586-7210

From: Ray Squitieri, Treasury
622-1301 phone
-1294 fax

Comments on
2/21/draft

To: Joe Kelliher, DOE
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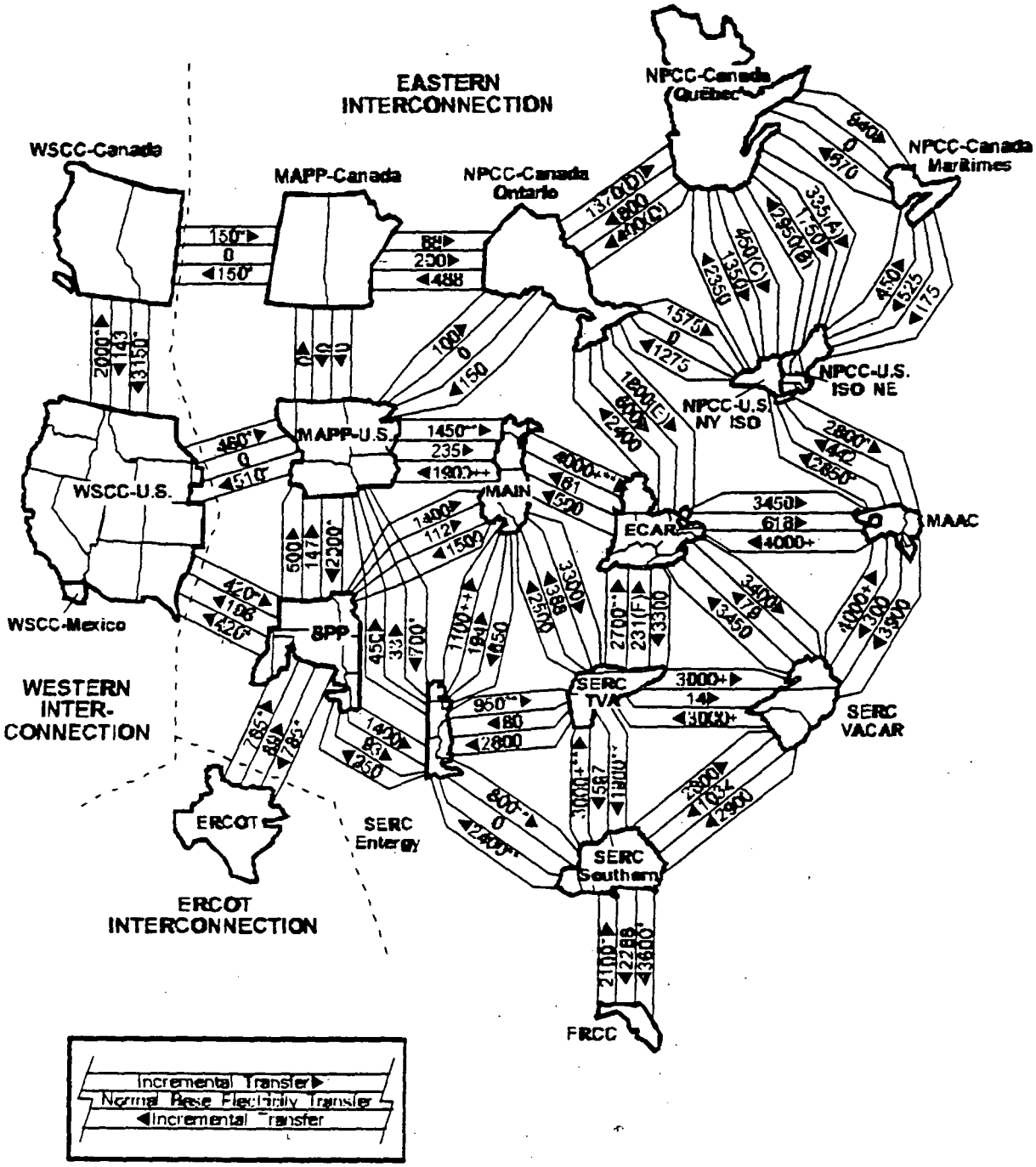
622-1301 phone
-1294 fax

FIGURE 1: NORMAL BASE ELECTRICITY TRANSFERS AND FIRST CONTINGENCY INCREMENTAL TRANSFER CAPABILITIES (NONSIMULTANEOUS), MW



15665

Definitions and Notes to Figure 1

The nonsimultaneous transfer capabilities shown represent the ability of the transmission network to transfer electricity from one area to another for a single demand and generation pattern. Different patterns of demand and generation cause variations in transfer capabilities on a day-to-day (or hour-to-hour) basis. Therefore, the numbers given in this diagram should be considered as representative, rather than definitive. If you would like more information, refer to the interregional studies for this peak demand season.

First Contingency Incremental Transfer Capability (FCITC) is the amount of electricity, incremental above normal base electricity transfers, that can be transferred over the transmission network in a reliable manner, based on the following conditions:

1. With all transmission facilities in service, all facility loadings are within normal ratings and all voltages are within normal limits.

2. The bulk electric system is capable of absorbing the dynamic electric swings and remaining stable following a disturbance resulting in the loss of any single generating unit, transmission circuit, or transformer.

3. After the dynamic swings following a disturbance (resulting in the loss of any single generating unit, transmission circuit, or transformer, but before operator-directed system adjustments are made), all transmission facility loadings are within emergency ratings and all voltages within emergency limits.

First Contingency Total Transfer Capability (FCTTC) is the total amount of electric power (net of normal base power transfers plus first contingency incremental transfers) that can be transferred between two areas of the interconnected transmission systems in a reliable manner based on conditions 1, 2, and 3 in the FCITC definition above.

Specific Diagram Notes

A. The base limit for the Phase II tie HVDC facility between New England and Québec ranges between 1,200 and 1,800 MW, and can be increased when west-to-east transfers in the MAAC Region and New York ISO (NYISO) are below their limits.

   The transfer capability from Québec to New England is expected to total 2,085 MW (60 MW through the Stanstead-Derby tie, 225 MW through Highgate, and 1,800 MW through Phase II).

B. Transfer on the Phase II HVDC facility from New England to Québec is in the range of 700–1,500 MW and is limited by the ability of the New England, New York, or PJM systems to reliably sustain a loss of load contingency or by the ability of the Québec system to reliably sustain a source contingency. The transfer capability from New England to Québec is expected to total 1,250 MW (zero through the Stanstead-Derby tie, 50 MW through Highgate, and 1,200 MW through Phase II).

C. The maximum approved limit for total transfers from Québec to the New York ISO is 1,800 MW. The FCTTC is about 1,800 MW over the Chateauguay-Massena 765 kV interconnection, on which the power flow is controlled by the HVDC facility at Chateauguay and radial generation. However, this limit is highly dependent on internal NYISO schedules and flows through the Central East and Total East NYISO interfaces. The 1,800 MW FCTTC does not include the Hydro-Québec generation that can be radially isolated to the Niagara Mohawk system.

D. Under normal operating conditions, the only transactions between Ontario and Québec consist of isolated demand and generation; there are no synchronous ac ties or HVDC interconnections between the two systems. A maximum of nearly 1,200 MW can be isolated onto the Ontario system by Hydro-Québec, and about 570 MW can be isolated onto the Québec system by Ontario. Under extreme emergencies, on either one of the two systems, additional demands can be transferred to the neighboring system. Thus, an additional 200 MW of Ontario demands can be isolated onto the Québec system and 400 MW of Québec demands can be isolated on to the Ontario system.

E. Transfer capability between NPCC and ECAR assumes 1,500 MW of generation at Ontario's Lambton generating station.

F. Includes 100 MW Big Rivers Electric Corporation to Southern Subregion wheeled through TVA and 50 MW Entergy to Southern Subregion (Oglethorpe Power Corporation) wheeled through TVA.

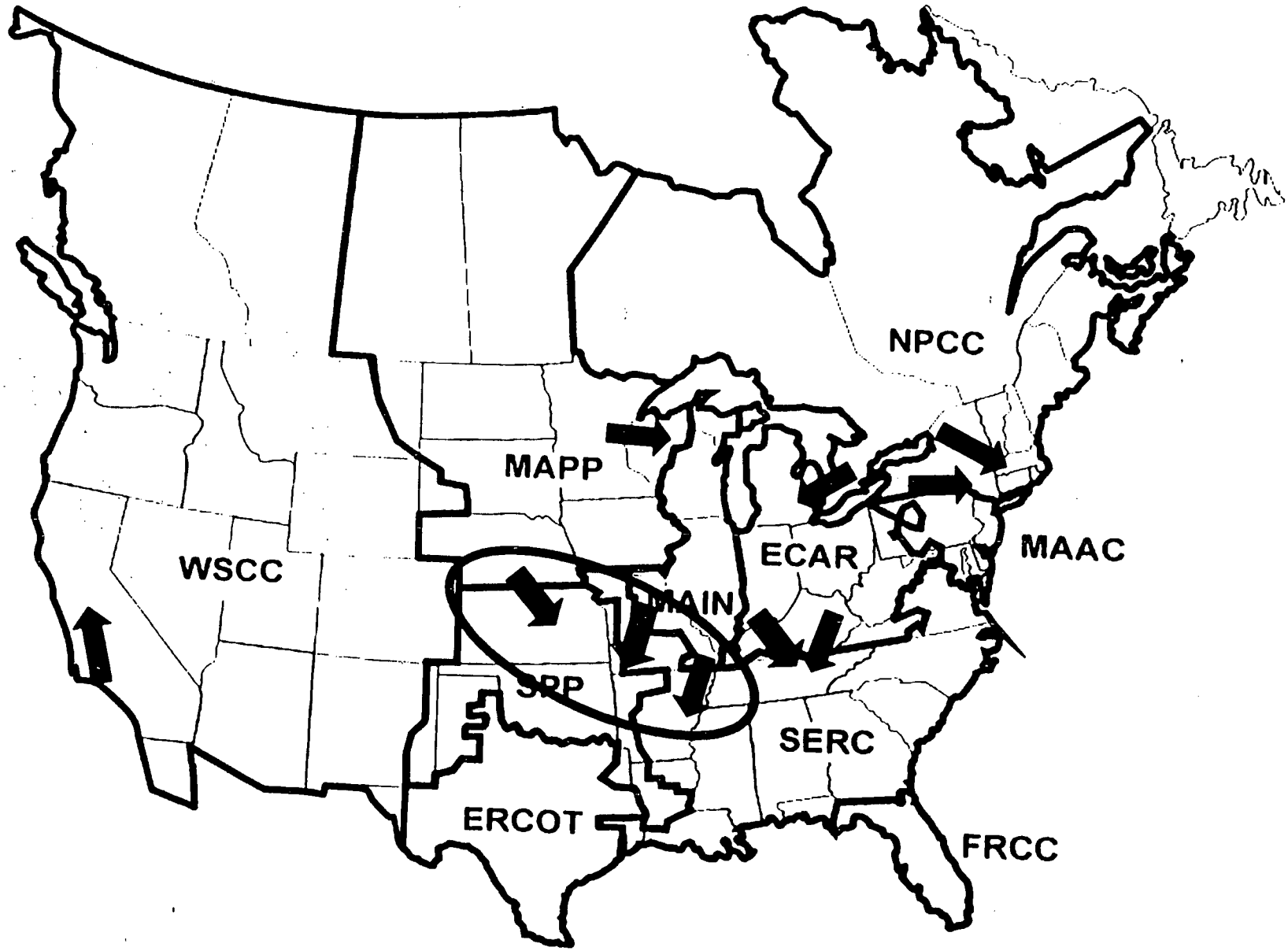
---

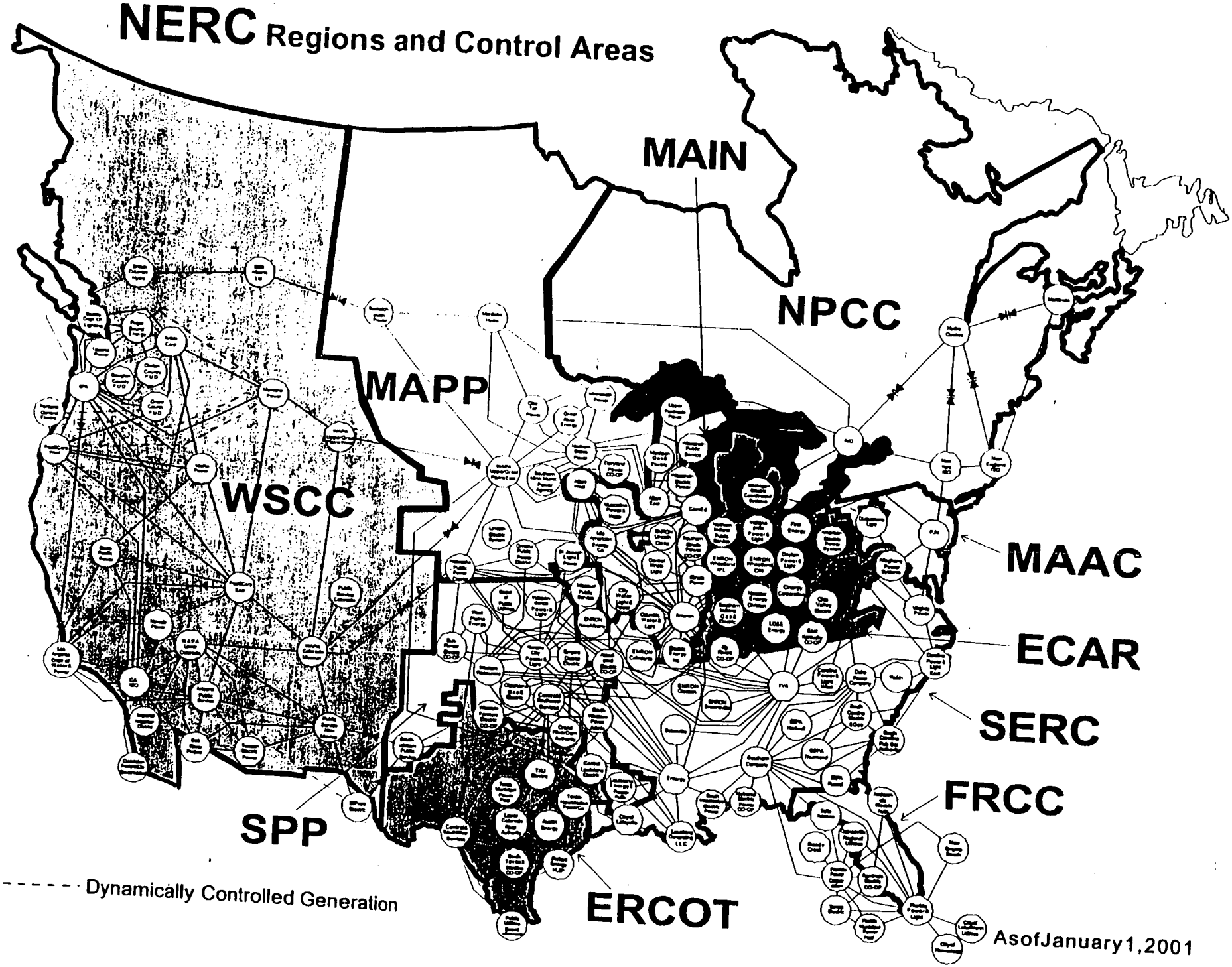
* Indicates that First Contingency Total Transfer Capability is listed.

** Indicates that an operating procedure must be in effect to allow the noted capability to be used.

\+ Indicates no significant transmission limit found at this level.

++ Requires an emergency operation procedure to be in place.




NERC Regions and Control Areas
MAIN
NPCC
MAPP
WSCC
MAAC
ECAR
SERC
FRCC
SPP
ERCOT
Dynamically Controlled Generation
AsofJanuary1,2001

15669

562

b(5)

MaryBeth Zimmerman 03/16/2001 09:28 AM

To: Jerry Dion/EE/DOE@DOE
cc:

Subject: High Performance Buildings

691

Martin, Adrienne

From: Cook, Trevor
Sent: Monday, May 07, 2001 3:26 PM
To: Anderson, Margot
Subject: an additional fact not checked on friday

its in bright pink... the only pink text in the file. No. 73.

Citation Check - NE CH 5.doc

42

Martin, Adrienne

Below

From: Cook, Trevor
Sent: Monday, May 07, 2001 3:30 PM
To: Anderson, Margot
Subject: found an error,...

made a correction in citation No. 58, shown in red and strikethrough.

NE - CitationsCH3.doc

700

Martin, Adrienne

From: KYDES, ANDY
Sent: Monday, May 07, 2001 7:38 PM
To: Anderson, Margot
Subject: FW: More NEP

CH1CITAT.DOC

Chapter 1 additions fact checked.

-----Original Message-----
From: Sitzer, Scott
Sent: Monday, May 07, 2001 4:05 PM
To: Margot Anderson
Cc: Hutzler, Mary; Kydes, Andy
Subject: RE: More NEP

Attached are citations for the two new facts indicated in Chapter 1.

Scott Sitzer
Director, Coal and Electric Power Division
EI-82
Washington, DC 20585
Phone: (202) 586-2308
Fax: (202) 586-1876

16802

DOE NEWS

NEWS MEDIA CONTACT:
Drew Malcomb, 202/586-5806
Jeanne Lopatto/Joe Davis, 202/586-4940

FOR IMMEDIATE RELEASE
March 14, 2001

Clean Coal Technology Burner Sales Top $1 Billion

Commercial Success Shows Benefits of Clean Coal Investment

(Washington, D.C.) The U.S. Department of Energy today announced that sales of a clean coal technology system that reduces the formation of pollutants related to the operation of coal-fired plants now top $1 billion. The advanced, low polluting coal combustion system called the "low-NOx concentric firing system" (LNCFS™), first pioneered in 1992-93 as part of the Clean Coal Technology Program, is rapidly becoming one of the government's fastest growing clean coal technology success stories. Results show the system is reducing nitrogen oxides, NOx, by nearly 40 percent in older coal burning plants.

According to data compiled by the Energy Department's National Energy Technology Laboratory in Morgantown, West Virginia, 56,000 megawatts of electricity are now being generated in the United States by power plants equipped with the high-tech burner.

"Advances in clean coal technology allow us to use America's abundant coal reserves more efficiently and, at the same time, protect the quality of our environment. America's clean coal technology program will be an important part of the Administration's comprehensive national energy plan, along with significant investments for clean coal technologies the President will submit as part of the Administration's budget."

Coal currently accounts for more than 52 percent of the electricity produced in the United States. The Bush Administration's budget proposal will include support for further clean coal technology advances as one of the core features of its energy program.

The advanced coal burner was first tested in the earlier Clean Coal Technology Program. The coal burner reduces the formation of nitrogen oxides, or NOx, one of the air pollutants that contributes to smog, ground-level ozone, and acid rain.

(MORE)

R-01-037

(b)(5)

Table 1.4 Energy Consumption by Source

(Quadrillion Btu)

	Fossil Fuels				Nuclear Electric Power	Hydroelectric Pumped Storage[e]	Renewable Energy[a]					Total[f]
	Coal	Natural Gas[b]	Petroleum[c]	Total[d]			Conventional Hydroelectric Power	Wood, Waste, Alcohol[f]	Geothermal	Solar and Wind	Total	
1973 Total	12.971	22.512	34.840	70.316	0.910	(g)	3.010	1.529	0.043	NA	4.581	R75.808
1974 Total	12.663	21.732	33.455	67.906	1.272	(g)	3.309	1.540	.053	NA	4.902	R74.080
1975 Total	12.663	19.948	32.731	65.355	1.900	(g)	3.219	1.499	.070	NA	4.788	R72.042
1976 Total	13.584	20.345	35.175	69.104	2.111	(g)	3.066	1.713	.078	NA	4.857	R76.072
1977 Total	13.922	19.931	37.122	70.989	2.702	(g)	2.515	1.838	.077	NA	4.431	R78.122
1978 Total	13.766	20.000	37.965	71.856	3.024	(g)	3.141	2.038	.064	NA	5.243	R80.123
1979 Total	15.040	20.666	37.123	72.892	2.776	(g)	3.141	2.152	.084	NA	5.377	R81.044
1980 Total	15.423	20.394	34.202	69.984	2.739	(g)	E3.118	2.485	.110	NA	5.712	R78.435
1981 Total	15.908	19.928	31.931	67.750	3.008	(g)	E3.105	2.590	.123	NA	5.818	R76.569
1982 Total	15.322	18.505	30.231	64.036	3.131	(g)	E3.572	2.615	.105	NA	6.292	R73.440
1983 Total	15.894	17.357	30.054	63.290	3.203	(g)	E3.899	2.831	.129	(s)	6.860	R73.317
1984 Total	17.071	18.507	31.051	66.617	3.553	(g)	E3.800	2.880	.165	(s)	6.845	R76.972
1985 Total	17.478	17.834	30.922	66.221	4.149	(g)	E3.398	E2.864	.198	(s)	6.460	R76.778
1986 Total	17.260	16.708	32.196	66.148	4.471	(g)	E3.446	E2.841	.219	(s)	6.507	R77.065
1987 Total	18.008	17.744	32.865	68.626	4.906	(g)	E3.117	E2.823	.229	(s)	6.170	R79.633
1988 Total	18.846	18.552	34.222	71.660	5.661	(g)	E2.662	E2.937	.217	(s)	5.817	R83.068
1989 Total	[h]18.944	19.384	34.214	72.536	5.677	(g)	2.998	E3.050	.334	.083	6.465	R84.607
1990 Total	19.136	19.296	33.553	71.910	6.162	-.036	3.146	E2.646	.355	.094	6.241	R84.214
1991 Total	18.985	19.606	32.845	71.505	6.580	-.047	3.159	E2.687	.363	.097	6.306	R84.271
1992 Total	19.144	20.131	33.527	72.889	6.608	-.043	2.818	E2.831	.374	.097	6.121	R85.491
1993 Total	19.755	20.827	33.841	74.500	6.520	-.042	3.119	2.791	.387	.102	6.399	R87.281
1994 Total	19.924	21.288	34.670	76.081	6.838	-.035	2.993	2.925	.388	.107	6.414	R89.189
1995 Total	20.016	22.163	34.553	76.915	7.177	-.028	3.481	3.056	.333	.106	6.976	R90.924
1996 Total	20.940	22.559	35.757	79.388	7.168	-.032	3.892	3.114	.346	.110	7.461	R93.902
1997 Total	21.444	22.530	36.266	80.395	6.678	-.042	3.961	2.991	.322	.107	7.382	R94.307
1998 January	1.874	2.476	3.045	7.404	.615	(s)	.312	E.256	E.029	E.009	.606	R8.614
February	1.651	2.177	2.743	6.576	.542	.001	.321	E.230	E.025	E.008	.585	R7.694
March	1.712	2.189	3.098	7.006	.571	(s)	.342	E.255	E.029	E.009	.635	R8.201
April	1.595	1.758	3.056	6.420	.505	-.005	.315	E.246	E.025	E.009	.595	R7.506
May	1.726	1.547	3.047	6.326	.547	-.008	.358	E.253	E.025	E.009	.645	R7.503
June	1.852	1.507	3.078	6.450	.592	-.007	.351	E.245	E.025	E.009	.630	R7.657
July	2.023	1.621	3.228	6.887	.653	-.007	.324	E.254	E.028	E.009	.615	R8.140
August	2.027	1.632	3.208	6.891	.641	-.007	.294	E.255	E.029	E.009	.586	R8.101
September	1.842	1.517	3.032	6.403	.608	-.003	.240	E.247	E.028	E.009	.524	R7.522
October	1.755	1.528	3.182	6.472	.610	-.005	.215	E.256	E.030	E.009	.510	R7.576
November	1.672	1.771	2.996	6.442	.609	-.005	.221	E.247	E.028	E.009	.505	R7.541
December	1.838	2.195	3.220	7.257	.664	(s)	.275	E.258	E.028	E.009	.570	R8.478
Total	21.569	21.921	36.934	80.539	7.157	-.046	3.569	3.003	.328	.104	7.005	R94.537
1999 January	1.868	2.610	3.143	7.627	.695	-.006	.308	E.299	E.027	E.007	.641	R8.947
February	1.627	2.195	2.850	6.675	.608	-.004	.303	E.267	E.024	E.007	.602	R7.872
March	1.699	2.237	3.220	7.164	.622	-.004	.339	E.293	E.027	E.008	.667	R8.440
April	1.627	1.845	3.061	6.550	.513	-.005	.304	E.286	E.026	E.009	.625	R7.675
May	1.695	1.554	3.090	6.349	.593	-.007	.320	E.294	E.028	E.012	.654	R7.580
June	1.833	1.472	3.171	6.485	.659	-.006	.330	E.286	E.033	E.011	.660	R7.788
July	2.061	1.578	3.274	6.924	.710	-.006	.322	E.296	E.035	E.012	.665	R8.286
August	2.011	1.622	3.319	6.968	.725	-.008	.284	E.296	E.036	E.011	.627	R8.303
September	1.815	1.504	3.114	6.449	.648	-.004	.245	E.288	E.035	E.009	.577	R7.661
October	1.745	1.627	3.282	6.667	.591	-.005	.232	E.295	E.036	E.008	.571	R7.813
November	1.708	1.767	3.051	6.547	.645	-.005	.244	E.287	E.033	E.007	.572	R7.748
December	1.871	2.272	3.386	7.545	.72	-.004	.282	E.298	E.033	E.008	.621	R8.875
Total	21.560	22.289	37.960	81.957	7.731	-.064	3.513	3.486	.374	.110	7.483	R96.991
2000 January	1.957	2.586	3.071	7.628	.723	-.005	.275	E.308	E.027	E.009	.619	R8.953
February	1.778	2.411	2.981	7.190	.655	-.005	.249	E.286	E.023	E.008	.566	R8.397
March	1.750	2.119	3.149	7.033	.643	-.006	.288	E.305	E.023	E.009	.626	R8.284
April	1.590	1.839	2.971	6.415	.598	-.004	.305	E.297	E.024	E.011	.638	R7.636
May	1.720	1.701	3.195	6.634	.653	-.005	.301	E.303	E.025	E.012	.641	R7.911
June	1.867	1.569	3.170	6.620	.686	-.006	.278	E.290	E.026	E.010	.604	R7.898
July	R1.952	1.608	3.235	6.811	.735	-.003	.270	E.311	E.028	E.010	.619	R8.149
August	R2.057	R1.695	3.340	7.122	.722	-.004	.265	E.309	E.028	E.009	.611	R8.439
September	R1.837	R1.501	3.155	6.512	.654	-.006	.206	E.298	E.027	E.009	.541	R7.688
October	1.812	F1.599	3.254	6.677	.587	-.004	.188	E.311	E.028	E.010	.537	7.784
10-Month Total	18.320	E18.628	31.522	68.642	6.655	-.048	2.625	E3.019	E.260	E.098	6.002	81.139
1999 10-Month Total	17.980	18.243	31.523	67.860	6.364	-.055	2.987	E2.900	E.307	E.094	6.289	80.363
1998 10-Month Total	18.058	17.950	30.717	66.834	5.883	-.041	3.073	E2.498	E.272	E.087	5.930	78.513

[a] End-use consumption, electric utility and nonutility electricity net generation, and net imports of electricity.

[b] Includes supplemental gaseous fuels.

[c] Petroleum products supplied, including natural gas plant liquids and crude oil burned as fuel.

[d] Includes coal coke net imports and electricity net imports from fossil fuels. See Table 1.5.

[e] Pumped storage facility production minus energy used for pumping.

[f] Alcohol (ethanol blended into motor gasoline) is included in both "Petroleum" and "Alcohol," but is counted only once in total energy consumption.

[g] Included in conventional hydroelectric power.

[h] Beginning in 1989, includes coal consumed by "Other Power Producers." See Table 6.2.

[i] Beginning in 1989, includes electricity generated by nonutility nuclear units.

R=Revised. NA=Not available. E=Estimate. F=Forecast. (s)=Less than +0.5 trillion Btu and greater than -0.5 trillion Btu.

Notes: • See Note 2 at end of section. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 States and the District of Columbia.

Sources: • Coal: Tables 6.1 and A5. • Natural Gas: Tables 4.1 and A4. • Petroleum: Tables 3.1a and A3. • Nuclear Electric Power: Tables 8.1 and A6. • Hydroelectric Pumped Storage: Tables 7.2 and A6. • Renewable Energy: Table E1.

1 This table is redesigned to incorporate additional renewable energy data. See Appendix E for further information.

19984

Table 1.3 Energy Production by Source

(Quadrillion Btu)

	Fossil Fuels							Renewable Energy[a]					
	Coal	Natural Gas (Dry)	Crude Oil[b]	Natural Gas Plant Liquids	Total	Nuclear Electric Power	Hydroelectric Pumped Storage[c]	Conventional Hydroelectric Power	Wood, Waste, Alcohol[d]	Geothermal	Solar and Wind	Total	Total
1973 Total	13.992	22.187	19.493	2.569	58.241	0.910	(e)	2.861	1.529	0.043	NA	4.433	R 63.585
1974 Total	14.074	21.210	18.575	2.471	56.331	1.272	(e)	3.177	1.540	.053	NA	4.769	R 62.372
1975 Total	14.989	19.640	17.729	2.374	54.733	1.900	(e)	3.155	1.499	.070	NA	4.723	R 61.357
1976 Total	15.654	19.480	17.262	2.327	54.723	2.111	(e)	2.976	1.713	.078	NA	4.768	R 61.602
1977 Total	15.755	19.565	17.454	2.327	55.101	2.702	(e)	2.333	1.838	.077	NA	4.249	R 62.052
1978 Total	14.910	19.485	18.434	2.245	55.074	3.024	(e)	2.937	2.038	.064	NA	5.039	R 63.137
1979 Total	17.540	20.076	18.104	2.286	58.006	2.776	(e)	2.931	2.152	.084	NA	5.166	R 65.948
1980 Total	18.598	19.908	18.249	2.254	59.008	2.739	(e)	E 2.900	2.485	.110	NA	5.494	R 67.241
1981 Total	18.377	19.699	18.146	2.307	58.529	3.008	(e)	E 2.758	2.590	.123	NA	5.471	R 67.007
1982 Total	18.639	18.319	18.309	2.191	57.458	3.131	(e)	E 3.266	2.615	.105	NA	5.985	R 66.574
1983 Total	17.247	16.593	18.392	2.184	54.416	3.203	(e)	E 3.527	2.831	.129	(s)	6.488	R 64.106
1984 Total	19.719	18.008	18.848	2.274	58.849	3.553	(e)	E 3.386	2.880	.165	(s)	6.431	R 68.832
1985 Total	19.325	16.980	18.992	2.241	57.539	4.149	(e)	E 2.970	E 2.864	.198	(s)	6.033	R 67.720
1986 Total	19.509	16.541	18.376	2.149	56.575	4.471	(e)	E 3.071	E 2.841	.219	(s)	6.132	R 67.178
1987 Total	20.141	17.136	17.675	2.215	57.167	4.906	(e)	E 2.635	E 2.823	.229	(s)	5.687	R 67.760
1988 Total	20.738	17.599	17.279	2.260	57.875	5.661	(e)	E 2.334	E 2.937	.217	(s)	5.489	R 69.025
1989 Total	21.346	17.847	16.117	2.158	57.468	[f]5.677	(e)	2.855	E 3.050	.323	.083	6.311	R 69.457
1990 Total	22.456	18.362	15.571	2.175	58.564	6.162	-.036	3.048	E 2.646	.343	.094	6.132	R 70.822
1991 Total	21.594	18.229	15.701	2.306	57.829	6.580	-.047	3.021	E 2.687	.348	.097	6.153	R 70.515
1992 Total	21.629	18.375	15.223	2.363	57.590	6.608	-.043	2.617	E 2.831	.355	.097	5.901	R 70.056
1993 Total	20.249	18.584	14.494	2.408	55.736	6.520	-.042	2.892	2.791	.369	.102	6.153	R 68.367
1994 Total	22.111	19.348	14.103	2.391	57.952	6.838	-.035	2.684	2.925	.364	.107	6.080	R 70.836
1995 Total	22.029	19.101	13.887	2.442	57.458	7.177	-.028	3.207	3.056	.314	.106	6.683	R 71.291
1996 Total	22.684	19.363	13.723	2.530	58.299	7.168	-.032	3.593	3.114	.332	.110	7.148	R 72.583
1997 Total	23.211	19.394	13.658	2.495	58.758	6.678	-.042	3.718	2.991	.322	.107	7.138	R 72.532
1998 January	2.081	1.688	1.176	.211	5.156	.615	(s)	E .298	E .256	E .029	E .009	.591	R 6.362
February	1.850	1.493	1.052	.196	4.591	.542	.001	E .308	E .230	E .025	E .008	.571	R 5.705
March	2.042	1.669	1.152	.217	5.079	.571	(s)	E .326	E .255	E .029	E .009	.619	R 6.266
April	1.955	1.610	1.128	.211	4.904	.505	-.005	E .295	E .246	E .025	E .009	.574	R 5.979
May	1.926	1.674	1.141	.214	4.956	.547	-.008	E .341	E .253	E .025	E .009	.627	R 6.123
June	1.962	1.604	1.091	.198	4.854	.592	-.007	E .332	E .245	E .025	E .009	.611	R 6.051
July	1.931	1.636	1.114	.185	4.865	.653	-.007	E .296	E .254	E .028	E .009	.587	R 6.099
August	1.944	1.647	1.115	.201	4.908	.641	-.007	E .261	E .255	E .029	E .009	.553	R 6.095
September	2.034	1.499	1.007	.194	4.735	.608	-.003	E .218	E .247	E .028	E .009	.502	R 5.841
October	2.063	1.620	1.104	.204	4.991	.610	-.005	E .199	E .256	E .030	E .009	.494	R 6.090
November	1.920	1.562	1.068	.200	4.750	.609	-.005	E .210	E .247	E .028	E .009	.494	R 5.847
December	2.011	1.586	1.087	.189	4.872	.664	(s)	E .262	E .258	E .028	E .009	.557	R 6.093
Total	23.719	19.288	13.235	2.420	58.662	7.157	-.046	3.345	3.003	.327	.104	6.780	R 72.553
1999 January	R 1.942	1.653	1.072	.192	4.859	.695	-.006	.301	E .299	E .027	E .007	.635	R 6.183
February	R 1.966	1.494	.969	.181	4.609	.608	-.004	.297	E .267	E .024	E .007	.596	R 5.809
March	R 2.099	1.660	1.058	.207	5.024	.622	-.004	.332	E .293	E .027	E .008	.661	R 6.303
April	R 1.906	1.581	1.024	.203	4.714	.513	-.005	.286	E .286	E .025	E .009	.607	R 5.829
May	R 1.818	1.617	1.056	.208	4.699	.593	-.007	.302	E .294	E .028	E .012	.636	R 5.921
June	R 1.930	1.576	1.002	.210	4.720	.659	-.006	.312	E .286	E .032	E .011	.642	R 6.014
July	R 1.876	1.623	1.042	.221	4.764	.710	-.006	.304	E .296	E .035	E .012	.647	R 6.114
August	R 1.982	1.611	1.039	.217	4.849	.725	-.008	.264	E .296	E .036	E .011	.607	R 6.174
September	R 1.975	1.556	1.010	.215	4.756	.648	-.004	.218	E .288	E .035	E .009	.550	R 5.950
October	R 1.924	1.613	1.069	.227	4.833	.591	-.005	.209	E .295	E .036	E .008	.548	R 5.966
November	R 1.961	1.563	1.037	.219	4.780	.645	-.005	.220	E .287	E .033	E .007	.548	R 5.968
December	R 1.971	1.579	1.071	.227	4.848	.727	-.004	.261	E .298	E .033	E .008	.601	R 6.171
Total	R 23.351	19.126	12.451	2.528	57.456	7.736	-.064	3.306	3.486	.374	.110	7.275	R 72.404
2000 January	1.857	E 1.611	E 1.049	.225	4.742	.723	-.005	.254	E .308	E .027	E .009	.598	R 6.057
February	1.849	E 1.519	E .991	.215	4.574	.655	-.005	.226	E .286	E .023	E .008	.543	R 5.768
March	2.110	E 1.646	E 1.056	.230	5.042	.643	-.006	.269	E .305	E .023	E .009	.607	R 6.286
April	1.732	E 1.558	E 1.018	.221	4.529	.598	-.004	.287	E .297	E .024	E .011	.620	R 5.742
May	1.879	E 1.615	E 1.049	.225	4.768	.653	-.005	.279	E .303	E .025	E .012	.620	R 6.036
June	1.918	E 1.581	E 1.013	.216	4.728	.686	-.006	.256	E .290	E .026	E .010	.582	R 5.990
July	R 1.814	E 1.620	E 1.041	.223	4.699	.735	-.003	.244	E .311	E .028	E .010	.593	R 6.023
August	R 2.071	RE 1.656	E 1.045	.226	4.998	.722	-.004	.224	E .309	E .028	E .009	.571	R 6.286
September	R 1.911	E 1.587	E 1.003	.216	4.718	.654	-.006	.182	E .298	E .027	E .009	.516	R 5.882
October	2.058	E 1.637	E 1.046	.223	4.964	.587	-.004	.175	E .311	E .028	E .010	.524	6.071
10-Month Total	19.199	E 16.030	E 10.312	2.220	47.762	6.655	-.048	2.397	E 3.019	E .259	E .098	5.773	60.142
1999 10-Month Total	19.419	15.984	10.343	2.082	47.828	6.364	-.055	2.825	E 2.900	E .307	E .094	6.127	60.264
1998 10-Month Total	19.788	16.140	11.080	2.031	49.040	5.883	-.041	E 2.873	E 2.498	E .272	E .087	5.730	60.612

[a] End-use consumption, and electric utility and nonutility electricity net generation.

[b] Includes lease condensate.

[c] Pumped storage facility production minus energy used for pumping.

[d] Ethanol blended into motor gasoline.

[e] Included in conventional hydroelectric power.

[f] Beginning in 1989, includes electricity generated by nonutility nuclear units.

R=Revised. NA=Not available. E=Estimate. (s)=Less than +0.5 trillion Btu and greater than -0.5 trillion Btu.

Notes: • See Note 1 at end of section. • Totals may not equal sum of components due to independent rounding. • Geographic coverage is the 50 States and the District of Columbia.

Sources: • **Coal:** Tables 6.1 and A5. • **Natural Gas (Dry):** Tables 4.1 and A4. • **Crude Oil and Natural Gas Plant Liquids:** Tables 3.1a and A2. • **Nuclear Electric Power:** Tables 8.1 and A6. • **Hydroelectric Pumped Storage:** Tables 7.2 and A6. • **Renewable Energy:** Tables E2, E3a, and E3b.

This table is redesigned to incorporate additional renewable energy data. See Appendix E for further information.

19985

Table 1.1 Energy Overview, 1949-1999

(Quadrillion Btu)

Year	Production				Imports		Exports		Adjustments [8]	Consumption			
	Fossil Fuels [1]	Nuclear Electric Power [2]	Renewable Energy [3]	Total [4]	Petroleum [5]	Total [6]	Coal	Total [7]		Fossil Fuels [9]	Nuclear Electric Power [2]	Renewable Energy [3]	Total [10]
1949	28.75	0	2.97	31.72	1.43	1.47	0.88	1.59	0.40	29.00	0	3.00	32.00
1950	32.56	0	2.98	35.54	1.89	1.93	0.79	1.47	-1.37	31.63	0	3.00	34.63
1951	35.79	0	2.96	38.75	1.87	1.92	1.68	2.62	-1.05	34.01	0	2.99	37.00
1952	34.98	0	2.94	37.92	2.11	2.17	1.40	2.37	-0.95	33.80	0	2.97	36.77
1953	35.35	0	2.83	38.18	2.28	2.34	0.98	1.87	-0.96	34.83	0	2.86	37.68
1954	33.76	0	2.75	36.52	2.32	2.37	0.91	1.70	-0.53	33.88	0	2.78	36.66
1955	37.36	0	2.78	40.15	2.75	2.83	1.46	2.29	-0.44	37.41	0	2.83	40.24
1956	39.77	0	2.85	42.62	3.17	3.25	1.98	2.95	-1.13	38.89	0	2.90	41.79
1957	40.13	(s)	2.85	42.98	3.46	3.57	2.17	3.45	-1.29	38.93	(s)	2.89	41.82
1958	37.22	(s)	2.92	40.13	3.72	3.92	1.42	2.06	-0.32	38.72	(s)	2.95	41.67
1959	39.05	(s)	2.90	41.95	3.91	4.11	1.05	1.54	-1.03	40.55	(s)	2.94	43.49
1960	39.87	0.01	2.93	42.80	4.00	4.23	1.02	1.48	-0.43	42.14	0.01	2.98	45.12
1961	40.31	0.02	2.95	43.28	4.19	4.46	0.98	1.38	-0.60	42.76	0.02	2.98	45.76
1962	41.73	0.03	3.12	44.88	4.56	5.01	1.08	1.48	-0.57	44.68	0.03	3.12	47.83
1963	44.04	0.04	3.10	47.17	4.65	5.10	1.36	1.85	-0.78	46.51	0.04	3.10	49.65
1964	45.79	0.04	3.23	49.06	4.96	5.49	1.34	1.84	-0.87	48.54	0.04	3.25	51.83
1965	47.23	0.04	3.40	50.68	5.40	5.92	1.38	1.85	-0.72	50.58	0.04	3.40	54.02
1966	50.04	0.06	3.43	53.53	5.63	6.18	1.35	1.85	-0.83	53.51	0.06	3.45	57.02
1967	52.60	0.09	3.69	56.38	5.56	6.19	1.35	2.15	-1.52	55.13	0.09	3.69	58.91
1968	54.31	0.14	3.78	58.23	6.21	6.93	1.38	2.03	-0.71	58.50	0.14	3.77	62.41
1969	56.29	0.15	4.10	60.54	6.90	7.71	1.53	2.15	-0.47	61.36	0.15	4.11	65.63
1970	59.19	0.24	R4.07	63.50	7.47	8.39	1.94	2.66	-1.37	63.52	0.24	R4.09	67.86
1971	58.04	0.41	4.27	62.72	8.54	9.58	1.55	2.18	-0.82	64.60	0.41	R4.30	69.31
1972	58.94	0.58	4.40	63.92	10.30	11.46	1.53	2.14	-0.48	67.70	0.58	4.48	72.76
1973	58.24	0.91	4.43	63.58	13.47	14.73	1.43	2.05	-0.46	70.32	0.91	4.58	75.81
1974	56.33	1.27	4.77	62.37	13.13	14.41	1.62	2.22	-0.48	67.91	1.27	4.90	74.08
1975	54.73	1.90	4.72	R61.35	12.95	14.11	1.76	2.36	-1.07	65.35	1.90	4.79	72.04
1976	54.72	2.11	4.77	61.60	15.67	16.84	1.60	2.19	-0.18	69.10	2.11	4.86	76.07
1977	55.10	2.70	4.25	62.05	18.76	20.09	1.44	2.07	-1.95	70.99	2.70	4.43	78.12
1978	55.07	3.02	5.04	63.14	17.82	19.25	1.08	1.93	-0.34	71.86	3.02	5.24	80.12
1979	58.01	2.78	R5.16	65.95	17.93	19.62	1.75	2.87	-1.65	72.89	2.78	R5.37	81.04
1980	59.01	2.74	5.49	67.24	14.66	15.97	2.42	3.72	-1.05	69.98	2.74	5.71	R78.43
1981	58.53	3.01	5.47	67.01	12.64	13.97	2.94	4.33	-0.08	67.75	3.01	5.82	76.57
1982	57.46	3.13	5.99	R66.57	10.78	12.09	2.79	4.63	-0.59	64.04	3.13	6.29	73.44
1983	54.42	3.20	6.49	64.11	10.65	12.03	2.04	3.72	0.90	63.29	3.20	6.86	73.32
1984	58.85	3.55	6.43	68.83	11.43	12.77	2.15	3.80	-0.82	66.62	3.55	6.84	76.97
1985	57.54	4.15	R6.03	R67.72	10.61	12.10	2.44	4.23	1.19	66.22	4.15	R6.46	R76.78
1986	56.58	4.47	R6.13	R67.18	13.20	14.44	2.25	4.06	-0.50	66.15	4.47	R6.51	R77.08
1987	57.17	4.91	R5.69	R67.76	14.16	15.76	2.09	3.85	-0.04	68.63	4.91	R6.17	R79.63
1988	57.87	5.66	R5.49	R69.03	15.75	17.56	2.50	4.42	0.89	71.66	5.66	R5.82	R83.07
1989	57.47	5.68	R,11 6.32	R,11 69.46	17.16	18.96	2.64	4.77	0.94	72.55	5.68	R,11 6.47	R,11 84.59
1990	58.56	6.16	R6.16	R70.85	17.12	R18.95	2.77	R4.87	-0.75	71.96	6.16	R6.26	R84.19
1991	57.83	6.58	R6.15	R70.51	18.35	R18.50	2.85	R5.16	0.21	71.23	6.58	R6.37	R84.06
1992	57.59	6.61	R5.90	R70.06	16.97	R19.58	2.68	R4.96	0.83	R72.85	6.61	R6.17	R85.51
1993	55.74	6.52	6.15	68.37	18.51	R21.50	1.96	R4.28	R1.73	R74.47	6.52	R6.42	87.31
1994	57.95	6.84	6.08	R70.83	R19.24	R22.73	1.88	R4.08	R-0.25	R75.98	6.84	6.39	R89.23
1995	57.46	7.18	6.68	71.29	18.86	R22.54	2.32	R4.54	R1.65	R76.80	7.18	R6.96	R90.94
1996	R58.30	7.17	7.15	R72.58	20.27	R23.99	2.37	R4.66	R1.99	R79.28	7.17	7.48	R93.91
1997	58.76	6.68	R7.14	R72.53	R21.74	R25.52	2.19	R4.57	R0.84	R80.29	6.68	R7.36	R94.32
1998	R58.66	7.16	R6.78	R72.55	R22.91	R26.86	R2.05	R4.34	R-0.49	R80.51	7.16	R6.98	R94.57
1999P	57.67	7.73	7.18	72.52	22.53	26.92	1.53	3.82	0.98	81.56	7.73	7.37	96.60

[1] Coal, natural gas (dry), crude oil, and natural gas plant liquids.
[2] See Note 1 at end of section.
[3] Conventional hydroelectric power, geothermal, wood, waste, ethanol blended into motor gasoline, solar, and wind.
[4] Also includes hydroelectric pumped storage.
[5] Crude oil and petroleum products.
[6] Also includes natural gas, coal, coal coke, and electricity.
[7] Also includes natural gas, petroleum, electricity, and coal coke.
[8] A balancing item. Includes stock changes, losses, gains, miscellaneous blending components, and unaccounted-for supply.
[9] Coal, coal coke net imports, natural gas, and petroleum.
[10] From 1989, includes net imported electricity from nonrenewable sources and hydroelectric pumped storage, and removes ethanol blended into motor gasoline, which would otherwise be double counted in both fossil fuels and renewable energy.
[11] There is a discontinuity in this time series between 1988 and 1989 due to the expanded coverage of renewable energy beginning in 1989. See Tables 10.1 and 10.2.

R=Revised. P=Preliminary. (s)=Less than 0.005 quadrillion Btu.
Note: Totals may not equal sum of components due to independent rounding.
Sources: See end of section.

Table 1.2 Energy Production by Source, 1949-1999

(Quadrillion Btu)

Year	Fossil Fuels					Nuclear Electric Power [2]	Hydroelectric Pumped Storage [3]	Renewable Energy						Total
	Coal	Natural Gas (Dry)	Crude Oil [1]	Natural Gas Plant Liquids	Total Fossil Fuels			Conventional Hydroelectric Power	Geothermal	Wood and Waste [4]	Solar	Wind	Total Renewable Energy	
1949	11.974	5.377	10.683	0.714	28.748	0	(5)	1.425	0	1.549	0	0	2.974	31.722
1950	14.060	6.233	11.447	0.823	32.563	0	(5)	1.415	0	1.562	0	0	2.978	35.540
1951	14.419	7.416	13.037	0.920	35.792	0	(5)	1.424	0	1.535	0	0	2.958	38.751
1952	12.734	7.964	13.281	0.998	34.977	0	(5)	1.466	0	1.474	0	0	2.940	37.917
1953	12.278	8.339	13.671	1.062	35.349	0	(5)	1.413	0	1.419	0	0	2.831	38.181
1954	10.542	8.682	13.427	1.113	33.764	0	(5)	1.360	0	1.394	0	0	2.754	36.518
1955	12.370	9.345	14.410	1.240	37.364	0	(5)	1.360	0	1.424	0	0	2.784	40.148
1956	13.306	10.002	15.180	1.283	39.771	0	(5)	1.435	0	1.416	0	0	2.851	42.622
1957	13.061	10.605	15.178	1.289	40.133	(s)	(5)	1.516	0	1.334	0	0	2.849	42.983
1958	10.783	10.942	14.204	1.287	37.216	0.002	(5)	1.592	0	1.323	0	0	2.915	40.133
1959	10.778	11.952	14.933	1.383	39.045	0.002	(5)	1.548	0	1.353	0	0	2.901	41.949
1960	10.817	12.656	14.935	1.461	39.869	0.006	(5)	1.608	0.001	1.320	0	NA	2.929	42.804
1961	10.447	13.105	15.206	1.549	40.307	0.020	(5)	1.656	0.002	1.295	0	NA	2.953	43.280
1962	10.901	13.717	15.522	1.593	41.732	0.026	(5)	1.816	0.002	1.300	0	NA	3.119	44.877
1963	11.849	14.513	15.966	1.709	44.037	0.038	(5)	1.771	0.004	1.323	0	NA	3.098	47.174
1964	12.524	15.298	16.164	1.803	45.789	0.040	(5)	1.986	0.005	1.337	0	NA	3.228	49.056
1965	13.055	15.775	16.521	1.883	47.235	0.043	(5)	2.059	0.004	1.335	0	NA	3.398	50.676
1966	13.468	17.011	17.561	1.998	50.035	0.064	(5)	2.062	0.004	1.369	0	NA	3.435	53.534
1967	13.825	17.943	18.651	2.177	52.597	0.088	(5)	2.347	0.007	1.340	0	NA	3.694	56.379
1968	13.609	19.068	19.308	2.321	54.306	0.142	(5)	2.349	0.009	1.419	0	NA	3.778	58.225
1969	13.863	20.446	19.556	2.420	56.286	0.154	(5)	2.648	0.013	1.440	0	NA	4.102	60.541
1970	14.607	21.668	20.401	2.512	59.186	0.239	(5)	2.634	0.011	R1.429	0	NA	R4.074	R63.499
1971	13.186	22.280	20.033	2.544	58.042	0.413	(5)	2.824	0.012	R1.430	0	NA	R4.266	R62.721
1972	14.092	22.208	20.041	2.598	58.938	0.584	(5)	2.864	0.031	R1.501	0	NA	R4.396	R63.918
1973	13.992	22.187	19.493	2.569	58.241	0.910	(5)	2.861	0.043	R1.527	0	NA	R4.431	R63.583
1974	14.074	21.210	18.575	2.471	56.331	1.272	(5)	3.177	0.053	R1.538	0	NA	R4.767	R62.370
1975	14.989	19.640	17.729	2.374	54.733	1.900	(5)	3.155	0.070	R1.497	0	NA	R4.722	R61.355
1976	15.654	19.480	17.262	2.327	54.723	2.111	(5)	2.976	0.078	R1.711	0	NA	R4.766	R61.600
1977	15.755	19.565	17.454	2.327	55.101	2.702	(5)	2.333	0.077	R1.837	0	NA	R4.247	R62.050
1978	14.910	19.485	18.434	2.245	55.074	3.024	(5)	2.937	0.064	R2.036	0	NA	R5.037	R63.136
1979	17.540	20.076	18.104	2.286	58.006	2.776	(5)	2.931	0.084	R2.150	0	NA	R5.164	R65.946
1980	18.598	19.908	18.249	2.254	59.008	2.739	(5)	2.900	0.110	R2.483	0	NA	R5.493	R67.240
1981	18.377	19.699	18.146	2.307	58.529	3.008	(5)	2.758	0.123	2.590	0	NA	5.471	67.007
1982	18.639	18.319	18.309	2.191	57.458	3.131	(5)	3.266	0.105	R2.615	0	NA	R5.985	R66.574
1983	17.247	16.593	18.392	2.184	54.416	3.203	(5)	3.527	0.129	2.831	0	(s)	6.488	64.106
1984	19.719	18.008	18.848	2.274	58.849	3.553	(5)	3.386	0.165	2.880	0	(s)	6.431	68.832
1985	19.325	16.980	18.992	2.241	57.539	4.149	(5)	2.970	0.198	R,6 2.862	0	(s)	R,6 6.030	R,6 67.718
1986	19.509	16.541	18.376	2.149	56.575	4.471	(5)	3.071	0.219	R,6 2.840	0	(s)	R,6 6.131	R,6 67.177
1987	20.141	17.136	17.675	2.215	57.167	4.906	(5)	2.635	0.229	R2.822	0	(s)	R5.688	R67.759
1988	20.738	17.599	17.279	2.260	57.875	5.661	(5)	2.334	0.217	R,6 2.940	0	(s)	R,6 5.491	R,6 69.028
1989	21.346	17.847	16.117	2.158	57.468	5.677	(5)	R,7 2.856	R,7 0.327	R,7 3.050	R,7 0.059	R,7 0.024	R,7 6.316	R,7 69.461
1990	22.456	18.362	15.571	2.175	58.564	R6.162	-0.036	R,8 3.049	R0.348	R2.665	0.063	R0.032	R6.157	R70.847
1991	21.594	18.229	15.701	2.306	57.829	R6.580	-0.047	R3.022	R0.353	R2.679	0.066	R0.032	R6.152	R70.513
1992	21.629	18.375	15.223	2.363	57.590	R6.608	-0.043	2.618	0.361	R2.826	0.068	0.030	R5.903	R70.058
1993	20.249	18.584	14.494	2.408	55.736	R6.520	-0.042	2.893	0.375	R2.782	0.071	0.031	R6.152	R68.366
1994	22.111	19.348	14.103	2.391	57.952	R6.838	-0.035	2.685	0.370	R2.914	0.072	0.036	R6.077	R70.833
1995	22.029	19.101	13.887	2.442	57.458	7.177	-0.028	3.209	0.321	R3.044	0.073	0.033	R6.679	R71.287
1996	22.684	R19.363	13.723	2.530	R58.299	7.168	-0.032	R3.594	0.339	R3.104	0.075	0.035	R7.147	R72.582
1997	23.211	19.394	13.658	2.495	58.758	6.678	-0.042	R3.720	R0.327	R2.982	0.074	R0.034	R7.138	R72.532
1998	R23.719	R19.288	R13.235	R2.420	R58.662	7.157	-0.046	R3.347	R0.334	R2.991	0.074	R0.031	R6.778	R72.550
1999P	23.328	19.295	12.544	2.506	57.673	7.733	-0.063	3.226	0.327	3.514	0.076	0.038	7.181	72.523

[1] Includes lease condensate.
[2] See Note 1 at end of section.
[3] Represents total pumped storage facility production minus energy used for pumping.
[4] Values are estimated. For all years, includes wood consumption in all sectors (see Table 10.4). Beginning in 1970, includes electric utility waste consumption (see Table 8.3). Beginning in 1981, includes industrial sector waste consumption, and transportation sector use of ethanol blended into motor gasoline (see Table 10.3). Beginning in 1989, includes expanded coverage of nonutility wood and waste consumption (see Table 8.4).
[5] Through 1989, pumped storage is included in conventional hydroelectric power.
[6] Not all data were available; therefore, values were interpolated.
[7] There is a discontinuity in this time series between 1988 and 1989 due to the expanded coverage of renewable energy beginning in 1989. See Tables 10.1 and 10.2.
[8] There is a discontinuity in this time series between 1989 and 1990; beginning in 1990, pumped storage is removed.

R=Revised. P=Preliminary. (s)=Less than 0.0005 quadrillion Btu. NA=Not available.
Note: Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fueloverview.html.
Sources: See end of section.

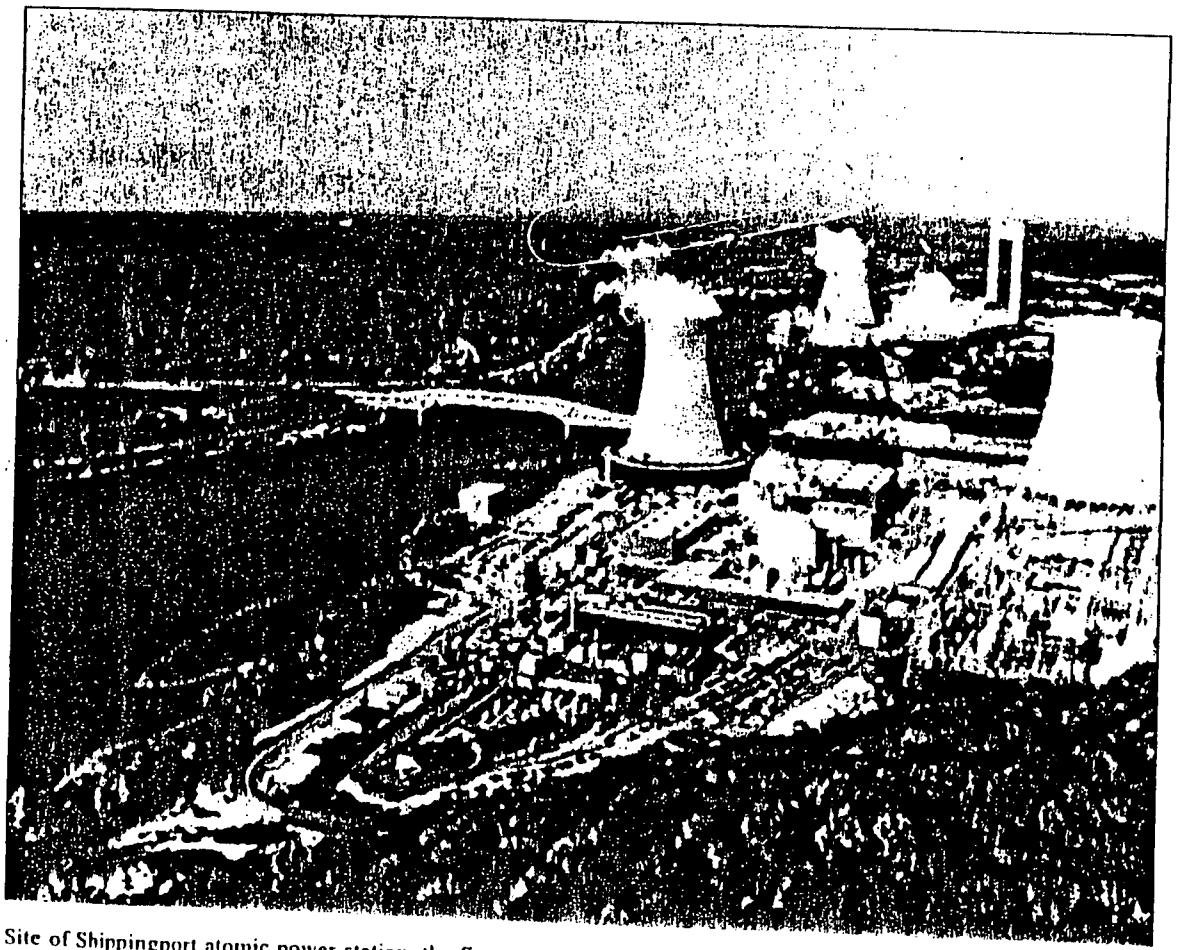
Table 13. Natural Gas Production, Transmission, and Consumption by State, 1967-1999
(Million Cubic Feet)

State	Marketed Production	Extraction Loss	Balancing Item	Net Interstate Movements	Net Movements Across U.S. Borders	Net Storage Changes	Supplemental Gas Supplies	Consumption
				1967				
Alabama	248	0	-1,113	255,041	0	0	NA	254,176
Alaska	14,438	0	-2,549	0	0	0	NA	11,889
Arizona	1,255	0	-1,219	162,446	-3,716	0	NA	158,766
Arkansas	116,522	3,499	-14,927	197,790	0	426	NA	295,460
California	681,080	34,803	-61,228	1,329,287	0	3,204	NA	1,911,132
Colorado	116,857	4,126	-5,515	125,426	0	1,134	NA	231,508
Connecticut	0	0	-1,963	51,743	0	0	NA	49,780
D.C.	a	a	a	a	a	a	NA	a
Delaware	0	0	-514	21,871	0	294	NA	21,063
Florida	123	0	-2,031	227,439	0	0	NA	225,531
Georgia	0	0	-3,690	258,024	0	0	NA	254,334
Idaho	0	0	-372	-219,052	253,707	0	NA	34,283
Illinois	144	13,725	-22,740	1,011,169	0	31,495	NA	948,353
Indiana	98	0	-3,478	442,703	0	4,791	NA	434,632
Iowa	0	0	-4,838	290,810	0	13,122	NA	272,850
Kansas	871,971	30,480	-2,280	-390,759	0	-2,511	NA	450,963
Kentucky	89,164	11,500	-3,942	120,974	0	2,236	NA	192,464
Louisiana	5,716,857	15,177	-16,428	-4,146,147	0	44,729	NA	1,394,376
Maine[b]	0	0	-426	6,391	613	0	NA	6,578
Maryland[a]	621	0	-1,726	149,746	0	8,788	NA	139,853
Massachusetts	0	0	-2,245	130,636	0	174	NA	128,217
Michigan	33,589	3,351	-9,352	698,475	-40,418	-7,152	NA	686,095
Minnesota	0	0	-202	199,570	83,718	0	NA	283,086
Mississippi	139,497	1,127	-3,286	146,600	0	-476	NA	282,160
Missouri	121	0	-9,221	369,872	0	69	NA	360,703
Montana	25,866	744	-1,289	24,361	30,663	13,819	NA	65,038
Nebraska	8,453	1,170	-1,020	183,044	0	646	NA	188,661
Nevada	0	0	-592	35,627	0	0	NA	35,035
New Hampshire	b	b	b	b	b	b	NA	b
New Jersey	0	0	-1,033	252,509	0	-6	NA	251,482
New Mexico	1,067,510	46,149	-12,616	-752,937	0	218	NA	255,590
New York	3,837	0	-3,228	617,151	-25,912	2,728	NA	589,120
North Carolina	0	0	-1,204	99,185	0	0	NA	97,981
North Dakota	40,462	5,150	-316	-3,138	0	0	NA	31,858
Ohio	41,315	0	-2,338	925,143	0	1,299	NA	962,821
Oklahoma	1,412,952	50,952	-4,537	-881,580	0	26,505	NA	449,378
Oregon	0	0	-1,743	71,620	0	0	NA	69,877
Pennsylvania	89,966	121	-11,305	617,504	0	17,566	NA	678,478
Rhode Island	0	0	-612	19,105	0	0	NA	18,493
South Carolina	0	0	-3,973	104,512	0	0	NA	100,539
South Dakota	0	0	-129	27,864	0	0	NA	27,735
Tennessee	58	0	-6,169	238,323	0	0	NA	232,212
Texas	7,188,900	433,684	-54,449	-3,247,981	43,529	11,069	NA	3,485,246
Utah	48,965	2,633	-1,113	60,053	0	220	NA	105,052
Vermont	b	b	b	b	b	b	NA	b
Virginia	3,818	0	-2,712	114,853	0	72	NA	115,887
Washington	0	0	-1,536	-10,598	140,428	1,064	NA	127,230
West Virginia	211,460	14,150	-1,487	-34,230	0	10,515	NA	151,078
Wisconsin	0	0	-4,870	252,903	0	0	NA	248,033
Wyoming	240,074	11,993	-2,658	-153,348	0	-1,209	NA	73,284
Total	18,171,325	784,534	-296,214	0	482,612	184,829	NA	17,388,360

See footnotes at end of table.

19988

9 Nuclear Energy

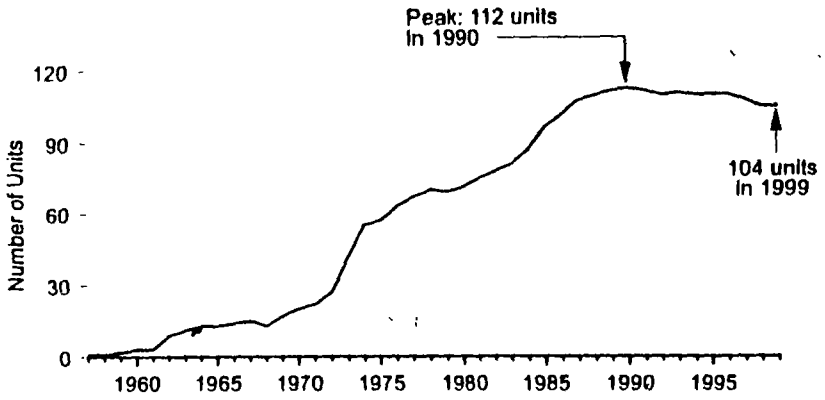


Site of Shippingport atomic power station, the first commercial nuclear power plant in the United States (rectangular reactor building and foreground); background, Beaver Valley 1 and 2 nuclear power plants and Bruce Mansfield coal-fired power plant (southwestern Pennsylvania). Source: U.S. Department of Energy.

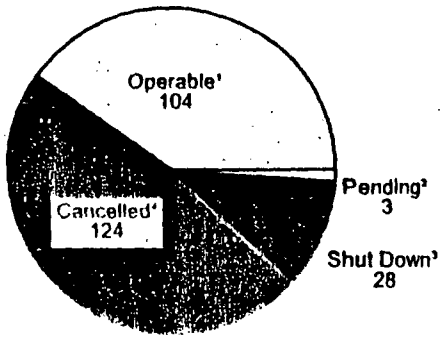
Figure 9.1 Nuclear Generating Units

Operable Units By Site, 1999

Operable Units,[1] 1957-1999

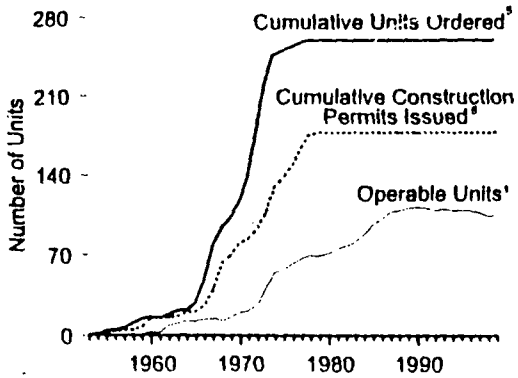


Status of All Ordered Units, 1953-1999

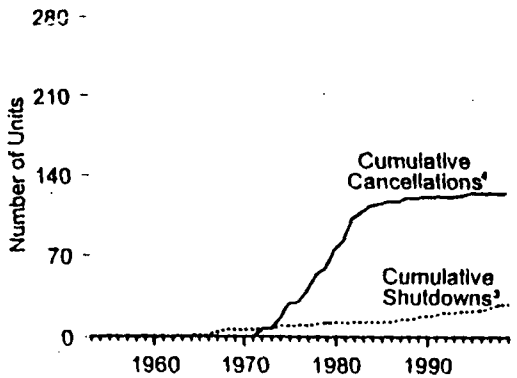


Total Units Ordered: 259

Orders, Permits, and Operable Units, 1953-1999



Cancellations and Shutdowns, 1953-1999



[1] Issuance by a regulatory authority of full-power operating license, or equivalent permission to operate.
[2] Ordered but not completed or cancelled.
[3] Ceased operation permanently.
[4] Cancellation of ordered units.
[5] Placement of an order by a utility for a nuclear steam supply system.
[6] Issuance by regulatory authority of a permit, or equivalent permission, to begin construction.

Note: Data are at end of year.

Sources: Map: Based on Energy Information Administration data. Other: Table 9.1.

Table 9.1 Nuclear Generating Units, 1953-1999

Year	Orders [1]	Construction Permits [2]	LPOL [3]	New Operable Units [4]	Shutdowns [5]	Total Operable Units [6]	Cancellations [7]	Cumulative Cancellations
1953	1	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0
1955	3	1	0	0	0	0	0	0
1956	1	3	0	0	0	0	0	0
1957	2	1	1	1	0	1	0	0
1958	4	0	0	0	0	1	0	0
1959	4	3	1	1	0	2	0	0
1960	1	7	1	1	0	3	0	0
1961	0	0	0	0	0	3	0	0
1962	2	1	7	6	0	9	0	0
1963	4	1	3	2	0	11	0	0
1964	0	3	2	3	1	13	0	0
1965	7	1	0	0	0	13	0	0
1966	20	5	1	2	1	14	0	0
1967	29	14	3	3	2	15	0	0
1968	16	23	0	0	2	13	0	0
1969	9	7	4	4	0	17	0	0
1970	14	10	4	3	0	20	0	0
1971	21	4	5	2	0	22	0	0
1972	38	8	6	6	1	27	7	7
1973	42	14	12	15	0	42	0	7
1974	28	23	14	15	2	55	9	16
1975	4	9	3	2	0	57	13	29
1976	3	9	7	7	1	63	1	30
1977	4	15	4	4	0	67	10	40
1978	2	13	3	4	1	70	13	53
1979	0	2	0	0	1	69	6	59
1980	0	0	5	2	0	71	15	74
1981	0	0	3	4	0	75	9	83
1982	0	0	6	4	1	78	18	101
1983	0	0	3	3	0	81	6	107
1984	0	0	7	6	0	87	6	113
1985	0	0	7	9	0	96	2	115
1986	0	0	7	5	0	101	2	117
1987	0	0	6	8	2	107	0	117
1988	0	0	1	2	0	109	3	120
1989	0	0	3	4	2	111	0	120
1990	0	0	1	2	1	112	1	121
1991	0	0	0	0	1	111	0	121
1992	0	0	0	0	2	109	0	121
1993	0	0	1	1	0	110	0	121
1994	0	0	0	0	1	109	1	122
1995	0	0	1	0	0	109	2	124
1996	0	0	0	1	1	109	0	124
1997	0	0	0	0	2	107	0	124
1998	0	0	0	0	3	104	0	124
1999	0	0	0	0	0	104	0	124

[1] Placement of an order by a utility or government agency for a nuclear steam supply system.
[2] Issuance by regulatory authority of a permit, or equivalent permission, to begin construction. Numbers reflect permits issued in a given year, not extant permits.
[3] Low-power operating license: Issuance by regulatory authority of license, or equivalent permission, to conduct testing but not to operate at full power.
[4] Issuance by regulatory authority of full-power operating license, or equivalent permission. Units generally did not begin immediate operation. See Note 1 at end of section.
[5] Ceased operation permanently.
[6] Total of units holding full-power licenses, or equivalent permission to operate, at the end of the year. See Note 1 at end of section.
[7] Cancellation by utilities of ordered units. Does not include three units (Bellefonte 1 and 2 and Watts Bar 2) where construction has been stopped indefinitely.

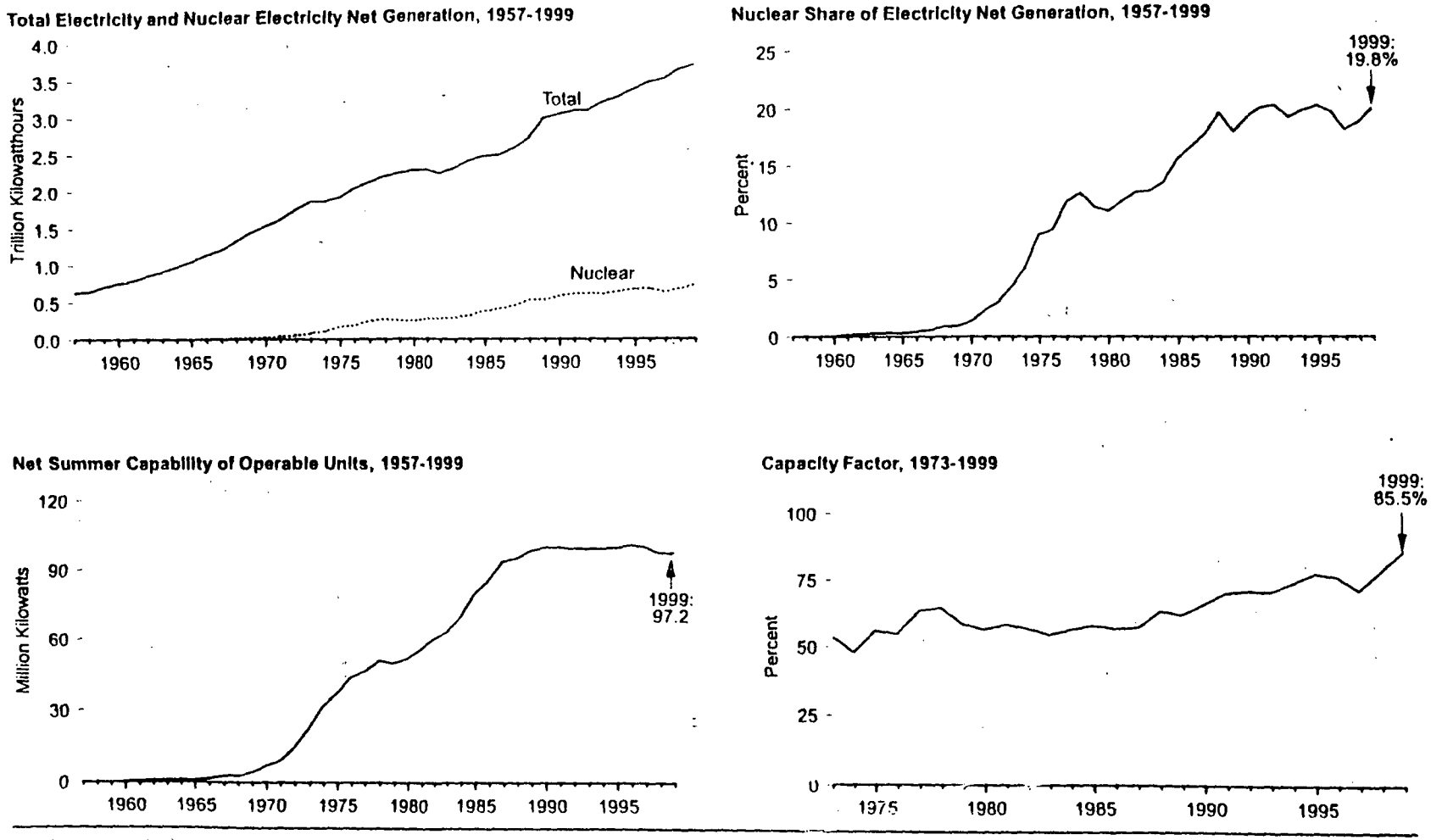
R=Revised.

Note: Data are at end of year.

Web Page: http://www.eia.doe.gov/fuelnuclear.html.

Sources: • 1953-1997: **Orders:** Energy Information Administration, *Commercial Nuclear Power 1991*, Appendix E, September 1991; Nuclear Energy Institute, *Historical Profile of U.S. Nuclear Power Development*, 1988 edition; U.S. Atomic Energy Commission, *1973 Annual Report to Congress, Volume 2, Regulatory Activities;* various utilities. **Construction Permits:** Nuclear Regulatory Commission, *Information Digest*, 1997 edition, Appendix A; Nuclear Energy Institute, *Historical Profile of U.S. Nuclear Power Development*, 1988 edition; various utility, Federal, and contractor officials. **Low-Power Operating Licenses:** Nuclear Energy Institute, *Historical Profile of U.S. Nuclear Power Development*, 1988 edition; U.S. Department of Energy, *Nuclear Reactors Built, Being Built, and Planned: 1995*; various utility, Federal, and contractor officials. **New Operable Units:** Nuclear Regulatory Commission, *Information Digest*, 1997 edition, Table 11 and Appendices A and B; various utility, Federal, and contractor officials. **Shutdowns:** Energy Information Administration, *Commercial Nuclear Power 1991*, Appendix E; Nuclear Regulatory Commission, *Information Digest*, 1998 edition; U.S. Department of Energy, *Nuclear Reactors Built, Being Built, and Planned: 1995*; Tennessee Valley Authority officials; Nuclear Regulatory Commission, "Plant Status Report." **Total Operable Units:** Running sum of new operable units minus permanent shutdowns. **Cancellations:** Energy Information Administration, *Commercial Nuclear Power 1991*, Appendix E, September 1991; Nuclear Regulatory Commission, *Information Digest*, 1997 editon, Appendix C; and Nuclear Energy Institute, *Historical Profile of U.S. Nuclear Power Development*, 1988 edition. • 1998 forward—http://www.nrc.gov/NRC/reactors.html.

Figure 9.2 Nuclear Power Plant Operations



Sources: Tables 8.1 and 9.2.

Table 9.2 Nuclear Power Plant Operations, 1957-1999

Year	Nuclear Electricity Net Generation	Nuclear Share of Electricity Net Generation	Net Summer Capability of Operable Units [1,2]	Capacity Factor [2]
	Billion Kilowatthours	Percent	Million Kilowatts	Percent
1957	(s)	(s)	0.1	NA
1958	0.2	(s)	0.1	NA
1959	0.2	(s)	0.1	NA
1960	0.5	0.1	0.4	NA
1961	1.7	0.2	0.4	NA
1962	2.3	0.3	0.7	NA
1963	3.2	0.4	0.8	NA
1964	3.3	0.3	0.8	NA
1965	3.7	0.3	0.8	NA
1966	5.5	0.5	1.7	NA
1967	7.7	0.6	2.7	NA
1968	12.5	0.9	2.7	NA
1969	13.9	1.0	4.4	NA
1970	21.8	1.4	7.0	NA
1971	38.1	2.4	9.0	NA
1972	54.1	3.1	14.5	NA
1973	83.5	4.5	22.7	53.5
1974	114.0	6.1	31.9	47.8
1975	172.5	9.0	37.3	55.9
1976	191.1	9.4	43.8	54.7
1977	250.9	11.8	46.3	63.3
1978	276.4	12.5	50.8	64.5
1979	255.2	11.4	49.7	58.4
1980	251.1	11.0	51.8	58.3
1981	272.7	11.9	56.0	58.2
1982	282.8	12.6	60.0	56.6
1983	293.7	12.7	63.0	54.4
1984	327.6	13.6	69.7	56.3
1985	383.7	15.5	79.4	58.0
1986	414.0	16.6	85.2	56.9
1987	455.3	17.7	93.6	57.4
1988	527.0	19.5	94.7	63.5
1989	[3]529.4	[3]17.8	[3]98.2	[3]62.2
1990	577.0	19.1	99.6	66.0
1991	612.6	19.9	99.6	70.2
1992	618.8	20.1	99.0	70.9
1993	610.4	19.1	99.1	70.6
1994	640.5	19.7	99.1	73.8
1995	673.4	20.1	99.5	77.4
1996	674.7	19.6	100.8	76.2
1997	628.6	18.0	99.7	71.1
1998	673.7	18.6	97.1	78.2
1999[P]	727.9	19.8	97.2	85.5

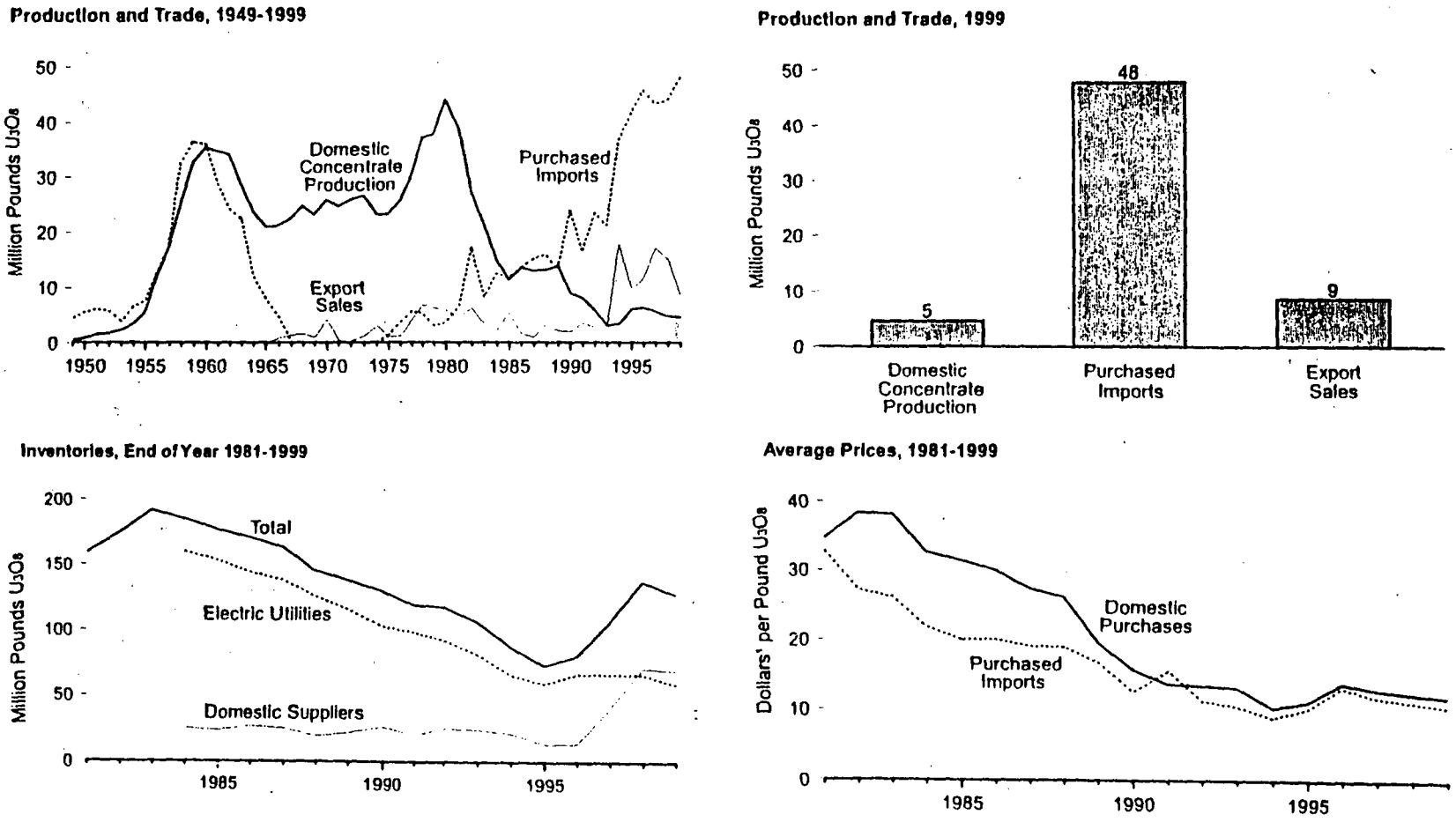
[1] At end of year.
[2] See Note 2 at end of section.
[3] Beginning in 1989, includes nonutility facilities.
P=Preliminary. NA=Not available. (s)=Less than 0.05 billion kilowatthours or less than 0.05 percent.

Note: The performance data shown in this table are based on a universe of reactor units that differs in some respects from the reactor universe used to profile the nuclear power industry in Table 9.1, especially in the years prior to 1973. See Note 1 at end of section for further discussion.

Sources: **Operable Units:** • 1957-1972—Federal Power Commission (FPC), Form FPC-4, "Monthly Power Plant Report." • 1973 forward—Nuclear Regulatory Commission, *Licensed Operating Reactors*, (NUREG-0020), monthly. **Electricity Generation:** • 1957-September 1977—FPC, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Federal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration (EIA), Form EIA-759, "Monthly Power Plant Report." **Net Summer Capability of Operable Units:** • 1957-1983—See Note 2 at end of section. • 1984 forward—EIA, Form EIA-860A, "Annual Electric Generator Report-Utility."

1999

Figure 9.3 Uranium Overview



' Nominal dollars.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 9.3.

1999A

Table 9.3 Uranium Overview, 1949-1999

Year	Domestic Concentrate Production	Purchased Imports [1]	Export [1] Sales	Utility Purchases From Domestic Suppliers	Loaded Into U.S. Nuclear Reactors [2]	Inventories			Average Price	
						Domestic Suppliers	Electric Utilities	Total	Purchased Imports	Domestic Purchases
	Million Pounds U_3O_8								U.S. Dollars[3] per Pound U_3O_8	
1949	0.36	4.3	0.0	NA	NA	NA	NA	NA	NA	NA
1950	0.92	5.5	0.0	NA	NA	NA	NA	NA	NA	NA
1951	1.54	6.1	0.0	NA	NA	NA	NA	NA	NA	NA
1952	1.74	5.7	0.0	NA	NA	NA	NA	NA	NA	NA
1953	2.32	3.8	0.0	NA	NA	NA	NA	NA	NA	NA
1954	3.40	6.5	0.0	NA	NA	NA	NA	NA	NA	NA
1955	5.56	7.6	0.0	NA	NA	NA	NA	NA	NA	NA
1956	11.92	12.5	0.0	NA	NA	NA	NA	NA	NA	NA
1957	16.96	17.1	0.0	NA	NA	NA	NA	NA	NA	NA
1958	24.88	32.3	0.0	NA	NA	NA	NA	NA	NA	NA
1959	32.48	36.3	0.0	NA	NA	NA	NA	NA	NA	NA
1960	35.28	36.0	0.0	NA	NA	NA	NA	NA	NA	NA
1961	34.70	29.0	0.0	NA	NA	NA	NA	NA	NA	NA
1962	34.02	24.2	0.0	NA	NA	NA	NA	NA	NA	NA
1963	28.44	22.4	0.0	NA	NA	NA	NA	NA	NA	NA
1964	23.70	12.1	0.0	NA	NA	NA	NA	NA	NA	NA
1965	20.88	8.0	0.0	NA	NA	NA	NA	NA	NA	NA
1966	21.18	4.6	0.8	NA	NA	NA	NA	NA	NA	NA
1967	22.51	0.0	1.4	NA	NA	NA	NA	NA	NA	NA
1968	24.74	0.0	1.6	NA	NA	NA	NA	NA	—	NA
1969	23.22	0.0	1.0	NA	NA	NA	NA	NA	—	NA
1970	25.81	0.0	4.2	NA	NA	NA	NA	NA	—	NA
1971	24.55	0.0	0.4	NA	NA	NA	NA	NA	—	NA
1972	25.80	0.0	0.2	NA	NA	NA	NA	NA	—	NA
1973	26.47	0.0	1.2	NA	NA	NA	NA	NA	—	NA
1974	23.06	0.0	3.0	NA	NA	NA	NA	NA	—	NA
1975	23.20	1.4	1.0	NA	NA	NA	NA	NA	—	NA
1976	25.49	3.6	1.2	NA	NA	NA	NA	NA	NA	NA
1977	29.88	5.6	4.0	NA	NA	NA	NA	NA	NA	NA
1978	36.97	5.2	6.8	NA	NA	NA	NA	NA	NA	NA
1979	37.47	3.0	8.2	NA	NA	NA	NA	NA	NA	NA
1980	43.70	3.6	5.8	NA	NA	NA	NA	NA	NA	NA
1981	38.47	6.6	4.4	32.6	NA	NA	NA	159.2	32.90	34.65
1982	26.87	17.1	6.2	27.1	NA	NA	NA	174.8	27.23	38.37
1983	21.16	8.2	3.3	24.2	NA	NA	NA	191.8	26.16	38.21
1984	14.88	12.5	2.2	22.5	NA	25.0	160.2	185.2	21.88	32.65
1985	11.31	11.7	5.3	21.7	NA	23.7	153.2	176.9	20.08	31.43
1986	13.51	13.5	1.6	18.9	NA	27.0	144.1	171.1	20.07	30.01
1987	12.99	15.1	1.0	20.8	NA	25.4	137.8	163.2	19.14	27.37
1988	13.13	15.8	3.3	17.6	NA	19.3	125.5	144.8	19.03	26.15
1989	13.84	13.1	2.1	18.4	NA	22.2	115.8	138.1	16.75	19.56
1990	8.89	23.7	2.0	20.5	NA	26.4	102.7	129.1	12.55	15.70
1991	7.95	16.3	3.5	26.8	34.6	20.7	98.0	118.7	15.55	13.68
1992	5.65	23.3	2.8	23.4	43.0	25.2	92.1	117.3	11.34	13.45
1993	3.06	21.0	3.0	15.5	45.1	24.5	81.2	105.7	10.53	13.14
1994	3.35	36.6	17.7	22.7	40.4	21.5	65.4	86.9	8.95	10.30
1995	6.04	41.3	9.8	22.3	51.1	13.7	58.7	72.5	10.20	11.11
1996	6.32	45.4	11.5	22.9	46.2	13.9	66.1	80.0	13.15	13.81
1997	5.64	43.0	17.0	18.7	48.2	40.4	65.9	106.2	11.81	12.87
1998	4.71	43.7	15.1	20.3	R38.2	70.7	R65.8	R136.5	11.19	12.31
1999P	4.61	47.6	8.5	19.2	58.8	68.8	58.2	127.0	10.55	11.88

[1] Import quantities through 1970 are reported for fiscal years. Prior to 1968, the Atomic Energy Commission was the sole purchaser of all imported U_3O_8. Trade data prior to 1982 were for transactions conducted by uranium suppliers only. For 1982 forward, transactions by uranium buyers (consumers) have been included. Buyer imports and exports prior to 1982 are believed to be small.

[2] Does not include any fuel rods removed from reactors and later reloaded.

[3] Nominal dollars.

R=Revised. P=Preliminary. NA=Not available. — = Not applicable.

Web Page: http://www.eia.doe.gov/fuelnuclear.html.

Sources: • 1949-1966—U.S. Department of Energy, Grand Junction Office, *Statistical Data of the Uranium Industry*, Report No. GJO-100, annual. • 1967-1998—Energy Information Administration (EIA), *Uranium Industry Annual*, annual reports. • 1999—EIA, *Uranium Industry Annual 1999* (May 2000), Tables H1, H2, H3, 5, 14, 27, 28, and 31.

1999

Nuclear Energy Notes

1. In 1997 EIA undertook a major revision of Table 9.1 to more fully describe the history of the U.S. commercial nuclear power industry. The time frame was extended back to the birth of the industry in 1953, and the data categories were revised for greater relevance to current industry conditions and trends. To acquire the data for the revised categories it was necessary to develop a reactor unit database employing different sources than those used previously for Table 9.1 and still used for Table 9.2.

In Table 9.1 "commercial" means that the units contributed power to the commercial electricity grid, whether or not they were owned by an electric utility. A total of 259 units ever ordered was identified. Although most orders were placed by electric utilities, several units are or were ordered, owned, and operated wholly or in part by the Federal Government, including BONUS (Boiling Nuclear Superheater Power Station), Elk River, Experimental Breeder Reactor 2, Hallam, Hanford N, Piqua, and Shippingport.

A reactor is generally defined as operable in Table 9.1 while it possessed a full-power license from the Nuclear Regulatory Commission or its predecessor the Atomic Energy Commission, or equivalent permission to operate, at the end of the year. The definition is liberal in that it does not exclude units retaining full-power licenses during long, non-routine shutdowns. For example:

> In 1985 the five then-active Tennessee Valley Authority units (Browns Ferry 1, 2, and 3 and Sequoyah 1 and 2) were shut down under a regulatory forced outage. Browns Ferry 1 remains shut down and has been defueled, while the other units were idle for several years, restarting in 1991, 1995, 1988, and 1988, respectively. All five units are counted as operable during the shutdowns.
>
> Shippingport was shut down from 1974 through 1976 for conversion to a light-water breeder reactor, but is counted as operable until its retirement in 1982.
>
> Calvert Cliffs 2 was shut down in 1989 and 1990 for replacement of pressurizer heater sleeves but is counted as operable during those years.

Exceptions to the rule are Shoreham and Three Mile Island 2. Shoreham was granted a full-power license in April 1989, but was shut down two months later and never restarted. In 1991, the license was changed to Possession Only. Although not operable at the end of the year, Shoreham is treated as operable during 1989 and shut down in 1990, because counting it as operable and shut down in the same year would introduce a statistical discrepancy in the tallies. A major accident closed Three Mile Island 2 in 1979, and although the unit retained its full-power license for several years, it is considered permanently shut down since that year.

2. Net summer capabilities were first collected on Form EIA-860 for 1984. Units not assigned a net summer capability rating by the utility were given an estimated rating by use of a statistical relationship between installed nameplate capacity and net summer capability for each prime mover. To estimate net summer capability for 1949-1984, two methods were used. For each prime mover except nuclear and "other," net summer capability estimates were calculated in two steps. First, the unit capacity values reported on Form EIA-860 and the unit start dates contained in the 1984 Generating Unit Reference File (GURF) were used to compute preliminary aggregate estimates of annual net summer capability and installed nameplate capacity. These preliminary estimates were obtained by aggregating unit capacity values for all units in service during a given year. Next, the ratio of the preliminary capability to nameplate estimate was computed for each year and multiplied by the previously published installed nameplate capacity values to produce the final estimates of net summer capability. The net summer capability data for nuclear and "other" units were use directly from the 1984 GURF for all years. Historical aggregates were then developed by use of the unit start dates on the GURF.

Historical capacity has also been modified to estimate capability based upon the operable definition, by assuming that non-nuclear generating units became operable between 1 and 4 months prior to their commercial operation dates, depending upon the prime mover and time period. The actual operable dates for nuclear units were used.

Aluminum Industry Analysis Brief

Return to Industry Briefs Page

Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy Management Activities

Sources

Return to the Main Page of Aluminum

Aluminum is widely used throughout the U.S. economy, particularly in the transportation, packaging, and construction industries. As a lightweight, high-strength, and recyclable structural metal, aluminum has and will continue to play an important role in a healthy economy as applications are extended in the infrastructure, aerospace, and defense industries.

The U.S. aluminum industry is the world's largest, producing about $33 billion in products and exports annually. U.S. companies are the largest single producer of primary aluminum (aluminum made from bauxite ore). The U.S. industry produces more than 22 billion pounds of primary and secondary (made from recycled metal) metal annually and employs 85,000 people with an annual payroll of $3.4 billion. [DOC 1997] There are 23 primary aluminum smelting facilities in the United States, operated by a dozen companies [DOE 1997]. The Standard Industrial Classification (SIC) for the primary aluminum smelting industry is SIC 3334. Secondary aluminum smelting is grouped under SIC 3341; rolling, drawing, and extrusion of aluminum are grouped under several four-digit SIC codes within SIC 335 (Rolling, Drawing, and Extruding of Nonferrous Metals).

Economic Profile and Trends

Shipments from domestic aluminum producers total about $33 billion annually.

Energy Use

The aluminum industry spends more than $2 billion annually on energy, the majority of which is for electricity.

State-Level Information

The majority of U.S. primary aluminum producers are located either in the Pacific Northwest or the Ohio River Valley.

Technologies and Equipment

Primary aluminum is produced from alumina (extracted from bauxite ore) in electrolytic cells, while scrap metal is melted in furnaces to produce secondary aluminum.

Energy-Management Activities

About half of aluminum industry facilities conduct energy-management activities.

Sources

19997

Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy Management Activities
Sources
Return to the Main Page of Aluminum

Economic Profile and Trends

Aluminum Industry Analysis Brief

Value of Shipments | Annual Production | Labor Productivity

The aluminum industry enjoyed considerable stability in terms of demand and prices throughout the early 1970s. Since then, continuing economic fluctuations have become the norm. The world aluminum industry had a painful adjustment to the production of excess metal from Russia, but production and prices remain sensitive to events in the global marketplace. The U.S. aluminum industry employed more than 85,000 Americans in 1997, with an annual payroll of nearly $3.4 billion. In addition, around 62,000 Americans are employed in casting aluminum products. [DOC 1997, AA 1999].

The U.S. aluminum industry is the world's largest, accounting for 17% of the world's primary aluminum production in 1997 [AA 1998, 2000]. Production and shipments of primary aluminum have risen steadily since 1994. Imports of ingots and mill products rose 12.4% between 1998 and 1999; exports of the same rose 5.7% during the same time period. [AA 2000]

The aluminum industry spent over $1 billion in new capital expenditures in 1997 [DOC 1997]. It also spent in excess of $100 million for pollution control equipment in 1993 and 1994 combined, more than half of which was spent on air pollution control equipment [DOC 1994].

Industry Economic and Trade Statistics - 1997

Value of Shipments*	$32.7 billion (based on NAICS) $27.5 billion (based on SIC)
Employment	85,300
Average Hourly Wages (Production Workers)	$16.49
Capital Expenditures	$1.0 billion
R&D Expenditures**	$353 million
Pollution Abatement Expenditures (1994)	
Capital	$42 million
Operating	$241 million
Trade	
Imports	$7.5 billion
Exports	$5.6 billion
Balance	-$1.9 billion

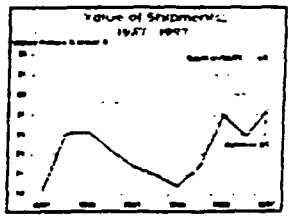
Source: DOC 1994, DOC 1997, NSF 1997

*A NAICS-based estimate has been provided only for Value of Shipments. In the SIC system, a number of production activities related to aluminum manufacturing were grouped with that of other non-ferrous metals. However, beginning in 1997 under NAICS, such activities have been separated into aluminum-specific classifications, which allow more precise tabulation.

** Includes R&D Expenditures for all non-ferrous metal production.

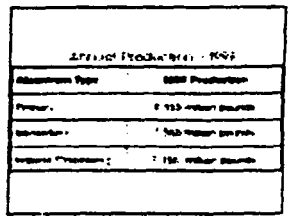
Value of Shipments

The industry and its downstream processors have a combined value of shipments of about $33 billion annually



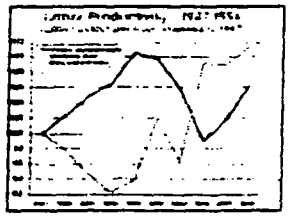
Annual Production

About 8,185 million pounds of primary aluminum and 7,588 million pounds of secondary aluminum were produced in 1998



Labor Productivity

The number of man-hours to produce a ton of primary aluminum has decreased over the last 10 years



Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy Management Activities

Sources

Return to the Main Page of Aluminum

Energy Use

Aluminum Industry Analysis Brief

Energy Use by Fuel | Fuel Consumption by End Use | Energy Consumption by Sector | Energy Expenditures | Energy Intensity

The production of primary aluminum relies on an eletrolytic process and is thus highly electricity-intensive. According to the most recent Manufacturing Energy Consumption Survey (MECS), the U.S. aluminum industry consumed about 727 trillion Btu of energy in 1994 (including electricity losses). This amount represents slightly less than 1% of domestic energy use and 2-3% of all U.S. manufacturing energy use. According to a study sponsored by DOE, the total energy consumption associated with the production of molten primary aluminum in 1995 was 522 trillion Btu [DOE 1997].

Aluminum Industry Total Energy Use (SIC 3334 only)

(Trillion Btu)

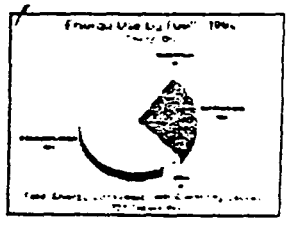
Year	Total Energy Use* (including electricity losses)	Total Energy Use (no losses)
1985	685	248
1988	727	258
1991	774	297
1994	621	241

* Includes electricity losses incurred during the distribution, generation, and transmission of electricity

Source: MECS 1985, 1988, 1991, and 1994

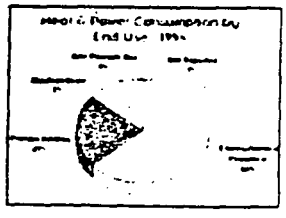
Energy Use by Fuel

Nearly 85% of the aluminum industry's energy comes from electricity (including losses)



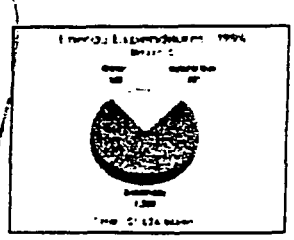
Fuel Consumption by End Use

The vast majority of the energy is consumed during the electrolytic reduction of alumina (Al_2O_3) to aluminum



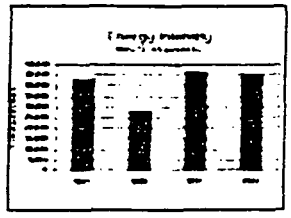
Energy Consumption by Sector

Nearly three-quarters of all energy consumed by the industry is for primary aluminum production



Energy Expenditures

One-third of the average cost of aluminum is for the energy required to make it



Energy Intensity

Energy intensity measures the energy consumed per dollar of products shipped

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Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy Management Activities
Sources
Return to the Main Page of Aluminum

Energy-Management Activities

Aluminum Industry Analysis Brief

Manufacturers may conduct a number of energy-management activities to improve the efficiency of energy use. In the aluminum industry, the top four reported activities in 1994 included energy audits, electricity load control, the purchase of electricity under special rate schedules (e.g., time-of-use rates), and direct machine drive. Overall, about 68% of the aluminum industry population reported engaging in at least one energy-management activity. These reporting establishments used nearly 90% of the total aluminum industry energy in 1994. [MECS 1994]

Energy-Management Activities* - 1994

Activities	Actual Establishments	% Aluminum Industry Population	% Consumed Energy for Heat & Power
Energy Audits	36	36.4	37.2
Electricity Load Control	34	34.3	50.7
Direct Machine Drive	31	31.3	31.8
Special Rate Schedule	31	31.3	29.2

Source: MECS 1994

* SIC 3334 and SIC 3353 only

Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Return to Industry Briefs Page

Economic Profile and Trends

Energy Use

State-Level Information

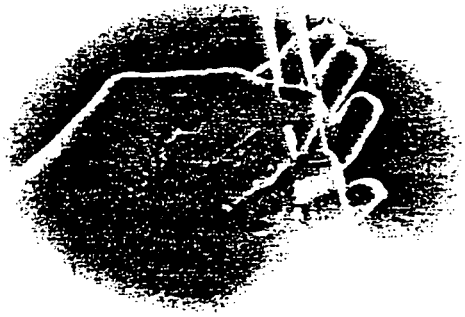
Technologies and Equipment

Energy-Management Activities

Sources

Return to the Main Page of Chemicals

Chemical Industry Analysis Brief



The chemical industry is a keystone of the U.S. economy, converting raw materials (oil, natural gas, air, water, metals, minerals) into more than 70,000 different products. Few goods are manufactured without some input from the chemical industry. Chemicals are used to make a wide variety of consumer goods, as well as thousands of products that are essential inputs to agriculture, manufacturing, construction, and service industries. The chemical industry itself consumes 26 percent of its output. Major industrial customers include rubber and plastic products, textiles, apparel, petroleum refining, pulp and paper, and primary metals. [CMA 1998]

Chemicals is nearly a $1.5 trillion global enterprise, and the U.S. chemical industry is the world's largest producer. There are 170 chemical companies with more than 2,800 facilities abroad and 1,700 foreign subsidiaries or affiliates operating in the United States. The industry records large trade surpluses and employs more than a million people in the United States alone. The chemical industry is also the second largest consumer of energy in manufacturing and spends over $5 billion annually on pollution abatement. [CMA 1998] The broad Standard Industrial Classification (SIC) for the industry is SIC 28 and encompasses many 3- and 4-digit SIC categories.

Economic Profile and Trends

Chemical shipments are nearly $400 billion annually.

Energy Use

Chemicals is the second largest industrial user of energy.

State-Level Information

Texas, New Jersey, Louisiana, North Carolina, and Illinois are the nation's top chemical producers.

Technologies and Equipment

Distillation, catalytic, and electrochemical reactors are the workhorses of the industry.

Energy-Management Activities

Over 36% of chemical facilities conduct energy management activities.

20003

Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy-Management Activities
Sources
Return to the Main Page of Chemicals

Economic Profile and Trends

Chemical Industry Analysis Brief

Value of Shipments | Annual Production | Labor Productivity

As a strong contributor to the U.S. economy, the chemical industry provides over 2% of the total U.S. GDP and nearly 12% of the manufacturing GDP. On a value-added basis, chemicals is the largest U.S. manufacturing sector. The industry employed more than a million people in 1997, including nearly 90,000 scientists, engineers, and technicians engaged in R&D. Over half of the industry employees are production workers earning weekly wages that are 30% greater than the manufacturing average. [CMA 1998]

The United States is the largest chemical producer in the world (over 25% of total production) and achieved a record trade surplus in 1997 of $19.2 billion. The industry continues to grow, with profits in 1997 reaching $44.8 billion, an all-time high. [CMA 1998]

The chemical industry is one of the largest U.S. private sector investors in R&D, with chemical patents accounting for 15% of the total awarded in the United States. Pharmaceuticals research accounts for more than half of R&D spending. [CMA 1998]

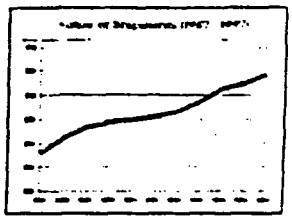
Industry Economic and Trade Statistics – 1997

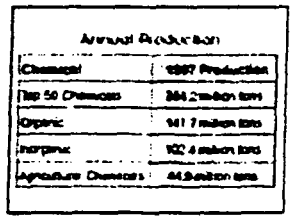
Value of Shipments	$392.2 billion
Employment	1,034,000
Average Hourly Wages (Production Workers)	$16.6
Capital Expenditures	$25.4 billion
R&D Expenditures	$18.7 billion
Pollution Abatement Expenditures	
Capital	$2.1 billion
Operating	$4.3 billion
Trade	
Imports	$50.3 billion
Exports	$69.5 billion
Balance	$19.2 billion

Source: DOC 1994, DOC 1997, CMA 1998

Value of Shipments

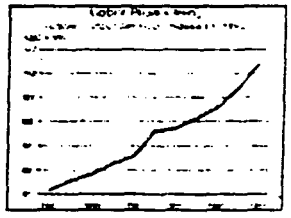
Chemical shipments are increasing 5% annually





Annual Production

Over 360 million tons of chemicals are produced every year



Labor Productivity

The labor productivity of chemical workers increased by 3% annually over the last decade

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Office of Industrial Technologies

Energy Information Administration

Last Updated: 01/05/00

Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy Management Activities

Sources

Return to the Main Page of Chemicals

Energy Use

Chemical Industry Analysis Brief

Energy Use by Fuel | Fuel Consumption by End Use | Energy Consumption by Sector | Energy Expenditures | Onsite Generation | Energy Intensity

The chemical industry uses energy both to supply heat and power for plant operations and as a raw material for the production of petrochemicals, plastics, and synthetic fibers. According to the most recent Manufacturing Energy Consumption Survey (MECS), the U.S. chemical industry consumed about 5.3 quads (quadrillion Btu, or 10^{15} Btu) of energy in 1994. This represents about 7% of domestic energy use and about 25% of all U.S. manufacturing energy use. Energy purchases cost the industry about $18 billion in 1994 [MECS 1994], about 5% of the value of shipments that year.

Chemical Industry Total Energy Use

(Trillion Btu)

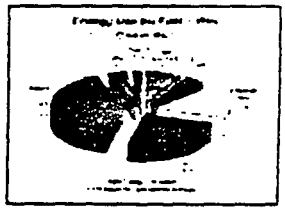
Year	Energy Use, No Feedstocks*	Feedstocks	Total Energy Use
1985	2213	1354	3567
1988	2682	1678	4360
1991	2693	2358	5051
1994	2865	2463	5328

* The primary component is energy used for heat and power.

NOTE: Years prior to 1994 do not include adjustments for energy shipped off site.
Source: MECS 1985, 1988, 1991, and 1994

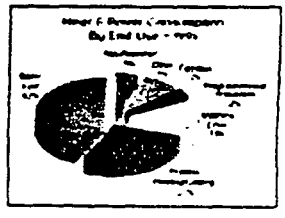
Energy Use by Fuel

Natural gas and LPG account for a large share of energy use



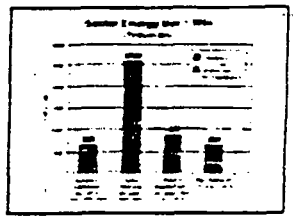
Fuel Consumption by End Use

Nearly 50% of energy is transformed into chemical products



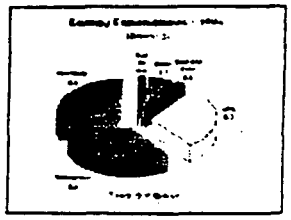
Energy Consumption by Sector

Organic chemicals consume the most energy



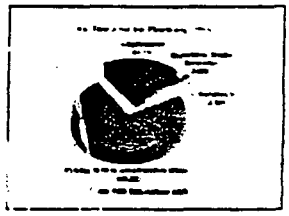
Energy Expenditures

Chemicals account for about 26% of all manufacturing energy costs



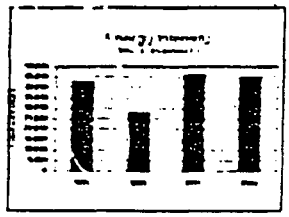
Onsite Generation

Chemical plants produce about 25% of electricity onsite



Energy Intensity

Energy intensity measures the energy consumed per dollar of products shipped



Office of Industrial Technologies

Energy Information Administration

Last Updated: 01/05/00

Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy-Management Activities

Sources

Return to the Main Page of Chemicals

Technologies and Equipment

Chemical Industry Analysis Brief

Cogeneration Technologies | Generic Technologies

Transforming raw materials into usable chemical products requires chemical, physical, and biological separation and synthesis processes that consume large amounts of energy for heating, cooling, or electrical power. Separations play a critical role and account for 40-70% of both capital and operating costs. The most widely used separation process is distillation, which accounts for as much as 40% of the industry's energy use [Humphrey 1997]. Chemical synthesis, predominantly heterogeneous catalytic processes, is the backbone of the industry. Process heat is integral and supports nearly all chemical operations.

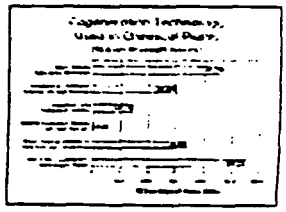
Industry-Specific Technologies

Unit Operation	Purpose	Major Technologies
Separations	Separate products, remove contaminants, dry solids	Distillation, extraction, absorption, crystallization, evaporation, drying, steam stripping or cracking, membranes
Chemical Synthesis	Synthesize chemicals, polymers, and resins	Catalytic reactions (oxidation, hydrogenation, alkylation) and polymerization (addition or suspension), hydration, hydrolysis, electrolysis
Process Heating	Drive chemical reactions and separations; can be direct or indirect	Direct heating: furnaces, kilns, dryers Indirect heating: Boilers, heat exchangers Heat transfer fluids: steam, boiling water, organic vapors, water, oils, and air

Source: DOE 1999

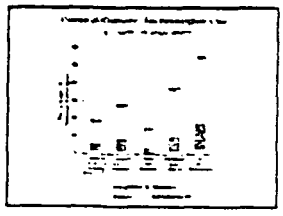
Cogeneration Technologies

Cogeneration in chemical plants often involves two or more technologies



Generic Technologies

More than half of chemical plants report using general technologies to increase efficiency



Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy-Management Activities
Sources
Return to the Main Page of Chemicals

Energy-Management Activities

Chemical Industry Analysis Brief

Manufacturers may conduct a number of energy management activities to improve the efficiency of energy use. In the chemical industry, the top four reported activities in 1994 included energy audits, electricity load control, equipment or facilities modification to improve lighting and other facility energy use, and purchase of electricity under special electricity rate schedules (e.g., interruptible or time-of-use rates). Overall, about 36% of the chemical population reported engaging in at least one energy-management activity. These reporting establishments used about 78% of the total chemical industry energy in 1994. [MECS 1994]

Energy-Management Activities - 1994

Activities	Establishments (weighted)	% Chemical Population	%Consumed Energy for Heat & Power
Energy Audits	1,745	18.2	49.7
Electricity Load Control	1,556	16.3	44.1
Equipment Installation/ Retrofit	1,259	13.2	28.0
Special Rate Schedule	1,185	12.4	43.8

Source: MECS 1994

Office of Industrial Technologies

Energy Information Administration

Last Updated: 01/05/00

Return to Industry Briefs Page

Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy Management Activities

Sources

Return to the Main Page of Forest Products

Forest Products Industry Analysis Brief

The U.S. forest products industry is divided into two major categories: Paper and Allied Products (SIC 26) and Lumber and Wood Products (SIC 24). These industries are often grouped together because both rely on the nation's vast forest resources for raw material. In addition, many companies that produce pulp and paper also produce lumber and wood products in integrated operations. With a timberland base of about 490 million acres, the forest products industry harvested close to 19 billion ft^3 of softwood and hardwood timber in 1998 [Miller Freeman 1998]. Almost half of the wood harvested is used for construction and building materials, and close to 30% of the wood is used to make pulp and paper [TAPPI PRESS 1998].

The United States is the world's leading producer of lumber and wood products used in residential construction and in commercial wood products such as furniture and containers. The United States is also the leader in the pulp and paper business, producing about 34 percent of the world's pulp and 29 percent of total world output of paper and paperboard [Miller Freeman 1998]. Fueling this large manufacturing sector is consumption; as the world's leading consumer of paper and paperboard products, the United States consumed close to 99 million tons in 1997 or about 738 pounds per capita [Miller Freeman 1999]. In 1997, exports totaled $14.4 billion dollars, only $123 million less than imports [AF&PA 1998].

The forest products industry is a multinational enterprise with plantations and mills around the world. With over 44,000 facilities in the United States alone (6,541 in Pulp and Paper and 37,471 in Lumber and Wood), the industry produced shipments valued at close to $262 billion in 1997. As a strong contributor to the nation's economy, the industry employs close to 1.3 million people in all regions of the country and ranks among the top 10 manufacturing industries in 46 states. Although the industry self-generated more than 56% of its energy needs in 1996, it is still the third largest user of fossil energy in the U.S. manufacturing sector. [AF&PA 1998, MECS 1994]

Economic Profile and Trends

Forest products industry shipments are close to $262 billion annually.

Energy Use

The forest products industry is the third largest industrial user of energy.

State-Level Information

Wisconsin, California, and Georgia are the nation's top three forest products producers.

Technologies and Equipment

Forest products industries employ a variety of physical and chemical processes.

Energy-Management Activities

Almost 2,500 energy audits were performed at forest products establishments in 1994.

Sources

Return to Industry Analysis Briefs home page.

Home page for
Office of Industrial Technologies

Home page for
Energy Information Administration

Return to home page for Manufacturing Energy Consumption Survey.

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Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy-Management Activities
Sources
Return to the Main Page of Forest Products

Economic Profile and Trends

Forest Products Industry Analysis Brief

Value of Shipments | Annual Production | Labor Productivity

The U.S. forest products industry makes a strong contribution to the national economy, producing 1.2% of the U.S. GDP. The industry employed almost 1.3 million people in 1997, with average hourly production wages of $16.17 in the pulp and paper sector and $11.43 in lumber and wood products [DOC 1997]. The industries are highly cyclical, being dependent on commodity prices and strong consumer markets. Following a prolonged downcycle in the economic recession of the early 1990s, a time of significant downsizing and industry restructuring, the industry is posting strong production gains in the robust economy of the late 1990s. With continuing recovery of Asian and other key overseas markets, the paper industry is projected to increase product shipments by 2% annually through 2003 [Miller Freeman 1998]. To stay competitive and to develop the products and processes that will be required to comply with environmental regulations, the pulp and paper sector directs about 1% of its sales annually toward R&D on new/improved products and processes. R&D spending for the pulp and paper sector alone was over $1.5 billion in 1996. [AF&PA 1998]

Industry Economic and Trade Statistics – 1997

Value of Shipments	**$262.3 billion**
Employment	**1,281,800**
Average Hourly Wages (Production Workers)	**$16.17 – pulp and paper** **$11.43 – lumber and wood products**
Capital Expenditures	**$12.7 billion**
R&D Expenditures	**$1.8 billion**
Pollution Abatement Expenditures (1994) Capital Operating	 **$771.3 million** **$2.2 billion**
Trade Imports Exports Balance	 **$30 billion** **$22.4 billion** **-$7.6 billion**

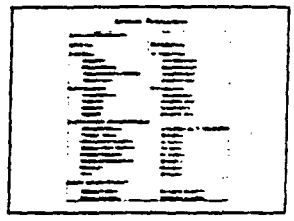
Source: DOC 1997, DOC 1994, NSF 1997

Value of Shipments

Strong production gains have been posted in the robust economy of the late 1990s

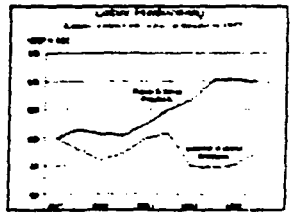
Annual Production

Total primary U.S. paper and paperboard production is about 95 million tons per year



Labor Productivity

The labor productivity of U.S. pulp and paper workers has increased 1% annually over the last decade



Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy-Management Activities

Sources

Return to the Main Page of Forest Products

Technologies and Equipment

Forest Products Industry Analysis Brief

Cogeneration Technologies | Generic Technologies

Transforming whole trees into lumber and wood products or into pulp and paper products requires significant physical, chemical, and some biological processes that are highly energy-intensive. The forest products industries alone account for over 14% of total industry energy demand; however, almost 40% of this energy is generated onsite through the use of biomass byproducts for heat and steam. The technologies used by the lumber and wood products industry differ significantly from those used by the pulp and paper industry. Principal processes in lumber and wood products include debarking, log processing, drying, product fabrication, and finishing. Major pulp and paper processes include pulping and papermaking.

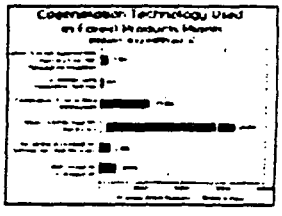
Industry-Specific Technologies

Unit Operation	Purpose	Major Technologies
Pulp & Paper (SIC 26)		
Pulping	Convert wood chips or wastepaper into fibers suitable for papermaking	Chemical (kraft, sulfite) – digesters, mechanical – refiners, semichemical – digesters & refiners
Chemical Recovery (Kraft Pulping)	Recovery of inorganic chemicals from spent pulping liquor (black liquor) and combustion of organic residuals to produce energy	Evaporation/concentration recovery boiler, causticizing, calcining (lime kiln)
Bleaching	Brighten or whiten pulps by using chemicals to selectively remove lignin during the pulping process	Chlorine dioxide, oxygen, hypochlorite, peroxide, ozone, or chlorination – upflow or downflow towers, vacuum washers, pumps, mixers
Paper Manufacture	Prepare stock from pulp, form a sheet, dewater, dry, calender, perhaps coat, and wind onto a reel	Head box, sheet forming table (Fourdrinier, twin wire), vacuum system, press section (mechanical), dryer section (heat), calender, reel
Lumber & Wood Products (SIC 24)		
Log	Production of roundwood (poles, posts, railroad ties), sawn-wood (lumber), veneers, chips (pressboard, plywood)	Computer vision mechanical sawing, cutting and chipping
Drying	Removing moisture from wood to facilitate shipping, handling, preservation and the application of treatments	Kiln or air drying
Fabrication	Additional processing to form desired end product	Specialized mechanical sawing, drilling, sanding, high pressure chemical reformation (press/particle board), high-pressure chemical lamination (plywood), manual construction
Finishing	Preserving and treating wood for final use	Pressure treatment, chemical treatment, thermochemical treatments, coating
Both (SICs 24 & 26)		
Process Heating	To drive pressure, steam and drying applications	Direct heating: furnaces, kilns, dryers Indirect heating: boilers, heat exchangers Heat transfer fluids: steam, water, oil & air
Debarking	Removes bark from the whole log	Barking drum, ring barker

Source: Smook 1992

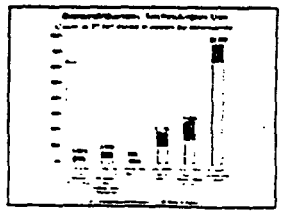
Cogeneration Technologies

Steam turbines driven by bed boilers are the most prevalent in forest product facilities



Generic Technologies

Adjustable speed motors are the most commonly used energy-saving technology



Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy-Management Activities

Sources

Return to the Main Page of Forest Products

Energy-Management Activities

Forest Products Industry Analysis Brief

Manufacturers may conduct a number of energy-management activities to improve the efficiency of energy use at their facilities. The four top management techniques used by the forest products industry include energy audits, electricity load controls, power factor correction or improvement, and facility lighting. The most commonly used of these is the energy audit, employed by almost 2,500 facilities in 1994. Approximately 20% of the forest products facilities reported using at least one type of energy-management activity. [MECS 1994]

Energy-Management Activities - 1994

Activities	Number of Establishments	% Forest Products Population	% Consumed Energy for Heat and Power
Lumber & Wood Products			
Energy Audits	1,413	6.6%	24.6%
Power Factor Correction or Improvement	1,068	5.0%	21.4%
Electricity Load Control	1,021	4.8%	19.8%
Facility Lighting	736	3.4%	11.3%
Pulp & Paper			
Energy Audits	1,034	18.5%	80.9%
Power Factor Correction or Improvement	585	10.5%	36.3%
Electricity Load Control	669	12.0%	53.0%
Facility Lighting	748	13.4%	34.7%

Source: MECS 1994

Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Return to Industry Briefs Page

Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy-Management Activities

Sources

Return to the Main Page of Glass

Glass Industry Analysis Brief

The glass industry is an integral part of the American economy and everyday life. Glass is used in a myriad of consumer products ranging from food and beverage packaging, lighting products for homes and businesses, automobile windshields, and windows in buildings to insulation for buildings, fiber optics for communications, and tubes for televisions.

The U.S. glass industry is a $27 billion enterprise with both large producers and small firms playing pivotal roles in the industry. While most sectors of the glass industry have restructured and consolidated in the past twenty years, the industry still employs 150,000 workers who earn an average of $15.53 per hour. On a percent-of-shipments basis, glassmaking is one of the most energy-intensive industries; the industry spent $14 billion on purchased energy in 1997. [DOC 1997]

Glass covers several Standard Industrial Classification (SIC) codes, including SICs 321, 322, 323, and 3296.

Economic Profile and Trends

Shipments from glass facilities total about $27 billion annually.

Energy Use

The glass industry primarily uses energy to supply heat to glass melting furnaces in which the raw materials are melted and refined.

State-Level Information

Ohio, Pennsylvania, California, and North Carolina are among the nation's top glass producers.

Technologies and Equipment

The industry depends largely on glass furnaces for melting and downstream processing to form glass products.

Energy-Management Activities

Over 50% of glassmaking establishments conduct energy-management activities.

Sources

Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy Management Activities
Sources
Return to the Main Page of Glass

Economic Profile and Trends

Glass Industry Analysis Brief

Value of Shipments | Annual Production | Labor Productivity

The glass industry employed over 150,000 workers in 1997. Over 80% of glass industry employees are production workers with wages averaging about 20% above the manufacturing average. [DOC 1997] Intense competition between producers of glass and alternative materials has caused the industry to significantly improve its operations. The fastest growing segments of the industry have been pressed and blown glass (specialty glass), products of purchased glass, and mineral wool (fiberglass insulation).

The United States is a large producer of glass products, with annual production of around 20 million tons annually. [Ross 1999] Overall, U.S. imports and exports are roughly equal. Some glass products do not lend themselves to extensive travel before use (e.g., beverage containers, fiberglass insulation).

The glass industry is also capital-intensive, due in part to the cost of rebuilding furnaces every 8-12 years. Most of the industry's limited R&D funds are focused on developing innovative products.

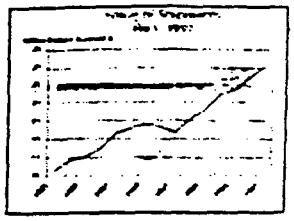
Industry Economic and Trade Statistics - 1997

Value of Shipments	**$27.2 billion**
Employment	**150,400**
Average Hourly Wages (Production Workers)	**$15.53**
Capital Expenditures	**$1.93 billion**
R&D Expenditures	**N/A**
Pollution Abatement Expenditures (1994)	
Capital	**$70.9 million**
Operating	**$213.7 million**
Trade	
Imports	**$3.439 billion**
Exports	**$3.288 billion**
Balance	**-$.151 billion**

Source: DOC 1994, DOC 1997

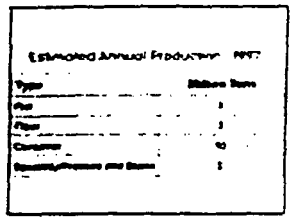
Value of Shipments

Increases in shipments have been driven by growth in specialty glass and products of purchased glass



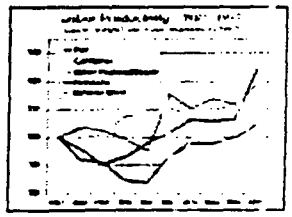
Annual Production

Over 20 million tons of glass products are produced every year



Labor Productivity

Labor productivity of glass workers has increased between 4-32% over the past decade



Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy Management Activities

Sources

Return to the Main Page of Glass

Energy Use

Glass Industry Analysis Brief

Energy Use by Fuel | Fuel Consumption by End Use | Energy Consumption by Sector | Energy Expenditures | Energy Intensity

The glass industry primarily uses energy to supply heat to the glass melting furnaces in which the raw materials are melted and refined, with downstream processing used to ultimately form and finish glass. According to the most recent Manufacturing Energy Consumption Survey (MECS), the U.S. glass industry consumed 249 trillion Btu of energy in 1994, excluding energy used in manufacturing products from purchased glass. [MECS 1994] Energy purchases cost the industry $1.4 billion in 1997, about 5% of the value of shipments that year. Excluding the much less energy-intensive products of purchased glass segment, energy purchases accounted for about 7% of shipments. [DOC 1997]

Glass Industry Total Reported Energy Use

(Trillion Btu)

Year	Total Energy Use*	
1991	186	
	Flat	49
	Container	85
	Pressed & Blown*	11
	Mineral Wool	41
1994	249	
	Flat	52
	Container	83
	Pressed & Blown*	63
	Mineral Wool	51

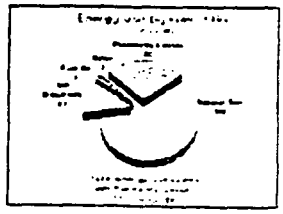
Source: MECS 1991, 1994

* Total excludes withheld data

Note: Years prior to 1994 do not include adjustments for energy shipped offsite. Does not include losses incurred during the distribution, generation, and transmission of electricity.

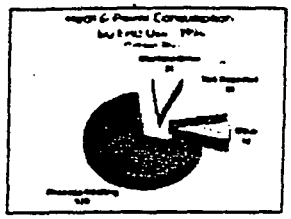
Energy Use by Fuel

Natural gas accounts for the majority of industry energy use



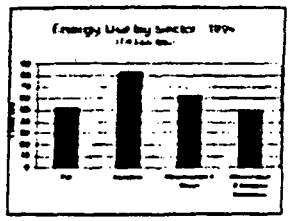
Fuel Consumption by End Use

Process heating accounts for two-thirds of industry energy use



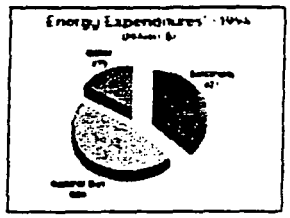
Energy Consumption by Sector

Glass container manufacturing consumes the most energy



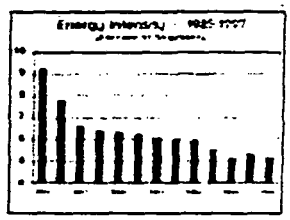
Energy Expenditures

Natural gas and electricity dominate energy expenditures



Energy Intensity

Energy intensity measures the energy consumed per dollar of product shipped



Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy Management Activities

Sources

Return to the Main Page of Glass

Technologies and Equipment

Glass Industry Analysis Brief

Generic Technologies

Transforming raw materials into usable glass products requires large amounts of energy to heat and melt the material and homogenize the glass.

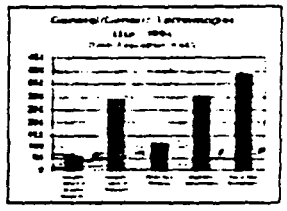
Industry-Specific Technologies

Unit Operation	Purpose	Major Technologies
Batch Preparation	Prepare raw material for melting	Wet mixing, batch agglomeration
Melting/Refining	Melt and refine glass to ensure uniformity	Side port furnace, end port furnace, regenerative furnace, electric boosting, unitmelters
Forming	Form glass	Tin bath (flat), IS machine (container), spinning (fiber)
Finishing	Modify strength and other properties	Annealing, tempering, coating, polishing

Source: Ross 1999

Generic Technologies

About 80% of glass facilities report using generic technologies to increase efficiency



Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy-Management Activities
Sources
Return to the Main Page of Glass

Energy-Management Activities

Glass Industry Analysis Brief

Manufacturers may conduct a number of energy-management activities to improve the efficiency of energy use. In the glass industry, the top four reported activities in 1994 included energy audits, purchase of electricity under special rate schedules (e.g., interruptible or time-of-use rates), equipment or facilities modification to improve direct machine drive, and equipment or facilities modification to improve facility lighting. Overall, about 53% of the glass population reported engaging in at least one energy-management activity. These reporting establishments were responsible for about 71% of the total glass industry energy use in 1994. [MECS 1994]

Energy-Management Activities - 1994

Activities	Establishments (weighted)	% Population	% Consumed Energy for Heat & Power
Energy Audits	184	38.1	52.6
Special Rate Schedule	126	26.1	34.5
Direct Machine Drive	122	25.3	38.6
Facility Lighting	116	24.0	34.5

Source: MECS 1994

Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Return to Industry Briefs Page

Economic Profile and Trends

Energy Use

State -Level Information

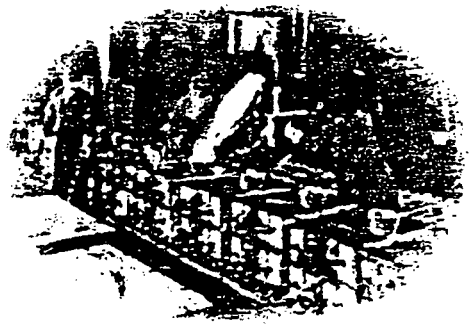
Technologies and Equipment

Energy Management Activities

Sources

Return to the Main Page of Metalcasting

Metalcasting Industry Analysis Brief



More than 90 percent of all manufactured goods and capital equipment use metal castings as engineered components or rely on castings for their manufacture [AFS 2000]. The metalcasting industry produces both simple and complex components of infinite variety, whether they are produced once as a prototype or thousands of times for use in a manufactured product. In addition to producing components of larger products, foundries may also do machining, assembling, and coating of the castings. Major end-use applications for castings include automobiles and trucks, farm and construction equipment, railroads, pipes and fittings, valves, and engines.[AFS 1998]

Metalcasting industry sales in the United States have been in the range of $25 to $28 billion annually for the past several years, with a small trade surplus. There are close to 3,000 foundries operating in all 50 states, employing one-quarter of a million people. [AFS 2000] The industry estimates that it invests more than $1.25 billion annually in pollution prevention technologies and in meeting environmental standards. [MECS 1994] Under the Standard Industrial Classification (SIC) system, the iron and steel foundries are grouped under code 332, while nonferrous foundries and die casters are grouped under code 336.

Economic Profile and Trends

Shipments from foundries are valued at about $28 billion annually.

Energy Use

The metalcasting industry uses an estimated 200 to 250 trillion Btu annually.

State-Level Information

U.S. metalcasting facilities are found in every state but are concentrated in the Midwest.

Technologies and Equipment

More than half of U.S. castings are produced using sand casting methods, followed by permanent mold, die casting, and investment casting.

Energy-Management Activities

About half of gray and ductile iron foundries conduct energy-management activities.

Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy Management Activities
Sources
Return to the Main Page of Metalcasting

Economic Profile and Trends

Metalcasting Industry Analysis Brief

Value of Shipments | Annual Production | Labor Productivity

The metalcasting industry provides approximately 1% of the manufacturing GDP. The industry employs a quarter of a million people in all 50 states, with a total annual payroll close to $7 billion [DOC 1996]. Small- and medium-sized foundries dominate the industry, with about 80% of all foundries employing fewer than 100 people and only 6% having a staff larger than 250 [Kanicki 1998].

The United States led all other countries in the world in producing metal castings in 1997, supplying one-fifth of the world's total shipments of 67 million tons. The nearest competitor is China, with about 16% of the total. [AFS 1998]

Public and private research institutions and organizations are part of the infrastructure of the metalcasting industry. R&D expenditures in 1997 were about evenly divided between nonferrous metals and ferrous metals [NSF 1997].

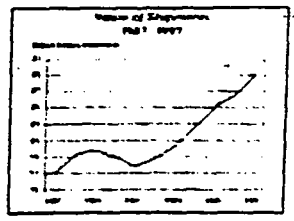
Industry Economic and Trade Statistics - 1997

Value of Shipments	**$29.1 billion**
Employment	**227,100**
Average Hourly Wages (Production Workers)	**$14.43**
Capital Expenditures	**$1.4 billion**
R&D Expenditures*	**$767 million**
Pollution Abatement Expenditures (1994)	
Capital	$52.2 million
Operating	$328.4 million
Trade	
Imports	$462 million
Exports	$579 million
Balance	$117 million

Source: DOC 1994, DOC 1997, NSF 1997, AFS 2000
* Includes R&D Expenditures for all primary metal production.

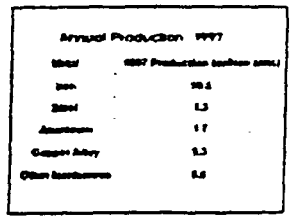
Value of Shipments

Casting shipments have increased steadily since the early 1990s



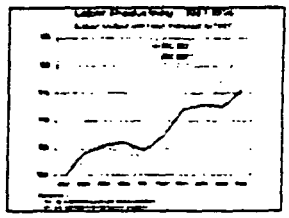
Annual Production

More than 14 million tons of castings are produced annually



Labor Productivity

The labor productivity of both ferrous and nonferrous foundry workers has increased over the last decade



Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Economic Profile and Trends
Energy Use
State -Level Information
Technologies and Equipment
Energy Management Activities
Sources
Return to the Main Page of Metalcasting

Technologies and Equipment

Metalcasting Industry Analysis Brief

Generic Technologies

The production of castings mainly involves process heating operations that consume large amounts of fossil fuels and electricity. Process heating needs include metal melting, mold and core baking and curing, and heat treatment. Process heating accounts for more than 75% of the industry's total energy use. Other operations include mechanical cleaning and finishing steps, which rely mainly on electric motors as does material transport. Sand reclamation units rely on thermal energy to clean the individual grains within the sand mass so that the sand may be reused. [Bates 1997, DOE 1999]

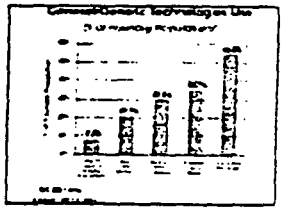
Onsite electricity cogeneration in the metalcasting industry is negligible. The majority of foundries are small establishments; many larger establishments are "captive" foundries within automotive manufacturing facilities.

Industry-Specific Technologies

Unit Operation	Purpose	Major Technologies
Process Heating	Melt metal (scrap, pig iron, virgin metal), heat molds and cores, heat treat castings, reclaim used foundry sand	Cupola furnace, electric induction furnace, arc furnace,reverberatory furnace, crucible furnace, hotbox, heat treating furnace, sand reclamation unit
Mechanical Cleaning and Finishing	Remove sand, scale, and excess metal from the casting	Rotary drum separators, blast cleaners, vibrators, cutoff machines, grinders

Generic Technologies

Slightly more than half of metalcasting industry facilities (SIC 3321 only) report using general technologies to increase efficiency



Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy-Management Activities

Sources

Return to the Main Page of Metalcasting

Energy-Management Activities

Metalcasting Industry Analysis Brief

Manufacturers may conduct a number of energy-management activities to improve the efficiency of energy use. In the metalcasting industry (SIC 3321 only), the top four reported activities in 1994 included the purchase of electricity under special rate schedules (e.g., time-of-use rates), energy audits, electricity load control, and equipment rebates. Overall, about half of all foundries reported in engaging in at least one energy-management activity. [MECS 1994]

Energy-Management Activities (SIC 3321) - 1994

Activities	Establishments	% Foundry Population	% Consumed Energy for Heat & Power
Special Rate Schedule	148	28.6	44.6
Energy Audits	144	27.9	45.7
Electricity Load Control	137	26.5	52.2
Equipment Rebates	100	19.3	32.6

Source: MECS 1994

Office of Industrial Technologies

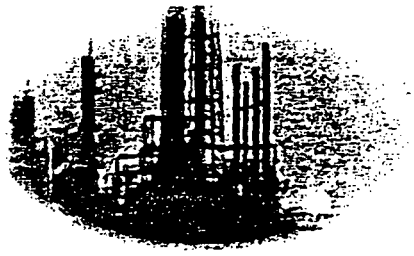
Energy Information Administration

Last Updated: 05/05/00

Return to Industry Briefs Page

Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy-Management Activities
Sources
Return to the Main Page of Petroleum

Petroleum Industry Analysis Brief



Petroleum is the single largest source of energy used in the United States. The nation uses two times more petroleum than either coal or natural gas and four times more than nuclear power or renewable energy sources. Before petroleum can be used it is sent to a refinery where it is physically, thermally, and chemically separated into fractions and then converted into finished products. About 90 percent of these products are fuels such as gasoline, aviation fuels, distillate and residual oil, liquefied petroleum gas (LPG), coke, and kerosene. Refineries also produce non-fuel products, including petrochemicals, asphalt, road oil, lubricants, solvents, and wax. Petrochemicals (ethylene, propylene, benzene, and others) are shipped to chemical plants, where they are used to manufacture chemicals and plastics. [DOE 1998]

The United States is the largest producer of refined petroleum products in the world, with 25 percent of global production and 163 operating refineries. In 1997 refineries supplied more than 6 billion barrels of finished products and employed about 65,000 people [DOE 1998, DOC 1997]. U.S. refineries are also the largest energy consumers in manufacturing and spend $5-$6 billion annually in pollution abatement costs [MECS 1994, DOE 1998]. The broad Standard Industrial Classification (SIC) for refining is SIC 29; oil and gas exploration falls under SIC 13.

Economic Profile and Trends

Refinery shipments total about $160 billion annually.

Energy Use

Petroleum refining is the largest industrial user of energy.

State-Level Information

Texas, Louisiana, California, Illinois, and Pennsylvania are the nation's top producers of refinery products.

Technologies and Equipment

Distillation, thermal and catalytic cracking, and reforming and alkylation are the workhorses of the industry.

Energy-Management Activities

Over 56% of petroleum refineries conduct energy-management activities.

Sources

Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy Management Activities

Sources

Return to the Main Page of Petroleum

Economic Profile and Trends

Petroleum Industry Analysis Brief

Value of Shipments | Annual Production | Labor Productivity

The U.S. petroleum refining industry is a strong contributor to the economic health of the United States, providing nearly $160 billion in annual shipments and employing 65,000 people in 1997 [DOC 1997]. Up to 2 million workers are employed in nearly 200,000 service stations around the United States. The wage paid to production workers in petroleum refineries is the highest in the nation, about $24 per hour [DOC 1997].

The United States is the largest, most sophisticated producer of refined petroleum products in the world, representing about 25% of global production. At the end of 1997 the United States had 163 operating refineries and 15.6 million barrels per day of crude oil distillation capacity [DOE/EIA 1999].

The petroleum industry has been dramatically impacted over the last three decades by geopolitical disruptions and volatile world oil prices. Today refiners must deal with volatile crude prices, crude quality variability, low marketing and transport profit margins, and the increasing capital and operating costs of environmental compliance. Refiners also import about 50% of crude oil and other feedstocks from foreign producers [DOE 1998].

Industry Economic and Trade Statistics - 1997

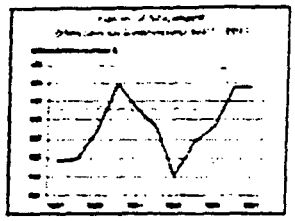
Value of Shipments	**$157.9 billion**
Employment	**64,800**
Average Hourly Wages (Production Workers)	**$23.80**
Capital Expenditures	**$4.25 billion**
R&D Expenditures *	**$1.6 billion**
Pollution Abatement Expenditures (1994)	
Capital	**$2.6 billion**
Operating	**$2.8 billion**
Trade	
Imports	**$13.2 billion**
Exports	**$6.6 billion**
Balance	**-$6.6 billion**

Source: DOC 1997, DOC 1994, NSF 1997

* Include petroleum refining and oil and gas exploration

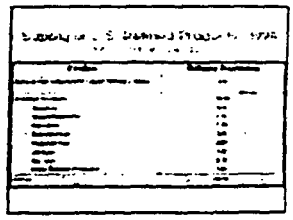
Value of Shipments

Refinery shipments have increased 4% annually over the last decade



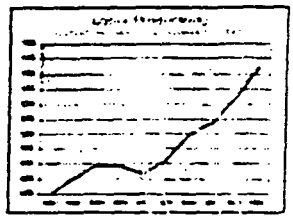
Annual Production

Over 6 billion barrels of refined products are produced each year



Labor Productivity

The labor productivity of refinery workers increased by 4% annually over the last ten years



Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy Management Activities
Sources
Return to the Main Page of Petroleum

Technologies and Equipment

Petroleum Industry Analysis Brief

Cogeneration Technologies | Generic Technologies

Refinery operations fall into five major categories that involve separation, cracking, rearrangement, and blending of hydrocarbons. How major processes are used varies considerably from refinery to refinery, as well as within an individual refinery, depending on the product slate that is desired.

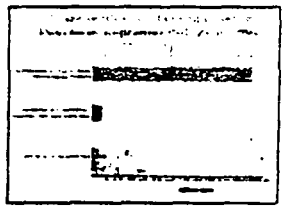
Major Petroleum Refining Processes

Category	Major Process
Topping (Separation of Crude Oil)	Atmospheric Distillation Vacuum Distillation Solvent Deasphalting
Thermal and Catalytic Cracking	Delayed Coking Fluid Coking/Flexicoking Visbreaking Catalytic Cracking Catalytic Hydrocracking
Combination/Rearrangement of Hydrocarbons	Alkylation Catalytic Reforming Polymerization Isomerization Ethers Manufacture
Treating	Catalytic Hydrotreating/Hydroprocessing Sweetening/Sulfur Removal Gas Treatment
Specialty Product Manufacture	Lube Oil Grease Asphalt

Source: DOE 1998

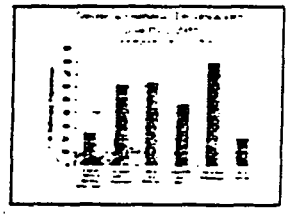
Cogeneration Technologies

Cogeneration in petroleum refineries often involves two or more technologies



Generic Technologies

More than half of petroleum refineries report using general technologies to increase efficiency



Office of Industrial Technologies

Energy Information Administration

Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy-Management Activities
Sources
Return to the Main Page of Petroleum

Energy-Management Activities

Petroleum Industry Analysis Brief

Manufacturers may conduct a number of energy-management activities to improve the efficiency of energy use. In petroleum refineries, the top reported activities in 1994 included energy audits, electricity load control, and equipment modifications to improve the efficiency of process heating and steam production. Overall, about 57% of the refinery population reported engaging in at least one energy-management activity. These reporting establishments used about 82% of the total refining industry process energy in 1994. [MECS 1994]

Energy-Management Activities

Activities	Establishments (weighted)	% Refinery Population	% Consumed Energy for Heat & Power
Energy Audits	108	43.7	71.3
Electricity Load Control	72	29.1	49.0
Direct/Indirect Process Heating	68	27.5	55.4
Steam Production	63	25.5	51.1

Source: MECS 1994

Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Return to Industry Briefs Page

Economic Profile and Trends

Energy Use

State-Level Information

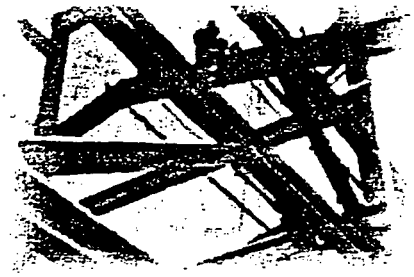
Technologies and Equipment

Energy-Management Activities

Sources

Return to the Main Page of Steel

Steel Industry Analysis Brief



The steel industry today is vital to both economic competitiveness and national security. Steel is the backbone of bridges, skyscrapers, railroads, automobiles, and appliances. Most grades of steel in use today – particularly high-strength steels that are lighter and more versatile – were not available ten years ago. Steel is the most recyclable and recycled material in North America, with an overall recycling rate of 68 percent. [AISI 2000]

The U.S. steel industry is a $50+ billion enterprise; additional downstream processing pushes this value closer to $75 billion. There are more than 1,200 firms operating in all but a few states. The absolute number of integrated mills (producing steel in basic oxygen furnaces) has always been relatively small and is currently about 20. The industry employs approximately 154,000 people nationwide. The steel industry (including iron production) is one of the largest energy consumers in the manufacturing sector and has invested more than $7 billion in environmental controls. [AISI 1999]

The broad Standard Industrial Classification (SIC) for the industry is SIC 331 and encompasses many 4-digit SIC categories.

Economic Profile and Trends

Shipments from steel industry facilities and downstream processors are about $75 billion annually.

Energy Use

The steel industry accounts for 2-3% of total U.S. energy consumption.

State-Level Information

Ohio, Indiana, Pennsylvania, Illinois, and Michigan have the highest steel shipments.

Technologies and Equipment

The industry consists of two types of facilities – integrated (ore-based) and electric arc furnace (primarily scrap-based)

Energy-Management Activities

About half of steel industry facilities conduct energy-management activities.

Sources

Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy-Management Activities
Sources
Return to the Main Page of Steel

Economic Profile and Trends

Steel Industry Analysis Brief

Value of Shipments | Annual Production | Labor Productivity

The steel industry provides about 5% of the total U.S. manufacturing GDP. The industry has undergone a major transformation since its recession of the late 1980s, investing in new process and product technologies and closing older mills. Today's steel industry is technologically sophisticated, employing more than 150,000 American production workers in jobs paying about 50% above the average for all U.S. manufacturing [AISI and SMA 1998]. The industry creates an additional 50,000 jobs for downstream processing.

The United States is the largest steel producer in the world, producing 107 million tons of raw steel in 1998, nearly 13% of total world production [Iron & Steelmaker 1999]. The industry has recently experienced large levels of imports because of world steel overcapacity resulting from economic downturns in Asia and the CIS. However, the industry's return on sales for both 1997 and 1998 approached 3% [AISI 1999a].

The steel industry spends hundreds of millions of dollars annually on R&D. Over the last 20 years, the industry has invested nearly $7 billion in environmental control equipment.

Industry Economic and Trade Statistics – 1997

Value of Shipments	**$75.9 billion**
Employment	**211,900***
Average Hourly Wages (Production Workers)	**$19.61**
Capital Expenditures	**$3.34 billion**
R&D Expenditures**	**$414 million**
Pollution Abatement Expenditures (1994)	
Capital	**$226.4 million**
Operating	**$1.2 billion**
Trade	
Imports	**$16.1 billion**
Exports	**$5.5 billion**
Balance	**-$10.6 billion**

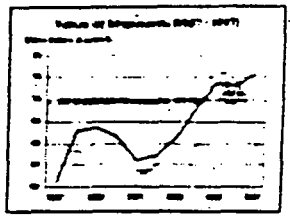
Source: DOC 1997, DOC 1994, NSF 1997

* Includes all types of employees in the steel industry and downstream industries related to steel fabrication.

** Includes R&D Expenditures for ferrous metal production and ferrous foundries.

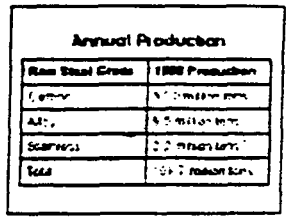
Value of Shipments

The industry and its downstream processors have a combined value of shipments exceeding $75 billion annually



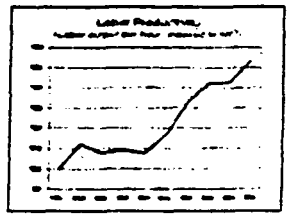
Annual Production

About 108 million tons of raw steel were produced in 1998



Labor Productivity

The number of man-hours to produce a ton of steel has been reduced by 60% in the last 15 years



Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy Management Activities

Sources

Return to the Main Page of Steel

Technologies and Equipment

Steel Industry Analysis Brief

Cogeneration Technologies | Generic Technologies

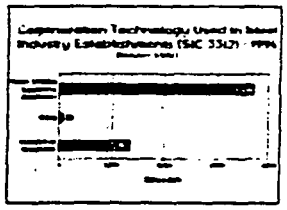
The production of molten steel mainly involves process heating operations that consume large amounts of fossil fuels (integrated steelmaking) and electricity (electric arc furnace steelmaking). Process heating accounts for more than 80% of the industry's total energy use. Forming processes use mainly electricity to drive casting machines, rolling mills, and other forming and finishing equipment.

Industry-Specific Technologies

Unit Operation	Purpose	Major Technologies
Process Heating	Drive chemical reactions, melt scrap, reheat steel prior to processing	Cokemaking, blast furnace ironmaking, BOF steelmaking, EAF steelmaking, reheating, argon oxygen decarburization
Forming	Shape steel into forms and semi-finished products and products	Casting, hot and cold rolling, extrusion, drawing, finishing, cutting

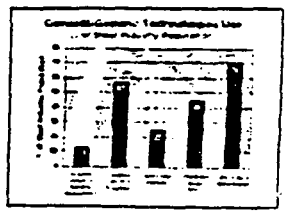
Cogeneration Technologies

Several large steel industry cogeneration projects have become operational in recent years



Generic Technologies

Nearly three-fourths of steel industry facilities report using general technologies to increase efficiency



Economic Profile and Trends
Energy Use
State-Level Information
Technologies and Equipment
Energy-Management Activities
Sources
Return to the Main Page of Steel

Energy-Management Activities

Steel Industry Analysis Brief

Manufacturers may conduct a number of energy-management activities to improve the efficiency of energy use. In the steel industry, the top four reported activities in 1994 included the purchase of electricity under special rate schedules (e.g., time-of-use rates), electricity load control, energy audits, and power factor correction or improvement. Overall, about 61% of the steel industry population reported engaging in at least one energy-management activity. These reporting establishments used nearly 94% of the total steel industry energy in 1994. [MECS 1994]

Energy-Management Activities (SIC 3312) - 1994

Activities	Establishments (weighted)	% Steel Industry Population	% Consumed Energy for Heat & Power
Energy Audits	94	33.1	67.9
Electricity Load Control	120	42.3	68.0
Power Factor Correction or Improvement	74	26.1	47.6
Special Rate Schedule	129	46.4	77.7

Source: MECS 1994

Office of Industrial Technologies

Energy Information Administration

Last Updated: 05/05/00

Economic Profile and Trends

Energy Use

State-Level Information

Technologies and Equipment

Energy Management Activities

Sources

Return to the Main Page of Steel

Technologies and Equipment

Steel Industry Analysis Brief

Cogeneration Technologies | Generic Technologies

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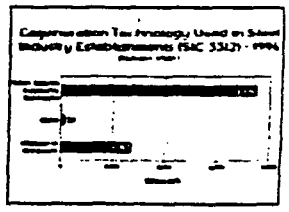

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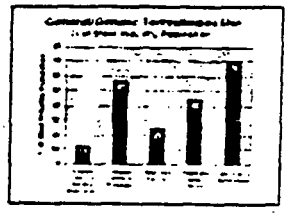


Summary of
Energy Policy Act Transportation Rate Study: Final Report on Coal Transportation
(U.S. Department of Energy - Energy Information Administration, November 2000, 90 pages)

This study was mandated by a provision in the Energy Policy Act of 1992. It was prompted by concerns of some in Congress that railroads would take advantage of shifts to low-sulfur coal induced by sulfur dioxide emission restrictions by raising their rates for hauling coal, especially low-sulfur coal from the Powder River Basin (PRB).

The study examined changes in transportation rates for coal purchased and delivered under supply contracts of more than one year duration shipped by rail from U.S. producers to certain U.S. investor-owned electric utilities from 1988 to 1997. Confidential rail rate data were obtained from Federal Energy Regulatory Commission (FERC) utility surveys. EIA augmented FERC data with data from the STB's Waybill Sample and industry reports.

Rail coal movements captured by the EIA study represent a majority of all rail coal deliveries to utilities, with the exact percentage varying from year to year. In 1997, for example, the quantity of coal hauled by railroads and covered by the study's augmented database was 367.2 million tons — an amount equal to 65 percent of the 563.3 million total tons of coal railroads delivered to all utilities in 1997. As expected, from 1988 to 1997 the share of low-sulfur coal rose (from 48.4 percent to 64.9 percent of movements), while the share of medium- and high-sulfur coal fell. The study noted that the rail share of total domestic coal tonnage rose from 57.5 percent in 1988 to 61.8 percent in 1997, driven largely by an increase in rail-hauled low-sulfur PRB coal.

The report's findings were unambiguous: "Although the share of coal transported by railroads increased, the average rate per ton to ship contract coal by rail fell steadily (a 25.8 percent decline) during the study period. The rates for coal in all sulfur categories were lower in 1997 than in 1988. ... The general finding of declining rates was also substantiated when the rates were calculated as a rate per ton-mile, a rate per million Btu, or rates between specific supply and demand regions. ... Clearly, the majority of the contract coal shipped by rail during this period traveled via lower real-dollar rates than in earlier years, and there is no evidence of widespread inflation of shipping rates by the major coal-hauling railroads following enactment of the [Clean Air Act Amendments of 1990]. In fact, the greatest decline in coal rail rates per ton — a 36.0 percent decline in constant dollar terms — was for low-sulfur coal, the very category over which concern may have been greatest." The report noted that "the decline in average contract coal rail rates during the study period was a response to competitive markets..."

A footnote in the study notes that "Because the rate data in this report represent regional data aggregations, they do not address alleged inequities in rates to and from isolated locations, or for "captive" shippers (with only one practical coal transportation option), or for small shippers who may not have access to technologically efficient loading equipment or may not qualify for high volume discounts." Rail detractors can be expected to seize upon this statement to dismiss the unambiguous major finding of the report: significantly lower rail rates for contract coal essentially across the board from 1988 to 1997.

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

ORDER REMOVING OBSTACLES TO INCREASED ELECTRIC GENERATION AND NATURAL GAS SUPPLY IN THE WESTERN UNITED STATES AND REQUESTING COMMENTS ON FURTHER ACTIONS TO INCREASE ENERGY SUPPLY AND DECREASE ENERGY CONSUMPTION

Docket No. EL01-47-000

COMMENTS OF THE NATIONAL HYDROPOWER ASSOCIATION

Introduction

On March 14, 2001, the Federal Energy Regulatory Commission (FERC, or the Commission) issued an Order asking for comments on ways to remove obstacles to electric generation and suggestions to increase energy supply in the Western United States. Below you will find comments of the National Hydropower Association (NHA, or the Association) concerning the section of FERC's Order which addresses the hydropower resource. NHA's comments focus on hydropower's role in providing near-, and long-term solutions to resolving the nation's energy problems by removing obstacles to increased electric generation. We thank the Commission for the opportunity to provide comments on these important matters.

NHA is the national trade association devoted exclusively to representing the interests of the hydroelectric power industry. Established in 1985, NHA has more than 120 members, including public utilities, investor-owned utilities, independent power producers, equipment manufacturers, engineering companies, consultants and law firms. NHA's membership owns or operates over 60 percent of all domestic, non-federal hydroelectric capacity and nearly 80,000 Megawatts (MW) overall.

Importance of Hydropower

Hydropower is by far our largest renewable electric generation resource – accounting for about ten percent of the nation's electricity and over 80 percent of its renewable energy. It is an emissions-free, clean, reliable source of domestic energy that possesses many valuable benefits beyond power supply. Among its benefits are transmission system reliability, water supply,

irrigation, flood control, recreation and transportation. Additionally, as an emissions-free power source, hydropower helps our nation meet its clean energy goals and reduces the number of health problems associated with air pollution. Further, as the FERC Order stated, hydropower is a critical component of the Western states' generating assets, as its combined total capacity is 24,600 MWs.

However, supply of hydropower is waning and America is in danger of losing significant hydropower capacity at a time when it is most needed. As we face rising energy prices, energy shortages and reliability concerns, now is clearly the time for policymakers at the federal level to incorporate hydropower into a national energy strategy. It is evident from the Order that FERC understands the value of hydropower and recognizes that actions can be taken to enhance the contribution of this valuable resource as we look to address the energy problems in the Western states.

Potential Hydro Capacity

In its Order, FERC suggests that many existing "projects are potentially capable of more fully using the available water resources to contribute to electric capacity and energy needs." NHA strongly agrees with this statement and also agrees with FERC that "existing projects are capable of improvements through 1) addition of new capacity units, 2) generator upgrading through rewinding, 3) turbine upgrading through runner replacement, and 4) operational improvements through such means as improving coordination of upstream and downstream plants, increasing hydraulic head, and computerization."

In the Order, FERC asks all licensees to immediately examine their hydro projects and propose any efficiency modifications that may contribute to the nation's power supply. Department of Energy statistics suggest that nationally 4,316 MWs of unutilized hydropower capacity is available at existing hydroelectric facilities. Of that potential capacity, 2,531 MWs are located in the Western states.

NHA has asked its membership to examine its projects in order to provide FERC with up-to-date capacity available through efficiency improvements and capacity additions. NHA and its members hope to present this data to FERC at its spring conference that is referenced in the Order.

Greater Operational Flexibility at Existing Commission-Licensed Projects to Address Short-Term Energy Shortages

The Commission's Order asked for comments on ways to allow for greater operating flexibility at Commission-licensed hydropower projects while protecting environmental resources. NHA interprets this request as a means to address immediate, short-term opportunities for increased generation. It was asked that the comments consider the following: 1) methods for agency involvement, 2) ways to handle and expedite Endangered Species Act consultation, and 3) criteria for modifying licenses.

In order for hydropower to play a role in addressing short-term energy problems while considering the criteria set forth in the Order, NHA recommends to FERC that it offer a new, temporary standard article to all licensees in the affected region, allowing those licensees to modify operations during generation emergencies without going through the time-consuming license amendment process.

Newer licenses typically have language allowing for temporary variances from minimum flow and certain other operational requirements, in emergencies beyond the licensee's control, upon agreement between the licensee and relevant resource agencies. The following standard article, which any licensee could adopt into its license, that allowed such flexible operation in a wider range of circumstances, would be an immediate way to help alleviate the current energy and reliability crisis in the Western region:

"Through December 31, 2001, the Licensee may modify or suspend any license article, term or condition that restricts electric generation, capacity or reliability, if such modification or suspension would help alleviate an electric supply, generating, or system reliability emergency within the United States portion of the Western System Coordinating Council. Prior to implementing any modification or suspension under this article, the Licensee shall consult with the appropriate federal and state resource agencies regarding any potential environmental impacts. No later than 10 days following modification or suspension under this article, the Licensee shall notify the Commission of its actions, including: (a) identification of each affected license article, term or condition; (b) an explanation of how the provision was modified or suspended; (c) the results of consultations with resource agencies and actions taken to minimize environmental impacts; and (d) the expected, or actual, time period of the modification or suspension. Any modification or suspension under this article shall continue only so long as such emergency shall persist."

The language suggested above would allow variances where licensees would consult with the resource agencies and attempt to minimize environmental impacts. In addition, these would be temporary modifications or variances to help to resolve temporary, but very serious, problems. Further, the proposal above is optional – licensees accept it only if they so desire: FERC would offer, not require, this article as an amendment. Finally, NHA suggests that FERC consider applying such an article to all projects nationwide as capacity and reliability problems are expected this summer in areas outside of the Western states.

In addition to the language above, NHA recommends that FERC expedite the approval of any application seeking authorization to add generating capacity achieved from 1) increased efficiency, or 2) additions of new capacity for projects that have the potential to offer immediate relief. Further, NHA recommends that FERC temporarily modify its Section 4.200 regulations to allow the "Required Exhibits" provisions of Section 4.201(b) to be complied with on an as-built basis for any amendment that would not result in a change in quantity of water diversion.

Incentives and Procedural Changes for New Generation at Existing Sites to Provide Longer-Term Solutions

Although maintaining a strong and viable hydropower industry is a critical component of the nation's energy strategies, hydropower development has been stagnant – almost non-existent – for a long period of time. NHA is examining FERC's capacity amendment process and will provide recommendations at the spring conference on ways to simplify and shorten the process in an effort to encourage the responsible development of new capacity.

While expediting capacity amendments to bring new hydro generation on-line as quickly as possible will help, financial incentives are needed for hydropower producers to seriously consider adding new capacity – bringing new hydro generation on-line is increasingly difficult and expensive. NHA recognizes that FERC does not have the ability or authority to provide financial incentives for new hydropower capacity at existing sites. NHA asks, however, that FERC strongly support legislative proposals that provide incentives for the development of untapped hydropower at existing sites. Through the combination of a proactive effort to more equitably balance energy and other interests (as FERC's Order addresses and we suspect legislation also will address), and the proper financial incentives (which Congress will address this session), new capacity can be added in the Western states that will provide long-term benefits.

Hydropower Licensing Reform

While the Order does not specifically ask for commenters to identify problems and suggest solutions related to FERC's hydro licensing process, NHA would like to take this opportunity to briefly comment on this matter. It is the view of our membership that a flawed licensing process has contributed to a decline in capacity and operational flexibility, a trend which is expected to continue unless action is taken by Congress, FERC and the Administration. If this problem is not resolved, the benefits offered earlier in our comments, and by FERC in its Order, will not be realized.

Problems inherent in the licensing process can be resolved by enacting legislation and implementing meaningful administrative remedies during this Congress. These remedies must require more balanced thought and circumspection by resource agencies such as the Departments of Interior and Commerce in applying their mandatory conditioning authority under Section 18 of the Federal Power Act, as well as the Department of Agriculture, under Section 4(e).

We must develop a licensing process that requires resource agencies to consider non-resource issues before exercising their review and conditioning authority. By requiring agencies to consider the economic effects of the conditions they impose on other project values and public interests, a balance can be struck and we can bring certainty to a process that desperately needs it. In addition, the process should allow licensees to review and comment on mandatory conditions during the process, limit conditions to project-caused impacts, enforce process deadlines, and improve the collaboration amongst agencies and stakeholders. Otherwise, we will continue to lose clean, reliable hydropower and exacerbate the problems we are currently experiencing.

Conclusion

NHA agrees with FERC that several steps can be taken to increase operational flexibility and encourage the additions of capacity to existing hydropower projects while still providing balance and environmental protection. NHA encourages FERC to continue examining ways to address these issues and to move forward as expeditiously as possible on procedures that would allow hydropower to operate in a more flexible manner and encourage the addition of new hydropower capacity. We look forward to working with FERC, resource agencies, and Congress to find ways to enhance the hydropower resource as a means to help address our nation's energy problems while still maintaining important environmental protections.

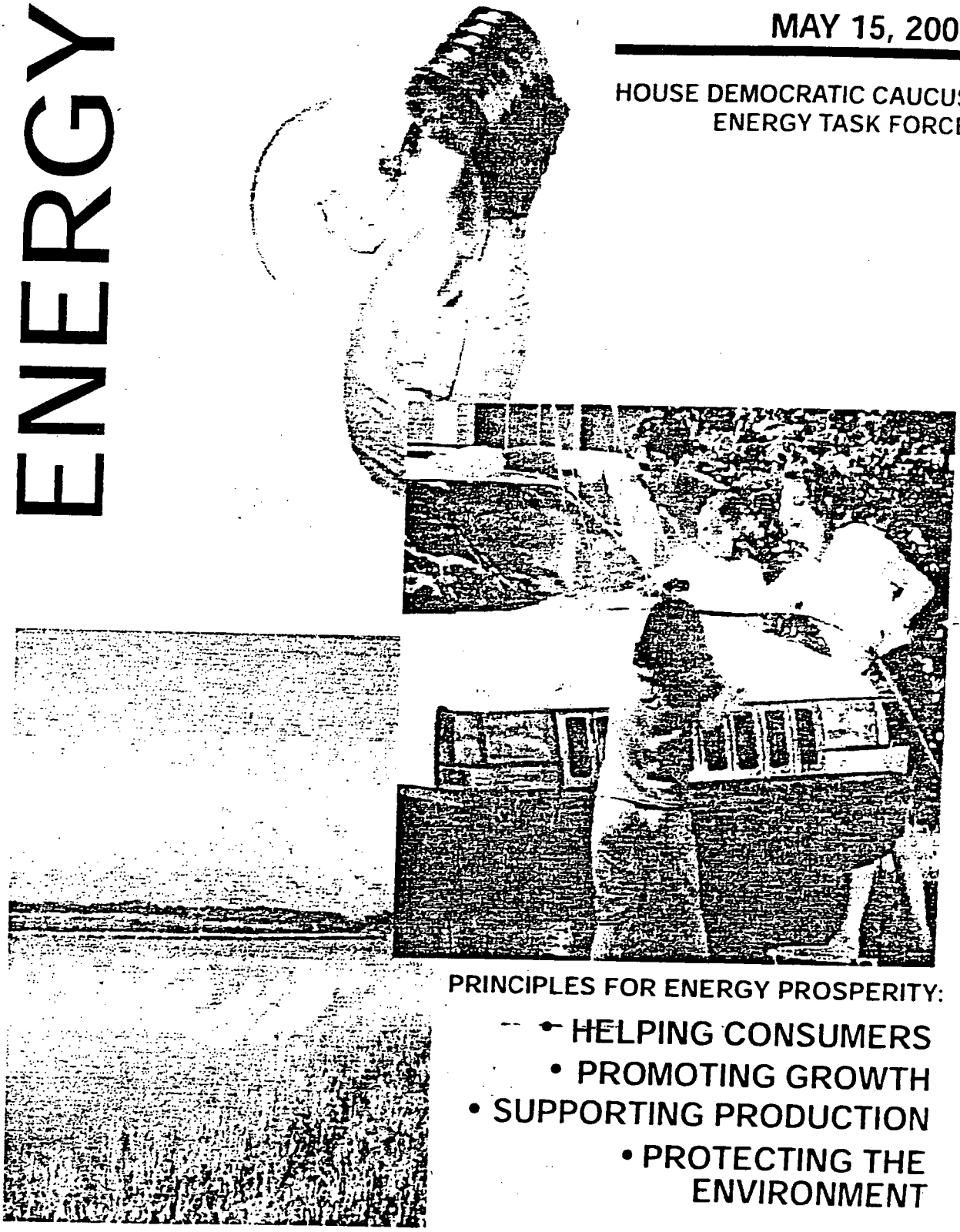
In addition, we are encouraged by the conference(s) your staff intends to convene this spring with agencies, licensees and others as indicated on page 20 of your Order, and look forward to participating in such conferences.

362

ENERGY

MAY 15, 2001

HOUSE DEMOCRATIC CAUCUS
ENERGY TASK FORCE



PRINCIPLES FOR ENERGY PROSPERITY:

- HELPING CONSUMERS
- PROMOTING GROWTH
- SUPPORTING PRODUCTION
- PROTECTING THE ENVIRONMENT

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PRINCIPLES FOR ENERGY PROSPERITY

Helping Consumers, Promoting Growth & Protecting the Environment

Democrats believe in a balanced national energy policy that helps consumers by both increasing energy production and reducing energy demand. We believe that America's current and future energy needs can be met without compromising our nation's fundamental environmental values. We believe that the federal government can lead by example and become more energy efficient, invest in innovative technologies, and assure that energy markets are fair and competitive.

Democrats reject President Bush's misguided notion that America must sacrifice the environment in order to maximize energy production. We can grow the economy and, at the same time, make strides in improving the environment. Democrats do not believe we need to open our most pristine wilderness areas to oil and gas drilling, when the vast majority of America's oil and gas resources – meeting decades of energy needs – are on less sensitive lands already open to energy development. Accordingly, Democrats oppose President Bush's plan to open the Arctic National Wildlife Refuge for oil and gas exploration.

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Democrats strongly object to President Bush's assertions that the substantial improvements made in cleaning the air we breathe, cleaning the water we drink, or improving our public health must be sacrificed in order to ensure adequate energy will be available to fuel our industries, heat and cool our homes and businesses, and keep motorists on the road. In fact, we think these assertions are just plain wrong and are designed to scare Americans. Democrats do not advocate energy policies that will require rationing or reductions in our standard of living, rather, we advocate an energy policy that is balanced, fair, and forward-looking. The President and his Administration will in the coming days advocate the construction of more than 1300 new power generating plants, drilling on environmentally-sensitive public lands, and reducing the regulations on energy production which have brought cleaner air and greater efficiency. Democrats support a plan that recognizes the need for new energy production and generation, and will at the same time save consumers money, continue the important work to cut pollutants that affect the health of every American, create real jobs, and will reduce the percentage of imported foreign oil we need to keep our economy strong and to protect our national security.

The plan to be unveiled this week by the Bush Administration follows on the heels of 6 years of energy inaction and intransigence from the Republican-controlled Congress. The Bush Administration is merely following the same tired old Republican playbook: cast blame, insist on extreme anti-environmental proposals, and provide American families struggling to pay their energy bills with no real help now and very little in the future.

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I. HELPING CONSUMERS NOW

President Bush has said that there is nothing he can do to help American families suffering through record high energy bills, gas prices, and electricity blackouts. These claims are a failure of leadership. The American people have earned answers, not excuses.

Democrats believe we can act to alleviate the electricity problems faced by the Western United States. We support multiple ~~steps for helping consumers **NOW** in~~ addition to proposals for providing longer-term help to American families and businesses. Democrats propose effective protections against price gouging, retroactive tax credits for better energy efficiency and assistance to lower income families and the elderly on fixed incomes to help meet and lower their energy costs.

Since the energy crisis of the 1970's, America has saved or produced ***four times*** more energy through efficiency, conservation and renewables than was produced from other new sources. In addition, energy savings cut utility bills for homes and businesses - saving money for American families and making American business more competitive. However, President Bush is now practicing divisive politics by proposing a shortsighted policy that disparages the value of energy efficiency and renewable energy.

An End to Price Gouging

Western Electricity: Democrats believe that the Federal Energy Regulatory Commission (FERC), led by a chairman appointed by President Bush, has failed to enforce the law and stop unjust and unreasonable wholesale prices from being charged in the Western electricity grid. As has been well reported by the press, many communities in the West have faced markedly higher prices for electricity while at the same time they have had to deal with blackouts in their electricity service. Democrats are concerned about the economic implications of this situation for the Western U.S. as well as for entire Nation. Since the FERC and President Bush have repeatedly refused to act, Democrats call on Republicans in Congress to work together with Democrats to promptly pass the ~~Feinstein~~-Smith bill (S. 764) or the Inslee bill (H.R. 1468) that will return the West to just and reasonable cost-of-service based rates until March 1, 2003. These bills still allow generators to ~~make a profit,~~ and in addition, they exempt new generation to encourage new power plant development and construction. Democrats also believe FERC should order refunds of unjust overcharges that have already occurred. To date, over $6 BILLION in overcharges have been referred to FERC for investigation.

Gasoline Nationwide: Democrats are disturbed about the inaction of President Bush in response to gasoline prices that have now climbed over to $1.70 per gallon for regular unleaded. While Bush Administration officials express their concern, they continue to disregard the Federal Trade Commission's (FTC) March 2001 report that found that during last summer's Midwestern gasoline price spike, certain suppliers withheld or delayed shipping gasoline in order to maximize profits. While not illegal, their actions were clearly against the public's interests. It is the responsibility of the President Bush and his Administration to be vigilant in protecting American consumers. **We call on President Bush to take the following steps:**

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Call on OPEC, and non-OPEC oil producers such as Mexico, to increase production at this time when the world spot price for crude oil continues to hover over $28 per barrel. In January 2000, when spot prices were $27 per barrel, then-candidate Bush harshly attacked President Clinton, saying the President "ought to get on the phone with the OPEC cartel and say 'We expect you to open your spigots!'"

Follow the examples of former Presidents Bush and Clinton, and announce that he is prepared to use his authority over the Strategic Petroleum Reserve to release crude oil in the event of future oil market disruptions. The last two Administrations both successfully released oil from the Reserve to calm energy markets during times of instability. President Bush's pronouncement that he will not use the Reserve to combat manipulation of energy markets amounts to unilateral disarmament in talks with oil producing countries.

Instruct the Justice Department to aggressively investigate energy pricing to assure that illegal price fixing does not occur, and to give thorough anti-trust reviews to any proposals to further consolidate energy companies.

Congress Must Act: The Republican Congress has also ignored the best interest of American consumers by ignoring rising gas prices and refusing to provide real relief for consumers and businesses in the Western U.S. The Republican Congress should fulfill its oversight responsibilities for monitoring energy supplies and the cost of energy. Congress should begin comprehensive hearings on pricing practices throughout the energy industry to find remedies for market manipulation and excessive concentration that can endanger economic growth and public safety.

Energy Efficiency Now!

American are already making lifestyle-changes because of high energy prices, and, as most of the country approaches air conditioning season and as summer vacations

approach, many families will have to curtail the use of appliances or change their vacation plans in order to be able to pay their energy bills. In addition to the immediate help we have called for above, Democrats believe the Congress should take quick action to help families and businesses maximize energy efficiency and conservation without having to make large and painful lifestyle changes. Democrats propose innovative tax incentives for gains in energy conservation and efficiency. We propose a flexible, non-refundable, tax credit for high efficiency vehicles, purchase of energy efficient homes, or defined home improvements that reduce energy costs.

Best Energy Saving Tax Credit (BEST Credit): A flexible consumer tax credit for up to $4,000, provided for:

- *New Homes:* Purchasing a newly constructed or manufactured home that exceeds efficiency standards set under the 2000 International Energy Conservation Code. Up to $4,000 credit for purchase, based on the energy efficiency of the new home.

- *Home Improvements:* Retrofitting existing homes with renewable energy generation, co-generation and/or geothermal heating/cooling. Replacing existing systems with Energy Star appliances, heating/cooling equipment that exceeds federal minimums, high efficiency lighting, windows/doors and/or insulation that meet or exceed federal guidelines. Twenty percent of cost up to $4,000 based on the measures taken by the consumer.

- *Vehicles:* Purchasing cars and/or light trucks/SUV's/minivans equipped with fuel saving new technology or alternative fuel engines. The consumer tax credit will facilitate the introduction of fuel saving technology on those vehicles that consumers are buying to meet their diverse transportation needs. Credit up to $4,000 based on fuel savings or other performance standards.

Structure and Vehicle Efficiency Tax Incentives (SAVE Incentives):
Democrats believe American business should be leading the world in lowering business costs through increased efficiency, conservation and use of renewables.

- *Renewables:* Provides up to a 30% investment tax credit for business investment in renewable energy generation, including wind turbines, co-generation, solar water heating and photovoltaic panels, fuel cells, geothermal technologies and other similar energy efficient technologies.

- *Efficiency:* Allows business to take a deduction for increasing energy efficiency in non-residential buildings, including commercial buildings, state and local government buildings and rental housing The deduction may be taken for up to $2.25 per square foot for property improvements that reduce

energy use by 50% below defined standards.

Vehicles: Provide a 20% investment tax credit for purchase of cars and/or light trucks/SUV's/minivans equipped with fuel-saving new technology or alternative fuel engines.

Supplemental Funding for LIHEAP: Democrats call for action now to help low and fixed income American families meet the rising costs for energy. Democrats call for supplemental funding for the low-income energy heating assistance program (LIHEAP), for the current fiscal year, to respond to record high energy prices.

Cutting the Federal Government's Energy Bill: Since the start of the Western Electricity crisis, the California state government has cut its daily electric usage by eight to over twenty percent. Democrats believe it is time for the federal government – America's largest energy user with over 500,000 buildings – to become part of the solution and not part of the problem. Democrats propose that all federal facilities in the Western Electric Grid, and in other regions susceptible to electricity shortages, meet a minimum daily reduction in electric power usage of eight percent. Facilities in areas subject to potential blackouts should be prepared to match local government reduction goals during times of power alerts. That means, for example, the federal government should match the twenty percent performance of California in the event of a serious power alert.

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Mass Transit and Van Pooling Benefits: Democrats have long supported the development of an extensive network of public transit systems throughout the nation, in urban, rural, and suburban areas. Democrats continue to support increased funding for these programs so as to provide more low-cost mobility for people who cannot afford to own a car as well as for providing an affordable, high-quality alternative to using automobiles for commuting to work. Because ridership costs for public transit are increasing, Democrats support increases in the transit benefit for both public and private sector employees as well as an increase in the allowable tax deduction for those private sector employers who make the program available to their employees. In addition, Democrats support providing tax incentives for businesses and individuals who provide van pools for commuting workers.

Helping Public Schools Now!

Democrats further believe supplemental funding of $200 million in emergency assistance should be provided in the current fiscal year to help mitigate the impacts of the electricity crisis in the Western Electric Grid. Modeled on the emergency measures adopted by the state government in California, we propose to provide the

funding to cover the costs of the necessary steps to reduce energy use in federal facilities, but also to assist public schools hard pressed by dramatically rising energy costs. This weatherization and energy cost assistance program is vital if public education is not to suffer. Many western school districts are already adjusting budgets – including laying-off teachers – to pay power bills. Democrats believe compromising the quality of education is an unacceptable consequence of the current electricity crisis.

II. LONG TERM ENERGY SAVINGS

These first steps to promoting better efficiency, more conservation, and greater use of renewables should be followed by continued support for bringing these new technologies to the market place to help consumers save money. Democrats, therefore, propose that the **BEST** Credit and **SAVE** Incentives (discussed on pages 3 and 4) be implemented as quickly as possible to help taxpayers in the current tax year and that they be made available for up to ten years. Over time, Democrats believe our proposals will lead to increased manufacture of new energy efficient equipment and vehicles, and greater investment in construction and renovation that will stimulate economic growth and provide real jobs for American workers. At the same time, these steps save money for businesses and families by reducing energy costs throughout the entire economy

In addition, we call for the enactment of other long-term incentives to help Americans deal with rising energy costs:

Weatherization, Heating Assistance, and Reduced-cost Mortgage Initiative (WHARM):

Democrats favor programs targeted to help lower and middle income Americans meet and lower their energy costs over the long term. We can do this by expanding the successful, bipartisan-supported, LIHEAP program. Currently, only one-third of eligible families receive assistance from LIHEAP for paying the high costs of heating and cooling their homes. We can also assist these families by helping them to take the often rudimentary steps necessary to reduce their energy cost by eliminating energy loss in their homes. Finally, we recognize that purchasing more energy efficient homes, or making energy saving improvements can be beyond the financial resources available to many Americans. ***Democrats believe we need to find creative new ways to help American families finance their steps that will lower their energy costs through greater energy efficiency.***

Weatherization: Democrats would fulfill President Bush's broken campaign promise and actually double the highly successful low income, home weatherization program (exceeding the Bush budget by $450 million over ten years - helping an estimated 150,000 more families than under the Bush budget.)

LIHEAP: Democrats would raise the authorization for the low income energy heating assistance program (LIHEAP) from $2 billion to $3.4 billion, and support appropriations for LIHEAP at the fully authorized level, beginning in FY2002.

Energy Efficient Financing: Democrats support steps to expand the market for "energy efficient mortgages" and to make these financial products more flexible to help more families. Democrats propose that the federally sponsored secondary

market institutions and any direct federal loan programs be required to offer financing tools that provide increased incentives to improve energy efficiency. Democrats would direct these agencies to develop within twelve months proposals for making energy efficient mortgages more affordable, more flexible home improvement loans, and allow energy savings to be included in calculating loan eligibility.

III. INCREASING ENERGY PRODUCTION

Democrats are committed to a policy of increased energy production and the environmentally sound use of all energy sources. Moreover, Democrats favor continuing the production of energy on public lands in accordance with the established procedures followed so successfully by the Clinton Administration. President Clinton produced more energy from our public lands that the previous Bush or Reagan Administrations, demonstrating that energy production can be enhanced while at the same time respecting environmental protections, and without sacrificing natural wonders set aside for their unique contribution to our environmental heritage. According to the Department of the Interior, 85% of the United States' proven oil and gas reserves are in areas open to drilling. Democrats support policies to encourage further production of energy from these regions.

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Democrats encourage the construction of and continued maintenance of energy production and delivery systems in the United States. We recognize that refinery bottlenecks, pipeline disruptions and outdated transmission facilities have had a significant negative impact on safe, efficient development and delivery of energy. Democrats support tax incentives to encourage the development of critical energy infrastructure, review of federal regulations to find ways to maximize use of this infrastructure, and strengthen laws to insure safety and reliability.

Domestic Energy Enhancement Program (DEEP)

Democrats recognize that traditional energy sources, such as natural gas, crude oil, nuclear and coal will continue to meet the majority of America's energy needs for much of the foreseeable future. Democrats believe in enhancing our energy production and in finding ways to encourage making greater advances in lessening the impact on our environment.

Petroleum Production: Currently, oil and natural gas account for approximately 65 percent of the nation's energy supply and will continue to be the significant energy source in our country. Democrats believe we need to provide greater market stability for both the oil and gas industry to help maintain and increase domestic production, and to deter wild price swings that hurt American families. Democrats support targeted tax incentives for domestic production of crude oil. These

incentives are directed at making marginal wells more profitable to keep them in production as well as to reduce the costs of domestic exploration for new sources of oil and gas. These tax credits include, but are not limited to:

- Tax credits for producing oil and gas from marginal wells.

- The election to expense geological and geophysical expenditures and delay rental payments.

- 5-year net operating loss carryback for losses attributable to operating mineral interests of independent oil and gas producers.

- Temporary suspension of limitation based on 65 percent of taxable income and extension of suspension of taxable income limit with respect to marginal production.

Petroleum Market Stability: Wild price swings are harmful to both domestic producers and consumers and can constitute a threat to our economic stability and national security.

- *Petroleum reserve:* One tool available to minimize the economic damage caused by oil market disruptions is the release of oil from the Strategic Petroleum Reserve. And, in order to protect the domestic industry in times of falling prices which may force the shut-down of domestic wells, the Federal government should purchase oil to place in the reserve. President Bush has announced that he is not willing to release oil from the SPR as a means to stabilize prices during market disruptions. Democrats would require the President to report to Congress on why oil will not be released when market prices exceed $30/barrel, and report why domestic oil will not be purchased from marginal wells for the SPR when prices are below $15/barrel.

- *Heating oil reserve:* Democrats pushed for the creation of the Northeast Home Heating Oil Reserve and call on President Bush to continue funding for the Northeast Home Heating Oil Reserve. Additionally, Democrats support legislation that would require the President to report to Congress why home heating oil will not be released when market prices exceed the triggers in current law, and report why stocks to fill the reserve will not be purchased when prices are low.

- *Enhance retail competition:* Democrats also recognize that increased concentration in the oil and gas industry has led to price discrimination against independent gasoline marketers who often do not get the lowest price from allied wholesalers and refiners. Democrats propose that a price-reporting requirement be imposed on the wholesale and refining industries in order to

allow independent marketers an equal opportunity to obtain the lowest price for vehicle fuels. This will allow these retailers to offer lower prices to consumers.

Natural Gas: Democrats recognize that, according to the National Petroleum Council, 91% of the United State's proven reserve of onshore natural gas (1,466 trillion cubic feet), is open to drilling. Seventy-nine percent of offshore natural gas (286 trillion cubic feet) is currently open to drilling. Together these reserves would meet current needs for 40 years. In order to encourage natural gas production, Democrats propose the same tax incentives for marginal wells and domestic exploration as proposed above for crude oil.

In addition, Democrats support a production tax credit to promote the development of a new Trans-Alaskan natural gas pipeline to bring natural gas on Alaska's North Slope to the continental United States, consistent with current environmental regulations and current law which authorizes the construction of the pipeline.

Democrats also support the creation of a natural gas reserve to protect American consumers from dangerously high natural gas prices which affect the electricity market, and to be used to buy domestic natural gas from marginal wells during times of low prices.

Pipelines: In addition to the development of a new Alaskan natural gas pipeline, Democrats propose strengthening our current oversight program for pipelines in order to enhance safety and reliability. In 2000, seventeen Americans lost their lives in pipeline accidents. In addition, pipeline disruptions caused significant supply and price problems.

Democrats would further require the Federal Energy Regulatory Commission to review its permitting process to speed approval of pipeline siting and construction. Under the Clinton Administration, FERC greatly reduced the time required for permitting new pipelines. However, more needs to be done to further expedite the siting of pipelines but without compromising safety or environmental standards. In addition, the Department of Transportation's Office of Pipeline Safety must stringently enforce pipeline safety laws in in order to protect human health and safety as well as environmental standards.

Coal: Coal is currently the source for over 50% of America's electricity generation. Democrats believe we need to encourage innovation in research and provide incentives for reducing pollution from our existing coal-fired power plants.

"EXCEED" Tax Credit: Democrats propose a ten percent investment tax credit for the cost of clean air control technology for utilities that lead a power plant to exceed mandatory emissions reduction levels for pollutants regulated

under Title I of the Clean Air Act, or for significant early compliance with clean air emissions reduction target dates. This credit would also be extended to measures that reduce CO2 emissions. This credit could be applied on a sliding scale to encourage greater or faster emissions reductions. Public utilities and coops would be permitted to trade the credits or use them as offsets against debt or obligations in lieu of tax credits.

Hybrid plants: Democrats propose up to a ten percent investment tax credit for modifications to existing coal plants to allow the use of biomass and/or synthetic liquid and gaseous fuels from coal, in combination with coal to produce at least five, and up to fifteen percent of a plants' fuel requirements from such sources. The use of such technologies as biomass would significantly improve environmental performance, while also offering farmers a new market for agricultural surpluses. Public utilities and coops would be permitted to trade the credits or use them as offsets against debt or obligations in lieu of tax credits.

New research: Over the last 30 years, emissions from coal-fired plants have been reduced by 20 percent, while power generation has tripled. Continuing this progress is important to our economy, to improving the environment, and to reducing our dependence on foreign sources of fossil fuels. Democrats support funding for research on technologies that can further reduce emissions from the use of coal.

Nuclear: Democrats recognize that nuclear energy currently provides approximately 20 percent of the nation's electricity. We support continued research in advanced technologies for nuclear power as well as continued efforts to find safe and environmentally sound methods to reduce nuclear waste and provide for its safe disposal.

Electricity transmission: Increased wholesale electricity sales have placed strains on our existing electricity transmission infrastructure. Democrats would direct the National Academy of Science to study our existing nationwide grid to identify infrastructure bottlenecks so that the federal government can then target incentives to the highest priority modernization projects.

Refining capacity: While refining capacity expanded in the past eight years to higher levels than were achieved under either former Presidents Bush or Reagan, recent refinery expansions have not resolved the many problems with refinery bottlenecks. Democrats propose measures to address the energy-processing problem:

Biomass-fuels: Last summer's Midwest gas price spike was caused in part by refinery delays in preparing reformulated and regular fuels. Democrats propose investment tax credits for cooperatives that construct biomass-fuel

(such as bio-diesel and ethanol) refining capacity. This tax incentive will help to increase the supply of these fuels to keep pace with rapidly rising demand. It will also help farmers who have been hard pressed during the past three years by record low crop prices.

Expedited review: Democrats would instruct EPA to continue the Clinton Administration practice of expediting the agency's review of refinery permits within 180 days. We support efforts that speed up federal environmental reviews when to do so does not detrimentally impact environmental standards. Under the last Administration, for example, the EPA's review process enforced environmental laws, and led to over two dozen refineries expanding their capacity – allowing American industry to achieve high levels of refining capacity.

Renewable Energy Advancement Program (REAP): Renewable energy remains at a competitive disadvantage in the current marketplace, where long-term energy security and environmental gains are minimal factors. Democrats propose a comprehensive tax and assistance program for leveling the playing field for energy produced from renewable resources so renewable energy use can grow as a percentage of the energy market for America's long-term benefit.

Tax Incentives: Democrats support increasing the existing investment credit for renewable energy infrastructure to 20% for solar and geothermal, and extending the credit to wind and biomass and any energy produced from renewable resources. Democrats also call for increasing the current tax credit for producing electricity to 2 cents per kilowatt hour for electricity produced from wind and biomass, and extend the credit to solar and geothermal.

CARE Bank: Democrats propose to create a **"Clean, Alternative and Renewable Energies" Public Benefits Bank** to provide flexible financing for rapid development of America's renewable energy generation. The CARE Bank would serve as an infrastructure bank for state and local governments, schools and universities, and non-profits and cooperatives. Funded at $1 billion per year for the next ten years, the CARE Bank would finance such projects as placing solar panels on school rooftops, the cost of net metering equipment, and the necessary infrastructure for maintaining fleets of alternative fuel vehicles. This flexible fund will help to provide the resources for local communities to better manage their energy costs and increase local energy generation.

IV. PROTECTING THE ENVIRONMENT

President Bush is dividing and not uniting Americans when he pits the Nation's energy needs against our most important environmental protections. The American public has consistently supported protection for our wildlife refuges and wilderness areas. ***Democrats believe the United States can increase energy production while also protecting the environment.*** The first steps to achieving this goal are the effective efficiency, conservation and renewable energy programs previously described. We must also continue to be wise stewards of our federal lands, advocates for cutting air pollution – including CO2 emissions that are the leading cause of global climate change – and oppose efforts to take short-sighted short-cuts through our environmental laws. In that light, Democrats are troubled by President Bush's turnaround on this important issue and call on him to fulfill his campaign promises to implement the CO2 emission regulations first proposed by President Clinton.

Protecting our lands: Democrats have long supported environmental protections for our rare wilderness areas. We believe that President Bush has failed to justify a change in the policy of successfully balancing energy production and environmental protections. In the last eight years, energy production on federal lands reached record highs, yet at the same time, millions of acres of America's most beautiful, rare and pristine lands were set aside for the enjoyment of all Americans and future generations.

Clean Air Incentives (EXCEED Tax Credit): Provide an investment tax credit of up to 20% for the cost of clean air control technology for businesses that **exceed** mandatory emissions reduction levels for pollutants regulated under Title I of the Clean Air Act. In addition, Democrats believe the **EXCEED** credit should be provided to **utilities that cap their CO2 emissions at 2000 levels**. The utility would earn a larger credit based on the increased level of emission reductions, with the largest credit for CO2 given for reducing emissions to 1990 levels. The credit could be traded by publicly owned utilities and energy cooperatives to encourage their participation in greater emissions reductions.

Expedited Environmental Review: Democrats disagree with Republican claims that environmental standards must be waived and weakened in order to speed economic development. Democrats oppose weakening America's environmental laws. We support efforts to quicken federal environmental reviews when to do so does not detrimentally impact environmental standards, such EPA's 180-day review of refinery permits previously noted. Democrats would require federal agencies to review their environmental review procedures in order to find time savings, that do not compromise environmental protections, for energy generation, processing, transportation and transmission projects that require federal approval.

Moving forward on the environment: Democrats are disappointed that President Bush has used his first 100 days to establish a record of rolling back environmental standards and the Nation's commitment to continued progress in fighting pollution. We call on the President to reverse course and work with Democrats on these key issues:

- *Vehicle fuel efficiency:* Democrats believe that the Secretary of Transportation should prescribe by regulation the maximum feasible fuel economy level for light trucks, SUVs, and mini-vans that he decides the manufacturers can achieve in a model year, in accordance with requirements and conditions of existing law.

- *Appliance efficiency standards:* Democrats believe the Bush Administration should not weaken the appliance efficiency standards proposed by the Clinton Administration, including those for air conditioners.

- *Global climate change:* Democrats believe the United States should continue to be an active participant in international talks on global climate change. President Bush should fulfill his campaign promises to seriously address climate change, and he should recognize that scientific fact shows global climate change is occurring and is a serious risk to the health of our planet. President Bush has significantly damaged the diplomatic credibility of the United States by his actions on global climate change, and he has acted in disregard of the views and best interests of the vast majority of Americans. Democrats also call for immediate action, as describe in Section V, to reduce federal government energy use, saving taxpayers money, and voluntarily achieving greenhouse gas reductions over in a manner consistent with current American law.

V. LEADING ON ENERGY

The federal government is the largest single consumer of energy in the United States. For example, the government manages the energy demands of 500,000 buildings. The federal government must become an energy leader by taking aggressive action to cut its energy use. The federal government can also lead the private sector by example by investing in research on long-term solutions to meet our national energy requirements.

Cutting Federal Energy Use: Democrats propose that the federal government establish an energy use budget, and set goals for reducing federal energy costs over the next ten years. Democrats call for increased funding for up-front investment in converting energy sources for federal buildings, such as installation of solar panels on roof-tops, and improving the energy performance of buildings and equipment. In addition, Democrats propose to reward energy saving agencies by allowing them retain half of the money saved from reduced energy bills for use in agency programs that serve the public.

Government contracting: We believe that the federal government's current contracting rules do not take into full consideration the energy costs incurred by the government. Democrats propose that the rules for awarding construction contracts and standards for equipment purchases be changed to require consideration of long term energy operating costs. The government should not, for example, be buying the least expensive air conditioning equipment if it costs more taxpayer's money when operating costs are factored into the bid. Government buildings should also be constructed in a way that produces the lowest costs to taxpayers throughout the life-expectancy of the structure.

Vehicle purchasing: The federal government is one of the largest single purchasers of vehicles in this country. As automakers prepare to introduce a new generation of hybrid vehicles into the marketplace, Democrats believe the government should be leading the way in making this new technology a success. We propose that the federal government be required to purchase hybrid vehicles, when such vehicles are available and can meet all performance needs for the purchasing agency. This presumption in federal purchasing would be a powerful stimulus to lowering the costs and increasing the available of these vehicles to the public at large.

Appliance Efficiency Standards: Democrats believe that the Bush Administration should immediately reinstate the 30% efficiency improvement standards for central air conditioners that it rolled back earlier this year. The Bush Administration should also accelerate rulemakings to adopt, within two

years, updated efficiency standards for commercial air conditioners and residential heating systems. In addition, Democrats also believe that the Department of Energy should propose strong new standards for other devices, such as limits on standby power consumption of televisions, VCRs, and other electronic products, and establish efficiency standards for exit signs, traffic lights, torchiere lighting fixtures; and utility transformers.

VI. INVESTING IN THE FUTURE:

The United States has long been the world leader in developing new energy technologies, yet, the Bush energy budget guts critical programs that encourage cutting edge research on renewable energy and energy efficiency. ***Democrats strongly believe that the U.S. must continue its investment in new techonology in order to maintain our technological lead in energy efficiency and that the Congress should direct the National Academy of Sciences to investigate cost-effective ways in which America can be come more energy efficient through the use of new technologies***. We also believe we need to invest in finding ways to increase energy production and to use fossil fuels and other currently utilized energy technologies in the most environmentally responsible manner possible

Democrats are particularly concerned the Bush budget has dramatically cut programs which will help us achieve these goals. In the first budget submission, the Bush Administration has proposed reductions in overall spending for the Department of Energy by $460 million. For example, if funding for he Bush clean coal power initiative is removed from the ***fossil energy research and development programs budget, the remaining fossil energy programs are cut by an average of 45 percent. Renewable energy is cut by 34.6 percent and conservation (other than weatherization grants) by 21.2 percent. Geothermal and hydrogen research are cut by 48.3 percent; hydropower by 49.9 percent; solar energy by 53.7 percent; and, wind energy by 48.2 percent.*** This is on top of a three-fourths reduction in energy funding (in constant dollars) between 1980 and 2000. This long-term decline in energy research and development spending, along with the short-sighted cuts in renewable energy programs proposed by the Bush Administration will be costly to the country in the long-run. ***Democrats call on the Administration and the Republican Congress to restore these cuts as well as to increase funding for those programs which have the greatest potential to reduce the need for the import of fossil fuels.***

Renewable and Alternative Energy: Democrats believe there are a number of promising technologies whose development could result in cost-effective alternatives to traditional energy sources. The Energy Information Administration has said an aggressive research and development and technology deployment program can make significant reductions in energy requirements over the next 20 years. Within such a comprehensive plan of energy research and development, we call on the Department of Energy to publish an annual inventory and assessment of renewable energy resources and to promote their development. Some of these programs include:

- wind, photovoltaic, solar, biomass, geothermal, and biofuels;
- distributed generation and cogeneration;
- fuel cell technology; and
- net metering and national interconnection standards.

Science Education: A critical factor in the development of new technologies is education. Democrats believe every effort should be made to encourage colleges and universities to participate in programs that will attract students who will be the research scientists, geologists, and engineers of tomorrow. We support a scholarship program for science and engineering students whose academic career is focused on energy research and development, as well as grants to those universities who establish programs directly-related to research and development in renewable and alternative energy techonologies.

Elevate Science and Technology in the Department of Energy: Democrats believe science and technology are issues deserving the full-time attention of DOE and call for increased funding for the Office of Science as well as the creation of the position of Under Secretary for Science and Technology to oversee all R&D programs.

NUCLEAR ENERGY INSTITUTE

The Nuclear Energy Electricity Supply Assurance Act of 2001

Senator Pete Domenici (R-N.M.) and 10 co-sponsors on March 7 introduced The Nuclear Energy Electricity Supply Assurance Act of 2001, a bipartisan bill to ensure that nuclear energy remains a major contributor to U.S. electricity production.

Nuclear energy generates more than 20 percent of U.S. electricity at the lowest production cost of any expandable large-scale energy source. Nuclear energy also is the largest emission-free source of electricity in the country.

The Domenici bill, S. 472, includes provisions to get more energy out of the nation's 103 nuclear plants, while laying the groundwork and encouraging planning for the construction of new advanced-design nuclear plants.

The wide-ranging bill encourages increased production from nuclear power plants, expands research and development on new reactor technologies, ensures a viable domestic nuclear fuel industry and educational support system, labels nuclear energy an "environmentally preferable" electricity technology, expands R&D on innovative used nuclear fuel management solutions, and reforms outdated Nuclear Regulatory Commission (NRC) rules and procedures.

The bipartisan co-sponsors of S. 472 are: Sens. Larry Craig (R-Idaho), Mike Crapo (R-Idaho), Bob Graham (D-Fla.), Chuck Hagel (R-Neb.), James Inhofe (R-Okla.), Jon Kyl (R-Ariz.), Mary Landrieu (D-La.), Blanche Lincoln (D-Ark.), Frank Murkowski (R-Alaska) and Fred Thompson (R-Tenn.).

Background

Domenici's legislative strategy is to expand and build upon a separate comprehensive energy bill—The National Energy Security Act of 2001—introduced two weeks earlier by Murkowski. Both bills, which contain some common provisions, address the need for more electricity production, which has become a critical concern in several U.S. regions.

- In California, shortages of generating capacity and rising natural gas prices have contributed to skyrocketing consumer electricity rates, the near-bankruptcy of two major utility companies, and blackouts affecting millions of people and thousands of businesses—all at a cost of billions of dollars. Generating capacity shortages are also forecast for other regions over the next few years.

- Rising energy prices topped the list of economic concerns voice by Americans in a February *Wall Street Journal*/NBC survey.[1] Eighty-six percent of Americans agree that the country faces an energy problem, and they ranked energy prices as a more pressing concern than federal taxes and the budget. One-third said the United States faces an energy crisis and more than one-half see rising energy costs as a problem rather than a crisis.

[1] *Wall Street Journal*, March 8, 2001

- By 2020, the Department of Energy (DOE) forecasts that the United States will need 393,000 megawatts to 564,000 megawatts of new electric generating capacity, assuming a modest growth rate in electricity demand of 1.8 percent to 2.5 percent per year.

Domenici said nuclear energy must continue to play a major role in the nation's energy portfolio to ensure a reliable U.S. electric system. Nuclear energy offers a near-term opportunity to help expand the nation's supply of low-cost generation, Domenici said, and it also represents the nation's largest producer of emission-free electricity. The energy problems in California serve as a warning of the risks of depending too heavily over the long term on a single fuel for electricity generation, the bill's supporters said.

To ensure that nuclear energy remains a viable and reliable electricity option, the legislation contains the following provisions:

Price-Anderson Act Extension

- Extends the Price-Anderson no-fault insurance law, which incurs no cost to the federal government or consumers, for an additional 10 years until Aug. 1, 2012.

DOE Programs

- Creates two new DOE assistant secretaries to head the Office of Nuclear Energy, Science and Technology and the Office of Science. A director currently heads both offices at DOE.

- Authorizes an increase in funding for DOE's Nuclear Energy Research Initiative (NERI) to $60 million in FY2002. The NERI program is a mid- to long-term R&D effort that addresses potential barriers to expanded use of nuclear energy.

- Authorizes an increase in funding for DOE's Nuclear Energy Plant Optimization (NEPO) program to $15 million in FY2002. DOE and private industry share the cost of NEPO research, which focuses on boosting the reliability and productivity of nuclear plants and supporting efforts to achieve license renewal through management of the long-term effects of plant aging.

- Authorizes DOE to pay 10 percent of the cost of any capital improvements that result in a permanent increase of at least 5 percent in the rated capacity of a nuclear plant. Payments are limited to $1 million per plant. DOE may also reimburse owners for NRC licensing fees. To qualify, the plant must achieve the increase in generating capacity before Dec. 31, 2004. The bill authorizes $15 million for the program in each of FY2002 and FY2003.

- Authorizes DOE grants to support university nuclear engineering and related education programs. $34.2 million in FY2002 would be used to upgrade research reactors, to support R&D, and for fellowships and scholarships.

- Prohibits DOE from selling surplus uranium and or conversion services through 2006.

- Authorizes DOE to begin a cooperative R&D program, funded at $10 million annually, to test advanced uranium mining technologies, and provides limited additional funding for other programs to maintain a viable domestic uranium mining and conversion industry.

(b)(5)

- Authorizes DOE to place the Portsmouth, Ohio, gaseous diffusion uranium enrichment plant in cold standby condition for 5 years.

New Nuclear Plant Construction

- Authorizes DOE to study the potential for completing unfinished nuclear plants that can be on line by 2005. DOE would then recommend to Congress actions for completing these facilities.
- Authorizes DOE to undertake jointly funded, government/industry demonstrations of the NRC's "early site permit" process, which allows pre-approval of sites for new nuclear plants before applications to the NRC for building the plants are submitted. DOE would build a "bank" of at least three approved sites by Dec. 31, 2003. The bill authorizes $15 million both in FY2002 and FY2003.
- Authorizes a DOE study of advanced ("Generation IV") nuclear power plants that are cost competitive, use enhanced safety systems, and are highly proliferation-resistant. DOE would select at least one Generation IV reactor for conceptual design by Sept. 30, 2004, and develop plans for one or more public/private cooperative demonstrations. The bill authorizes $50 million in FY2002 for the program.
- Authorizes the NRC to spend $25 million in FY2002 for research to support resolution of potential licensing issues for new reactor designs.

Environmentally Preferable Power

- Denotes nuclear energy as an "environmentally preferable" product and prohibits the federal government from discriminating against it in purchasing decisions.
- Clarifies that the expanded use of emission-free power sources, such as nuclear plants, is eligible for economic incentives available under State Implementation Plans (SIP) required by the Clean Air Act. Today, only pollution control measures are eligible for these programs.
- Prohibits the use of federal funds to support domestic or international organizations that finance, develop, insure, or underwrite electricity production facilities—such as the Agency for International Development, World Bank, Overseas Private Investment Corporation, International Monetary Fund and Export-Import Bank—if they exclude consideration of nuclear energy.

proliferation

Used Nuclear Fuel Management

- Establishes an Office of Spent Nuclear Fuel Research at DOE to develop a national used nuclear fuel strategy and conduct research.
- Directs DOE to study electrometallurgical technology as a proliferation-resistant alternative to used fuel reprocessing. The bill authorizes $10 million in FY2002 for the program, which would apply to Generation IV nuclear reactors.
- Directs DOE to launch an Advanced Accelerator Applications program to demonstrate the use of accelerators for transmutation of high-level radioactive waste. By June 30, 2003, DOE must recommend a site for construction of the facility.

NRC Programs and Regulatory Reform

- Eliminates outdated NRC regulations that restrict foreign ownership of U.S. nuclear power plants and require the agency to conduct duplicative anti-trust reviews in connection with licensing actions.
- Simplifies hearing requirements in NRC proceedings involving amendments to, or transfer of, an operating license. The bill allows NRC to use informal rulemaking procedures, not formal adjudicatory hearings.
- Authorizes NRC to establish requirements to ensure that former nuclear plant licensees comply fully with obligations to fund nuclear plant decommissioning.
- Allows NRC to recover user fees from other government agencies.
- Makes it a federal crime to sabotage a used nuclear fuel storage facility and authorizes guards at NRC-licensed facilities to carry firearms.

C E R A

Decision Brief

NORTH AMERICAN ELECTRIC POWER

APRIL 1999

GRIDLOCK—TRANSMISSION INVESTMENT AND ELECTRIC RESTRUCTURING

by Steven Taub and Mark Smith

Who will invest in the electric power transmission network? Currently there is no entity in the emerging industry structure—neither generators, transmission owners, independent system operators, distribution companies, traders, retail marketers nor end users—facing the proper incentives to invest.

This investment paralysis, or "gridlock," is rooted in the partial unbundling of the power industry into horizontal segments, creating a muddled mixture of competition and cooperation that has not aligned the desire to invest in transmission with the ability to recover that investment. Complicating this lack of incentives is the fact that the costs and benefits of transmission investments that were internalized by vertically integrated utilities in the future will fall on different parties, politicizing investment decisions. Existing regulatory institutions and the emerging independent system operators are not well equipped to resolve these issues.

Gridlock creates an investment bias in favor of generation projects, even if the overall cost-benefit analysis would favor a transmission project. Without investment, transmission congestion will become increasingly frequent, balkanizing the electric power markets. This will lead to chronically inefficient wholesale power markets with volatile prices, low liquidity, and persistent problems with local market power. Sustained underinvestment in transmission may eventually threaten the reliability of the bulk power system.

The key to breaking out of gridlock is incentives, but they will require delicate balancing or they will have unintended consequences.

Pressure for further structural change is mounting: several utilities are developing for-profit transmission companies. The Federal Energy Regulatory Commission's (FERC's) upcoming proposal for restructuring the transmission sector will catalyze the debate over the future management of the grid.

Optimizing Electric Transmission Networks as a Whole

The complexities of the electric transmission system network result from the inability to control directly the flow of power on the system. This fundamental physical reality requires that the grid be viewed as an integrated whole, making it difficult to manage and optimize. As Figure 1 shows, a seemingly simple power market transaction to move 1,000 megawatts (MW) from Ontario to neighboring New York can affect power flow hundreds of miles away from either party.

Please mark your calendars for CERA's Spring 1999 North American Electric Power Executive Roundtables:

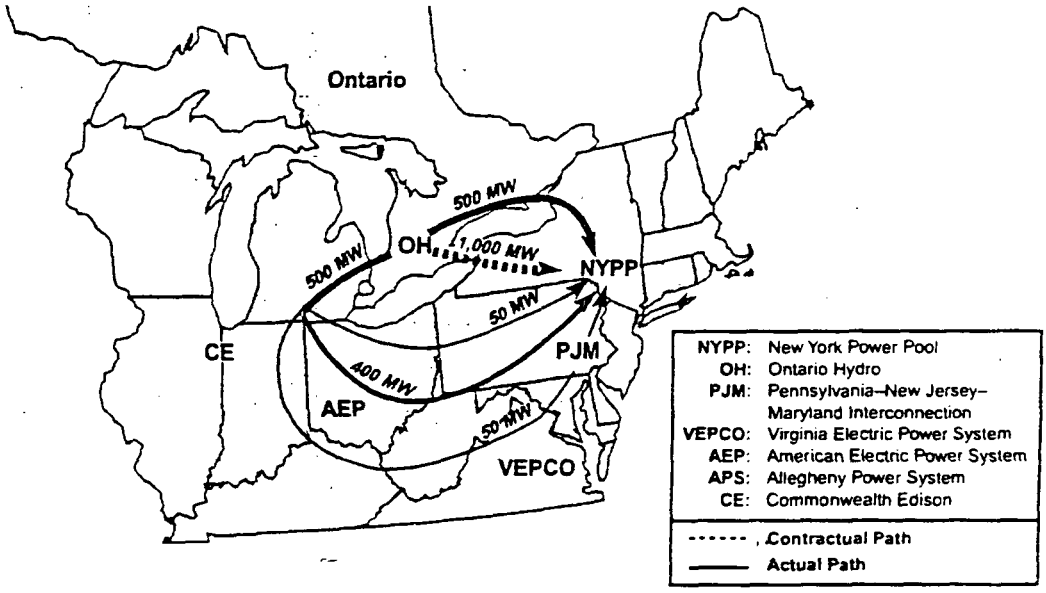
New York (Global Energy Overview)	May 7
Calgary	May 12
San Francisco	May 14
Houston	May 20
Charlotte, NC	June 8
Boston	June 21

To register please contact CERA Registration by telephone: (617) 497-6446, extension 800; fax: (617) 498-9176; or e-mail: register@cera.com.

Cambridge Energy Research Associates

Figure 1

Parallel Path Flow:
Actual Flow of 1,000 MW Transfer from Ontario to New York



Source: Cambridge Energy Research Associates.
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Efficient investment decisions require an analysis of the transmission network as a whole to internalize loop flows like those shown in Figure 1. They must also consider all of the potential options and their costs and benefits (see Figure 2). One major benefit of transmission investment is a reduction in the level and duration of differentials in wholesale power prices at different locations. Wholesale price differentials have been a persistent feature of the wholesale power markets because transmission system bottlenecks prevent arbitrage. Another potentially substantial benefit of transmission investment is lower ancillary service prices due to decreased demand.

For many decades transmission investment has been primarily driven by the need to interconnect new power plants to the grid. Figure 3 illustrates the historically close relationship between investments in transmission and the installation of generating capacity by utilities and nonutility generators. Interconnections between neighboring utilities to enhance reliability and allow sharing of generating capacity were also common after the cascading blackout of the northeastern United States in 1965.

Future decisions to invest in the transmission system will depend on a balancing of costs and benefits, often independently of generating plant construction. In theory there exists an optimal level of investment to achieve an economically efficient level of transmission congestion, balancing the price differentials and ancillary service costs against the cost of investments in the transmission system (see Figure 4).

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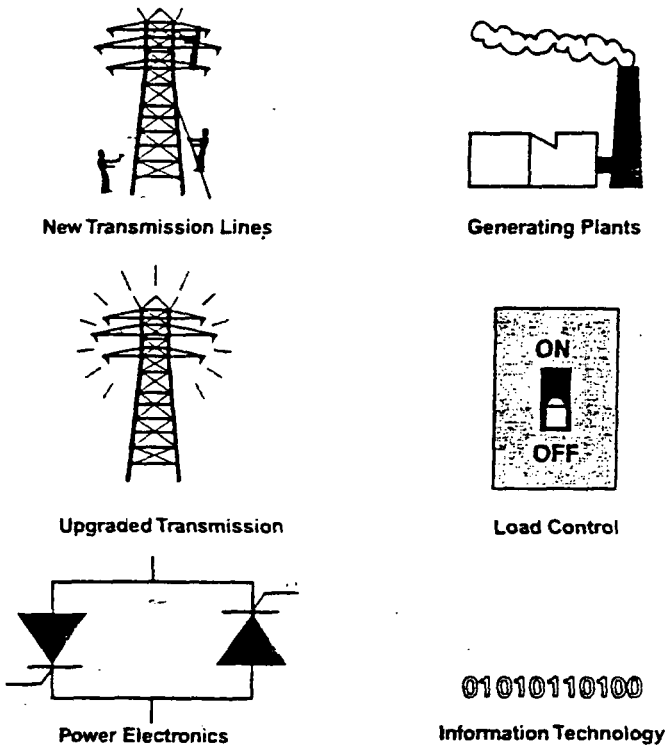
Figure 2

Six Ways to Relieve Transmission Bottlenecks



Source: Cambridge Energy Research Associates.

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Gridlock exists because nobody is in a position to analyze the system as a whole, develop the optimal investment plan, raise the necessary capital, and find a way to capture the benefits to recover the investment and earn an adequate return.

Investment Signals and Responses

Wholesale electricity prices are a key signal to investors. High energy and capacity prices are a signal that investment is needed in generation, and high price differentials and ancillary service prices are signals that investment is needed in transmission.

The high prices and differentials in the Midwest during the summer of 1998 sent a clear signal that there is a need for investment either in generating plants to alleviate regional power shortages or in transmission facilities to allow power to flow into the regions where it is needed. Generators are responding to these price signals: 1,400 MW of new capacity is now under construction in the East Central Area Reliability Coordination Agreement (ECAR) and Mid-America Interconnected Network (MAIN) regions, the epicenter of the price spikes. Unregulated generation companies and vertically integrated utilities are developing another 6,500 MW slated to come online in those regions by 2001. Some of these investments

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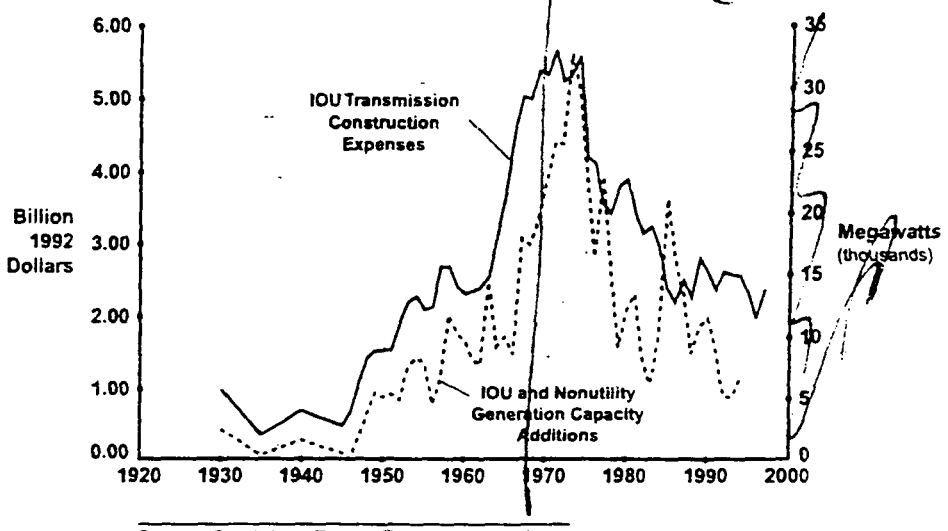
Figure 3

US Transmission Investment and Generating Capacity Additions



Source: Cambridge Energy Research Associates.

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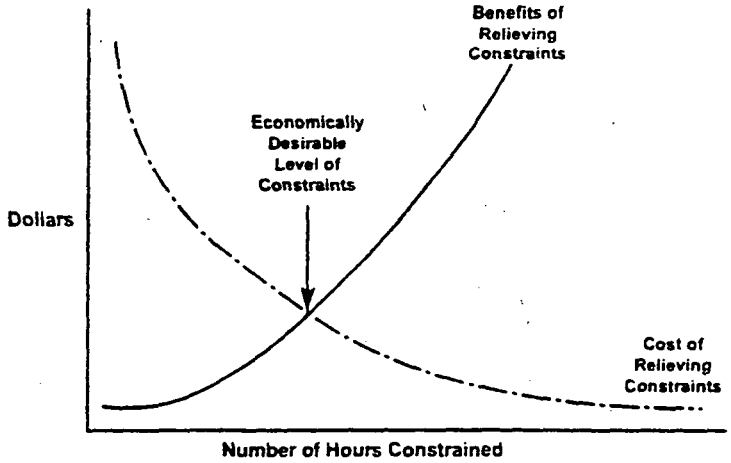
Figure 4

Some Level of Transmission Constraints Is Economically Efficient



Source: Cambridge Energy Research Associates.

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are being made to ensure reliability, but many have been undertaken to capture the financial opportunity of booming market prices.

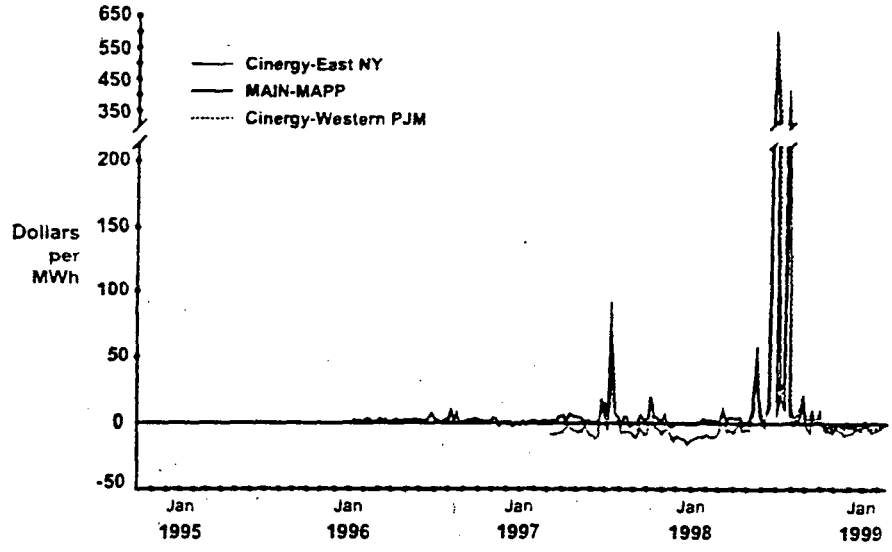
Price differentials between the Midwest and the adjacent Mid-Continent Area Power Pool (MAPP) and Pennsylvania–New Jersey–Maryland (PJM) markets spiked to unprecedented levels during June and July 1998 (see Figure 5). This situation is not unique to the Midwest; price differentials rose across North America, and market-based ancillary service prices in California were high enough to lead the Federal Energy Regulatory Commission (FERC) to impose a cap of $250 per megawatt per hour. Gridlock has almost completely blocked a response by transmission projects to these price signals.* Despite over 120,000 MW of new generation being developed nationwide, investor-owned utility (IOU) transmission investment plans, as shown in Table 1, are flat.

Gridlock—Why Are We Stuck?

Complexity, cost, and public opposition are significant challenges to transmission investment, but utilities have overcome these obstacles hundreds of times in the past. What has changed? One simple fact has caused the current affliction: nobody is motivated to invest. There are a number of regulatory, financial, and structural reasons for this predicament:

Figure 5

Midwest Spot Power Differentials



Source: Cambridge Energy Research Associates.

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*The only proposal to strengthen the interconnections between the eastern Wisconsin utilities and their neighbors to the south and west.

20153

Table 1

Transmission Investment by Investor-owned Utilities
(billion 1992 dollars)

1995	2.30
1996	1.97
1997 preliminary	2.37
1998 forecast	2.60
1999 forecast	2.63
2000 forecast	2.57

Source: Edison Electric Institute.

Regulatory Obstacles

- **Network boundaries and regulatory jurisdictions are not aligned.** States and sometimes even local governments retain an important role in siting and permitting transmission facilities despite the federal preemption for interstate commerce. State regulators must also approve transmission investments that are to be collected through cost-of-service rates. This tangle of overlapping jurisdictions makes regulatory approvals a complex process fraught with opportunities to delay or scuttle investment plans.

- **Regulations are in flux.** The FERC has advocated regional transmission organizations and is in the process of developing a Notice of Proposed Rulemaking (NOPR) for an Order that would compel transmission owners to join them. Until the FERC acts or abandons this effort, transmission owners, unsure of the disposition of their current assets, seem unwilling investors for fear of creating additional stranded investment.

Financial Hurdles

- **Revenues are uncertain.** Revenue streams to recover transmission investments are not clearly defined under the new ISO structures and transmission pricing schemes. For example, PJM and New York propose to award transmission congestion contracts* to transmission investors, but the number of contracts to be awarded will only be determined when the project is complete, and the value of the contracts is difficult to predict.

- **Raising capital is difficult.** Utilities may prefer to commit capital to more profitable, unregulated investments. Even those seeking low-risk returns on regulated investments will be reluctant to invest where they have no control of operations or pricing and are exposed to additional liability for future capital investments at the ISO's discretion. The ISOs themselves lack the financial strength to raise capital on their own. Investors will naturally be wary if it is not clear where the revenue will come from to repay debt and generate returns on equity.

- **Assignment of costs and benefits is problematic.** Utility and ISO operating rules and generation interconnection procedures require transmission system studies to identify where the grid needs to be upgraded to handle increased loads or new power plants. But how much investment is necessary and who decides? Who should bear the costs of transmission upgrades?

*Congestion contracts are financial instruments that entitle the holder to receive congestion payments related to a particular transmission path.

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Allocations of costs and benefits to specific generating projects and transmission service requests depend on their sequence. How should the ISO evaluate service requests and interconnection applications by competing developers when it does not know which plants will be built or which contracts will be signed? Will owners of existing transmission rights be compensated for the effects of new facilities? Since constraints are network phenomena, cost and benefit assignments will always be somewhat arbitrary and vulnerable to attack.

Structural Problems

- **Ownership of the existing grid is fragmented.** Over 100 private companies and a number of federal, state, and local governments and cooperatives own the existing transmission assets. The nature of the network makes it difficult for any of these parties to act unilaterally to change the grid because their actions may be detrimental to others. Even if they are able to act, the net effect of many decisions made on the basis of only a small part of the network will be unlikely to optimize the entire grid.

- **Unbundling is only partially accomplished.** Many transmission owners also own generation, and they will undoubtedly consider the effect of grid investments on those assets.

- **ISOs are nonprofit institutions.** Lacking a profit motivation, the ISOs will make investment decisions based on political compromises and other criteria. This decision structure is more likely to favor goldplating or underinvestment, not optimization.

- **The ISO is focused on reliability.** The ISOs were created as a way to provide open access while maintaining reliability. Often there is no clear decision-making process, and where processes are articulated, they utilize committee structures with complex voting rules. The ISO has no motive to initiate an investment unless reliability is threatened.

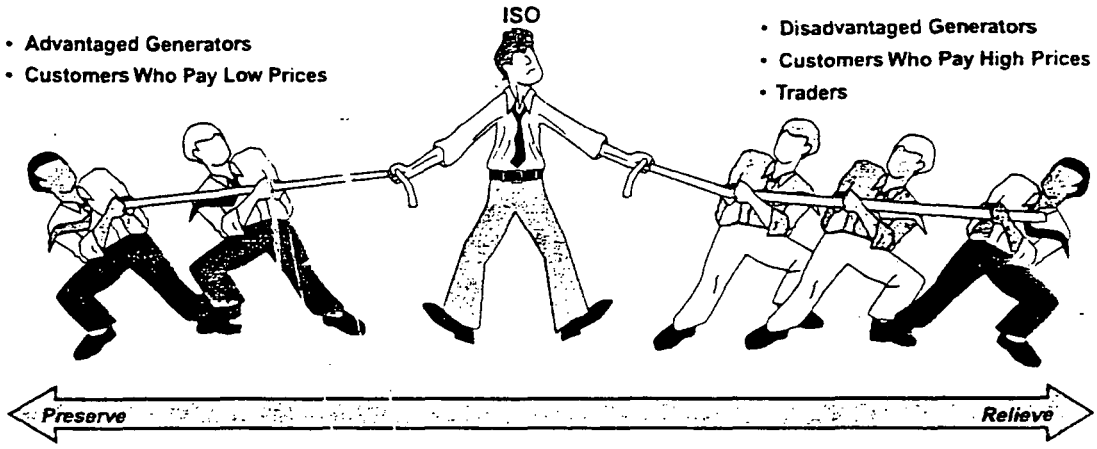
- **ISOs depend on the transmission owners.** The ISOs do not own the assets they manage and must have the owners' cooperation to modify them. In most cases the ISO can only recommend action, not compel it. The ISO may also have to depend on the utilities' willingness to exercise their power of eminent domain to condemn land for new rights of way to overcome fierce local opposition.

- **Politics are inevitable.** As the entity charged with managing the grid, the ISO is caught between competing interests (see Figure 6). The costs and benefits of transmission investments, once internalized by a vertically integrated utility and recovered in average-cost prices set by regulators, will fall on different parties in the future. Restructuring has created natural adversaries where previously there was only one entity. State and federal government intervention is likely, especially if voters complain that they will see little of the commercial benefits of the capital expenses they pay for in rates, or if reliability is threatened. Several governors and members of Congress have already indicated their desire to maintain their states' low-cost power as a way to support economic development and as a populist campaign position. The technical complexity of the issue and the lack of available information outside the ISO and transmission owners' hands will cause suspicion of the ISO and the transmission-owning utilities unless the ISO is able to cast itself as an honest broker.

None of the ISOs in operation or under development is well equipped to address the complex technical, economic, business, regulatory, and political issues that surround transmission planning and investment in a restructured world. The emerging structure—ISOs with committees that recommend when and how to modify the grid owned by multiple utilities with competing interests—is a recipe for gridlock.

Figure 6

Conflict Is Inevitable in Addressing Transmission Constraints



Source: Cambridge Energy Research Associates.
80309-6

What Are the Implications of Gridlock?

What does gridlock mean for the North American electric power industry? CERA sees five major implications:

Investment Bias in Favor of Generation

There are many developers weighing the costs and benefits of generating plant investments and acting on projects that offer an attractive rate of return, but no one is evaluating the costs and benefits of potential transmission investments. This lack of attention means that when both generation and transmission projects are attractive options to capture a particular benefit, the generating plant is the one likely to be built even if the overall cost-benefit analysis would favor a transmission project. In effect, gas pipelines connected to new peaking capacity have become an alternative to major new transmission investments.

Increasing Balkanization of Power Markets

As the transmission system is unable to keep pace with load growth and generation investments, congestion will become increasingly frequent. This will tend to isolate regional power markets into smaller and smaller areas, especially during times of peak loads. Taking advantage of the marketers' inability to wheel power, developers will build plants and cogeneration facilities near industrial facilities, municipalities, and other loads. Ultimately, end-users frustrated by price volatility or perceived market power may install their own generators. This balkanization will make the existing transmission congestion contracts increasingly valuable assets.

The October 28, 1998, decision by the FERC regarding a cogeneration facility in Maine is an important signpost for balkanization. The FERC struck down the New England Power Pool's (NEPOOL's) long-standing requirement that new generators be fully integrated with the pool, meaning they must invest in transmission that allows them to serve loads anywhere in the region. In contrast, existing generators have the option to pay for other generators on the system to be ramped up or down, or "redispatched" to accommodate their transactions when constraints arise. By allowing new generators to substitute redispatch for transmission upgrades, the FERC has encouraged balkanization and made it less expensive to build generation—potentially reducing the need for transmission upgrades in the first place.

Growing Price Volatility, Falling Liquidity, and Persistent Price Differentials

The loss of load and resource diversity that comes with balkanization will amplify the natural volatility of the wholesale power markets. Price differentials will persist because there will be only limited ability to arbitrage them through the natural gas pipeline system. In the longer term, power market liquidity will develop much more slowly, and generation market concentration will increase. This may lead to chronically inefficient wholesale and retail power markets.

Volatility will create a booming market in hedging instruments—particularly for the more liquid trading points. Traders, retail energy merchants, and large industrial and commercial users need to insulate themselves from price volatility and the growing risk of curtailment. This means a demand for liquid, location-specific financial hedging instruments.

Consolidation of power traders will be another natural result of increased volatility, as demonstrated in the fallout from the June 1998 Midwest price spikes: small power marketers without adequate financial strength will not be able to convince potential trading partners of their creditworthiness, and players unable or unwilling to bear the financial risks of volatility will exit the business. Volatility and balkanization also favor scale because larger trading organizations can hedge by controlling assets and/or taking positions in multiple regions and have the resources to develop a sophisticated understanding of the transmission system.

Reliability Is Threatened

As existing systems age and load grows, gridlock causes increased congestion and more frequent equipment failures. Larger power systems are inherently more reliable than small ones because they are less vulnerable to a single contingency and the operators have more options available to them when contingencies occur. Ultimately, reliability problems emerge as a greater number of highly concentrated markets are forced to operate independently.

Experiments with Transmission Companies

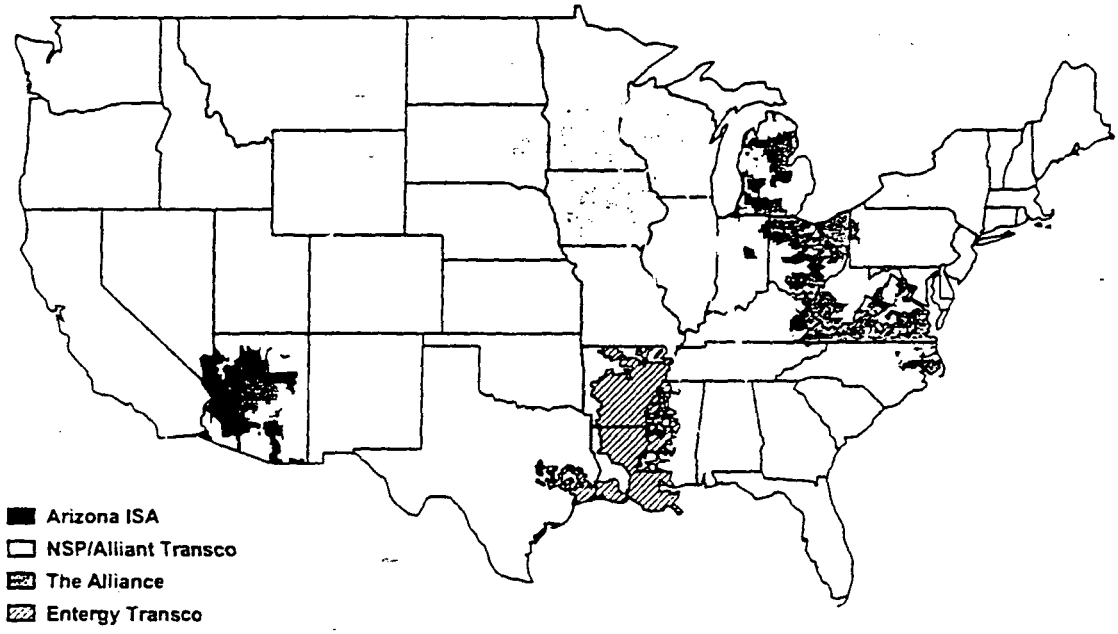
Pressure for further structural and regulatory changes is already building as the industry begins to question long-term viability of the ISO model. Several utilities are developing for-profit independent transmission companies ("grid company" or "gridco") that they believe will solve many of the problems that are causing gridlock (see Figure 7). These companies would continue to be regulated monopolies, but they would be independent of both the generators and the distribution utilities.

The combination of control and ownership gives grid companies three major advantages over ISOs:

- A grid company will have a profit motive to encourage action and guide its decisions.
- Control of operation and pricing would make it substantially easier for grid companies to raise the capital necessary to improve the transmission network.

Figure 7

Proposed Independent Transmission Companies
(Utility Participation as of March 1999)



Source: Cambridge Energy Research Associates.
90309-7

- Grid companies will have more effective governance because their management teams and boards of directors have a clear motivation to identify and execute profitable investments. In contrast, ISOs are governed either by stakeholder boards where coalitions of members have the power to block action or by expert boards of directors with no stake in the outcome of their decisions.

Are Grid Companies the Answer?

If the root of gridlock is lack of incentives, then incentives are also the way to solve the problem. For-profit grid companies address some but not all of the necessary elements. Transmission management institutions, whether nonprofit or for-profit, must have incentives to

- maintain reliability and safety by buying ancillary services, operating the grid, and controlling maintenance and generator and load interconnections.
- offer nondiscriminatory access to the grid
- expand quickly to achieve a critical mass to internalize loop flows, enhance reliability, and eliminate rate pancaking

- align their geography with the extent of the transmission system—not regulatory boundaries
- operate and price transmission to facilitate an efficient market for electric power
- invest to optimize the efficiency of the power market in the long term
- adopt new technologies such as high-voltage direct current (HVDC), superconductivity, power flow controllers, and information technology where appropriate

Although these criteria are easy to articulate, they will be difficult to implement. The complexity of the problem creates the potential that actions will have unintended consequences. For example, performance-based rates can unintentionally create the incentive to minimize costs by deferring maintenance or avoiding investments, potentially leading to chronic underinvestment or reliability problems.

Some of the goals listed above are in conflict—for example, maintaining reliability while encouraging an efficient, unfettered market. One conflict that directly affects the gridlock problem is the potential contradiction between offering nondiscriminatory access to generators and making investments in transmission. Incentives must create the proper balance between transmission and generation, which often compete to be the marginal source of capacity and energy in the market. Without careful attention to incentives, a monopoly grid company or ISO will favor its own transmission solutions over new generation.

Who Holds the Key?

The consequences of gridlock—inefficient investment, balkanization, market failure, unreliable electricity—are severe, but they may not be severe enough to precipitate a crisis. Without such a crisis, the industry and the FERC must both realize there is a problem before there will be any urgency to break the stalemate. Recent innovative grid company proposals are a sign that transmission owners are beginning to recognize the current state of paralysis. The FERC's upcoming NOPR on regional transmission entities will be an important indicator of its understanding of gridlock. The worse it perceives the problem to be, the more radical its NOPR is likely to be. The NOPR could well cause transmission issues to emerge as the dominant issue of electric restructuring in 1999.

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MARK J. SMITH, CERA Associate Director, North American Electric Power specializes in energy industry structure, economics, marketing, and strategic planning. Immediately prior to joining CERA Mr. Smith assisted in the start-up of the California Independent System Operator (ISO). Before his assignment at the ISO he spent eighteen years with the Pacific Gas & Electric Company as, among other posts, Director, Revenue Requirements and Director of Pricing. His diverse assignments included responsibilities for regulatory policy analysis, marketing and contract negotiation. He received a BS from Arizona State University and an MA from New Mexico State University. He is based in CERA's California office.

Embargo memo
I pass to McNally

366

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Memo to McNally

RAILROADS AND COAL

Because of coal's importance to the economy and because it is consumed in huge quantities all over the country, while production is focused in a limited number of areas, an efficient coal transportation system — with railroads at its core — is critical to our nation's economic well-being.

According to the U.S. Department of Energy's Energy Information Administration (EIA), some 65 percent of coal shipments were delivered to their final U.S. destinations by rail in 1999. The rail share is far higher than water (14 percent); trucks (11 percent); and the aggregate of conveyor belts, slurry pipelines, and tramways (10 percent). Over the past decade, the rail share has trended slightly upward, largely reflecting the growth of coal from the Powder River Basin in northeast Wyoming and southeast Montana that often moves long distances by rail.

Coal is by far the most important single commodity carried by rail. In 1999 (the latest year for which data are available), coal accounted for 26 percent of carloads, 44 percent of tonnage, and 22 percent of revenue for Class I railroads.

Coal-fired power plants, which consume the vast majority of coal in this country, compete against one another and against power plants fueled by other energy sources. For example, non-coal fuel sources account for nearly half of U.S. electricity generation. Consequently, railroads must work closely and cooperatively with mines and utilities to maximize efficiencies and enhance competitiveness. Over time, for example, higher capacity freight cars (which now carry almost 110 tons of coal per car on average) and more powerful locomotives have increased railroads' coal-carrying efficiency significantly. Highly-efficient unit trains, which carry 50 or more carloads of coal from a loading facility straight through to a customer without interruption using dedicated equipment, account for most rail coal shipments.

Railroads have worked hard to keep service as responsive, and rates as low, as possible. Since it recognizes both distance and weight, revenue per ton-mile (RPTM) is a useful surrogate for railroad rates. In 1999, rail RPTM for coal was 1.64 cents, easily the lowest such figure among all major commodity groups. In inflation-adjusted terms, 1999 RPTM for coal was 61 percent lower than in 1981 and 35 percent lower than in 1990.

Numerous studies have confirmed that rail coal rates have been falling steadily. For example, an April 1999 study by the General Accounting Office found that "In general, real rail rates for coal shipments have fallen since 1990." More recently, an October 2000 EIA study examined changes in railroad coal rates. The EIA's findings were unambiguous: "Although the share of coal transported by railroads increased, the average rate per ton to ship contract coal by rail fell steadily (a 25.8 percent decline) during the study period. The rates for coal in all sulfur categories were lower in 1997 than in 1988." EIA noted that "the decline in average contract coal rail rates during the study period was a response to competitive markets."

Today, many of our nation's coal mines, coal-fired power plants, and the railroad lanes serving them are at or near full capacity. Rail coal volume in 2001 through March is higher than the same time period of any recent year, and is up 7.2 percent over last year — reflecting both the higher demand for coal in light of high natural gas prices and the efficient, cost-effective service railroads are providing.

Association of American Railroads

Economic Impact of U.S. Freight Railroads

Freight railroads move just about everything — from lumber to vegetables, from coal to orange juice, from grain to automobiles, from chemicals to scrap iron — and connect businesses with each other across the country and with markets overseas. They also contribute billions of dollars to the economy through investments, wages, purchases, and taxes.

America's Freight Railroads Carry...

- More than 40 percent of the nation's intercity freight;
- Approximately 70 percent of vehicles from domestic manufacturers;
- 64 percent of the nation's coal to coal-fired power plants (coal generates more than 50 percent of the nation's electricity);
- Some 40 percent of the nation's grain.

...and Move Tens of Millions of Tons Every Day

- Class I railroad freight volume in 1999 was 1.43 trillion ton-miles. U.S. railroads hauled more than 27 million carloads of freight in 1999, including more than 9.0 million intermodal trailers and containers. Intermodal volume has nearly tripled since 1980.
- Class I railroads operated 20,256 locomotives in 1999 which hauled a fleet of 1,368,836 freight cars with an aggregate capacity of 134.4 million tons — an increase of 24 percent since 1990. It would take three million trucks to equal the capacity of the rail car fleet.
- U.S. railroads operated 145,000 route miles in 1999, enough to circle the globe almost six times.

Railroads Move Freight at a Lower Cost Than Ever Before

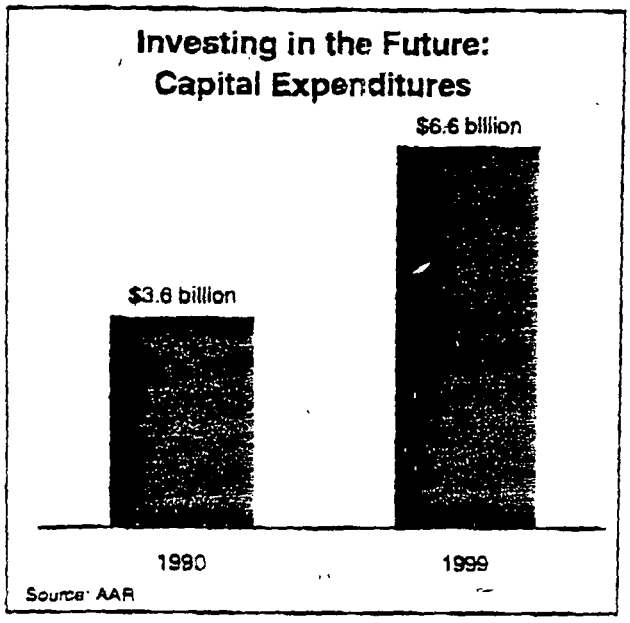
- On average it costs 28 percent less to move freight by rail now than it did in 1981, and 57 percent less in inflation-adjusted dollars. These rate reductions have saved American consumers tens of billions of dollars.

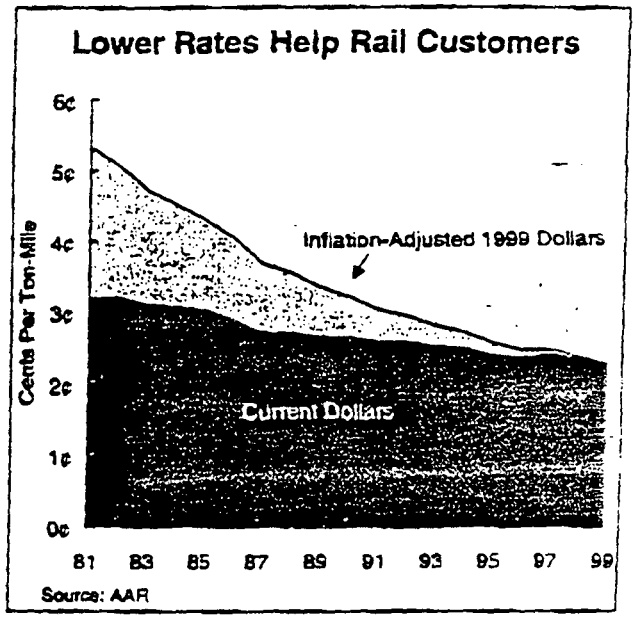
Railroads Directly Boost the Economy

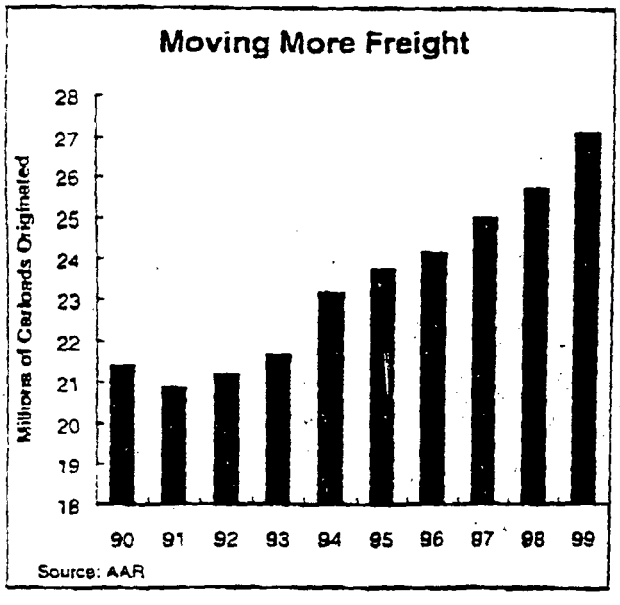
- U.S. freight railroads directly contribute some $13 billion a year to the economy in wages and benefits to nearly 200,000 employees and billions more in purchases from suppliers.
- Almost 700,000 retired railroad workers and family members receive $8 billion in retirement benefits each year.
- In 1999, Class I railroads paid $2.3 billion in payroll taxes, $379 million in federal income taxes (in addition to incurring $1.3 billion in deferred income tax liability), and nearly $694 million in other taxes.

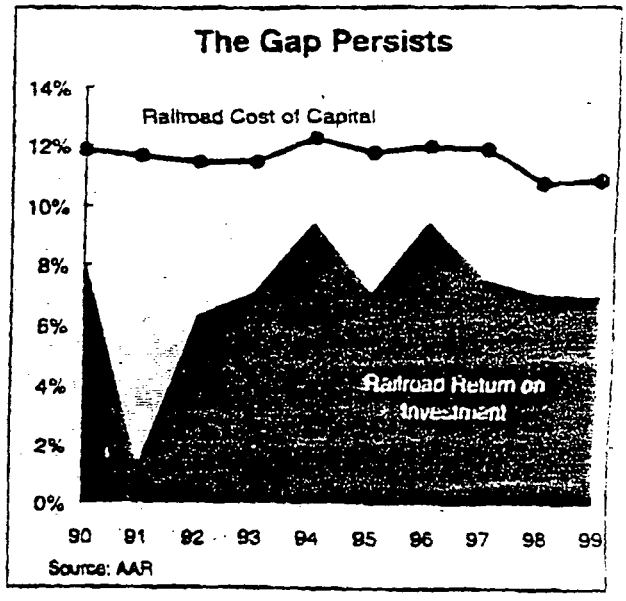
America's Freight Railroads

Economic Facts-At-A-Glance









Investment: Essential to Railroads and Their Customers

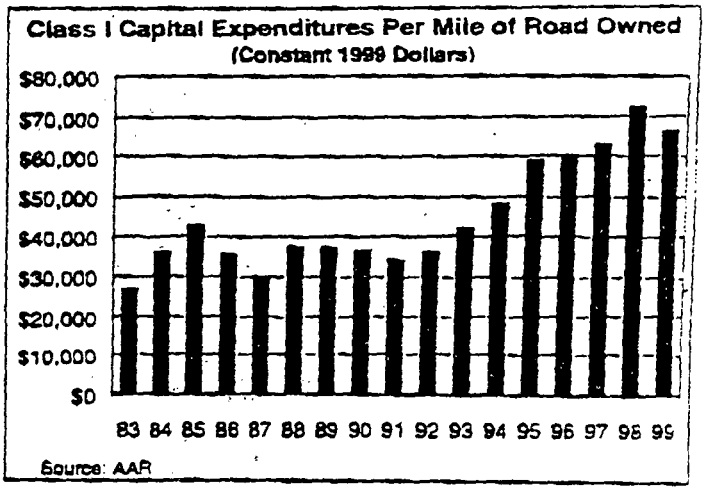
As the U.S. freight railroads well know from their experiences in the years before the Staggers Rail Act of 1980, a rail system deteriorates rapidly when railroads are capital-starved. Capital is the lifeblood of the freight rail industry and today, thanks to infusions of capital and the massive investment made possible by deregulation, railroads have been reborn. Since 1980, major freight railroads in the United States have invested more than $260 billion to maintain and improve their infrastructure and equipment, and to create a national system that is the envy of the world.

Prior to Deregulation, Rail Investment Was Woefully Deficient

- In the 1970s, railroads simply lacked the ability to invest at adequate levels. Due largely to stifling regulation, during the 1970s the rail industry's rate of return averaged two percent and rail bankruptcies were commonplace.
- In the mid-1970s, 25 percent of the nation's rail miles had to be operated at reduced speeds because of dangerous conditions. Congress estimated that, absent meaningful change, the rail industry's capital shortfall would approach $20 billion by the mid-1980s.

Deregulation Gave Railroads the Means to Invest

- By giving railroads the opportunity to earn revenues sufficient to cover their cost of operations, deregulation sparked an industry transformation.
- As income increased, so did investment. Investment led to greater efficiency, sharply improved safety, better service, and dramatically reduced rates — down 57 percent in real terms from 1981 to 1999.
- Today, U.S. freight railroads reinvest more in plant and equipment as a percentage of revenues than any other major U.S. industrial sector. Class I railroad revenues reached $33.5 billion in 1999. Of that, railroads reinvested $6.6 billion, or 19.8 percent.
- Capital expenditures per mile of road owned were more than $66,000 in 1999, almost 2 ½ times the comparable inflation-adjusted 1983 figure.

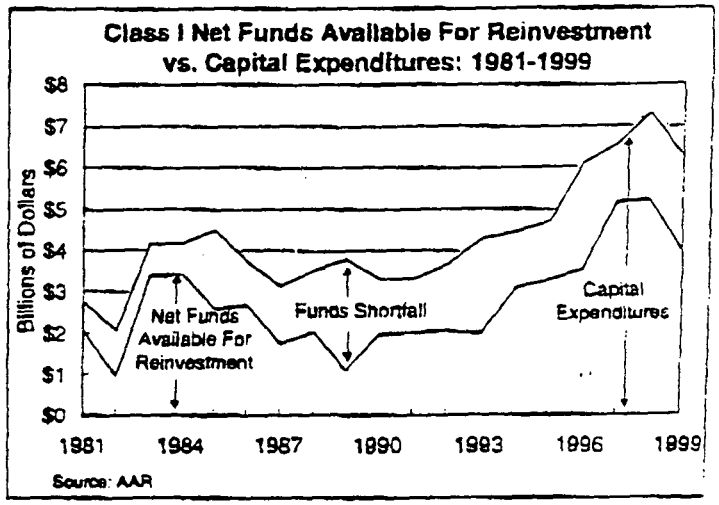


Reregulation Would Threaten Rail Investment and the Viability of the Rail System

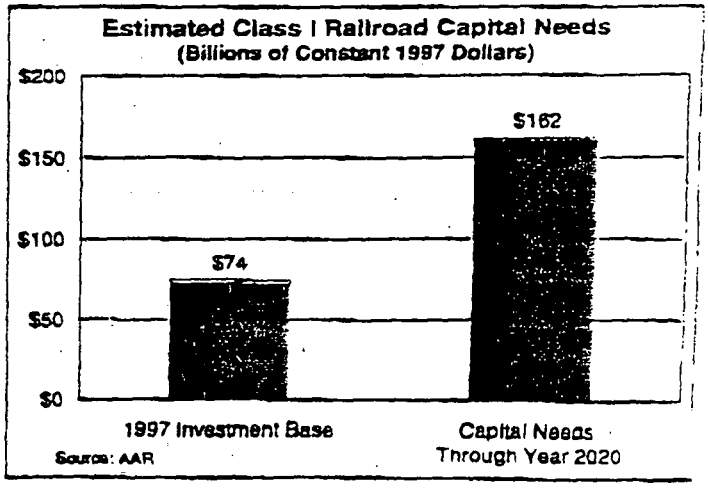
- U.S. freight railroads are overwhelmingly privately owned and operated. Because they receive no appreciable government funding, they must earn enough year after year to cover the massive spending they require.

- The industry is committed to expending the resources needed to continue to improve service, expand capacity, and offer their customers reasonable rates. But, they would be unable to do so if reregulation prevented them from earning revenues and attracting the capital necessary to cover their total costs and make the required level of investment.

- The cash generated by the rail industry since Staggers has been insufficient to sustain the capital investment required. Railroads have found it necessary every year since 1980 to obtain funds from outside sources: from 1981 to 1999, of the cumulative $81.9 billion in capital expenditures, approximately 64 percent was provided from internally-generated funds and 36 percent from external capital providers. Thus, artificial or unrealistic restrictions that impede the rail industry's opportunity to generate sufficient returns will compromise its ability to retain and attract the capital it needs to sustain its investment and operations over the long term.



Railroads will have to invest an estimated $162 billion (in 1997 dollars) by the year 2020 — the equivalent of rebuilding the entire rail system twice — simply to maintain their current share of the freight market. This can occur only if railroads are allowed to operate under a stable and limited set of regulatory constraints.



- Railroads are far more capital intensive than other major

industries. For example, in 1998 (the latest year for which comparable non-railroad data are available), railroads' capital expenditures were equal to 21.7 percent of revenue, compared to an average of just 3.9 percent for all manufacturing industries.

Similarly, data for Fortune 500 firms in selected industries that are major rail shippers or competitors reveal the capital intensive nature of railroading. Compared on the basis of total assets required per dollar of revenue produced, railroads have significantly higher asset needs — $2.57 of assets for each dollar of revenue produced.

Capital Expenditures as a Percentage of Revenue for Various U.S. Industries: 1998

All manufacturing	3.9%
Food manufacturing	2.6%
Wood product manufacturing	3.0%
Paper manufacturing	5.5%
Chemicals manufacturing	5.1%
Petroleum & coal products mfg	3.7%
Nonmetallic mineral product mfg	5.3%
Primary metal product mfg	4.0%
Fabricated metal product mfg	3.9%
Machinery manufacturing	3.6%
Computer & electr. product mfg	4.8%
Transportation equipment mfg	3.3%
Class I Railroads	**21.7%**

Source: U.S. Bureau of the Census, AAR

Ratio of Assets to Revenues of Fortune 500 Firms for Selected Industry Groups: 1999

	Number of Firms	Total Revenues ($ Billions)	Total Assets ($ Billions)	Ratio of Assets to Revenues
Chemicals	15	$114.4	$162.1	1.42
Food	22	178.6	116.2	0.65
Forest & Paper Products	11	106.3	134.0	1.26
Industrial & Farm Equipment	11	81.2	88.3	1.09
Metals	8	44.2	54.6	1.24
Mining, Crude Oil Production	3	17.0	24.6	1.45
Motor Vehicles & Parts	14	452.8	634.6	1.40
Railroads	**4**	**36.4**	**93.6**	**2.57**
Telecommunications	13	289.6	638.0	2.20
Trucking	2	8.8	4.4	0.50
Gas & Electric Utilities	37	266.3	594.8	2.23

Source: *Fortune*, April 17, 2000

Railroads: Building a Cleaner Environment

Investments in new technology and infrastructure have made the railroad industry environmentally "cleaner and greener" than ever before. Over the past five years alone, railroads have invested billions of dollars in more than 4,000 locomotives that are more fuel efficient and environmentally friendly.

Railroads Are More Environmentally-Friendly Than Other Modes

- The U.S. Environmental Protection Agency (EPA) estimates that for every ton-mile, a typical truck emits roughly three times more nitrogen oxides and particulates than a locomotive. Other studies suggest that trucks emit six to 12 times more pollutants per ton-mile than do railroads, depending upon the pollutant measured.
- According to the American Society of Mechanical Engineers, 2.5 million fewer tons of carbon dioxide would be emitted into the air annually if 10 percent of intercity freight now moving by highway were shifted to rail.
- Railroads are committed to substantial reductions in atmospheric emissions. They endorse an EPA proposal that calls for a 60 percent reduction in nitrogen oxide (NOx) emissions from locomotives manufactured beginning in 2005.
- According to the EPA, railroads account for just 7 percent of total transportation-related NOx emissions and less than 5 percent of transportation-related particulate emissions, even though railroads account for 40 percent of the nation's intercity freight ton-miles.

Railroads Are the Most Fuel-Efficient Form of Ground Transport

- Railroad fuel efficiency has increased 64 percent since 1980, when a gallon of diesel fuel moved a ton of freight an average of 235 miles. In 1999, railroads moved a ton of freight an average of 386 miles per gallon.
- If just 10 percent of the freight moved by highway were diverted to rail, the nation could save as much as 200 million gallons of fuel annually.
- On average, railroads are three times more fuel efficient than trucks.

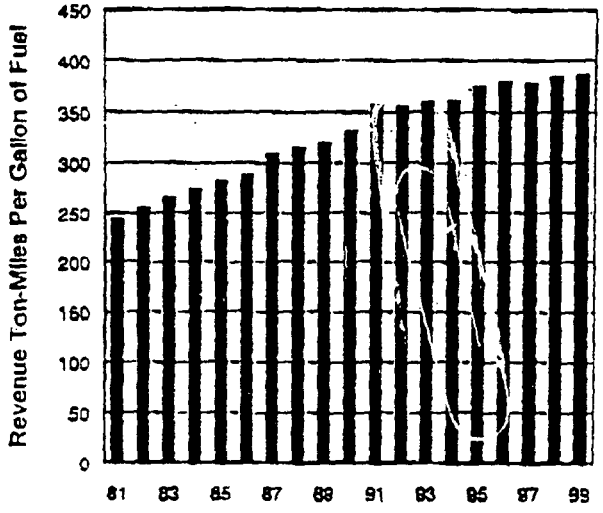
Public Policy

- National transportation policy should recognize the freight railroad advantages in energy efficiency and pollution abatement.

America's Freight Railroads

Environmental Facts-At-A-Glance

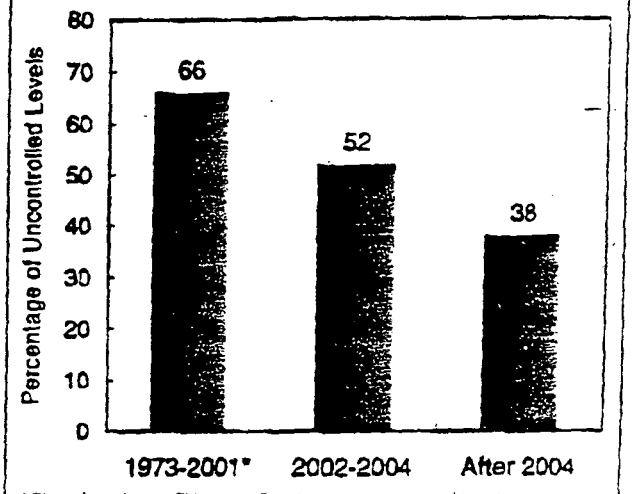
Gains in Railroad Fuel Efficiency



Source: AAR

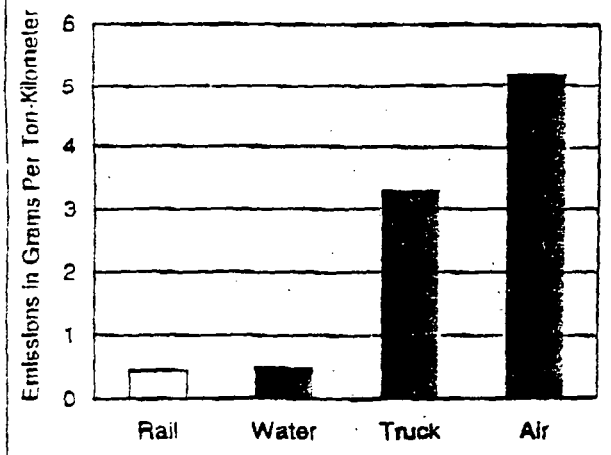
Toward a Cleaner Environment

Railroad Plans to Reduce NOx Emissions



*Class I engines will be retrofitted to meet proposed levels.

Modal Comparisons of Nitrogen Oxide Emissions



Source: Environmental Canada 1994

Railroads: The Best Choice for the Environment

Rank	Oxides of Nitrogen	Volatile Organic Compounds	Particulate Matter	Carbon Monoxide	Carbon Dioxide
1 Most Desirable	Rail	Rail	Air	Rail	Rail
2	Water	Water	Rail	Water	Water
3	Truck	Air	Water	Air	Truck
4 Least Desirable	Air	Truck	Truck	Truck	Air

Source: Environment Canada, Transportation Systems Division, Ottawa, Canada, 1994

Additional comments by Hamberger not included in bullets:

Railroads and barges comprise the foundation of the domestic coal distribution system, together handling three-quarters of all coal shipments. Trucks and conveyor systems generally are used to move coal over shorter distances. Lake carriers and ocean vessels move large coal shipments over water. Association of American Railroads want to remove anticompetitive 4.3 cents sales tax railroad and barges pay in legislation: HR1024 and S661. Railroads move more coal than any other commodity and account for 22 percent of total rail freight and more than 40 percent of total Class I freight tonnage transported.

According to Mr. Edward Hamberger, President of Association of American Railroads, Class I from 1980 to 2000 ton-miles, the movement of a ton of freight one mile, a standard freight volume measurement -- rose from 919 billion to 1.47 trillion, a 60% increase. The rail network is used more intensely and far more productively than in the past, and in some cases running at full track capacity today. For instance, ton-miles per mile of road owned rose from 5.6 million in 1980 to 14.8 million in 2000 a 165% increase. During this period of huge traffic expansion, railroads carefully managed their cost and generated enormous productivity growth 172 % while reducing their operating costs 41% inflation adjusted basis, but operating revenue declined 36%.

As traffic congestion on our highways becomes even more acute and pressure to reduce emissions, conserve fuel and promote safety continues to increase, railroads are likely to be called upon to do even more based on their advantages over other modes. The demand for additional passenger service utilizing freight lines is widespread and growing. In addition to infrastructure capacity, configuration of infrastructure is a critical issue in determining feasibility of running passenger trains on freight-owned tracks. Also passenger railroad companies should be required to work out a deal with freight companies that own the tracks they want to use, the Government should not demand passenger railroads can use these tracks without such agreements. There are different engineering and maintenance standards that will have to be addressed if passenger and freight trains eventually share same tracks, for example curves are different for slower moving freight trains than faster passenger trains. Unfortunately most knowledgeable people would agree that most readily attainable gains of companies sharing the cost of upgrading infrastructure costs have mostly already been made. Gains from this area going forward are more evolutionary not revolutionary. Government should be willing to help with upgrading Class I lines. Believes Government should pass HR1020 for Class II and III railroads.

Since the railroad industry depends on the capital markets to fund a large portion of their investment, and that the return on investment does not provide a return equivalent to alternative investments of similar risk, the railroad companies will be challenged to increase theses returns by say limiting capital expenditures. Railroads will continue to face pressure from investment community to maximize returns and are most likely unable to accommodate the financial demands required to improve infrastructure while trying to appease lenders return on investment requirements.

U.S. RAILROAD MILEAGE

	Owned	Leased	Trackage Rights	Govt. Owned	Other	Total Incl. Trackage Rights	Total Excl. Trackage Rights
Class I Subtotal	88,848	8,642	21,586	1,587	323	120,986	99,400
Regional Railroads	14,473	1,654	2,563	2,409	151	21,250	18,687
Local Railroads	14,149	1,257	1,154	4,158	401	21,118	19,964
S&T Railroads	4,562	255	731	1,646	110	7,304	6,573
Canadian	581	0	976	0	0	1,557	581
TOTAL	122,613	11,808	27,010	9,800	985	172,215	145,205

Source: AAR

367

Summary of
Energy Policy Act Transportation Rate Study: Final Report on Coal Transportation
(U.S. Department of Energy - Energy Information Administration, November 2000, 90 pages)

This study was mandated by a provision in the Energy Policy Act of 1992. It was prompted by concerns of some in Congress that railroads would take advantage of shifts to low-sulfur coal induced by sulfur dioxide emission restrictions by raising their rates for hauling coal, especially low-sulfur coal from the Powder River Basin (PRB).

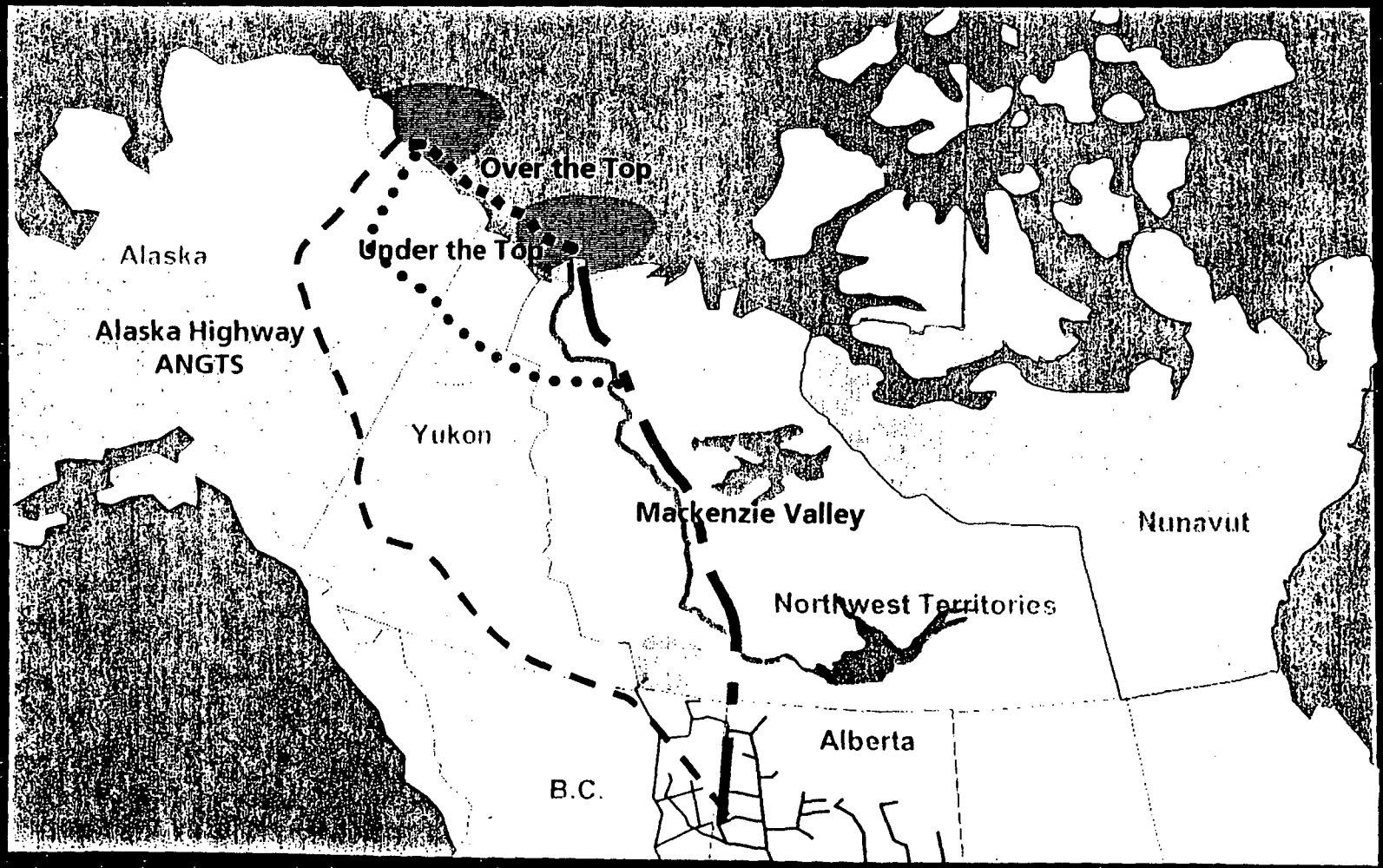
The study examined changes in transportation rates for coal purchased and delivered under supply contracts of more than one year duration shipped by rail from U.S. producers to certain U.S. investor-owned electric utilities from 1988 to 1997. Confidential rail rate data were obtained from Federal Energy Regulatory Commission (FERC) utility surveys. EIA augmented FERC data with data from the STB's Waybill Sample and industry reports.

Rail coal movements captured by the EIA study represent a majority of all rail coal deliveries to utilities, with the exact percentage varying from year to year. In 1997, for example, the quantity of coal hauled by railroads and covered by the study's augmented database was 367.2 million tons — an amount equal to 65 percent of the 563.3 million total tons of coal railroads delivered to all utilities in 1997. As expected, from 1988 to 1997 the share of low-sulfur coal rose (from 48.4 percent to 64.9 percent of movements), while the share of medium- and high-sulfur coal fell. The study noted that the rail share of total domestic coal tonnage rose from 57.5 percent in 1988 to 61.8 percent in 1997, driven largely by an increase in rail-hauled low-sulfur PRB coal.

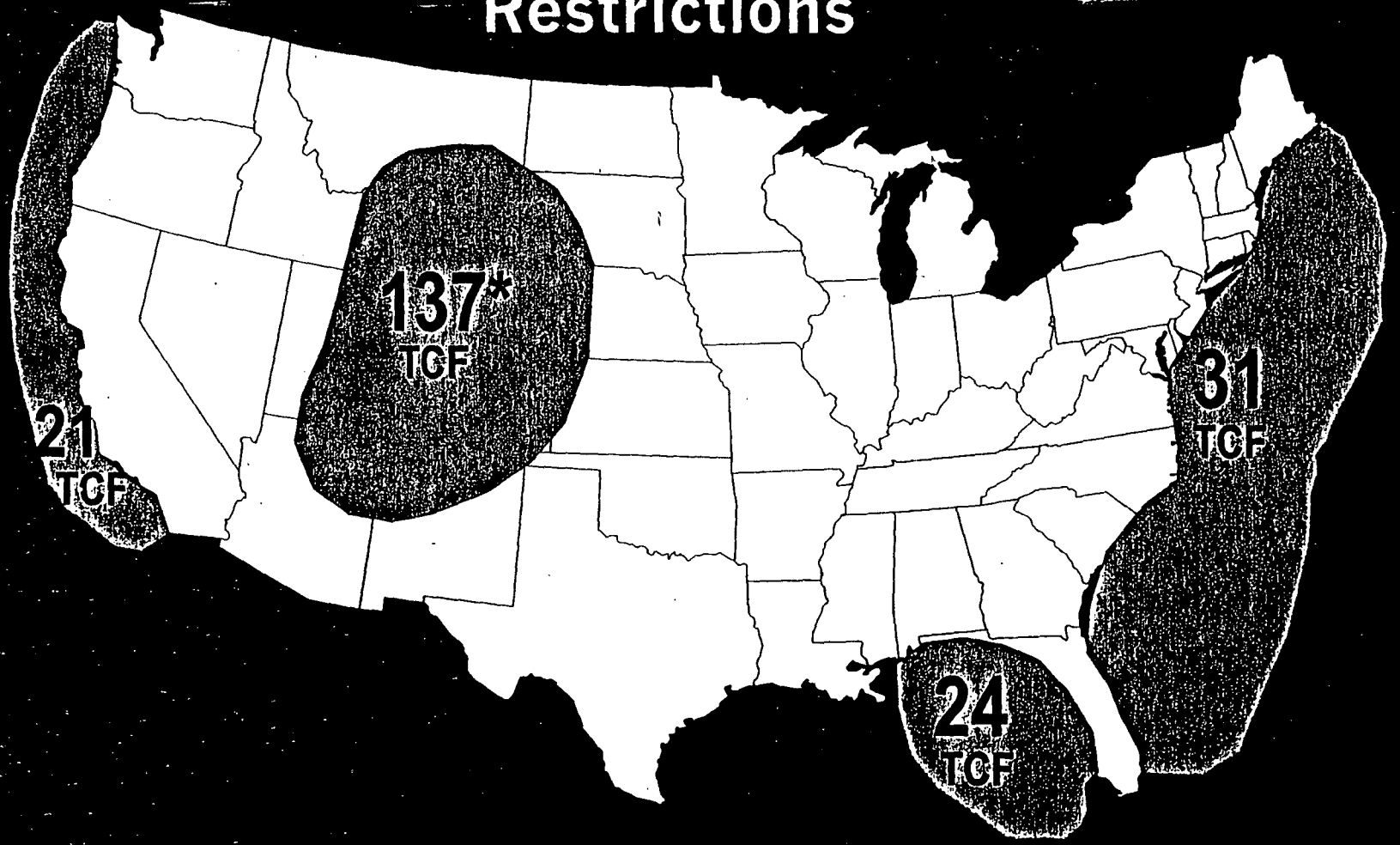
The report's findings were unambiguous: "Although the share of coal transported by railroads increased, the average rate per ton to ship contract coal by rail fell steadily (a 25.8 percent decline) during the study period. The rates for coal in all sulfur categories were lower in 1997 than in 1988. ... The general finding of declining rates was also substantiated when the rates were calculated as a rate per ton-mile, a rate per million Btu, or rates between specific supply and demand regions. ... Clearly, the majority of the contract coal shipped by rail during this period traveled via lower real-dollar rates than in earlier years, and there is no evidence of widespread inflation of shipping rates by the major coal-hauling railroads following enactment of the [Clean Air Act Amendments of 1990]. In fact, the greatest decline in coal rail rates per ton — a 36.0 percent decline in constant dollar terms — was for low-sulfur coal, the very category over which concern may have been greatest." The report noted that "the decline in average contract coal rail rates during the study-period was a response to competitive markets..."

A footnote in the study notes that "Because the rate data in this report represent regional data aggregations, they do not address alleged inequities in rates to and from isolated locations, or for "captive" shippers (with only one practical coal transportation option), or for small shippers who may not have access to technologically efficient loading equipment or may not qualify for high volume discounts." Rail detractors can be expected to seize upon this statement to dismiss the unambiguous major finding of the report: significantly lower rail rates for contract coal essentially across the board from 1988 to 1997.

Alaska North Slope: Pipeline Development Options



U.S. Lower-48 Natural Gas Resources Subject to Access Restrictions



** Approximately 29 Tcf of the Rockies gas resources are closed to development and 108 Tcf are available with restrictions.*

Kolevar, Kevin 153

From: Renze L Hoeksema [hoeksemar@dteenergy.com]
Sent: Wednesday, August 22, 2001 3:43 PM
To: Kolevar, Kevin
Subject: Mtg. Regarding Landfill Gas-to-Energy Industry

Kevin, it was good to talk to you again the other day. I appreciate your willingness to assist in organizing a meeting to discuss the interests of the landfill gas-to-energy industry with the appropriate policy representatives within DOE.

The industry representatives would be Curt Ranger, President, DTE Biomass Energy and Jerrold Jung, President, Michigan CAT, two Michigan based companies. Curt Ranger is also currently serving as the Advocacy Committee Chairman for the Solid Waste Association of North America (SWANA). In general terms we would like to discuss the role of landfill gas as a part of the national energy strategy. More specifically, we would focus on the benefits derived from nonconventional fuel tax credits.

The dates I have available for a meeting are August 29 and September 11, 12 and 14. If these dates are not workable, please let me know and I will look later into September.

Thank you for your consideration. If you have questions I can be reached at 202-347-8420. - Renze

For Release Upon Delivery
Expected at 10:00 a.m.
June 14, 2001

STATEMENT OF
THE OFFICE OF TAX POLICY
DEPARTMENT OF THE TREASURY
BEFORE THE SUBCOMMITTEE ON SELECT REVENUE MEASURES
COMMITTEE ON WAYS AND MEANS

Mr Chairman, Mr. McNulty, and Members of the Subcommittee:

The Office of Tax Policy appreciates the opportunity to present testimony on tax incentives to increase domestic production of oil and gas and promote energy conservation. There has been renewed interest in the role of tax incentives in our national energy policy.

The fundamental principle underlying a sound energy policy is that markets should be allowed to function freely and market interventions should be avoided unless justified by compelling energy security, economic, environmental, or other concerns. For example, returns on investments that increase domestic oil and gas reserves may not reflect the contribution of those investments to ensuring stability in supply and thereby reducing our vulnerability to oil supply disruptions. It is the goal of this Administration to pursue an energy policy that protects America's economic, security, and environmental interests.

Beyond the fundamental issue of whether a tax incentive is justified at all, a number of other, often contradictory, considerations must be taken into account in the design of any particular incentive. For example, incentives should be appropriately targeted to induce desired activities in a cost-effective manner. Thus, incentives should be designed to not reward investments that would have been made in the absence of an incentive. At the same time, however, incentives that are targeted too narrowly may reduce the cost of only some technologies and discourage investment in other promising approaches. This can result in economic inefficiency and will contribute to perceptions that the tax system is being used inappropriately to pick winners and losers among competing technologies.

In addition, incentives should also be designed to minimize complexity and avoid unnecessary increases in taxpayer compliance burdens and IRS administrative costs.

Increasing Domestic Oil and Gas Production

Before turning to a discussion of the present tax treatment of oil and gas activities, we would like to provide a brief overview of this sector.

Overview

Oil is an internationally traded commodity with its domestic price set by world supply and demand. Domestic exploration and production activity is affected by the world price of crude oil. Historically, world oil prices have fluctuated substantially. From 1970 to the early 1980s, there was a fivefold increase in real oil prices. World oil prices fell sharply in 1986 and were relatively more stable from 1986 through 1997. During that period, average refiner acquisition costs ranged from $14.91 to $23.59 in real 1992 dollars. In 1998, however, oil costs to the refiner declined to $12.52 per barrel in nominal dollars ($11.14 per barrel in 1992 dollars), their lowest level in 25 years in real terms. Since 1998, the decline has reversed with refiner acquisition costs (in nominal dollars) rising to $17.51 per barrel in 1999 and $27.69 per barrel in 2000 (the price has since dropped to $24.11 per barrel in March 2001, the latest month for which composite figures are available). The equivalent prices in 1992 dollars are $15.31 per barrel in 1999, $24.28 per barrel in 2000, and $20.39 per barrel in March 2001.

Domestic oil production has been on the decline since the mid-1980s. From 1978 to 1983 oil consumption in the United States also declined, but increasing consumption since 1983 has more than offset this decline. In 2000, domestic oil consumption was 28 percent higher than in 1970. The decline in oil production and increase in consumption have led to an increase in oil imports. Net petroleum (crude and product) imports have risen from approximately 38 percent of consumption in 1988 to 52 percent in 2000.

A similar pattern of large recent price increases and increasing dependence on imports has occurred in the natural gas market. During the second half of the 1990s, spot prices for natural gas exceeded $4.00 per million Btu (MMBtu) in only one month (February 1996). The spot price again exceeded $4.00 per MMBtu in May 2000, rose above $5.00 per MMBtu in September 2000, and exceeded $10.00 per MMBtu for several days last winter. The current spot price is approximately $3.71 per MMBtu.[1]

The United States has large natural gas reserves and was essentially self-sufficient in natural gas until the late 1980s. Since 1986, natural gas consumption has increased by more than 30 percent but natural gas production has increased by only 17 percent. Net imports as a share of consumption nearly quadrupled from 1986 to 2000, rising from 4.2 percent to 15.6 percent. Natural gas from Canada makes up nearly all of the imports into the United States.

Current law tax incentives for oil and gas production

The importance of maintaining a strong domestic energy industry has been long recognized and the Internal Revenue Code includes a variety of measures to stimulate domestic exploration and production. They are generally justified on the ground that they reduce vulnerability to an oil supply disruption through increases in domestic production, reserves, exploration activity, and production capacity. The tax incentives contained in present law address the drop in domestic exploratory drilling that has occurred since the mid-1950s and the continuing loss of production from mature fields and marginal properties.

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[1] All price references are to the spot price at the Henry Hub and are in nominal dollars.

Incentives for oil and gas production in the form of tax expenditures are estimated to total $9.8 billion for fiscal years 2002 through 2006.[2] They include the nonconventional fuels (i.e., oil produced from shale and tar sands, gas produced from geopressured brine, Devonian shale, coal seams, tight formations, or biomass, and synthetic fuel produced from coal) production credit ($2.4 billion), the enhanced oil recovery credit ($4.4 billion), the allowance of percentage depletion for independent producers and royalty owners, including increased percentage depletion for stripper wells ($2.3 billion), the exception from the passive loss limitation for working interests in oil and gas properties ($100 million), and the expensing of intangible drilling and development costs ($640 million). In addition to those tax expenditures, oil and gas activities have largely been eliminated from the alternative minimum tax. These provisions are described in detail below.

Percentage depletion

Certain costs incurred prior to drilling an oil- or gas-producing property are recovered through the depletion deduction. These include costs of acquiring the lease or other interest in the property, and geological and geophysical costs (in advance of actual drilling). Any taxpayer having an economic interest in a producing property may use the cost depletion method. Under this method, the basis recovery for a taxable year is proportional to the exhaustion of the property during the year. The cost depletion method does not permit cost recovery deductions that exceed the taxpayer's basis in the property or that are allowable on an accelerated basis. Thus, the deduction for cost depletion is not generally viewed as a tax incentive.

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[2] *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2002*, U.S. Government Printing Office, Washington, DC, 2001, p. 63. These estimates are measured on an "outlay equivalent" basis. They show the amount of outlay that would be required to provide the taxpayer the same after-tax income as would be received through the tax preference. This outlay equivalent measure allows a comparison of the cost of the tax expenditure with that of a direct Federal outlay.

Independent producers and royalty owners (as contrasted to integrated oil companies)[3] may qualify for percentage depletion. A qualifying taxpayer determines the depletion deduction for each oil or gas property under both the percentage depletion method and the cost depletion method and deducts the larger of the two amounts. Under the percentage depletion method, generally 15 percent of the taxpayer's gross income from an oil- or gas-producing property is allowed as a deduction in each taxable year. The amount deducted may not exceed 100 percent of the net income from that property in any year (the "net-income limitation").[4] Additionally, the percentage depletion deduction for all oil and gas properties may not exceed 65 percent of the taxpayer's overall taxable income (determined before such deduction and adjusted for certain loss carrybacks and trust distributions).[5]

A taxpayer may claim percentage depletion with respect to up to 1,000 barrels of average daily production of domestic crude oil or an equivalent amount of domestic natural gas. For producers of both oil and natural gas, this limitation applies on a combined basis. All production owned by businesses under common control and members of the same family must be aggregated; each group is then treated as one producer for application of the 1,000-barrel limitation.

Special percentage depletion provisions apply to oil and gas production from marginal properties. The statutory percentage depletion rate is increased (from the general rate of 15 percent) by one percentage point for each whole dollar that the average price of crude oil (as

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[3] An independent producer is any producer who is not a "retailer" or "refiner." A retailer is any person who directly, or through a related person, sells oil or natural gas or any product derived therefrom (1) through any retail outlet operated by the taxpayer or related person, or (2) to any person that is obligated to market or distribute such oil or natural gas (or product derived therefrom) under the name of the taxpayer or the related person, or that has the authority to occupy any retail outlet owned by the taxpayer or a related person. Bulk sales of crude oil and natural gas to commercial or industrial users, and bulk sales of aviation fuel to the Department of Defense, are not treated as retail sales for this purpose. Further, a person is not a retailer within the meaning of this provision if the combined gross receipts of that person and all related persons from the retail sale of oil, natural gas, or any product derived therefrom do not exceed $5 million for the taxable year. A refiner is any person who directly or through a related person engages in the refining of crude oil, but only if such person or related person has a refinery run in excess of 50,000 barrels per day on any day during the taxable year.

[4] By contrast, for any other mineral qualifying for the percentage depletion deduction, the deduction may not exceed 50 percent of the taxpayer's taxable income from the depletable property.

[5] Amounts disallowed as a result of this rule may be carried forward and deducted in subsequent taxable years, subject to the 65-percent-of-taxable-income limitation for those years.

determined under the provisions of the nonconventional fuels production credit of section 29) for the immediately preceding calendar year is less than $20 per barrel. In no event may the rate of percentage depletion under this provision exceed 25 percent for any taxable year. The increased rate applies for the taxpayer's taxable year which immediately follows a calendar year for which the average crude oil price falls below the $20 floor. To illustrate the application of this provision, the average price of a barrel of crude oil for calendar year 1999 was $15.56; thus, the percentage depletion rate for production from marginal wells was increased by four percent (to 19 percent) for taxable years beginning in 2000. The 100-percent-of-net-income limitation has been suspended for marginal wells for taxable years beginning after December 31, 1997, and before January 1, 2002.

Marginal production is defined for this purpose as domestic crude oil or domestic natural gas which is produced during any taxable year from a property which (1) is a stripper well property for the calendar year in which the taxable year begins, or (2) is a property substantially all of the production from which during such calendar year is heavy oil (i.e., oil that has a weighted average gravity of 20 degrees API or less corrected to 60 degrees Fahrenheit). A stripper well property is any oil or gas property for which daily average production per producing oil or gas well is not more than 15 barrel equivalents in the calendar year during which the taxpayer's taxable year begins.[6] A property qualifies as a stripper well property for a calendar year only if the wells on such property were producing during that period at their maximum efficient rate of flow.

If a taxpayer's property consists of a partial interest in one or more oil- or gas-producing wells, the determination of whether the property is a stripper well property or a heavy oil property is made with respect to total production from such wells, including the portion of total production attributable to ownership interests other than the taxpayer's. If the property satisfies the requirements of a stripper well property, then each owner receives the benefits of this provision with respect to its allocable share of the production from the property for its taxable year that begins during the calendar year in which the property so qualifies.

The allowance for percentage depletion on production from marginal oil and gas properties is subject to the 1,000-barrel-per-day limitation discussed above. Unless a taxpayer elects otherwise, marginal production is given priority over other production for purposes of utilization of that limitation.

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[6] Equivalent barrels is computed as the sum of (1) the number of barrels of crude oil produced, and (2) the number of cubic feet of natural gas produced divided by 6,000. If a well produced 10 barrels of crude oil and 12,000 cubic feet of natural gas, its equivalent barrels produced would equal 12 (i.e., 10 + (12,000 / 6,000)).

Because percentage depletion, unlike cost depletion, is computed without regard to the taxpayer's basis in the depletable property, cumulative depletion deductions may be far greater than the amount expended by the taxpayer to acquire or develop the property. The excess of the percentage depletion deduction over the deduction for cost depletion is generally viewed as a tax expenditure.

Intangible drilling and development costs

In general, costs that benefit future periods must be capitalized and recovered over such periods for income tax purposes, rather than being expensed in the period the costs are incurred. In addition, the uniform capitalization rules require certain direct and indirect costs allocable to property to be included in inventory or capitalized as part of the basis of such property. In general, the uniform capitalization rules apply to real and tangible personal property produced by the taxpayer or acquired for resale.

Special rules apply to intangible drilling and development costs ("IDCs").[7] Under these special rules, an operator (i.e., a person who holds a working or operating interest in any tract or parcel of land either as a fee owner or under a lease or any other form of contract granting working or operating rights) who pays or incurs IDCs in the development of an oil or gas property located in the United States may elect either to expense or capitalize those costs. The uniform capitalization rules do not apply to otherwise deductible IDCs.

If a taxpayer elects to expense IDCs, the amount of the IDCs is deductible as an expense in the taxable year the cost is paid or incurred. Generally, IDCs that a taxpayer elects to capitalize may be recovered through depletion or depreciation, as appropriate; or in the case of a nonproductive well ("dry hole"), the operator may elect to deduct the costs. In the case of an

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[7] IDCs include all expenditures made by an operator for wages, fuel, repairs, hauling, supplies, etc., incident to and necessary for the drilling of wells and the preparation of wells for the production of oil and gas. In addition, IDCs include the cost to operators of any drilling or development work (excluding amounts payable only out of production or gross or net proceeds from production, if the amounts are depletable income to the recipient, and amounts properly allocable to the cost of depreciable property) done by contractors under any form of contract (including a turnkey contract). Such work includes labor, fuel, repairs, hauling, and supplies which are used in the drilling, shooting, and cleaning of wells; in such clearing of ground, draining, road making, surveying, and geological works as are necessary in preparation for the drilling of wells; and in the construction of such derricks, tanks, pipelines, and other physical structures as are necessary for the drilling of wells and the preparation of wells for the production of oil and gas. Generally, IDCs do not include expenses for items which have a salvage value (such as pipes and casings) or items which are part of the acquisition price of an interest in the property.

integrated oil company (i.e., a company that engages, either directly or through a related enterprise, in substantial retailing or refining activities) that has elected to expense IDCs, 30 percent of the IDCs on productive wells must be capitalized and amortized over a 60-month period.[8]

A taxpayer that has elected to deduct IDCs may, nevertheless, elect to capitalize and amortize certain IDCs over a 60-month period beginning with the month the expenditure was paid or incurred. This rule applies on an expenditure-by-expenditure basis; that is, for any particular taxable year, a taxpayer may deduct some portion of its IDCs and capitalize the rest under this provision. This allows the taxpayer to reduce or eliminate IDC adjustments or preferences under the alternative minimum tax.

The election to deduct IDCs applies only to those IDCs associated with domestic properties.[9] For this purpose, the United States includes certain wells drilled offshore.[10]

Intangible drilling costs are a major portion of the costs necessary to locate and develop oil and gas reserves. Because the benefits obtained from these expenditures are of value throughout the life of the project, these costs would be capitalized and recovered over the period of production under generally applicable accounting principles. The acceleration of the deduction for IDCs is viewed as a tax expenditure.

Nonconventional fuels production credit

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[8] The IRS has ruled that if an integrated oil company ceases to be an integrated oil company, it may not immediately write off the unamortized portion of the IDCs capitalized under this rule, but instead must continue to amortize those IDCs over the 60-month amortization period.

[9] In the case of IDCs paid or incurred with respect to an oil or gas well located outside of the United States, the costs, at the election of the taxpayer, are either (1) included in adjusted basis for purposes of computing the amount of any deduction allowable for cost depletion or (2) capitalized and amortized ratably over a 10-year period beginning with the taxable year such costs were paid or incurred.

[10] The term "United States" for this purpose includes the seabed and subsoil of those submerged lands that are adjacent to the territorial waters of the United States and over which the United States has exclusive rights, in accordance with international law, with respect to the exploration and exploitation of natural resources (i.e., the Continental Shelf area).

Taxpayers that produce certain qualifying fuels from nonconventional sources are eligible for a tax credit ("the section 29 credit") equal to $3 per barrel or barrel-of-oil equivalent.[11] Fuels qualifying for the credit must be produced domestically from a well drilled, or a facility treated as placed in service before January 1, 1993.[12] The section 29 credit generally is available for qualified fuels sold to unrelated persons before January 1, 2003.[13]

For purposes of the credit, qualified fuels include: (1) oil produced from shale and tar sands; (2) gas produced from geopressured brine, Devonian shale, coal seams, a tight formation, or biomass (i.e., any organic material other than oil, natural gas, or coal (or any product thereof); and (3) liquid, gaseous, or solid synthetic fuels produced from coal (including lignite), including such fuels when used as feedstocks. The amount of the credit is determined without regard to any production attributable to a property from which gas from Devonian shale, coal seams, geopressured brine, or a tight formation was produced in marketable quantities before 1980.

The amount of the section 29 credit generally is adjusted by an inflation adjustment factor for the calendar year in which the sale occurs.[14] There is no adjustment for inflation in the case of the credit for sales of natural gas produced from a tight formation. The credit begins to phase out if the annual average unregulated wellhead price per barrel of domestic crude oil exceeds $23.50 multiplied by the inflation adjustment factor.[15]

The amount of the section 29 credit allowable with respect to a project is reduced by any unrecaptured business energy tax credit or enhanced oil recovery credit claimed with respect to such project.

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[11] A barrel-of-oil equivalent generally means that amount of the qualifying fuel which has a Btu (British thermal unit) content of 5.8 million.

[12] A facility that produces gas from biomass or produces liquid, gaseous, or solid synthetic fuels from coal (including lignite) generally will be treated as being placed in service before January 1, 1993, if it is placed in service by the taxpayer before July 1, 1998, pursuant to a written binding contract in effect before January 1, 1997. In the case of a facility that produces coke or coke gas, however, this provision applies only if the original use of the facility commences with the taxpayer. Also, the IRS has ruled that production from certain post-1992 "recompletions" of wells that were originally drilled prior to the expiration date of the credit would qualify for the section 29 credit.

[13] If a facility that qualifies for the binding contract rule is originally placed in service after December 31, 1992, production from the facility may qualify for the credit if sold to an unrelated person before January 1, 2008.

[14] The inflation adjustment factor for the 2000 taxable year was 2.0454. Therefore, the inflation-adjusted amount of the credit for that year was $6.14 per barrel or barrel equivalent.

[15] For 2000, the inflation adjusted threshold for onset of the phaseout was $48.07 ($23.50 x 2.0454) and the average wellhead price for that year was $26.73.

As with most other credits, the section 29 credit may not be used to offset alternative minimum tax liability. Any unused section 29 credit generally may not be carried back or forward to another taxable year; however, a taxpayer receives a credit for prior year minimum tax liability to the extent that a section 29 credit is disallowed as a result of the operation of the alternative minimum tax. The credit is limited to what would have been the regular tax liability but for the alternative minimum tax.

The provision provides a significant tax incentive (currently about $6 per barrel of oil equivalent or $1 per thousand cubic feet of natural gas). Coalbed methane and gas from tight formations currently account for most of the credit.

Enhanced oil recovery credit

Taxpayers are permitted to claim a general business credit, which consists of several different components. One component of the general business credit is the enhanced oil recovery credit. The general business credit for a taxable year may not exceed the excess (if any) of the taxpayer's net income tax over the greater of (1) the tentative minimum tax, or (2) 25 percent of so much of the taxpayer's net regular tax liability as exceeds $25,000. Any unused general business credit generally may be carried back one taxable year and carried forward 20 taxable years.

The enhanced oil recovery credit for a taxable year is equal to 15 percent of certain costs attributable to qualified enhanced oil recovery ("EOR") projects undertaken by the taxpayer in the United States during the taxable year. To the extent that a credit is allowed for such costs, the taxpayer must reduce the amount otherwise deductible or required to be capitalized and recovered through depreciation, depletion, or amortization, as appropriate, with respect to the costs. A taxpayer may elect not to have the enhanced oil recovery credit apply for a taxable year.

The amount of the enhanced oil recovery credit is reduced in a taxable year following a calendar year during which the annual average unregulated wellhead price per barrel of domestic crude oil exceeds $28 (adjusted for inflation since 1990).[16] In such a case, the credit would be reduced ratably over a $6 phaseout range.

For purposes of the credit, qualified enhanced oil recovery costs include the following costs which are paid or incurred with respect to a qualified EOR project: (1) the cost of tangible property which is an integral part of the project and with respect to which depreciation or

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[16] The average per-barrel price of crude oil for this purpose is determined in the same manner as for purposes of the section 29 credit.

amortization is allowable; (2) IDCs that the taxpayer may elect to deduct;[17] and (3) the cost of tertiary injectants with respect to which a deduction is allowable, whether or not chargeable to capital account.

A qualified EOR project means any project that is located within the United States and involves the application (in accordance with sound engineering principles) of one or more qualifying tertiary recovery methods which can reasonably be expected to result in more than an insignificant increase in the amount of crude oil which ultimately will be recovered. The qualifying tertiary recovery methods generally include the following nine methods: miscible fluid displacement, steam-drive injection, microemulsion flooding, in situ combustion, polymer-augmented water flooding, cyclic-steam injection, alkaline flooding, carbonated water flooding, and immiscible non-hydrocarbon gas displacement, or any other method approved by the IRS. In addition, for purposes of the enhanced oil recovery credit, immiscible non-hydrocarbon gas displacement generally is considered a qualifying tertiary recovery method, even if the gas injected is not carbon dioxide.

A project is not considered a qualified EOR project unless the project's operator submits to the IRS a certification from a petroleum engineer that the project meets the requirements set forth in the preceding paragraph.

The enhanced oil recovery credit is effective for taxable years beginning after December 31, 1990, with respect to costs paid or incurred in EOR projects begun or significantly expanded after that date.

Conventional oil recovery methods do not recover all of a well's oil. Some of the remaining oil can be extracted by unconventional methods, but these methods are generally more costly. At current world oil prices, a large part of the remaining oil in place is uneconomic to recover by unconventional methods. In this environment, the EOR credit can increase recoverable reserves. Although recovering oil using EOR methods is more expensive than recovering it using conventional methods, it may be less expensive than producing oil from new reservoirs. Although the credit could phase out at higher oil prices, it is fully effective at present world oil prices.

Alternative minimum tax

A taxpayer is subject to an alternative minimum tax ("AMT") to the extent that its tentative minimum tax exceeds its regular income tax liability. A corporate taxpayer's tentative

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[17] In the case of an integrated oil company, the credit base includes those IDCs which the taxpayer is required to capitalize.

minimum tax generally equals 20 percent of its alternative minimum taxable income in excess of an exemption amount. (The marginal AMT rate for a noncorporate taxpayer is 26 or 28 percent, depending on the amount of its alternative minimum taxable income above an exemption amount.) Alternative minimum taxable income ("AMTI") is the taxpayer's taxable income increased by certain tax preferences and adjusted by determining the tax treatment of certain items in a manner which negates the deferral of income resulting from the regular tax treatment of those items.

As a general rule, percentage depletion deductions claimed in excess of the basis of the depletable property constitute an item of tax preference in determining the AMT. In addition, the AMTI of a corporation is increased by an amount equal to 75 percent of the amount by which adjusted current earnings ("ACE") of the corporation exceed AMTI (as determined before this adjustment). In general, ACE means AMTI with additional adjustments that generally follow the rules presently applicable to corporations in computing their earnings and profits. As a general rule a corporation must use the cost depletion method in computing its ACE adjustment. Thus, the difference between a corporation's percentage depletion deduction (if any) claimed for regular tax purposes and its allowable deduction determined under the cost depletion method is factored into its overall ACE adjustment.

Excess percentage depletion deductions related to crude oil and natural gas production are not items of tax preference for AMT purposes. In addition, corporations that are independent oil and gas producers and royalty owners may determine depletion deductions using the percentage depletion method in computing their ACE adjustments.

The difference between the amount of a taxpayer's IDC deductions and the amount which would have been currently deductible had IDC's been capitalized and recovered over a 10-year period may constitute an item of tax preference for the AMT to the extent that this amount exceeds 65 percent of the taxpayer's net income from oil and gas properties for the taxable year (the "excess IDC preference"). In addition, for purposes of computing a corporation's ACE adjustment to the AMT, IDCs are capitalized and amortized over the 60-month period beginning with the month in which they are paid or incurred. The preference does not apply if the taxpayer elects to capitalize and amortize IDCs over a 60-month period for regular tax purposes.

IDC's related to oil and gas wells are generally not taken into account in computing the excess IDC preference of taxpayers that are not integrated oil companies. This treatment does not apply, however, to the extent it would reduce the amount of the taxpayer's AMTI by more than 40 percent of the amount that the taxpayer's AMTI would have been if those IDCs had been taken into account.

In addition, for corporations other than integrated oil companies, there is no ACE adjustment for IDCs with respect to oil and gas wells. That is, such a taxpayer is permitted to use its regular tax method of writing off those IDCs for purposes of computing its adjusted current earnings.

Absent these rules, the incentive effect of the special provisions for oil and gas would be reduced for firms subject to the AMT. These rules, however, effectively eliminate AMT concerns for independent producers.

Passive activity loss and credit rules

A taxpayer's deductions from passive trade or business activities, to the extent they exceed income from all such passive activities of the taxpayer (exclusive of portfolio income), generally may not be deducted against other income.[18] Thus, for example, an individual taxpayer may not deduct losses from a passive activity against income from wages. Losses suspended under this "passive activity loss" limitation are carried forward and treated as deductions from passive activities in the following year, and thus may offset any income from passive activities generated in that later year. Losses from a passive activity may be deducted in full when the taxpayer disposes of its entire interest in that activity to an unrelated party in a transaction in which all realized gain or loss is recognized.

An activity generally is treated as passive if the taxpayer does not materially participate in it. A taxpayer is treated as materially participating in an activity only if the taxpayer is involved in the operations of the activity on a basis which is regular, continuous, and substantial.

A working interest in an oil or gas property generally is not treated as a passive activity, whether or not the taxpayer materially participates in the activities related to that property. This exception from the passive activity rules does not apply if the taxpayer holds the working interest through an entity which limits the liability of the taxpayer with respect to the interest. In addition, if a taxpayer has any loss for any taxable year from a working interest in an oil or gas property which is treated pursuant to this working interest exception as a loss which is not from a passive activity, then any net income from such property (or any property the basis of which is determined in whole or in part by reference to the basis of such property) for any succeeding taxable year is treated as income of the taxpayer which is not from a passive activity.

Similar limitations apply to the utilization of tax credits attributable to passive activities. Thus, for example, the passive activity rules (and, consequently, the oil and gas working interest

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[18] This provision applies to individuals, estates, trusts, personal service corporations, and closely held C corporations.

exception to those rules) apply to the nonconventional fuels production credit and the enhanced oil recovery credit. However, if a taxpayer has net income from a working interest in an oil and gas property which is treated as not arising from a passive activity, then any tax credits attributable to the interest in that property would be treated as credits not from a passive activity (and, thus, not subject to the passive activity credit limitation) to the extent that the amount of the credits does not exceed the regular tax liability which is allocable to such net income.

As a result of this exception from the passive loss limitations, owners of working interests in oil and gas properties may use losses from such interests to offset income from other sources.

Tertiary injectants

Taxpayers are allowed to deduct the cost of qualified tertiary injectant expenses for the taxable year. Qualified tertiary injectant expenses are amounts paid or incurred for any tertiary injectant (other than recoverable hydrocarbon injectants) which is used as a part of a tertiary recovery method.

The provision allowing the deduction for qualified tertiary injectant expenses resolves a disagreement between taxpayers (who considered such costs to be IDCs or operating expenses) and the IRS (which considered such costs to be subject to capitalization).

Energy Efficiency and Alternative Energy Sources

Incentives for energy efficiency and alternative energy sources are also essential elements of national energy policy. The continuing strength of our economy over the past two years, despite oil price rises, underscores the dramatic improvements in energy efficiency we have achieved over the past quarter century, as well as the changing economy. While past oil shortages have taken a significant toll on the U.S. economy, the recent increases in oil prices have not affected the economy much. Increased energy efficiency in cars, homes, and manufacturing has helped insulate the economy from these short-term market fluctuations. In 1974, we consumed 15 barrels of oil for every $10,000 of gross domestic product. Today we consume only 8 barrels of oil for the same amount (in constant dollars) of economic output.

Current law tax incentives for energy efficiency and alternative fuels

Tax incentives currently provide an important element of support for energy-efficiency improvements and increased use of renewable and alternative fuels. Current incentives in the form of tax expenditures are estimated to total $1.2 billion for fiscal years 2002 through 2006. They include a tax credit for electric vehicles and expensing for clean-fuel vehicles ($20 million), a tax credit for the production of electricity from wind or biomass and a tax credit for certain

solar energy property ($590 million), and an exclusion from gross income for certain energy conservation subsidies provided by public utilities to their customers ($580 million).[19]

Electric and clean-fuel vehicles and clean-fuel vehicle refueling property

A 10-percent tax credit is provided for the cost of a qualified electric vehicle, up to a maximum credit of $4,000. A qualified electric vehicle is a motor vehicle that is powered primarily by an electric motor drawing current from rechargeable batteries, fuel cells, or other portable sources of electric current, the original use of which commences with the taxpayer, and that is acquired for use by the taxpayer and not for resale. The full amount of the credit is available for purchases prior to 2002. The credit begins to phase down in 2002 and does not apply to vehicles placed in service after 2004.

Certain costs of qualified clean-fuel vehicles and clean-fuel vehicle refueling property may be deducted when such property is placed in service. Qualified electric vehicles do not qualify for the clean-fuel vehicle deduction. The deduction begins to phase down in 2002 and does not apply to property placed in service after 2004.

Energy from wind or biomass

A 1.5-cent-per-kilowatt-hour tax credit is provided for electricity produced from wind, "closed-loop" biomass (organic material from a plant that is planted exclusively for purposes of being used at a qualified facility to produce electricity), and poultry waste. The electricity must be sold to an unrelated person and the credit is limited to the first 10 years of production. The credit applies only to facilities placed in service before January 1, 2002. The credit amount is indexed for inflation after 1992.

Solar energy

A 10-percent investment tax credit is provided to businesses for qualifying equipment that uses solar energy to generate electricity, to heat or cool or provide hot water for use in a structure, or to provide solar process heat.

Ethanol and renewable source methanol

An income tax credit and an excise tax exemption are provided for ethanol and renewable source methanol used as a fuel. In general, the income tax credit is 53 cents per gallon for

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[19] *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2002*, U.S. Government Printing Office, Washington, DC, 2001, p. 63.

ethanol and 60 cents per gallon for renewable source methanol. As an alternative to the income tax credit, gasohol blenders may claim an equivalent gasoline tax exemption for each ethanol and renewable source methanol that is blended into qualifying gasohol.

The income tax credit expires on December 31, 2007, and the excise tax exemption expires on September 30, 2007. In addition, the ethanol credit and exemption are each reduced by 1 cent per gallon in 2003 and by an additional 1 cent per gallon in 2005. Neither the credit nor the exemption apply during any period in which motor fuel taxes dedicated to the Highway Trust Fund are limited to 4.3 cents per gallon. Under current law, the motor fuel tax dedicated to the Highway Trust Fund will be limited to 4.3 cents per gallon beginning on October 1, 2005.

Energy conservation subsidies

Subsidies provided by public utilities to their customers for the purchase or installation of energy conservation measures are excluded from the customers' gross income. An energy conservation measure is any installation or modification primarily designed to reduce consumption of electricity or natural gas or to improve the management of energy demand with respect to a dwelling unit.

Administration budget proposals

The Administration's budget proposals for fiscal year 2002 include tax incentives for renewable energy resources. The budget also contains proposals to modify the tax treatment of nuclear decommissioning funds related to electricity production and to extend the suspension of the net income limitation applicable to certain oil and gas production. The Administration's proposals are described below.[20]

Electricity from wind and biomass

The Administration proposes to extend the credit for electricity produced from wind and biomass for three years to facilities placed in service before January 1, 2005. In addition, eligible biomass sources would be expanded to include certain biomass from forest-related resources, agricultural sources, and other specified sources. Special rules would apply to biomass facilities placed in service before January 1, 2002. Electricity produced at such facilities from newly eligible sources would be eligible for the credit only from January 1, 2002, through December 31, 2004. The credit for such electricity would be computed at a rate equal to 60 percent of the generally applicable rate. Electricity produced from newly

[20] For a more detailed description, see *General Explanations of the Administration's Fiscal Year 2002 Tax Relief Proposals*, Department of the Treasury, April 2001.

eligible biomass co-fired in coal plants would also be eligible for the credit only from January 1, 2002, through December 31, 2004. The credit for such electricity would be computed at a rate equal to 30 percent of the generally applicable rate.

Residential solar energy systems

The Administration proposes a new tax credit for individuals that purchase solar energy equipment used to generate electricity (photovoltaic equipment) or heat water (solar water heating equipment) for use in a dwelling unit that the individual uses as a residence. The credit would be available only for equipment used exclusively for purposes other than heating swimming pools. The proposed credit would be equal to 15 percent of the cost of the equipment and its installation. The credit would be nonrefundable and an individual would be allowed a lifetime maximum credit of $2,000 per residence for photovoltaic equipment and $2,000 per residence for solar water heating equipment. The credit would apply only to solar water heating equipment placed in service after December 31, 2001, and before January 1, 2006, and to photovoltaic systems placed in service after December 31, 2001, and before January 1, 2008.

Nuclear decommissioning funds

The Administration proposes to repeal the current law provision that limits deductible contributions to a nuclear decommissioning fund to the amount included in the taxpayer's cost of service for ratemaking purposes. Thus, unregulated taxpayers would be allowed a deduction for amounts contributed to a qualified nuclear decommissioning fund. The Administration also proposes to permit funding of all decommissioning costs (including pre-1984 costs) through qualified nuclear decommissioning funds. Contributions to fund pre-1984 costs would be deductible except to the extent a deduction (other than under the qualified fund rules) or an exclusion from income has been previously allowed with respect to those costs. The Administration's proposal would clarify that any transfer of a qualified nuclear decommissioning fund in connection with the transfer of the power plant with which it is associated would be nontaxable and no gain or loss will be recognized by the transferor or transferee as a result of the transfer. In addition, the proposal would permit taxpayers to make deductible contributions to a qualified fund after the end of the nuclear power plant's estimated useful life and would provide that nuclear decommissioning costs are deductible when paid.

Net income limitation on percentage depletion from marginal wells

The Administration proposes a one-year extension of the provision suspending the 100-percent-of-net-income limitation for marginal oil and gas wells. Under the Administration

proposal, marginal wells would continue to be exempt from the limitation during taxable years beginning in 2002.

NEPD Group proposals

The Report of the National Energy Policy Development (NEPD) Group issued in May also included tax incentives for renewable energy resources and for more efficient energy use. The NEPD Group proposals are described below.[21]

Fuel from landfill methane

The NEPD Group proposes to extend the section 29 credit for fuel produced from landfill methane produced at a facility (or portion of a facility) that is placed in service after December 31, 2001. Fuel produced at such facilities would be eligible for the credit through December 31, 2010. The proposal would also expand the credit by permitting the credit for fuel used by the taxpayer to produce electricity. The credit for fuel produced at landfills subject to EPA's 1996 New Source Performance Standards/Emissions Guidelines would be limited to two-thirds of the otherwise applicable amount. In the case of landfills with facilities that currently qualify for the section 29 credit, this limitation would not apply until after 2007.

Ethanol and renewable source methanol

The NEPD Group proposes to extend the income tax credit and excise tax exemption for ethanol and renewable source methanol through December 31, 2010. The current law rule providing that neither the credit nor the exemption apply during any period in which motor fuel taxes dedicated to the Highway Trust Fund are limited to 4.3 cents per gallon would be retained.

Hybrid and fuel cell vehicles

The NEPD Group proposes to provide temporary tax credits for certain hybrid and fuel cell vehicles.

A credit of $250 to $4,000 would be available for purchases of qualifying hybrid vehicles after December 31, 2001, and before January 1, 2008. A hybrid vehicle is a vehicle that draws propulsion from both an on-board internal combustion or heat engine using combustible fuel and an on-board rechargeable energy storage system. To qualify for the minimum credit, a hybrid vehicle would be required to derive at least 5 percent of its maximum available power from the rechargeable energy storage system. Larger credits would be available for vehicles that derive

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[21] For a more detailed description, see the attachments to this testimony.

larger percentages of power from the rechargeable energy storage system and for vehicles that meet specified fuel economy standards.

A credit of $1,000 to $8,000 would be available for the purchase of qualifying fuel cell vehicles after December 31, 2001, and before January 1, 2008. A fuel cell vehicle is a motor vehicle propelled by power derived from one or more cells that convert chemical energy directly into electricity by combining oxygen with on-board hydrogen (including hydrogen produced from on-board fuel that requires reformation before use). To qualify for the minimum credit, a fuel cell vehicle would be required to meet a minimum fuel economy standard for its weight class. Larger credits would be available for vehicles that achieve higher fuel economy standards.

Combined heat and power systems

To encourage more efficient energy usage, the NEPD Group proposes to provide a 10-percent investment credit for qualifying combined heat and power (CHP) systems. CHP systems are used to produce electricity (and/or mechanical power) and usable heat from the same primary energy source. To qualify for the credit, a system would be required to produce at least 20 percent of its total useful energy in the form of thermal energy and at least 20 percent in the form of electrical and/or mechanical power and would also be required to satisfy an energy efficiency standard. The credit would apply to CHP equipment placed in service after December 31, 2001, and before January 1, 2007.

This concludes our testimony. We would be pleased to answer any questions the Subcommittee may have.

Tripodi, Cathy

From: Kelliher, Joseph
Sent: Tuesday, July 03, 2001 8:24 PM
To: Tripodi, Cathy
Subject: FW: CZMA

CZMA Bullets1.doc CZMAreauthbckgnd 4_.doc CZMA White Paper.doc

-----Original Message-----
From: Jim Ford [mailto:Fordj@api.org]
Sent: Thursday, March 22, 2001 11:40 AM
To: Kelliher, Joseph
Subject: CZMA

Joe - the short answer to your question on CZMA is that we do believe that legislation is necessary to solve the problems that application of the law have created for sound OCS development. The note below and the attachments speak in more detail. After you look at this, perhaps we should have a couple of our experts come meet with you. Please let me know what we can do next. Thanks. Jim. Industry position -

- Support the original tenets of the CZMA including environmentally compatible energy development.

- Consistency process is broken and a fix is necessary to consider as impacts on America's energy supplies are evaluated.

The previous problems are -

- Delays or impediments to obtaining permits especially in frontier areas. For example,

- States have blocked or delayed federal offshore energy activities far outside of their coastal waters through unreasonable application of the CZMA consistency provisions. (i.e., FPSO's)

- Commerce's improper objection and failure to act in an appeals decision which is highlighted in a Supreme Court decision issued involving leases off North Carolina known as the Manteo prospect.

problems foreseen with recently finalized regulation -

NOAA's recently revised CZMA federal consistency regulations expand the ability for a state to use its coastal management program to impede federal permitting involving proposed activities which occur in federal waters off the coasts of other States. (We are already seeing this in the FPSO example)

Industry amendments would fix the law without affecting a state's ability to be part of the consistency process. The amendments would:

1. Avoid the expansion of a state's review of activities outside of its own geographic area;

2. Create a single comprehensive consistency review process covering all activities rather than redundant processes authorized under current law;

3. Recognize that the Secretary of the Interior will determine information requirements for consistency certifications for OCS oil and gas activities;

4. Allow override appeals concerning OCS activities to be decided by the Secretary of the Interior; and

5. Ensure timely decisions by the esponsible deral official in override appeals.

Agencies should be considering how the broken CZMA process is affecting energy in this country. For example, the Administration, through DOI, Commerce, and EPA is ultimately responsible for achieving (and accountable for failures in) the balance between national and state/local interests and economic growth and environmental protection that is at the heart of the CZMA. The time is ripe for federal "CZMA leadership" in the national interest, just as certain state governments continue providing divergent "leadership" in the state/ local interest.

Tripodi, Cathy

From: Kelliher, Joseph
Sent: Tuesday, July 03, 2001 8:24 PM
To: Tripodi, Cathy
Subject: FW: Recommendations on National Energy Policy

-----Original Message-----
From: Jim Ford [mailto:Fordj@api.org]
Sent: Thursday, March 22, 2001 8:41 AM
To: Kelliher, Joseph
Subject: RE: Recommendations on National Energy Policy

We do have more. I'll get back to you with supplementary material as soon as possible. Curious as to whether any of the other suggestions we've made - particularly the short-term administrative measures recommended in the first e-mail I sent you - have any traction. By the way, I heard some word yesterday that the NEP development group may have produced a draft. Can you send any light on that?

-----Original Message-----
From: Kelliher, Joseph [mailto:Joseph.Kelliher@hq.doe.gov]
Sent: Wednesday, March 21, 2001 4:38 PM
To: 'Jim Ford'
Subject: RE: Recommendations on National Energy Policy
Importance: High

Do you have more detail on the CZMA issue? Your description suggests that legislation is not needed, and that changing the regulations would suffice. Is that true? Also, please explain in more detail how the current regulations relating to consistency impede offshore development, it is not clear what the problem is. Thanks.

-----Original Message-----
From: Jim Ford [mailto:Fordj@api.org]
Sent: Tuesday, March 20, 2001 2:51 PM
To: Kelliher, Joseph
Subject: Recommendations on National Energy Policy
Importance: High

Hi, Joe. As we discussed, attached are a set of papers on national energy
policy recommendations. Much of it is designed to be self-explanatory. The
last document is a suggested executive order to ensure that energy
implications are considered and acted on in rulemakings and other executive
actions. This draft has DOE as the coordinator. Probably also need to make
energy a major portfolio item for a senior White House aide.

Let me know if you have questions or additional info needs. Thanks.

Jim Ford
[illegible]
fordj@api.org <mailto:fordj@api.org>

Kelliher, Joseph

From: Pettit, Susan [SPettit@appanet.org]
Sent: Tuesday, April 17, 2001 3:16 PM
To: Kelliher, Joseph
Subject: RE: Info on public power

Mitch is out this afternoon but can e-mail you tomorrow. In addition to what I described, he mentioned that Jt. Tax assumed that no public power entities would elect to give up the issuance of tax-exempt bonds (under the first scenario I described). We disagree with that assumption, and there are other points he'd like to highlight for you as well. Will tomorrow work? There seems to be a shortage of consultants given the Easter recess...

-----Original Message-----
From: Kelliher, Joseph [SMTP:Joseph.Kelliher@hq.doe.gov]
Sent: Tuesday, April 17, 2001 10:42 AM
To: 'Pettit, Susan'
Subject: RE: Info on public power

Susan, could you ask him to send me an email explaining whether he thought JTC's estimate was unreasonable, and explain any difference of opinion. It seems unreasonable to me to assume that public power would be required to participate in competitive markets if no State has yet done so.

-----Original Message-----
From: Pettit, Susan [mailto:SPettit@appanet.org]
Sent: Tuesday, April 17, 2001 10:37 AM
To: Kelliher, Joseph
Subject: RE: Info on public power

As you probably know, under the proposed legislation, public power systems can provide open access without triggering the private use limitations. The systems can:

(1) elect to forgo issuance of most future tax-exempt debt and its existing bonds would be protected from private use restrictions. But the system could still issue tax-exempt debt to finance local transmission and distribution facilities over which it provides open access.

or,

(2) choose not to make the election and remain subject to private use rules EXCEPT, even under this scenario, the system would still be permitted to provide open access transmission and distribution without triggering the private use restrictions.

So, under the legislation and under either scenario, public power systems could provide local open access transmission without being subject to private use rules.

Joint Tax assumed that without the legislation, in the 23 states that have adopted restructuring, all outstanding public power debt would be defeased. Taxable bonds would then be issued, so JT Tax assumed that the federal government would lose all of that revenue should the legislation pass. On top of that, they assumed that all 50 states would ultimately adopt restructuring...and to get to the conclusion that all public power debt would be defeased, they assumed that public power would be mandated to participate in restructuring.

My knowledge on other specifics of these assumptions is limited, but our tax consultant, Mitch Rapaport, was in all the meetings with JT Tax and could be far more helpful. Would you like to talk to him?

--Susan Pettit

-----Original Message-----
From: Kelliher, Joseph [SMTP:Joseph.Kelliher@hq.doe.gov]
Sent: Monday, April 16, 2001 7:25 PM
To: 'Pettit, Susan'
Subject: RE: Info on public power

Susan, what were the assumptions underlying the private use estimate? Did Joint Tax assume that some publics would provide open access notwithstanding the private use limits. Curious about the reasoning.

-----Original Message-----
From: Pettit, Susan [mailto:SPettit@appanet.org]
Sent: Monday, April 16, 2001 1:51 PM
To: Kelliher, Joseph
Subject: Info on public power

Joe, Hopefully you have received my fax regarding the revenue estimates, transmission and retail sales stats. Let me know if you have additional questions. You might find additional useful information on this link to our website:

http://www.appanet.org/general/issues/stats.htm

--Susan Pettit
Government Relations Representative
APPA
202-467-2985

Kelliher, Joseph

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Sent: Tuesday, April 17, 2001 10:37 AM
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--Susan Pettit
Government Relations Representative
APPA
202-467-2985

Kelliher, Joseph

From: Linda Stuntz [lstuntz@sdsatty.com]
Sent: Thursday, February 15, 2001 6:27 PM
To: Kelliher, Joseph
Subject: Re: Reliability Legislation

THanks Joe. How about the 26th, or the morning of the 27th? I will check with DAve and DAvid to be sure, but I think David Cook is down here most Mondays and could stay over to Tuesday morning if that would help you.

Thank you for the kind words on the Energy Strategy. It was a work product of a lifetime (and I had a lot of great help). I do have some feel for what you are trying to do, and would like very much to help. (By the Way, Vito Stagliano is putting finishing touches on a book about the preparation of the strategy, complete with all the scoop on inside fights, as well as less juicy discussion of analysis/assumptions etc. It is now dated, but some of the interagency and agency-White House tensions remain, I am sure. I have most of the near-final manuscript, when you ever have time, if you are interested.)

As for that transmission investment data, I canot recall for sure, but I think I used data from Leonard Hyman's book, "Unlocking the Benefits of Restructuring: A BluePrint for Transmission." I can fax you key pages or messenger the whole book over to you in the morning, please just let me know.

Best regards,
Linda

-----Original Message-----
From: Kelliher, Joseph <Joseph.Kelliher@hq.doe.gov>
To: 'Linda Stuntz' <lstuntz@sdsatty.com>
Date: Thursday, February 15, 2001 3:43 PM
Subject: RE: Reliability Legislation

>I would like to meet with you all. When is a convenient time? I would be grateful if we can do it after 2/23. In the meantime, let me ask a favor. Remember the transmission article you inserted in the record of the E&P hearing on March 18, 1999. Do you still have a copy? If I recall, it had good historical information on transmission investment. The PA report commissioned by National Grid has good info on investment since 1990, but the report you provided had info going back to the 60s and 70s, I believe. We are looking for good graphs and charts for the VP's energy task force report. I reviewed your National Energy Strategy. It was a good piece of work.
>
>-----Original Message-----

>From: Linda Stuntz [mailto:lstuntz@sdsatty.com]
>Sent: Wednesday, February 14, 2001 12:37 PM
>To: Kelliher, Joseph
>Cc: Dave Nevius; David Cook
>Subject: Reliability Legislation
>
>
> Dave Nevius, David Cook and I would appreciate the opportunity to visit
with you sometime soon to talk about reliability legislation. As you may
know, Senator Gordon Smith has introduced the Gorton bill of last year (S.
172). Mr. Wynn and others have introduced legislation similar to the Wynn
Bill of last year, which includes RTO coordination amendments (H.R. 312). I
understand that you are working with the Vice President's task force on a
Comprehensive Energy Strategy. We would like to talk with you about making
the NERC reliability legislation a part of that Strategy, and address any
questions you may have about our legislative effort.
>
>Dave would also be prepared to talk about the status of NERC's summer
assessment, and how things look to them.
>
>I know you are swamped. Please just let me know when you could fit us in,
and we will be there.
>
>thanks and best regards,
>Linda
>

James Rannels
04/27/2001 05:41 PM

To: kknutson@ovp.eop.gov
cc: Robert Dixon, William Parks
Subject: Solar Home

Attached is the cut away picture of the energy efficient home powered by solar that you requested. Please let me know if I can provide additional information.

Shea Homes Broc

James Rannels
04/27/2001 05:45 PM

To: kknutson@ovp.eop.gov
cc:
Subject: Solar Homes

Attached is one of the pictures of a solar home you requested. Please let me know if I can provide additional information.

21st Century Townhouse
In 1996, the National Association of Home Builders constructed advanced townhouses featuring energy-efficient materials and systems at the National Research Home Park 21st Century Townhouse, in Bowie, Maryland. The townhouse on the right has an integrated photovoltaic standing-seam roof; the photovoltaic modules look and perform like the standard metal roofing on the other units (on the left), but they also produce electricity. The solar roofing system, developed by United Solar Systems Corporation and Energy Conversion Devices, is designed to serve as a direct replacement for standard architectural metal roofing panels. Photo credit: Tim Ellison, Energy Conversion Devices, Troy, MI

PCD 04473

Img04473

James Rannels
04/27/2001 05:47 PM

To: kknutson@ovp.eop.gov
cc:
Subject: Solar Homes

Attached is one of the pictures of a solar home you requested. Please let me know if I can provide additional information.

Maine Residence
This house in coastal Maine generates its own electricity from a 4.25-kilowatt photovoltaic system beautifully integrated into the rooftop. The south roof incorporates an integrated array of solar thermal collectors and large-area photovoltaic modules to form a single, uniform glass pane. Through a net-metering arrangement with Central Maine Power, surplus solar electricity is exported to the utility grid, effectively spinning the utility meter backward. Space heating and domestic hot-water are provided by the solar thermal system. Photo credit: Solar Design Associates, Harvard, MA

PCD 04470


Img04470

To: John Fenzel/OVP/EOP

cc:
Subject: Meeting Schedule

John, how about 11 to 12 or 12:30 on Monday or Tuesday? If we go through ch. 1 and 2 on Friday, we will have less to do on Monday.

According to the National Petroleum Council Report on natural gas (December 1999):

Much of the nation's natural gas resource base resides on federal lands or in federal waters, yet a large portion of this resource base is not open to either assessment or development. Two of the most promising regions for future gas production, the Rocky Mountains and the Gulf of Mexico, currently have significant access restrictions. For example, an estimated 40%—or 137 trillion cubic feet (TCF)—of potential gas resource in the Rockies is on federal land that is either closed to exploration or is open under restrictive provisions. Another 76 TCF of resources are estimated for restricted offshore areas in the eastern Gulf of Mexico, the Atlantic, and the Pacific. The eastern Gulf of Mexico is largely closed to exploration and the limited areas that are now open are the subject of political debate. The proposed MMS Lease Sale 181 scheduled for December 2001 in the eastern Gulf of Mexico is the first such sale in this area since the late 1980s, yet only covers a small portion of the entire area. The East Coast of the United States is completely closed to development while Canada is pursuing its East Coast gas resources, as demonstrated by the Sable Island development off the coast of Nova Scotia. In addition, drilling on the West Coast of the United States also faces strong restrictions, while offshore British Columbia is opening up to greater exploration and production.

#39

Post-Hearing Questions Submitted by Minority Members

Representative Lynn Woolsey, Ranking Minority Member, Energy Subcommittee

Q1. Please provide the names of all Department of Energy employees or contractor employees who provided support or staff work for the Cheney Group's work.

Q2. During the hearing, you indicated that the lack of a Science Advisor to the President had a negligible impact on the work of the Task Force. It was asserted that scientific expertise drawn from all the involved agencies stepped into the breach. Please provide the names of the science specialists at DOE who played a role in the work of the Task Force. Please provide their resumes for the record.

Mr. Secretary, during the hearing you briefly touched on your participation and the participation of the Department in the work of the Cheney Group. Please provide for the record:

Q3.1. The names of all witnesses or organizations who provided advice or material to the Cheney Task Force.

Q3.2. An explanation of why the Task Force conducted its business in secret and why that veil of secrecy has not been lifted with the completion of the Task Force report.

Q3.3. The details regarding the schedule of meetings that you or your representatives attended with other Task Force Members. Please indicate the name of DOE attendee/s, list of other invitees, list of other attendees, date and time of meeting, subject matter and/or agenda, names and affiliations of non-governmental attendees or witnesses meeting with the Group, copies of all discussion materials and DOE memoranda prepared for or distributed prior to the meeting, and copies of all materials distributed at each meeting.

Q4. In recent years, the House of Representatives has conducted very aggressive oversight of policy and conduct by the Executive Branch. For the record, please provide the following information:

Q4.1. How many subpoenas has the Department received from Committees of the House regarding DOE participation in the Cheney Task Force? Please provide copies of all such House Committee subpoenas.

Q4.2. How many document requests has the Department received from Committees of the House regarding DOE participation in the Cheney Task Force? Please provide copies of all House document requests related to the Cheney Task Force.

Q5. In the National Energy Policy, Report of the National Energy Policy Development Group (Cheney Group), May 2001, it is claimed on page 1-5 that "Energy

intensity is projected to continue to decline through 2020 at an average rate of 1.6 percent a year."

Q5.1. What is the source for this projection? If it is EIA, please indicate which EIA product is the source of this projection.

Q5.2. Please provide copies of all the analytical documents upon which this projection is based. Included in this submission should be any analytical documents that indicate how 1.6% was settled upon as the energy intensity level to be anticipated as opposed to other levels.

Q5.3. Please specify the policy assumptions that underlie this projection (i.e., funding levels for conservation and efficiency programs at DOE, tax credit programs for efficiency products, efficiency programs in the states, market conditions for energy that may affect consumer choice, etc.).

Q5.4 Given that other policy mixes would likely produce different declines in energy intensity, what cost-benefit analyses were done to show the trade offs between, for example, a 1.9% decline, a 2.5% decline and a 1.6% decline?

Q6. On page 1-5 of the Cheney Report, it is asserted that the nation will need between 1,300 and 1,900 new power plants over the next twenty years.

Q6.1. What is the source for this projection? If it is an EIA product, please identify which of their reports was used.

Q6.2. Please provide all of the analytical documents that underlie this projection. Included in this submission should be any analytical documents (including e-mails and memoranda) indicating how the figure of 1,300 to 1,900 power plants was settled upon.

Q6.3. What policy and market assumptions were made in settling on this projection?

Q6.4. What cost-benefit models were run to adopt a set of policies that puts us on a path towards needing 1,300 to 1,900 power plants as opposed to some smaller number?

Q7. In hearings earlier this year, the Committee received testimony from witnesses who cited the "Scenarios for a Clean Energy Future" report. This report, released in November 2000, was produced by the Interlaboratory Working Group on Energy-Efficient and Clean Energy Technologies with representatives from Oak Ridge, Lawrence Berkeley, NREL, Argonne and Pacific Northwest National Laboratories. The Interlaboratory Group report suggests that an aggressive energy efficiency and renewable energy policy path could lead to a 60% reduction in the anticipated growth in electricity demand by 2020. This leads to a demand for just 580 new plants rather than the projected 1,300 to 1,900 mentioned by you and the Cheney Group report.

Q7.1. Were the findings of this Interlaboratory Working Group report made available to the Cheney Group by your Department? If this report was not

made available to the Cheney Group by your Department, please explain why.

Q7.2. Were any of the Lab staff who worked on this report involved in staffing or briefing the Cheney Group?

Q7.3. What analysis of this report has been done in-house at DOE? Please provide copies of all such analysis for the record.

Q7.4. What information or evaluations of this report were provided by your Department or its contractors to the Cheney Task Force staff? Please provide copies for the record.

Q8. In Chapter 4 of the National Energy Policy, there is a recommendation that "the President direct the Office of Science and Technology Policy and the President's Council of Advisors on Science and Technology (PCAST) to review and make recommendations on using the nation's energy resources more efficiently." Yet, in 1997 PCAST, led by Harvard plasma physicist John Holdren, produced a comprehensive report identical to the one called for by the Task Force.

Q8.1. Why are you proposing to repeat the Holdren report?

Q8.2. The Holdren report called for major new Federal investments in efficiency R&D. Do you believe that recommendation was wrong?

Q8.3. Was Professor Holdren invited to participate in the task force's deliberations? If not, why not?

Q9. There have been reports in the press regarding potential conflicts of interest involving several senior Bush officials. For example, Karl Rove, a senior policy advisor to the President, held as much as a quarter-million dollars in stock in Enron as well as holdings in GE (which has a nuclear power division), Royal Dutch Shell and BP Amoco. Reportedly, Mr. Rove was involved in crafting the Administration's Energy plan.

Q9.1 Can you confirm whether or not Enron, GE, Royal Dutch Shell or BP Amoco provided testimony or other materials to the Cheney Working Group, its staff or other high Bush Administration officials?

Q9.2. Can you provide the names of all the Bush Administration officials, save the DOE officials noted in response to Questions 1 and 2 above, who played a role in crafting the Energy plan?

Q9.3. Why didn't the administration bar conflicts-of-interest such as that involving Mr. Rove, and compel officials with the Cheney Group to divest themselves of all energy-related holdings before they could work on energy policy?

Q10. On several occasions, the President has claimed that his Administration is the first to propose a comprehensive, National Energy Strategy. Would you please explain what we should consider the first Bush Administration's National Energy Strategy to be? We also note that Congress passed a bipartisan National Energy Strategy Act, which was signed into law by then-President Bush in 1992. Did that

effort in 1991 and 1992 provide, as then Secretary of Energy James Watkins described it, "a comprehensive blueprint for America's energy future?" If you believe the work of that Bush Administration was not a truly comprehensive strategy, please explain why it was not and how this Bush Administration's approach constitutes a truly comprehensive National Energy Strategy?

Q11. The Administration's FY2002 budget request for the Department of Energy included severe cuts to renewable energy and conservation programs. However, there were some assurances included in the Department's RENEWABLE ENERGY RESOURCES, ENERGY SUPPLY section of the DOE FY 2002 budget request submitted to congress. The following paragraph from document seems to suggest that despite the steep cuts, some future addition request would occur.

> **"HIGHLIGHTS OF PROGRAM REQUEST ($ in millions)**
> **Renewable Resources Technologies (FY 2001 $277.3; FY 2002 $174.2) ..... -$103.1**
> Even though FY 2002 funding is 37 percent below FY 2001, the request maintains core R&D efforts for renewable technologies and hydrogen research until ongoing operations can be evaluated against the outcome and priorities that will flow from the Vice President's National Energy Policy Development Group."

Based on this statement, I'd like to ask the following:

Q11.1 With respect to the FY 2002 budget:

- Q11.1.1 How did you determine "core R&D efforts"? Will "core R&D efforts" be reduced or cut back in any way compared to the previous year's activities?
- Q11.1.2 Which specific efforts were deemed non-core? Please provide a specific list of projects, grants, or programs that you would terminate or reduce in level of effort to accommodate this 37% cut.

Q11.2 With respect to the NEPD Group:

- Q11.2.1. Where are the "priorities" that are supposed to flow from the National Energy Policy? Do these priorities exist at this time? If so, what are they?
- Q11.2.2. What would you say was the "outcome" that has flowed from the Vice President's National Energy Policy Development Group? How can this outcome be used to evaluate ongoing operations in renewable resource technologies?

Q11.2.3. When will the Department be evaluating ongoing operations against the outcome and priorities?

Q11.2.4. What specific budget guidance came out of the NEPD process for these accounts?

Q12. The President has said we must fund innovative technologies for conservation and renewable energy. Yet the FY 02 budget included cuts of 26% for renewable energy research and 27% for conservation research.

Q12.1. These large reductions in the budget appear to be at odds with the President's call for greater attention to energy. How do you reconcile the Administration's words and actions?

Q12.2 Were the proposed cuts in the energy research budget supported by any studies? Can you provide us with those studies?

Q13. Which R&D programs were highlighted in the National Energy Policy as deserving of more funding than was provided in the April budget request? Where would the additional funds come from? Will the Department be sending Congress reprogramming requests or supplemental requests to support these numbers? Please provide a general description of the requests that the Department plans to submit to Congress?

Q14. In his statement on global climate change, the President called for research in a variety of areas ranging from fundamental research on climate change to applied alternative fuels technologies. Given that the DOE budget has been cut in both R&D and alternative fuel sources, how will these initiatives be funded and who will do the research?

Q15. We know you don't support the Kyoto Protocol, but do you believe that the U.S. should commit itself to ANY reduction of greenhouse gas emissions? If so, what rate of reduction would be appropriate? If not, what rate of increase would be inappropriate?

Q16. During the campaign for the Presidency, Mr. Bush was very critical of the Clinton Administration for not being effective enough or tough enough with OPEC to raise its production levels. I have seen reports that, since January when the Bush Administration took office, OPEC has reduced its production by 2.5 million barrels a day. What steps are you taking, distinct from the prior administration, to get OPEC to expand its production?

Representative Jim Barcia

Last summer, gas prices in the Midwest surged above $2.00 a gallon and this year, prior to the Memorial Day holiday weekend, gasoline prices increased by as much as 25 cents

across the state, making the cost of gasoline in Michigan the third highest of any state in the country. The Federal Trade Commission did a review of the last summer's price spike and issued a report in March of this year that stated there was no evidence of collusion. However, the report did note that individual companies withheld extra supply because "selling extra supply would have pushed down prices and thereby reduced profits."

I know that oil companies have a right to a make a profit. At the same time, those companies carry a public trust to deliver a product to our consumers in a timely fashion. Deliberately acting to depress production or withhold supply from the market to inflate the price could be viewed as a violation of that trust.

What steps will this Administration take to ensure that oil companies live up to their responsibility to consumers?

Congressman John Larson

During your question and answer period, you cited the President's interest in a CO2 technology program. President Clinton for years proposed a Climate Change Technology Initiative, which was repeatedly cut by the Republican Congress. Please submit for the record how, specifically, President Bush's CCTI will differ from President Clinton's.

Congressman Jerry Costello

I support the President's Clean Power Initiative - however even after you add the $150 million down payment of the President's proposed $2 billion initiative to this year's fossil fuel budget - the budget is cut by 17%. This trend continues over the next few years. How can the Administration support increased funding for clean coal technologies then turn around and slash the fossil fuel budget?

Congressman David Wu

There are 19 recommendations contained in the "Final Report of the Taskforce against Racial Profiling":

Q1. Issue a letter from the Secretary to all Federal and contractor employees. The letter reiterates DOE's policy against racial profiling.

Q2. Appoint a National Ombudsman to be located at DOE headquarters to continue DOE's work in eliminating racial profiling, monitor and review diversity management matters, and advise the DOE on improving systems for primarily addressing contractor employees' concerns and resolving workplace disputes.

Q3. Assign responsibility to the DOE Executive Steering Committee on Diversity, in collaboration with the National Ombudsman, for monitoring and reviewing diversity and racial profiling issues for Federal and contractor employees, following the sunset of this Task Force.

Q4. Improve leadership accountability for Federal executives and managers by developing a model to assess effectiveness in diversity management. The model should seek employee feedback and assessment of results. Additionally, performance in this areas should be linked to promotion, bonuses, and hiring.

Q5. Develop contract language, which ensures fair and meaningful assessment of EEO activity by contractors. DOE should take steps to hold Management and Operating (M&R), Management and Integration (M&I) contractors, and laboratory facilities accountable for human resource management (recruitment, outreach, hiring, retention, promotions, training, etc.), by requiring that they include relevant performance goals and measures in their strategic plans, in accordance with the letter and spirit of the Government Performance and Results Act. To support this objective, contractors should conduct regular "quality of work life" surveys in measuring employee opinions and attitudes. Furthermore, contractors should routinely publicize to their employees' relevant employment statistics and related information. Contractor performance in this areas should be linked to performance fees and should be utilized as part of an overall assessment of past performance for a variety of contract management purposes (e.g. exercising options, conducting evaluations for future rewards, etc.)

Q6. Establish a team to promptly address any outstanding individual cases regarding security practices. This team would report to the Deputy Secretary on regular basis.

Q7. Conduct an EEO/diversity stand-down, similar to the approach utilized for the Security Awareness stand-down.

Q8. Ensure that an inclusive review process is utilized for making future security changes, with input and advice from line management, employees, and human resources professionals. The current Field Management Council process, which was established in April 1999, should be utilized to ensure proper coordination and collaboration between appropriate staff offices.

Q9. Review security procedures to ensure that they do not take a "one-size-fits-all" approach for all sites.

Q10. Publish baseline human resources management data on hiring, promotions, and diversity representation by grades, with respect to all Federal and contractor employees.

Q11. Include Asian Pacific American leaders and representatives of other minority groups in future workplace assessments.

Q12. Require Federal, M/Os, M/Is, and laboratory executives to issue annually and in writing diversity policy statements and publish them in a universal manner to coincide with performance appraisal cycles. Require discussion of these policies at performance appraisal review sessions. Develop a set of definitions and a glossary for diversity, pluralism, racial profiling, etc. based on private sector models.

Q13 Consider creating a DOE web-site on workplace improvements, and publishing progress reports on improvement in diversity management, to include human resource management data.

Q14. Form appropriate consortiums to plan for - and to combat - the recruitment and retention problems being experienced throughout DOE laboratory facilities.

Q15. Improve training for the DOE Federal and contractor workforce in effective diversity management, with special seminars for executives. The Office of Economic Impact and Diversity, in collaboration with Heads of Headquarters and Field Elements should ensure that all Federal and contractor employees undergo mandatory training on equal employment opportunity and interpersonal sensitivity. Also, site managers should conduct periodic focus group meetings to discuss employee diversity issues, including racial profiling.

Q16. Conduct follow-up fact finding visits in Spring 2002 to assess whether management has successfully carried out its policy against racial profiling; look for innovations, and provide feedback and suggestions for improvement to Federal and contractor work force management.

Q17. Monitor, track and follow-up on pertinent data with respect to representation of minorities, women, and underrepresented groups in the Federal and contractor workforce.

Q18. Conduct a multi-year workplace satisfaction evaluation survey; include topics such as management practices and diversity management. The survey should be repeated at given intervals (e.g. biannually). If costs are prohibitive for a comprehensive survey of all employees/contractors, utilize a statistically significant sample.

Q19. Require an organizational self-assessment based on "best practices."

Q20. Please address the following items for each of these recommendations: (a) whether there has been any follow-up on the recommendation, (b) what action has been taken to date, and (c) what are the next steps proposed by DOE with regard to this recommendation.

June 3, 2002

Documents

Documents Released on June 3, 2002

V AUGHN INDEX NUMBER	BATES NUMBER
2770	14681
2773	14727[1]
2789	14887
2792	15032
2796	15198
3976	21173
3977	21179
3978	21180
3979	21188
3980	21189
3984	21200
3991	21249
3994	21261
3995	21262
3999	21284
4007	21324

[1]Document erromeously reported on the Vaughn Index as bates number 14727. Actual bates number is 14726.

Department of Energy
Washington, DC 20585

Office of Policy

Facsimile

Phone: (202) 586-5316

Fax: (202) 586-3047

To: KJERSTEN D. Fax: 456.1606

From: MARGOT Phone: _____

Subject: FACT CHECKS ON EFFICIENCY Pages: _____

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DOE017-1777

-3

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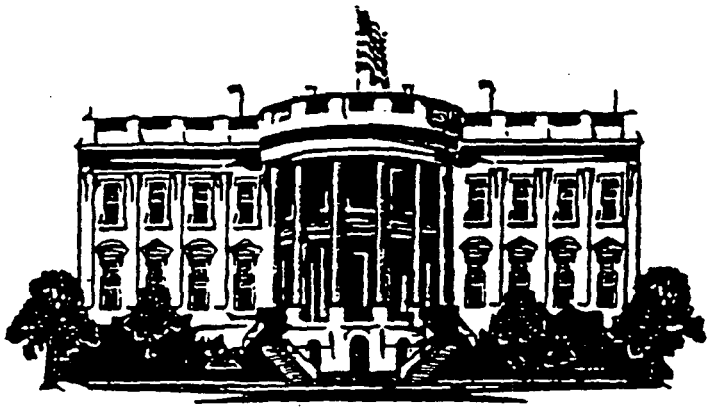
DOE017-1822

001

a
2/21/01
draft



FAX COVER SHEET

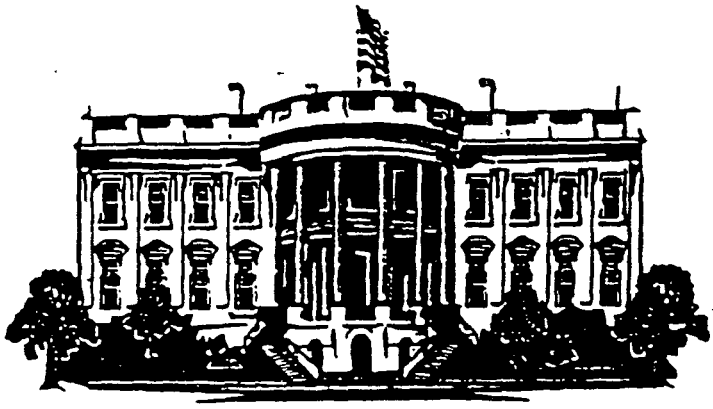
BOB MCNALLY
NATIONAL ECONOMIC COUNCIL
THE WHITE HOUSE
WASHINGTON, DC 20502
PHONE: 202/456-5365 FAX: 202/456-2223
96

DATE: 2-22-01
TO: Joe Kelliher
FAX: 586-7644

NUMBER OF PAGES (INCL. COVER):

COMMENTS: Just some thoughts on the draft.

a
2/21/01
draft



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BOB MCNALLY
NATIONAL ECONOMIC COUNCIL
THE WHITE HOUSE
WASHINGTON, DC 20502
PHONE: 202/456-5365 FAX: 202/456-2223

DATE: 2-22-01
TO: Joe Kelliher
FAX: 586 7644

NUMBER OF PAGES (INCL. COVER):

COMMENTS: Just some thoughts on the draft.

Comments on
2/21/draft

To: Joe Kelliher, DOE
586-7210

From: Ray Squitieri, Treasury
622-1301 phone
-1294 fax

THE WHITE HOUSE
CORRESPONDENCE TRACKING WORKSHEET

ID# 488444
PAGE 1

DATE RECEIVED: 05/25/2001

NAME OF CORRESPONDENT: THE HONORABLE MIKE THOMPSON

SUBJECT: REQUESTS THE PRESIDENT TO IMPLEMENT THEIR RECOMMENDATIONS DIRECTING FEDERAL FACILITIES TO TAKE CONSERVATION MEASURES BY ISSUING AN EXECUTIVE ORDER

		ACTION		DISPOSITION		
ROUTE TO: OFFICE/AGENCY	(STAFF NAME)	ACTION CODE	DATE YY/MM/DD	TYPE RESP	C D	COMPLETED YY/MM/DD
LEGISLATIVE AFFAIRS	NICK CALIO	ORG	2001/05/25	NL	A	2001/6/6
ACTION COMMENTS: Please Send to additional Signees						
Vice President (Domestic Policy)		DAR	01/01/13			/ /
ACTION COMMENTS:						
DD Lamo		I	01/01/13			/ /
ACTION COMMENTS:						
DOE		I	01/01/13			/ /
ACTION COMMENTS:						

COMMENTS

ADDITIONAL CORRESPONDENTS: 0 **MEDIA:** LETTER **INDIVIDUAL CODES:**

REPORT CODES: **USER CODE:** 19 SIGNEES

5

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C - COMMENT/RECOMMENDETION
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CODE = A
COMPLETED = DATE OF OUTGOING

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21173

Exec. Sec.

014609

THE WHITE HOUSE OFFICE

REFERRAL

2001-014609 6/19 P 3:23

June 13, 2001

TO: DEPARTMENT OF ENERGY

ACTION REQUESTED: INFO COPY ONLY/NO ACTION NECESSARY

DESCRIPTION OF INCOMING:

ID: 488437

MEDIA: LETTER, DATED MAY 18, 2001

TO: PRESIDENT BUSH

FROM: THE HONORABLE TIM HUTCHINSON
UNITED STATES SENATE
WASHINGTON, DC 20510

SUBJECT: EXPRESSES SUPPORT FOR THE PRESIDENT PROPOSED NATIONAL ENERGY POLICY AND SHARE A THOUGHTS ON ALLEVIATING THE ECONOMIC STRAIN CAUSED BY ENERGY SHORTAGES IN THE WESTERN STATES

PROMPT ACTION IS ESSENTIAL – IF REQUIRED ACTION HAS NOT BEEN TAKEN WITHIN 9 WORKING DAYS OF RECEIPT, PLEASE TELEPHONE THE UNDERSIGNED AT 456-2590.

RETURN CORRESPONDENCE, WORKSHEET AND COPY OF RESPONSE (OR DRAFT) TO: RECORDS MANAGEMENT, ROOM 72, THE WHITE HOUSE, 20500

OFFICE OF RECORDS MANAGEMENT - THE WHITE HOUSE

21179

137

THE WHITE HOUSE
CORRESPONDENCE TRACKING WORKSHEET

ID# 488437
PAGE 1

DATE RECEIVED: 05/25/2001

NAME OF CORRESPONDENT: THE HONORABLE TIM HUTCHINSON

SUBJECT: EXPRESSES SUPPORT FOR THE PRESIDENT PROPOSED NATIONAL ENERGY POLICY AND SHARE A THOUGHTS ON ALLEVIATING THE ECONOMIC STRAIN CAUSED BY ENERGY SHORTAGES IN THE WESTERN STATES

		ACTION		DISPOSITION		
ROUTE TO: OFFICE/AGENCY	(STAFF NAME)	ACTION CODE	DATE YY/MM/DD	TYPE RESP	C D	COMPLETED YY/MM/DD
LEGISLATIVE AFFAIRS	NICK CALIO	ORG	2001/05/25	NC	A	01/06/13
	ACTION COMMENTS					
VP/E/Domestic Policy		A	01/06/13			/ /
	ACTION COMMENTS:					
DP		I	01/06/13		C	/ /
	ACTION COMMENTS:					
DOE		I	01/06/13		C	/ /
	ACTION COMMENTS:					

COMMENTS

ADDITIONAL CORRESPONDENTS: 0 **MEDIA:** LETTER **INDIVIDUAL CODES:**

REPORT CODES: **USER CODE:**

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144

THE WHITE HOUSE OFFICE

REFERRAL

014919 2001 JUN 25 A 11:43 June 19, 2001

TO: DEPARTMENT OF ENERGY

ACTION REQUESTED: DIRECT REPLY W/COPY

DESCRIPTION OF INCOMING:

ID: 483785

MEDIA: LETTER, DATED MAY 17, 2001

TO: PRESIDENT BUSH

FROM: THE HONORABLE RUSS FEINGOLD
UNITED STATES SENATE
WASHINGTON, DC 20510

SUBJECT: LISTS FIVE THINGS THE ADMINISTRATION CAN DO NOW TO ADDRESS HIGH ENERGY PRICES

PROMPT ACTION IS ESSENTIAL – IF REQUIRED ACTION HAS NOT BEEN TAKEN WITHIN 9 WORKING DAYS OF RECEIPT, PLEASE TELEPHONE THE UNDERSIGNED AT 456-2590.

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OFFICE OF RECORDS MANAGEMENT - THE WHITE HOUSE

THE WHITE HOUSE
CORRESPONDENCE TRACKING WORKSHEET

ID# 483785
PAGE 1

DATE RECEIVED: 05/22/2001

NAME OF CORRESPONDENT: THE HONORABLE RUSS FEINGOLD

SUBJECT: LISTS FIVE THINGS THE ADMINISTRATION CAN DO NOW TO ADDRESS HIGH ENERGY PRICES

ROUTE TO: OFFICE/AGENCY	(STAFF NAME)	ACTION CODE	ACTION DATE YY/MM/DD	DISPOSITION TYPE RESP	DISPOSITION C D	DISPOSITION COMPLETED YY/MM/DD
LEGISLATIVE AFFAIRS	NICK CALIO	ORG	2001/05/22	NC	A	2001/5/24
ACTION COMMENTS: Please send a copy of your response to Leg Affairs						
✓VP Task Force	(A. Lundquist)	C/R	01/06/01		C	6/15/01
ACTION COMMENTS:						
LEQ		I	/ /			/ /
ACTION COMMENTS:						
✓DOE		C/R	01/06/01 6/15/01			/ /
ACTION COMMENTS: Thoughtful letter that should get thoughtful response.						

COMMENTS

ADDITIONAL CORRESPONDENTS: 0 **MEDIA:** LETTER **INDIVIDUAL CODES:**

REPORT CODES: **USER CODE:**

S

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21189

1104.T

THE WHITE HOUSE OFFICE

REFERRAL

014923 2001 JUN 25 P 12:43

TO: DEPARTMENT OF ENERGY

ACTION REQUESTED: DIRECT REPLY W/COPY

DESCRIPTION OF INCOMING:

ID: 483732

MEDIA: LETTER, DATED MAY 10, 2001

TO: PRESIDENT BUSH

FROM: THE HONORABLE JEFF BINGAMAN
UNITED STATES SENATE
WASHINGTON, DC 20510

SUBJECT: EXPRESSES CONCERN ABOUT GASOLINE PRICES AND OUTLINE 5 THINGS THE ADMINISTRATION CAN DO ABOUT GASOLINE PRICES AND WOULD LIKE TO KNOW THAT ACTIONS THE ADMINISTRATION IS PLANNING TO TAKE IN THE SHORT TERM TO ADDRESS RISING PRICES IN VARIOUS REGIONS OF THE CO

PROMPT ACTION IS ESSENTIAL -- IF REQUIRED ACTION HAS NOT BEEN TAKEN WITHIN 9 WORKING DAYS OF RECEIPT, PLEASE TELEPHONE THE UNDERSIGNED AT 456-2590.

RETURN CORRESPONDENCE, WORKSHEET AND COPY OF RESPONSE (OR DRAFT) TO:
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OFFICE OF RECORDS MANAGEMENT - THE WHITE HOUSE

21200

1-14

THE WHITE HOUSE
CORRESPONDENCE TRACKING WORKSHEET

ID# 488636
PAGE 1

DATE RECEIVED: 06/13/2001 2001-018401 8/6 A 10:07

NAME OF CORRESPONDENT: THE HONORABLE MAX BAUCUS

SUBJECT: REQUESTS THE PRESIDENT TO DENY CALIFORNIA'S WAIVER REQUEST

		ACTION		DISPOSITION		
ROUTE TO: OFFICE/AGENCY	(STAFF NAME)	ACTION CODE	DATE YY/MM/DD	TYPE RESP	C D	COMPLETED YY/MM/DD
LEGISLATIVE AFFAIRS	NICK CALIO	ORG	2001/06/13	NC	A	01/06/25
	ACTION COMMENTS					
CEQ		R	01/06/25			/ /
	ACTION COMMENTS:					
EPA		A	01/06/25			/ /
	ACTION COMMENTS:					
✓ DOE		CJI	01/06/25 (01/06/02)			/ /
	ACTION COMMENTS:					

COMMENTS

ADDITIONAL CORRESPONDENTS: 0 MEDIA: LETTER INDIVIDUAL CODES:

REPORT CODES: USER CODE:

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REFERRAL

August 17, 2001

2001-019468 Aug 21 A 11:23

TO: DEPARTMENT OF ENERGY

ACTION REQUESTED: INFO COPY ONLY/NO ACTION NECESSARY

DESCRIPTION OF INCOMING:

ID: 491473

MEDIA: LETTER, DATED JUL 17, 2001

TO: PRESIDENT BUSH

FROM: THE HONORABLE TIM JOHNSON
UNITED STATES SENATE
WASHINGTON, DC 20510

SUBJECT: EXPRESSES THEIR SUPPORT FOR INCREASED DOMESTIC NATURAL GAS DEVELOPMENT

PROMPT ACTION IS ESSENTIAL – IF REQUIRED ACTION HAS NOT BEEN TAKEN WITHIN 9 WORKING DAYS OF RECEIPT, PLEASE TELEPHONE THE UNDERSIGNED AT 456-2590.

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THE WHITE HOUSE
CORRESPONDENCE TRACKING WORKSHEET

ID# 491473
PAGE 1

DATE RECEIVED: 07/25/2001

NAME OF CORRESPONDENT: THE HONORABLE TIM JOHNSON

SUBJECT: EXPRESSES THEIR SUPPORT FOR INCREASED DOMESTIC NATURAL GAS DEVELOPMENT

		ACTION		DISPOSITION		
ROUTE TO: OFFICE/AGENCY	(STAFF NAME)	ACTION CODE	DATE YY/MM/DD	TYPE RESP	C D	COMPLETED YY/MM/DD
LEGISLATIVE AFFAIRS	NICK CALIO	ORG	2001/07/25	NL	A	2001/7/31
ACTION COMMENTS: Response sent to additional signers						
Vice President's DP		R	01 17 31			/ /
ACTION COMMENTS:						
✓ Dept. of Energy	CJ	I	010817 01 17 31			/ /
ACTION COMMENTS:						
			/ /			/ /
ACTION COMMENTS:						

COMMENTS

ADDITIONAL CORRESPONDENTS: 0 **MEDIA:** LETTER **INDIVIDUAL CODES:**

REPORT CODES: **USER CODE:** 1 SIGNEE

ACTION CODES:
A - APPROPRIATE ACTION
C - COMMENT/RECOMMENDETION
D - DRAFT RESPONSE
F - FURNISH FACT SHEET
I - INFO COPY/NO ACT NECCESSARY
R - DIRECT REPLY W/ COPY
S - FOR SIGNATURE
X - INTERIM REPLY

DISPOSITION CODES:
A - ANSWERED
B - NON-SEPC-REFERRAL
C - COMPLETED
S - SUSPENDED

OUTGOING CORRESPONDENCE:
TYPE RESP = INITIALS OF SIGNER
CODE = A
COMPLETED = DATE OF OUTGOING

REFER QUESTIONS AND ROUTING UPDATES TO RECORDS MANAGEMENT (ROOM 72, OEOB) EXT-62590
KEEP THIS WORKSHEET ATTACHED TO THE ORIGINAL INCOMING LETTER AT ALL TIMES AND SEND COMPLETED RECORD TO RECORDS MANAGEMENT.

2001-019685 8/24 A 11:41

OFFICE OF THE VICE PRESIDENT

WASHINGTON

TO: Ms. Carol A. Kennedy
Executive Secretariat
Room 7E-054 Forrestal Building
Department of Energy
1000 Independence Avenue SW
Washington, DC 20585

DATE: August 23, 2001

We are forwarding the enclosed constituent mail containing views and concerns about energy issues. It is not necessary to respond to our office regarding each reply.

Should you have questions about these procedures or need to provide updated contact information, you may reach me by telephone at 202.456.9002 or by fax at 202.456.7044.

Sincerely,

Cecelia Boyer

Cecelia Boyer
Special Assistant to the Vice President
for Correspondence

21284

DOE022-0165

THE WHITE HOUSE
CORRESPONDENCE TRACKING WORKSHEET

ID# 491473
PAGE 1

NR006

DATE RECEIVED: 07/25/2001

NAME OF CORRESPONDENT: THE HONORABLE TIM JOHNSON

SUBJECT: EXPRESSES THEIR SUPPORT FOR INCREASED DOMESTIC NATURAL GAS DEVELOPMENT

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LEGISLATIVE AFFAIRS	NICK CALIO	ORG	2001/07/25	NC	A	2001/7/31 CJ
ACTION COMMENTS: Response sent to additional signers						
Vice President's DP CJ		R	01/08/37		C	9/12/01
ACTION COMMENTS:						
Dept. of Energy		B	01/12/31		C	1 1 RY
ACTION COMMENTS:						
Dept of Energy RY		R	01/09/28			1 1
ACTION COMMENTS:						

COMMENTS

ADDITIONAL CORRESPONDENTS: 0 **MEDIA:** LETTER **INDIVIDUAL CODES:**

REPORT CODES: **USER CODE:** 1 SIGNEE

ACTION CODES:
A - APPROPRIATE ACTION
C - COMMENT/RECOMMENDETION
D - DRAFT RESPONSE
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REFER QUESTIONS AND ROUTING UPDATES TO RECORDS MANAGEMENT (ROOM 72, OEOB) EXT-62590
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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

NATURAL RESOURCES DEFENSE COUNCIL, Plaintiff, v. UNITED STATES DEPARTMENT OF ENERGY, Defendant.	Civ. No. 1:01CV02545 (GK)

JUDICIAL WATCH, INC., Plaintiff, v. UNITED STATES DEPARTMENT OF ENERGY, et al., Defendants.	Civ. No. 1:01CV00981 (PLF)

DEPARTMENT OF ENERGY'S VAUGHN INDEX
APRIL 25, 2002

1. Document entitled "The National Energy Security Act of 2001," dated March 6, 2001. B-5 Exemption - Information redacted consists of deliberative notes, comments, and suggestions in the margin by Department of Energy employee reviewer redacted because of pre-decisional nature. 3 pages. DOE Bates number (hereafter "#") 143-145 Released in Part

2. Document entitled "Outline, The National Electricity and Environmental Technology Act," dated December 18, 2000. B-5 Exemption - Information redacted consists of deliberative comments and advice in the margin by Department of Energy employee reviewer redacted because of pre-decisional nature. 1 page. #160 Released in Part

3. Document entitled "Overview, The National Electricity and Environmental Technology Act," dated December 18, 2000. B-5 Exemption - Information redacted consists of deliberative comments and suggestions in the margin by Department of Energy employee reviewer redacted because of pre-decisional nature. 1 page. #161 Released in Part

4. Undated document entitled "INGA Energy Policy Issues." B-5 Exemption - Information redacted consists of deliberative comments, edits and opinions in the margin by employee reviewer redacted because of pre-decisional nature. 2 pages. #276-277 Released in Part

5. Document entitled "Reliability Assessment 2000-2009, The Reliability of Bulk Electric Systems in North America," North American Electric Reliability Council, dated October 2000. B-5 Exemption - Information redacted consists of deliberative comments, advice and suggestions in the margin by Department of Energy employee reviewer redacted because of pre-decisional nature. 76 pages. #347-422 Released in Part

6. Document entitled "Toward a National Energy Strategy," dated February 2001. B-5 Exemption - Information redacted consists of deliberative comments, revisions and notes in the margin by Department of Energy employee reviewer redacted because of pre-decisional nature. 51 pages. #431-481 Released in Part

7. Document entitled "NDOL, New Democrats Online," dated May 17, 2001. Subject: A 21st Century Energy Agenda. B-5 Exemption - Information redacted consists of pre-decisional notes and comments in the margin by Department of Energy employee reviewer redacted because of pre-decisional nature. 4 pages. #485-488 Released in Part

8. Position paper on S. E. United States. B-5 Exemption - Information redacted consists of pre-decisional marginalia reflecting DOE staff deliberations. 1 page. #710 Released in Part

9. Yakama Nation Federal Energy Policy provides, April 2001. B-5 Exemption - Information redacted consists of marginalia by Department of Energy employee reflecting reviewers comments, suggestions and advice redacted because of deliberative and pre-decisional nature. 1 page. #711 Released in Part

10. E-mail to Charles Smith and Joan O'Callahan from Margot Anderson, dated April 23, 2001. Subject: TWO (only 2) comments on chapter 9. B-5 Exemption - Information redacted consists of the writer's comments, recommendations, and suggestions reflecting the pre-decisional and deliberative process. 1 page. #2279 Released in Part

11. E-mail to MaryBeth Zimmerman and William Breed from Margot Anderson, dated March 26, 2001. Subject: FW: questions. B-5 Exemption - Information redacted consists of the writer's questions regarding policy options because it reflected the pre-decisional and deliberative process. 1 page. #2280 Released in Part

12. E-mail to Margot Anderson from Joseph Kelliher, dated April 12, 2001. Subject: RE: VP Task Force. B-5 Exemption - Information withheld reflects the writer's comments, recommendations, and suggestions on technical issues discussed was redacted because it reflected the pre-decisional and deliberative process. #2281 Withheld

13. Document entitled "America's Energy Infrastructure: A Comprehensive Delivery System," dated April 30, 2001. B-5 Exemption - Information withheld is internally generated draft language reflecting deliberations concerning pre-decisional draft of National Energy Policy (NEP) report. 18 pages. #2282-2298 Withheld

14. Document entitled "From the Desk of Andy S. Kydes to Margot Anderson, dated February 25, 2001. Subject: Comments on Chapters. B-5 Exemption - Information withheld consists of pre-decisional and deliberative material reflecting advice, recommendations, and suggestions on revising draft documents relating to NEPDG. 2 pages. #2299-2300 Withheld

15. Undated document entitled "Section 9- Infrastructure Investment, Integrity, and Safety." B-5 Exemption - Information withheld includes deliberative comments and recommendations on revising draft pre-decisional documents relating to NEPDG. 5 pages. #2301-2305 Withheld

16. Document entitled "America's Energy Infrastructure: A Comprehensive Delivery System," dated May 1, 2001. B-5 Exemption - Information withheld consists of pre-decisional and deliberative process comments, recommending and suggesting revisions to draft documents relating to NEPDG. 18 pages. #2306-2323 withheld

17. E-mail to Charles M. Smith from Margot Anderson, dated March 21, 2001. Subject: RE: comments on graphics. B-5 Exemption - Information redacted consists of deliberative and pre-decisional comments and advice on possible graphics to be utilized in draft documents relating to NEPDG. 2 pages. #2324-2325 Released in Part

18. E-mail to Douglas Cater from Margot Anderson, dated March 8, 2001. Subject: RE: Multipollutant strategies & CO2. B-5 Exemption - Information redacted consists of pre-decisional and deliberative material reflecting the process of commenting and technical recommendations for inclusion in draft documents relating to NEPDG. 1 page. #2326 Released in part

19. E-mail to Margot Anderson from Douglas Carter, dated March 7, 2001, with one attachment (Bates #2328). Subject: Multi pollutant strategies & CO2. B-5 Exemption - Information redacted consists of deliberative material reflecting an analysis, opinion, and review of materials for possible inclusion in pre-decisional draft documents relating to NEPDG. 1 page. #2327 Released in Part

20. Undated document entitled "Review of EIA 3-Pollutant Report." B-5 Exemption - Information withheld consists of pre-decisional and deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #2328 Withheld

21. Document entitled "Renewable and Alternative Energy," dated May 2, 2001. B-5 Exemption - Withheld draft chapter of the NEPDG that indicate deliberative draft pre-decisional documents relating to NEPDG. 26 pages. #2329-2354 Withheld

22. Document entitled "Renewable and Alternative Energy, dated May 3, 2001. B-5 Exemption - Information withheld consists of draft materials reflecting the deliberative opinion and notes and marginalia indicating the comments and suggests of writer. 25 pages. #2355-2379 Withheld

23. E-mail to Darrell Beechen and Margot Anderson from Margot Anderson, dated February 20, 2001. Subject: RE: The Regional piece reminder. B-5 Exemption - Information redacted consists of draft narrative indicating deliberative notes, suggestions and advice for inclusion in the draft pre-decisional NEPDG report. 3 pages. #2380-2382 Released in Part

24. Document entitled "Barriers to Increased Production of Energy Resources," dated April 30, 2001. B-5 Exemption - Information withheld consists of draft chapter which contains deliberative notes, marginalia, and content relating to draft NEPDG report. 14 pages. #2383-2395 Withheld

25. E-mail to Charles M. Smith from Margot Anderson, dated March 1, 2001. Subject: RE: Feedback on captions. B-5 Exemption - Information withheld consists of deliberative comments and feedback on proposed captions for pre-decisional draft sections of the NEPDG. 2 pages. #2396-2397 Withheld

26. E-mail to Charles M. Smith from Margot Anderson, dated March 1, 2001. Subject: RE: Feedback on captions. B-5 Exemption - Information redacted consists of feedback and comments on proposed captions for draft section of the NEPDG as well as comments, revisions and suggestions on substantive aspects of the pre-decisional draft. 3 pages. #2398-2400 Released in Part

27. Undated document entitled "Short-Term Energy Supply Disruption." B-5 Exemption - Information redacted consists of pre-decisional and deliberative material reflecting a brief analysis and evaluation of raw data intended for inclusion in the draft NEPDG report. 3 pages. #2403-2405 Released in Part

28. E-mail to Joseph Kelliher from Charles M. Smith, dated April 30, 2001. Subject: chapter 3. B-5 Exemption - Information redacted consists of pre-decisional and deliberative

material reflecting recommendation for revisions, edits and suggestions for draft NEPDG report. 1 page. #2410 Released in Part

29. E-mail to Margot Anderson from Douglas Carter, dated May 1, 2001. Subject: Chap 3-Coal gasification intro. B-5 Exemption - Information redacted consists of pre-decisional and deliberative process material for revisions to a specific chapter of the draft NEPDG report. 2 pages. #2411-2412 Released in Part

30. E-mail to Charles M. Smith from Joseph Kelliher, dated May 1, 2001. Subject: RE: chapter 3. B-5 Exemption - Information redacted consists of pre-decisional and deliberative process material comprised of narrative draft data to be inserted into the draft NEPDG report. 1 page. #2413 Released in Part

31. E-mail to Margot Anderson from Michelle Pochen, dated April 4, 2001. Subject: RE: coal. B-5 Exemption - Pre-decisional and deliberative information redacted consists of reviewer's suggested edits and deletions from the draft NEPDG report. 2 pages. #2414-2415 Released in Part

32. E-mail to Margot Anderson from Andy Kydes, dated April 30, 2001. Subject: FW: Info. Needed from Chapter 5 by 3:00 TODAY. B-5 Exemption - Pre-decisional and deliberative process information redacted consists of corrections, comments and deletions to the draft NEPDG report. 2 pages. #2416-2418 Released in Part

33. E-mail to Margot Anderson from Andy Kydes, dated April 30, 2001. Subject: FW: Info. Needed for Chapter 5 by 3:00 TODAY. B-5 Exemption - Pre-decisional and deliberative process information redacted consists of corrections, comments and deletions to the draft NEPDG report. 3 pages. #2419-2421 Released in Part

34. E-mail to Margot Anderson from Douglas Carter, dated April 30, 2001(without attachment). B-5 Exemption - Pre-decisional and deliberative information redacted reflects substantive comments, suggestions and advice on revising draft documents relating to draft NEPDG report. 1 page. #2422 Released in Part

35. E-mail to Margot Anderson from Douglas Carter, dated April 30, 200, with one attachment (Bates #2425). B-5 Exemption - Pre-decisional and deliberative process information redacted reflects comments, advice and recommendations on the substantive aspects of documents relating to draft NEPDG report. 2 pages. #2423-2424 Released in Part

36. Document entitled "Recommended change to Infrastructure chapter, ch.DOC distributed 4/30/2001." B-5 Exemption - Pre-decisional and deliberative process Information withheld represents reviewer's recommended textual changes and suggestions to a draft chapter of the NEPDG. 1 page. #2425 Withheld

37. E-mail to Joseph Kelliher from Douglas Carter, dated May 1, 2001. Subject: RE: clean coal. B-5 Exemption - Pre-decisional and deliberative process information redacted involves discussion of edits, textual and narrative changes to draft sections of the NEPDG report. 2 pages. #2426-2427 Released in Part

38. E-mail to Douglas Carter and Margot Anderson, dated May 1, 2001. Subject: RE: clean coal. B-5 Exemption - Pre-decisional and deliberative process information redacted reflects discussions and advice about proposed language to be used or recommended to the draft NEPDG report. 2 pages. #2428-2429 Released in Part

39. E-mail to Margot Anderson and Joseph Kelliher from Douglas Carter, dated May 1, 2001. Subject: RE: clean coal. B-5 Exemption - Pre-decisional and deliberative process information redacted because it reflects recommendations, opinions and advice on language to be used in revising draft documents relating to NEPDG. 2 pages. #2430-2431 Released in Part

40. E-mail to Margot Anderson from Joseph Kelliher, dated April 30, 2001. Subject: RE: clean coal. B-5 Exemption - Pre-decisional and deliberative process information redacted because it reflects recommended edits and revisions to the draft NEPDG report. 1 page. #2432 Released in Part

41. E-mail to Robert Kripowicz from Joseph Kelliher, dated April 30, 2001. Subject: clean coal. B-5 Exemption - Pre-decisional and deliberative process information redacted consisting of comments, recommendations and revisions to draft documents relating to NEPDG report. 1 page. #2433 Released in Part

42. E-mail to Margot Anderson from Douglas Carter, dated May 1, 2001, with one attachment (Bates #2435). Subject: RE: clean coal. B-5 Exemption - Information redacted consists of pre-decisional and deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #2434 Released in Part

43. Undated document entitled "Clean Coal Technology Program." B-5 Exemption - Information redacted consists of pre-decisional and deliberative material reflecting the suggestions, advice and opinions of writer relating to draft documents relating to NEPDG. 1 page. #2435 Released in Part

44. E-mail to Margot Anderson from Andy Kydes, dated April 25, 2001, with three attachments (Bates #2438-2442). B-5 Exemption - Pre-decisional and deliberative information redacted as containing suggested edits, revisions, and suggestions for draft documents relating to NEPDG report. 2 pages. #2436-2437 Released in Part

45. Undated draft graphic entitled "U.S. Per Capita Oil Consumption, 1970-2000." B-5 Exemption - Information withheld is a deliberative and pre-decisional graphic considered for use in the NEP report. 1 page. # 2438 Withheld

46. Undated draft graphic entitled "Electricity Fuel Shares-2000." B-5 Exemption - Information withheld is a deliberative and pre-decisional graphic considered for use in the NEP. 1 page. # 2439 Withheld

47. Undated document entitled "Information Needed for Chapter 1." B-5 Exemption - Pre-decisional and deliberative process information withheld as reflecting comments, edits, and recommended revisions to draft documents relating to NEPDG. 3 pages. #2440-2442 Withheld

48. E-mail to Joseph Kelliher from Charles M. Smith, dated March 8, 2001. Subject: None. B-5 Exemption - Pre-decisional and deliberative process Information redacted as reviewers suggested revisions and edits to draft documents relating to NEPDG. 2 pages. #2443-2444 Released in Part

49. E-mail to Margot Anderson from Ellen Brown, dated March 9, 2001, with one attachment (Bates #2447-2448). B-5 Exemption - Pre-decisional and deliberative process information redacted as containing suggestions and comments on documents relating to NEPDG. 2 pages. #2445-2446 Released in Part

50. Untitled document "file://C:\Windows\TEMP\temp.htm, dated June 1, 2001." Subject: Margot-We scrambled to put this together this morning. B-5 Exemption - Information redacted consists of pre-decisional and deliberative material reflecting the process of writer's opinions on commenting, recommending and revising draft documents relating to NEPDG. 2 pages. #2447-2448 Released in Part

51. E-mail to Margot Anderson and Robert Kripowicz from Joseph Kelliher, dated March 30, 2001. Subject: coal transportation. B-5 Exemption - Pre-decisional and deliberative process information redacted as consisting of substantive questions on coal transportation issues for draft documents relating to NEPDG. 1 page. #2449 Released in Part

52. E-mail to Margot Anderson from Joseph Kelliher, dated March 23, 2001, with one attachment (Bates #2451). Subject: policy options. B-5 Exemption - Pre-decisional and deliberative process information redacted as containing the reviewer's comments and suggested consolidations of material relating to policy issues involved in draft documents relating to NEPDG 1 page. #2450 Released in Part

53. Undated document entitled "NEP Policy Issues." B-5 Exemption - Pre-decisional and deliberative process information withheld as reflecting comments and opinions on draft policy issue documents relating to NEPDG. 7 pages. #2451-2457 Withheld

54. E-mail to Joseph Kelliher and Margot Anderson from Jean Vernet, dated May 1, 2001. Subject: RE: NSR. B-5 Exemption - Pre-decisional and deliberative process Information redacted as consisting of specific substantive comments on draft documents relating to NEPDG. 2 pages. #2458-2459 Released in Part

55. E-mail to Charles M. Smith from Joseph Kelliher, dated May 1, 2001. Subject: RE: Chapter 7 requirements. B-5 Exemption - Pre-decisional and deliberative process information redacted as reflecting recommended inserts to draft chapter of NEPDG report. 1 page. #2460 Released in Part

56. E-mail to Margot Anderson from Christopher Freitas, dated April 23, 2001, with one attachment (Bates #2463-2480). Subject: FW: Edited chapter 9. B-5 Exemption - Pre-decisional and deliberative process information redacted as representing edits to a draft chapter of the NEPDG. 2 pages. #2461-2462 Released in Part

57. Document entitled "America's Energy Infrastructure: A Comprehensive Delivery System." B-5 Exemption - Pre-decisional and deliberative process information withheld as representing draft document/chapter of NEPDG report. 18 pages. #2463-2480 Withheld

58. E-mail to Margot Anderson from Charles Smith, dated April 20, 2001, with three attachments (Bates #s 2483-2517). Subject: Re: Environment Chapter. Pre-decisional and deliberative process information redacted as reflecting suggested revisions, comments and recommendations for revising draft chapter of NEPDG report. 2 pages. #2481-2482 Released in Part

59. Document entitled "Protecting the Nation's Health, Environment, and Energy Supply", dated April 18 draft. B-5 Exemption - Information withheld as reflecting the deliberative thoughts and opinions expressed in pre-decisional working draft relating to NEPDG report. 17 pages. #2483-2499 Withheld

60. Document entitled "Protecting the Nation's Health, Environment, and Energy Supply, dated April 18 draft. B-5 Exemption - Information withheld, consisting of specific substantive comments on draft documents relating to NEPDG. 17 pages. #2500-2516 Withheld

61. E-mail to Margot Anderson from William Breed, dated March 27, 2001, with one attachment (Bates #2519-2521). Subject: Q's from Joe K. B-5 Exemption - Pre-decisional and deliberative process information redacted as reflecting questions and decisions on what information is to be included in draft documents relating to NEPDG. 1 page. #2518 Released in Part

62. Undated document entitled "Coal Resources on Federal Lands." B-5 Exemption - Information redacted consists of pre-decisional and deliberative material reflecting draft revisions to the NEPDG report. 3 pages. #2519-2521 Released in Part

63. E-mail to Margot Anderson from Joseph Kelliher, dated March 26, 2001. Subject: Questions. B-5 Exemption - Information redacted consists of pre-decisional and deliberative material reflecting substantive questions regarding particular content of the NEPDG report. 1 page. #2522 Released in Part

64. E-mail to Margot Anderson from Ellen Brown, dated March 9, 2001, with one attachment (Bates #2524). Subject: More on 8. B-5 Exemption - Pre-decisional and deliberative process information redacted reflecting the process of commenting, recommending and revising draft documents and chapters of NEPDG report. 1 page. #2523 Released in Part

65. Document entitled "Margot, I just got these but they seem helpful so I am passing them on to Ellen, dated June 1, 2001. 1 page. B-5 Exemption - Pre-decisional and deliberative process; expresses views, comments, and suggestions of reviewer on the working draft of NEPDG report. #2524 Released in Part

66. E-mail to Charles Smith from Margot Anderson, dated May 1, 2001, with one attachment (2526-2542). Subject: (blank). B-5 Exemption - Deliberative process information redacted, reflects substantive comments on draft documents relating to NEPDG. 1 page. #2525 Released in Part

67. Document entitled "America's Energy Infrastructure: A Comprehensive Delivery System." B-5 Exemption - Deliberative process information withheld reflecting a draft chapter to the NEPDG 18 pages. #2526-2542 Withheld

68. E-mail to Jay Braitsch from Margot Anderson, dated May 8, 2001, with two attachments (Bates #2545-2569). Subject: DOT request for (blank) Chapter. B-5 Exemption - Deliberative process information redacted consists of recommendations for citations to the NEPDG. 2 pages #2543-2544. Released in Part

69. Document entitled "SECTION: Chapter 7." B-5 Exemption - Information withheld consists of suggested language to be utilized in the NEPDG 7 pages. #2545-2551 Withheld

70. Document entitled "America's Energy Infrastructure: A Comprehensive Delivery System." B-5 Exemption - Deliberative Draft chapter to the pre-decisional NEPDG report. 18 pages. #2552-2569 Withheld

71. E-mail to Michelle Poche from Margot Anderson, dated May 8, 2001, with one attachment (Bates #2572-2578). Subject: URGENT: National Energy Policy: citations

request. Deliberative process information redacted as reflecting comments on the drafting and content of pre-decisional draft of the NEPDG report 2 pages. #2570-2571 Released in Part

72. Document entitled "SECTION: Chapter 7." B-5 Exemption - Information redacted under deliberative process exemption as reflecting suggested revisions to a deliberative draft chapter of the NEPDG. 7 pages. #2572-2578 Withheld

73. E-mail to Elena Melchert from Margot Anderson, dated May 7, 2001, with one attachment (Bates #2580-2586). Subject: FW: NEP - Chapter 7. B-5 Exemption - Information redacted consists of deliberative material reflecting comments and advice on a draft chapter of the deliberative NEPDG report. 1 page. #2579 Released in Part

74. Document entitled "SECTION: Chapter 7." B-5 Exemption - Information withheld consisting of deliberative material which reflects comments, opinions, and recommended revisions to deliberative draft chapter of NEPDG report. 7 pages. #2580-2586 Withheld

75. E-mail to Jay Braitsch from Margot Anderson, dated April 18, 2001, with one attachment (Bates #25889-2600). Subject: FW: Edited chapter 8. Deliberative process information redacted portion reflects the writer's questions, comments, recommendations, and/or suggestions relating to the development of pre-decisional draft of NEP report. #2587-2588 Released in Part

76. Document entitled "Barriers to Increased Production of U.S. Energy Resources." B-5 Exemption - Information withheld consists of deliberative material reflecting the process the comments, recommends, advice and revision of pre-decisional draft documents relating to NEPDG. 12 pages. #2589-2600 Withheld

77. E-mail to Kevin Kolevar from Robert Kripowicz, dated April 3, 2001, with four attachments (Bates #2602-2607). Subject: FW: Integrating GHG Reduction into NEP. B-5 Exemption - Information redacted consists of deliberative material reflecting substantive comments, advice and recommendations concerning GHG for possible use in deliberative draft documents relating to NEPDG. 1 page. #2601 Released in Part

78. Undated document entitled "Voluntary Reduction of Greenhouse Gas Emissions From Existing Power Plants. B-5 Exemption - Information redacted consists of deliberative material reflecting the process of commenting, recommending and revising draft deliberative documents relating to NEPDG. 1 page. #2602 Released in Part

79. Undated document entitled "Technology Development to Increase Electricity Production From New Fossil Fuel-fired Power Plants. B-5 Exemption - Information redacted contains deliberative material reflecting substantive narrative description of information

and data relating to deliberative draft of NEPDG report. 2 pages. #2603-2604 Released in Part

80. Undated document entitled "Seqest FE #2-Expanding Cost-effective Options for Climate Change Mitigation." B-5 Exemption - Information redacted consists of deliberative material reflecting the discussion of data to be included in deliberative draft of the NEPDG report. 2 pages. #2605-2606 Released in Part

81. Undated document entitled "Elements of a Long-term Climate Program." B-5 Exemption - Information redacted consists of deliberative material reflecting writer's opinions, advice, and discussion of data to be included in the deliberative draft of NEPDG report. 1 page. #2607 Released in Part

82. E-mail to Robert Kripowicz and Kevin Kolevar from Margot Anderson, dated April 3, 2001. Subject: Integrating GHG Reduction into the NEP. B-5 Exemption - Information redacted consists of deliberative material reflecting suggestions, changes, and advice on GHG for possible inclusion in deliberative draft NEPDG report. 1 page. #2608 Released in Part

83. E-mail to William Magwood from Margot Anderson, dated February 14, 2001. Subject: RE: draft NEP instructions. B-5 Exemption - Deliberative process material reflecting the writer's views and recommendations concerning drafting the NEP.1 page. #2609 Released in Part

84. E-mail to William Magwood from Margot Anderson, dated February 14, 2001. Subject: RE: draft NEP instructions. B-5 Exemption - Deliberative process materials reflecting questions regarding the instructions for drafting the deliberative NEP report. 2 pages. #2610-2611 Released in Part

85. E-mail to William Magwood from Margot Anderson, dated February 14, 2001. Subject: Clarification: you NEP instructions. B-5 Exemption - Deliberative process material reflecting questions the writers had concerning the instructions for drafting the deliberative NEP report 2 pages. #2612-2613 Released in Part

86. E-mail to William Magwood from Margot Anderson, dated February 14, 2001. Subject: RE: Clarification: you NEP instructions. B-5 Exemption - Deliberative process material identical to above for deliberative draft NEP report. 2 pages. #2614-2615 Released in Part

87. E-mail to Douglas Carter and Elena Melchert from Margot Anderson, dated March 23, 2001. Subject: RE. B-5 Exemption -Deliberative material containing questions, remarks and suggestions about graphics to be used in drafting the deliberative version of NEP report. 1 page. #2616 Released in Part

88. E-mail to Margot Anderson from Douglas Carter, dated March 23, 2001. Subject: RE. B-5 Exemption - Deliberative material reflecting questions about graphics to be utilized in drafting the deliberative version of NEP report. 2 pages. #2617-2618 Released in Part

89. E-mail to Jay Braitsch from Margot Anderson, dated February 12, 2001. Subject: FW: Impediments to Conventional Energy Production. Deliberative process material reflecting substantive discussions regarding data relating to drafting the deliberative NEP report. 2 pages. #2619-2620 Released in Part

90. E-mail to Karen Knutson from Joseph Kelliher, dated March 30, 2001, with one attachment (Bates #2622-2623). Subject: Nuclear Energy Paper. - Information redacted consists of deliberative material reflecting the thoughts, advice and recommendations involved process of commenting, recommending and revising draft documents relating to deliberative NEPDG report. 1 page. #2621 Released in Part

91. Undated document entitled "Nuclear Energy." B-5 Exemption - Deliberative material reflecting text for possible inclusion in the deliberative NEP report. 2 pages. #2622-2623 Released in Part

92. Document entitled "Section 5." B-5 Exemption - Information withheld contains deliberative text for possible inclusion in the pre-decisional draft of NEP report. 6 pages. #2625-2630 Withheld

93. E-mail to Margot Anderson from Joseph Kelliher, dated April 2, 2001. Subject: RE: energy efficiency one paper. Deliberative material reflecting the writer's comments and question relating to the pre-decisional drafting of the NEP. 1 page. #2631 Released in Part

94. E-mail to Margot Anderson and Jeremy Symons from Joseph Kelliher, dated March 30, 2001. Subject: RE: energy efficiency one paper. Deliberative material reflecting the writer's pros and cons on data to be included in the deliberative drafting of the NEP report. 1 page. #2632 Released in Part

95. E-mail to Margot Anderson from Douglas Carter, dated March 27, 2001 with one attachment (Bates #2634-2642). Subject: Chapter 8 changes. Deliberative materials reflecting substantive discussion on deliberative drafting the NEP report. 1 page. #2633 Released in Part

96. Document entitled "Chapter 8: Increased Production of U.S. Energy Resources," dated June 1, 2001. B-5 Exemption - Deliberative material reflecting the text of a deliberative draft chapter of the NEP. 9 pages. #2634-2642 Withheld

97. E-mail to Margot Anderson from William Breed, dated March 26, 2001. Subject: quick comments on list of policies. B-5 Exemption - Deliberative material reflecting comments on revising the NEP. #2643 Released in Part

98. E-mail to Margot Anderson from Joseph Kelliher, dated March 13, 2001. Subject: Re: 3/15 testimony B-5 Exemption - Information redacted consists of deliberative and pre-decisional comments, views, recommendations, and advice on documents relating to NEPDG. 1 page. #3067 Released in Part

99. E-mail to Margot Anderson from Charles M. Smith, dated March 13, 2001. Subject: Comments. B-5 Exemption - Information redacted consists of comments on infrastructure matters containing deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3070 Released in Part

100. E-mail to Peter Karpoff from Margot Anderson, dated March 21, 2001. Subject: Thanks for helping on the NEP ! B-5 Exemption - Information redacted consists of deliberative and pre-decisional comments, views, recommendations, and advice relating to NEPDG. 1 page. #3075 Released in Part

101. E-mail to Michael York from Margot Anderson, dated March 27, 2001. Subject: FW: NEP issues. B-5 Exemption - Information redacted consists of discussion of chapters of NEP report containing deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3078 Released in Part

102. E-mail to Joseph Kelliher from Bob Slaughter, dated March 22, 2001, with one attachment (Bates #3081-3083). Subject: NPRA Recommendations on National Energy Policy. B-6 Exemption - Information redacted under Exemption 6 consists of Home telephone number. 2 pages. #s 3079-3080 Released in Part

103. E-mail to Charles Smith from Margot Anderson, dated March 27, 2001. Subject: Update. B-5 Exemption - Information redacted consists of update on chapter 8 containing deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3084 Released in Part

104. Undated and untitled document that discusses waiver of penalties by the Public Utility Commission of California. B-5 Exemption - Information withheld consists of position paper containing deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3086 Withheld

105. E-mail to Margot Anderson from Jeremy Symons, dated April 5, 2001. No subject. B-5 Exemption - Information redacted consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3087 Released in Part

106. E-mail to Margot Anderson from Jeremy Symons, dated April 5, 2001. Subject: RE: B-5 Exemption - Information redacted consists of discussion of electric issues containing deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3088 Released in Part

107. E-mail to John Conti from Margot Anderson, dated February 12, 2001. Subject: FW: National Energy Strategy B-5 Exemption - Information redacted consists of deliberative and pre-decisional comments, views, recommendations, and advice on relating to NEPDG. 1 page. #3089 Released in Part

108. E-mail to MaryBeth Zimmerman from Margot Anderson, dated March 30, 2001. Subject: FW: DRAFT Energy Efficiency recommendation B-5 Exemption - Information redacted consists of deliberative and pre-decisional comments, views, recommendations, and advice on documents relating to NEPDG. 1 page. #3090 Released in Part

109. E-mail to William Breed from Margot Anderson, dated February 12, 2001. Subject: FW: Impediments to Conventional Energy Production B-5 Exemption - Information redacted consists of deliberative and pre-decisional comments, views, recommendations, and advice on documents relating to NEPDG. 1 page. #3091 Released in Part

110. E-mail to Jay Braitsch from Margot Anderson, dated March 30, 2001, with two attachments, only one attached (Bates number 3093). Subject: FW: Hydraulic Fracturing: Status and Background Information. B-5 Exemption - Information redacted consists of staff discussion of hydraulic fracturing issues containing deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3092 Released in Part

111. Undated note to Margot Anderson from Jeremy Symons. B-5 Exemption - Information redacted consists of discussion hydraulic fracturing containing deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG 1 page. #3093 Released in Part

112. E-mail to Margot Anderson from Joseph Kelliher, dated March 12, 2001. Subject: RE: NEP Schedule. B-5 Exemption - Information redacted consists of discussion of schedule, policy options, and draft chapters of NEP report containing deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3098 Released in Part

113. E-mail to Margot Anderson from Joseph Kelliher, dated March 7, 2001. Subject: 9:15 meeting. B-5 Exemption - Information redacted consists of discussion of NEP meetings containing deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3101 Released in Part

114. E-mail to Margot Anderson from Cecilia Rogers, dated March 7, 2001. Subject: RE: NEP goals. B-5 Exemption - Information redacted consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3102 Released in Part

115. E-mail to Margot Anderson from Robert Kripowicz, dated April 12, 2001. Subject: RE: Climate change. B-5 Exemption - Information redacted consists of discussions of climate change containing deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3106 Released in Part

116. E-mail to Abe Haspel and MaryBeth Zimmerman, dated March 11, 2001. Subject: Distributed generation demonstration project. B-5 Exemption - Information redacted consists of author's discussion of generation demonstration projects containing deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3107 Released in Part

117. E-mail to Andy Kydes from Margot Anderson, dated April 11, 2001. Subject: RE: need your help. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's comments, recommendations, or suggestions relating to development of NEP. 1 page. #3108 Released in Part

118. E-mail to Andy Kydes from Margot Anderson, dated April 11, 2001, with one attachment (Bates #3110). Subject: Need your help. B-5 Exemption - Deliberative Process. Redacted document contains views, comments, or recommendations pertaining to the NEP. 1 page. #3109 Released in Part

119. Undated document entitled "California In-State Electricity Sales and Generation, 1993-1999 (thousand megawatt hours)." B-5 Exemption -Deliberative Process, withheld document is graph considered for use in drafting NEP. 1 page. #3110 Withheld

120. E-mail to Margot Anderson from Joseph Kelliher, dated March 13, 2001. Subject: RE: 3/15 Testimony. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP. 1 page. #3111 Released in Part

121. Undated document entitled "Permitting Recommendation." B-5 Exemption - Information withheld consists of deliberative material reflecting the process of

commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3113 Withheld

122. E-mail to Robert Kripowicz from Margot Anderson, dated April 12, 2001, with one attachment (Bates #3115-3117). Subject: FW: Climate change. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP. 1 page. #3114 Released in Part

123. Undated document entitled "U.S. Climate Change Policy Options." B-5 Exemption - Deliberative Process, withheld document concerns Policy Recommendations for NEP. 3 pages. #3115 - 3117 Withheld

124. Undated document entitled "Chapter 8: Increased Production of U.S. Energy Resources." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 21 pages. #3119-#3139 Withheld

125. E-mail to Margot Anderson from Jean Vernet, dated March 13, 2001. Subject: Another Nat'l Energy Policy Option, with one attachment (Bates #s 3141-3142). B-5 Exemption - Information redacted consists of deliberative and pre-decisional comments, views, recommendations, and advice relating to NEPDG. 1 page. #3140 Released in Part

126. Undated document entitled "National Energy Policy - Policy Options." B-5 Exemption - Deliberative Process, withheld document contains Policy Recommendations for NEP. 2 pages. #3141-3142 Withheld.

127. Undated document entitled "Information Needed for Chapter 1." Subject: Chapter One Assignments.doc. B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 2 pages. #3144-3145 Withheld

128. E-mail to Margot Anderson from William Bettenberg, dated April 13, 2001, with one attachment entitled "twotaxoptions.doc" (#3147-3151). Subject: Two tax proposals to encourage enhance production. B-5 Exemption - Deliberative Process redacted document contains views, comments, or recommendations pertaining to drafting of NEP. 1 page. #3146 Released in Part

129. Undated document entitled "Onshore Oil and Gas." Subject: twotaxoptions.doc. B-5 Exemption - Deliberative Process, withheld document contains Policy Recommendations for NEP. 5 pages. #3147-3151 Withheld

130. E-mail to Margot Anderson from Jay Braitsch, dated April 20, 2001, with one attachment (Bates #3153-3165). Subject: Chapter 8. B-5 Exemption - Deliberative Process redacted document contains views, comments, or recommendations pertaining to drafting of NEP. 1 page. #3152 Released in Part

131. Document entitled "Barriers to Increased Production of Energy Resources," dated April 18. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 12 pages. #3153-3165 Withheld

132. E-mail to Margot Anderson from Tom Kimbis, dated April 23, 2001, with one attachment entitled "Renewable chapter graphics" (Bates #3167-3171). Subject: production note. B-5 Exemption - Information redacted consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3166 Released in Part

133. Undated document entitled "Increases in Domestic Production, 1990-1999." Subject: Renewable chapter graphics. B-5 Exemption -Deliberative Process, withheld graphics considered for use in drafting NEP. 5 pages. #3167-3171 Withheld

134. E-mail to Margot Anderson from Douglas Carter, dated April 20, 2001. Subject: RE: NSR. B-5 Exemption - Deliberative Process, information redacted reflects the writer's questions, comments, recommendations, or suggestions relating to development of NEP 3 pages. #3172-3174 Released in Part

135. E-mail to Margot Anderson from Jay Braitsch, dated April 20, 2001. Subject: RE: Chapter 8. B-5 Exemption - Deliberative Process, information redacted reflects the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3175 Released in Part

136. E-mail to Margot Anderson from Jay Braitsch, dated April 19, 2001, with one attachment (Bates #3177-3188). Subject: Chapter 8. B-5 Exemption - Information redacted consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3176 Released

137. Document entitled "Barriers to Increased Production of Energy Resources," dated April 18. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 12 pages. #3177-3188 Withheld

138. Undated document entitled "Free Flight." B-5 Exemption - Deliberative Process, withheld document reflects the writer's questions, comments, recommendations, or suggestions relating to development of NEP. 1 page. #3189 Withheld

139. E-mail to Margot Anderson from Jean Vernet, dated April 17, 2001. Subject: fyi - FW: comments/revisions to EPA NSR background document. B-5 Exemption - Deliberative Process, redacted information reflects the writer's questions, comments, recommendations, or suggestions relating to development of NEP. 2 pages. #3190-3191 Released in Part

140. E-mail to Joseph Kelliher from Jean Vernet, dated April 17, 2001. Subject: RE: comments/revisions to EPA NSR background document. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP. 2 pages. #3192-3193 Released in Part

141. Undated document entitled "Wind Resources." B-5 Exemption -Deliberative Process, redacted information considered for use in drafting NEP. 1 page. #3194 Released in Part

142. Undated document entitled "Solar Insolation Resource." B-5 Exemption -Deliberative Process, withheld graph considered for use in drafting NEP. 1 page. #3195 Withheld

143. Undated document entitled "United States Annual Average Wind Power." B-5 Exemption -Deliberative Process, withheld graph considered for use in drafting NEP. 1 page. #3196 Withheld

144. Undated document entitled "Suggested Hydropower Narrative - chapter 8". B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3197 Withheld

145. E-mail to Margot Anderson from Joseph Kelliher, dated April 17, 2001. Subject: EPA NSR proposal. B-5 Exemption - Deliberative Process, information redacted reflects the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3198 Released in Part

146. E-mail to Joseph Kelliher from Jean Vernet, dated April 17, 2001, with one attachment (Bates #3200). Subject: comments/revisions to EPA NSR background document. B-5 Exemption - Deliberative Process redacted document contains views, comments, or recommendations pertaining to drafting of NEP 1 page. #3199 Released in Part

147. E-mail to Joseph Kelliher from Robert Kripowicz, dated April 17, 2001, with one attachment (Bates #3201). Subject: RE: EPA NSR proposal. B-5 Exemption -

Deliberative redacted document contains views, comments, or recommendations pertaining to drafting of NEP. 1 page. #3200 Released in Part

148. Undated document entitled "Additional background on New Source Review." B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 2 pages. #3201 - 3202 Withheld

149. Undated document entitled "Reformulated Gasoline and Boutique Fuels." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3203 - 3204 Withheld

150. Undated document entitled "Background on New Source Review." B-5 Exemption - Deliberative Process. Withheld position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 1 page. #3205 Withheld

151. Undated document entitled "Information Needed for Chapter 1." B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 2 pages. #3207-3208 Withheld

152. Undated document entitled "Sequestration Discussion."B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 4 pages. #3210 - 3213 Withheld

153. Undated document entitled "Sequestration Discussion." B-5 Exemption - Deliberative Process, withheld document contains text recommended for inclusion in NEP. Information redacted under . 4 pages. #3214 - 3218 Withheld

154. E-mail to Margot Anderson from MaryBeth Zimmerman, dated April 26, 2001. Subject: definitions from Michael York. B-5 Exemption - Information redacted consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3219 Released in Part

155. Undated and untitled document. Subject: CHP - St. Paul Minnesota and CHP - Industry. B-5 Exemption - Deliberative Process. Withheld text contains facts or conclusions submitted in drafting process for possible inclusion in NEP. 1 page. #3221 Withheld

156. E-mail to Margot Anderson from MaryBeth Zimmerman, dated April 27, 2001, with one attachment (Bates #3223). Subject: Pulte callout. B-5 Exemption - Deliberative Process redacted document contains views, comments, or recommendations pertaining to drafting of NEP. 1 page. #3222 Released in Part

157. Undated document entitled "Chapter 10 - National Energy Security and International Affairs." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 15 pages. #3225-3239 Withheld

158. E-mail to Margot Anderson from Linda Lawson, dated April 27, 2001. Subject: RE: Transportation Language. B-5 Exemption - Deliberative Process, redacted information reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP. 1 page. #3240 Released in Part

159. E-mail to Margot Anderson from MaryBeth Zimmerman, dated April 27, 2001, with one attachment (Bates #3242). Subject: Hybrid Vehicle Text Box. B-5 Exemption - Deliberative Process redacted document contains views, comments, or recommendations pertaining to drafting of NEP. 1 page. #3241 Released in Part

160. Undated document entitled "Hybrid Vehicle Text Box." B-5 Exemption - Deliberative Process. Withheld text contains facts or conclusions submitted in drafting process for possible inclusion in NEP. 1 page. #3242 Withheld

161. E-mail to Jean Vernet and Margot Anderson from Joseph Kelliher, dated April 29, 2001, with one attachment (Bates #3244). Subject: NSR. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP. 1 page. #3243 Released in Part

162. Document entitled "New Source Review Recommendations," dated April 24, 2001. B-5 Exemption - Deliberative Process. Withheld position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 1 page. #3244 Withheld

163. E-mail to Margot Anderson from Andy Kydes, dated April 25, 2001, with three attachments (Bates #3247-3252). Subject: RE: NEP help on Chapter 1. B-5 Exemption - Deliberative redacted information contains views, comments, or recommendations pertaining to drafting of NEP. 2 pages. #3245-3246 Released in Part

164. Undated and untitled document. Subject: U.S. Per Capita Oil Consumption, 1970 - 2000 and Electricity Fuel Shares. B-5 Exemption -Deliberative Process, withheld graph considered for use in drafting NEP. 2 pages. #3247-3248 Withheld

165. Undated document entitled "Information needed for Chapter 1." B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 3 pages. #3249-3251 Withheld

166. Undated document entitled "Reformulated Gasoline and Boutique Fuels." B-5 Exemption - Deliberative Process. Withheld position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3253-3254 Withheld

167. Document entitled "Background on New Source Review," dated April 16, 2001. B-5 Exemption - Deliberative Process. Withheld position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 1 page. #3255 Withheld

168. Document entitled "Renewable and Alternative Energy," dated May 3, 2001. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 25 pages. #3256-3280 Withheld

169. Undated document entitled "Renewable and Alternative Energy." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 26 pages. #3281-3306 Withheld

170. Document "Renewable and Alternative Energy," dated May 3, 2001. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 25 pages. #3307-3331 Withheld

171. Document entitled "Chapter 7 - Alternative and Renewable Energy," dated April 19, 2001. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 11 pages. #3332-3342 Withheld

172. Document entitled "Renewable and Alternative Energy," dated May 3, 2001. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments,

recommendations, and thought processes of persons preparing the NEP. 25 pages. #3343-3367 Withheld

173. Document entitled "Chapter 7 - Alternative and Renewable Energy," dated April 19, 2001. 11 pages. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 11 pages. #3368-3378 Withheld

174. Document entitled "Chapter 7 - Alternative and Renewable Energy," dated March 15, 2001. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 5 pages. #3379-3383 Withheld

175. Document entitled "Renewable and Alternative Energy," dated May 3, 2001. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 25 pages. #3384-3408 Withheld

176. Undated document entitled "Renewable and Alternative Energy." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 26 pages. #3409-3434 Withheld

177. Document entitled "Renewable and Alternative Energy," dated May 3, 2001. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 25 pages. #3435-3459 Withheld

178. Document entitled "Chapter 7 - Alternative and Renewable Energy," dated April 19, 2001. 11 pages. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 11 pages. #3460-3470 Withheld

179. Document entitled "Chapter 7 - Alternative and Renewable Energy," dated March 15, 2001. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 5 pages. #3471-3475 Withheld

180. Undated document entitled "Section 10 Informal Draft." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 12 pages. #3476-3487 Withheld

181. Email to Joseph Kelliher from Margot Anderson, dated April 17, 2001. Subject: More on NSR. B-5 Exemption - Information redacted consists of deliberative material reflecting

the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3488 Released in Part

182. Email to Jay Braitsch from Margot Anderson, dated April 17, 2001, with one attachment (Bates #3490). Subject: Chapter 8 – Hydropower language (Virus checked). B-5 Exemption - Deliberative Process redacted document contains views, comments, or recommendations pertaining to drafting of NEP 1 page. #3489 Released in Part

183. Undated document entitled "Suggested Hydropower Narrative – Chapter 8." B-5 Exemption - Deliberative Process. Withheld text contains facts or conclusions submitted in drafting process for possible inclusion in NEP 1 page. #3490 Withheld

184. Email to Jacob Moss from Margot Anderson, dated April 17, 2001. Subject: For Review. B-5 Exemption - Information redacted consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 2 pages. #3491-3492 Released in Part

185. Email to Jeremy Symons from Margot Anderson, dated April 17, 2001. Subject: For Review. B-5 Exemption - Information redacted consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. 3493 Released in Part

186. Email to Jeremy Symons from Margot Anderson, dated April 17, 2001, with one attachment (Bates #3495-3496). B-5 Exemption - Information redacted consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3494 Released in Part

187. Undated document entitled "Reformulated Gasoline and Boutique Fuels." B-5 Exemption - Deliberative Process. Withheld position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3495-3496 Withheld

188. Undated document entitled "U.S. Economy Runs on Fossil Fuels." B-5 Exemption - Deliberative Process, withheld graph considered for use in drafting NEP. 9 pages. #3498-3506 Withheld

189. Undated and untitled note to Charlie and Joan. No subject. B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3508 Withheld

190. Document entitled "Chapter 7 - Alternative and Renewable Energy," dated April 19, 2001. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects,

comments, recommendations, and thought processes of persons preparing the NEP 11 pages. #3509-3519 Withheld

191. Undated document entitled "Wind Resources." B-5 Exemption -Deliberative Process, withheld draft graphics considered for use in drafting NEP. 3 pages. #3520-3522 Withheld

192. Email to Jay Braitsch from Margot Anderson, dated April 19, 2001. Subject: Chapter 8. B-5 Exemption - Deliberative Process redacted document contains views, comments, or recommendations pertaining to drafting of NEP 1 page. #3523 Released in Part

193. Email to Edward Watts from Margot Anderson, dated April 19, 2001. Subject: Chapter 8. B-5 Exemption - Deliberative Process redacted document contains views, comments, or recommendations pertaining to drafting of NEP. 1 page. #3524 Released in Part

194. Document entitled "Barriers to Increased Production of Energy Resources," dated April 18. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 12 pages. #3525-3536 Withheld

195. Email to Michael York from Margot Anderson, dated April 19, 2001. Subject: Renewable Energy/Biomass. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP . 1 page. #3537 Released in Part

196. Email to Jay Braitsch from Margot Anderson, dated April 20, 2001. Subject: Chapter 8. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 2 pages. #3538-3539 Released in Part

197. Email to Douglas Carter, Jean Vernet and Robert Kripowicz from Margot Anderson, dated April 20, 2001. Subject: NSR. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's qucstions, comments, recommendations, or suggestions relating to development of NEP. 3 pages. #3540-3542 Released in Part

198. Email to Tom Kimbis from Margot Anderson, dated April 24, 2001. Subject: Production note. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP. 2 pages. #3543-3544 Released in Part

199. Email to Tom Kimbis from Margot Anderson, dated April 24, 2001. Subjection: RE: production note. B-5 Exemption - Deliberative Process, information redacted reflecting

the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3545 Released in Part

200. Email to Margot Anderson, John Conti and Paul Carrier from Joseph Kelliher, dated March 14, 2001. Subject: CA Peaking Units. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3546 Released in Part

201. Email to Margot Anderson from John Shages, dated March 14, 2001. Subject: NEP 2 Pagers On SPR. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3547 Released in Part

202. Email to MaryBeth Zimmerman from Margot Anderson, dated April 30, 2001. Subject: Technology Climate Piece. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3548 Released in Part

203. Email to Margot Anderson from K. Murphy, dated March 20, 2001. Subject: Commerce Suggestions For Draft Chapters 7 & 8. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3549 Released in Part

204. Email to MaryBeth Zimmerman from Margot Anderson, dated May 3, 2001. Subject: Climate Questions. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 2 pages. #3550-3551 Released in Part

205. Email to Tom Kimbis from Margot Anderson, dated May 3, 2001. Subject: Revisions To Renewables Chapter. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 2 pages. #3552-3553 Released in Part

206. Email to Margot Anderson from Nancy Johnson, dated March 14, 2001, with 10 attachments (Bates #3555-3574). Subject: Revised FE NEP Papers – Oil And Gas. 1 page. B-5 Exemption - Deliberative redacted document contains views, comments, or recommendations pertaining to drafting of NEP . 1 page. Released in Part

207. Undated document entitled "Clean Liquid Fuels." B-5 Exemption - Deliberative Process. Withheld Position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3555-3556 Withheld

208. Undated document entitled "Access to Oil and Natural Gas Resources on Federal Lands." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3557-3558 Withheld

209. Undated document entitled "Develop "Frontier" Resources to Ensure Future Oil and Natural Gas Supply." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3559-3560 Withheld

210. Undated document entitled "International Petroleum Markets - Energy Security through Supply Diversity." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3561-3562 Withheld

211. Undated document entitled "Oil and Natural Gas Incentives." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 2 pages. #3563-3564 Withheld

212. Undated document entitled "Ensuring Secure, Reliable Natural Gas and Petroleum Delivery Systems." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3565-3566 Withheld

213. Undated document entitled "Expedite Natural Gas and Petroleum Pipeline Permitting." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3567-3568 Withheld

214. Undated document entitled "Preserving U.S. Refining Viability." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3569-3570 Withheld

215. Undated document entitled "Streamlining Regulations Affecting Oil and Natural Gas Supply." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3571-3572 Withheld

216. Undated document entitled "Sustaining U.S. Oil and Natural Gas Production." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 2 pages. #3573-3574 Withheld

217. Undated document entitled "Expanding Cost-effective Options for Climate Change Mitigation." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3576-3577 Withheld

218. Undated document entitled "Incentives for Clean Power Generation Technologies." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3578-3579 Withheld

219. Undated document entitled "Reducing "1st-of-a-Kind" Risks For New Fossil Fuel Power Technologies (Clean Coal Power Initiative)." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3580-3581 Withheld

220. Undated document entitled "A Four-Pollutant Strategy for Existing Coal-fired Power Plants." B-5 Exemption - Deliberative Process. Withheld Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 2 pages. #3582-3583 Withheld

221. Email to MaryBeth Zimmerman from Margot Anderson, dated May 7, 2001. Subject: Bullets. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 2 pages. #3584-3585 Released in Part

222. Email to Jay Braitsch and Douglas Carter from Margot Anderson, dated May 7, 2001, with one attachment (Bates #3587-3592). Subject: An Additional Fact Not Checked On Friday. B-5 Exemption - Information redacted consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3586 Released in Part

223. Undated document entitled "Section 5." B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 6 pages. #3587-3592 Withheld.

224. Email to Jay Braitsch, Christopher Freitas, John Conti, William Breed and Andy Kydes from Margot Anderson, dated May 8, 2001, with two attachments (Bates #3595-3619). B-5 Exemption - Information redacted consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 2 pages. #3593-3594 Released in Part

225. Undated document entitled "Section: Chapter 7." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 7 pages. #3595-3601 Withheld

226. Undated document entitled "America's Energy Infrastructure: A Comprehensive Delivery System." B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 18 pages. #3602-3619 Withheld

227. Email to Paul Carrier from Joseph Kelliher, dated March 14, 2001. Subject: California Questions. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 2 pages. #3620-3621 Released in Part

228. Email to MaryBeth Zimmerman from Joseph Kelliher, dated March 14, 2002. Subject: California Questions. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 3 pages. #3622-3624 Released in Part

229. Email to Margot Anderson from Nancy Johnson, dated March 14, 2001. Subject: NEP Papers – Oil And Gas. B-5 Exemption - Deliberative Process redacted document contains views, comments, or recommendations pertaining to drafting of NEP. 1 page. #3625 Released in Part

230. Email to Margot Anderson from Jeffrey Stier, dated March 14, 2001, with five attachments (Bates #3626-3632). Subject: Updated Papers. B-5 Exemption - Deliberative Process. Redacted Position paper contains proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 1 page. #3626 Released

231. Undated document entitled "National Energy Policy - Policy Options." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3627-3628 Withheld

232. Undated document entitled "National Energy Policy - Policy Options." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 1 page. #3629 Withheld

233. Undated document entitled "National Energy Policy - Policy Options." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 1 page. #3630 Withheld

234. Undated document entitled "National Energy Policy - Policy Options." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 1 page. #3631 Withheld

235. Undated document entitled "National Energy Policy - Policy Options." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 1 page. #3632 Withheld

236. Email to Tracy Terry from MaryBeth Zimmerman, dated March 15, 2001. Subject: California Questions-Federal Facilities. B-5 Exemption - Deliberative Process, redacted information reflects the writer's questions, comments, recommendations, or suggestions relating to development of NEP 4 pages. #3633-3636 Released in Part

237. Email to Margot Anderson from Joseph Kelliher, dated March 15, 2001, with one attachment (Bates #3638-3640). Subject: Talking Points. B-5 Exemption - Deliberative Process withheld document contains views, comments, or recommendations pertaining to drafting of NEP. 1 page. #3637 Withheld

238. Undated document entitled "Energy Briefing By Secretary Spencer Abraham," dated March 14, 2001. B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 3 pages. #3638-3640 Withheld

239. Undated document entitled "6 High Performance Building." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 2 pages. #3642-3643 Withheld

240. Undated document entitled "7 Factories." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3644-3645 Withheld

241. Undated document entitled "12 Government Purchasing." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 3 pages. #3646-3648 Withheld

242. Undated document entitled "13 Consumer Information." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3649-3650 Withheld

243. Undated document entitled "15 Tech Assistance Business." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3651-3652 Withheld

244. Undated document entitled "16 Reduce energy costs for truckers." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 2 pages. #3653-3654 Withheld

245. Undated document entitled "24 Infrastructure Development Partnership." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 3 pages. #3655-3657 Withheld

246. Email to Margot Anderson from Paul Carrier, dated March 16, 2001, with four attachments (Bates #3659-3663). Subject: E-Files For NEP Options. B-5 Exemption - Deliberative Process redacted document contains views, comments, or recommendations pertaining to drafting of NEP. 1 page. #3658 Released in Part

247. Undated document entitled "National Energy Policy, Policy Options, 2-Page Descriptions." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 1 page. #3659 Withheld.

248. Undated document entitled "National Energy Policy, Policy Options, 2-Page Descriptions." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 1 page. #3660 Withheld.

249. Undated document entitled "National Energy Policy, Policy Options, 2-Page Descriptions." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 1 page. #3661 Withheld.

250. Undated document entitled "National Energy Policy, Policy Options, 2-Page Descriptions." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 2 pages. #3662-3663 Withheld.

251. Email to Margot Anderson from George Person, dated March 16, 2001, with one attachment (Bates #3666-3676). Subject: A New NEP Chapter 10. B-5 Exemption - Deliberative Process Transmits attachment. Redacted transmitting document contains views, comments, or recommendations pertaining to drafting of NEP. 2 pages. #3664-3665 Released in Part

252. Undated document entitled "Section 10." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 11 pages. #3666-3676 Withheld

253. Email to Paul Kondis from Margot Anderson, dated March 1, 2001, with one attachment (Bates #3678-3683). Subject: Graphics Request for NEP. B-5 Exemption - Deliberative redacted document contains views, comments, or recommendations pertaining to drafting of NEP. 1 page. #3677 Released in Part

254. Undated document entitled "U.S. Energy Source, 1999." B-5 Exemption -Deliberative Process, withheld draft graphics considered for use in drafting NEP. 6 pages. #3678-3683 Withheld

255. Email to Tracy Terry from Margot Anderson, dated March 1, 2001. Subject: California Electricity Demand. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP. 1 page. #3684 Released in Part

256. Undated document entitled "Over-riding Principle." B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3686 Withheld.

257. Undated document entitled "U.S. Energy Supply And Demand Overview." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 15 pages. #3687-3701 Withheld

258. Email to Trevor Cook from Margot Anderson, dated March 6, 2001. Subject: Template. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 2 pages. #3702-3703 Released in Part

259. Email to Abe Haspel, MaryBeth Zimmerman, Andrea Lockwood, Patricia Breed, William Breed, Andy Kydes, Michael Whatley, Douglas Carter, Jay Braitsch, Elena Melchert and Trevor Cook from Margot Anderson, dated March 6, 2001, with two attachments (Bates #3706-3707). Subject: Template. B-5 Exemption - Deliberative Process redacted

document contains views, comments, or recommendations pertaining to drafting of NEP. 2 pages. #3704-3705 Released in Part

260. Undated document entitled "National Energy Policy, Policy Options, 2 Page (Max) Descriptions." B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3706 Withheld

261. Undated document entitled "Over-riding Principles." B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3707 Withheld.

262. Email to Joseph Kelliher and Kevin Kolevar from Margot Anderson, dated March 7, 2001. Subject: NEP News. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3708 Released in Part

263. Email to Douglas Carter from Margot Anderson, dated March 8, 2001. Subject: Multipollutant Strategies and CO2. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3709 Released in Part

264. Email to Matthew T. McManus from Margot Anderson, dated March 8, 2001. Subject: Template. B-5 Exemption - Deliberative Process redacted document contains views, comments, or recommendations pertaining to drafting of NEP. 2 pages. #3710-3711 Released in Part

265. Email to Matthew T. McManus from Margot Anderson, dated March 8, 2001, with one attachment (Bates #3714-3722). Subject: Template. B-5 Exemption - Deliberative Process redacted document contains views, comments, or recommendations pertaining to drafting of NEP. 2 pages. #3712-3713 Released in Part

266. Undated document entitled "Section 10, National Energy Security And International Affairs." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 9 pages. #3714-3722 Withheld

267. Email to Matthew T. McManus from Margot Anderson, dated March 8, 2001, with one attachment (Bates #3724-3726). Subject: Comments On Your Chapter. B-5 Exemption - Information withheld consists of deliberative material reflecting the process of

commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3723 Withheld

268. Undated document entitled "DOE Comments: Chapter 10." B-5 Exemption - Deliberative Process withheld, information reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 3 pages. #3724-3726 Withheld

269. Email to Matthew T. McManus from Margot Anderson, dated March 8, 2001, with one attachment (Bates #3728). Subject: Chapter 10 Revision. B-5 Exemption - Deliberative Process Transmits redacted document contained views, comments, or recommendations pertaining to drafting of NEP 1 page. #3727 Released in Part

270. Undated and untitled document. Subject: LNG. B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3728 Withheld

271. Email to Matthew T. McManus from Margot Anderson, dated March 8, 2001, with one attachment (Bates #3730). B-5 Exemption - Deliberative Process Transmits attachment. Redacted transmitting document contains views, comments, or recommendations pertaining to drafting of NEP. 1 page. #3729 Released in Part

272. Undated and untitled document. Subject: LNG. B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3730 Withheld

273. Undated document entitled "Section 10, National Energy Security And International Affairs." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 9 pages. #3731-3739 Withheld.

274. Undated document entitled "DOE Comments: Chapter 10." B-5 Exemption - Deliberative Process, withheld information reflects the writer's questions, comments, recommendations, or suggestions relating to development of NEP 3 pages. #3741-3743 Withheld

275. Email to Matthew T. McManus from Margot Anderson, dated March 9, 2001. Subject: Stand By For New Direction Of Our Chapter. B-5 Exemption - Deliberative Process, redacted information reflects the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3744 Released in Part

276. Email to Paula Scalingi from Margot Anderson, dated March 9, 2001. Subject: NEP Goals. B-5 Exemption - Deliberative Process, redacted information reflects the writer's questions, comments, recommendations, or suggestions relating to development of NEP 2 pages. #3745-3746 Released in Part

277. Email to Margot, Anderson, Abe Haspel, MaryBeth Zimmerman, Andrea Lockwood, Patricia Breed, William Breed, Andy Kydes, Michael Whatley, Douglas Carter, Jay Braitsch, Elena Melchert and Trevor Cook from Margot Anderson, dated March 12, 2001. Subject: Template. B-5 Exemption - Deliberative Process, redacted information reflects the writer's questions, comments, recommendations, or suggestions relating to development of NEP 2 pages. #3747-3748 Released in Part

278. Email to Abe Haspel, MaryBeth Zimmerman, Andrea Lockwood, William Breed, Andy Kydes, Michael Whatley, Douglas Carter, Jay Braitsch, Elena Melchert, Trevor Cook, Kevin O'Donovan, Kevin Kolevar and Paula Scalingi from Margot Anderson, dated March 12, 2001, with one attachment (Bates #3750-3760). Subject: NEP Policy Options. B-5 Exemption - Deliberative Process Transmits attachment. Redacted transmitting document contained views, comments, or recommendations pertaining to drafting of NEP. 1 page. #3749 Released in Part

279. Undated document entitled "Short Titles." Email to William Breed, Andy Kydes, Michael Whatley, Douglas Carter, Jay Braitsch, Elena Melchert and Trevor Cook from Margot Anderson, dated March 12, 2001. Subject: Template. B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 11 pages. #3750-3760 Withheld

280. Email to Paula Scalingi from Margot Anderson, dated March 12, 2001. Subject: Policy Options For Infrastructure Goals. B-5 Exemption - Deliberative Process, redacted information reflects the writer's questions, comments, recommendations, or suggestions relating to development of NEP 3 pages. #3761-3763 Released in Part

281. Undated document entitled "Section 10." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 13 pages. #3765-3777 Withheld.

282. Document entitled "Chapter 8: Increased Production of U.S. Energy Resources," dated March 7, 2001. B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 7 pages. #3779-3784 Withheld

283. Undated document entitled "Chapter 7 - Alternative and Renewable Energy." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 5 pages. #3786-3790 Withheld

284. Document entitled "Chapter 8: Increased Production of U.S. Energy Source." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 7 pages. #3792-3798 Withheld

285. Email to John Conti, Abe Haspel, MaryBeth Zimmerman, Andrea Lockwood, William Breed, Andy Kydes, Michael Whatley, Douglas Carter, Jay Braitsch, Elena Melchert, Trevor Cook, J. K. Steir, Michael York, and Christopher Freitas from Margot Anderson, dated March 22, 2001, with one attachment (Bates #3800-3804). Subject: Chapter 9. B-5 Exemption - Deliberative Process. Withheld transmitting document contained views, comments, or recommendations pertaining to drafting of NEP 1 page. #3799 Withheld.

286. Undated document entitled "Chapter 9 - Infrastructure Investment, Integrity, and Safety." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP. 4 pages. #3800-3804 Withheld.

287. Email to William Bettenberg from Margot Anderson, dated March 22, 2001. Subject: RE: help. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3805 Released in Part

288. Email to Crystal A Ball and Paul Carrier from Margot Anderson, dated March 23, 2001. Subject: BPA DSI Information. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3806 Released in Part

289. Document entitled "Chapter 4 Public Health and Environmental Considerations for Developing Energy Policy," dated February 21. B-5 Exemption - Deliberative Process, Withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 5 pages. #3808-3812. Withheld

290. Email Jeffrey K. Stier, Crystal A Ball, and Paul Carrier from Margot Anderson, dated March 23, 2001. Subject: PBA DSI Information. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page. #3813. Released in Part

291. Undated document entitled "11 Transportation management." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP. 2 pages. #3815-3816 Withheld

292. Undated document entitled "12 Government Purchasing." B-5 Exemption - Deliberative Process. Withheld position paper containing proposed recommendations, views, discussion or factual background pertaining to drafting of NEP 2 pages. #3817-3818 Withheld

293. Email to Margot Anderson from Joseph Kelliher, dated March 17, 2001. Subject: CEC conservation estimate. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 1 page #3819 Released in Part

294. Email to Margot Anderson from Joseph Kelliher, dated March 18, 2001. Subject: Cal supply and demand. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP. 1 page #3820 Released in Part

295. Email to Margot Anderson from Andy Kydes, dated March 18, 2001. Subject: Chapter/Section 10 Comments. B-5 Exemption - Deliberative Process, information redacted reflecting the writer's questions, comments, recommendations, or suggestions relating to development of NEP 2 pages #3821-3822 Released in Part

296. Undated document entitled "The Economic Impacts of Energy Shortages on Families, Communities, and Businesses." B-5 Exemption - Information withheld consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 16 pages. #3824-3839 Withheld

297. Undated document entitled "Section - U.S. Energy Supply and Demand Overview." B-5 Exemption - Deliberative Process, withheld Draft of NEP chapter, reflects, comments, recommendations, and thought processes of persons preparing the NEP 16 pages. #3840-3855 Withheld

298. Undated document entitled "Regional Issues Relating to Short-Term Energy Supply Disruption and Increased Production of Traditional Energy Resources." B-5 Exemption - withheld draft position paper to be used in preparation of the NEPDG Chapter titled Regional Issues Relating to Short-Term Energy Supply Disruption and Increased Production of Traditional Energy Resources. 5. 13 pages. #3856-3868 Withheld

299. E-mail to Margot Anderson from Andy Kydes, dated April 25, 2001, with three attachments (Bates #3871-3875). B-5 Exemption - Subject: RE: NEP help on Chapter 1.

Comments, recommendations and revisions in the e-mail were redacted. (2 pages. #3869-3870) Release in Part

300. Attachment to e-mail to Margot Anderson from Andy Kydes, dated April 25, 2001, with three attachments (Bates #3871-3875). Subject is entitled "Information Needed for Chapter 1." B-5 Exemption - Suggestions and revisions to the draft NEPDG. 5 pages. #3871-3875 Withheld

301. Email to Andy Kydes from Evelyn Wheeler, dated April 4, 2001. Subject: Another clarification. B-5 Exemption - Redacted was a draft suggestion or revision for inclusion in draft NEPDG. 1 page. #3876 Released in Part

302. Email to Andy Kydes from Evelyn Wheeler, dated April 4, 2001. Subject: Clarification please. B-5 Exemption - Redacted was a draft suggestion or revision for inclusion in draft NEPDG. 1 page. #3877 Released in Part

303. Document entitled "Draft Final Report of the National Energy Policy Development Group," dated March 8, 2001. B-5 Exemption - Withheld was the draft of the Table of Contents of the Draft Report of the NEPDG. 6 pages. #3878-3883 Withheld

304. Undated document entitled "Report Of The National Energy Policy Development Group." Subject: Draft Chapters 3-10. B-5 Exemption - Withheld was the draft of Chapters 3-10 of the draft NEPDG. 56 pages. #3884-3939 Withheld

305. Document entitled "Over-riding Principle," dated March 12, 2001. B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting the internal deliberation process of strategy for the drafting of NEPDG documents. 1 page. #3940 Withheld

306. Undated document entitled "Draft Policy Proposals." B-5 Exemption - Withheld were pages of draft policy proposals to be considered for the NEPDG. These pages were deliberative materials reflecting the process of commenting, recommending and revising policy proposals for the NEPDG. 12 pages. #3941-3952 Withheld

307. Document entitled "A Four-Pollutant Strategy for Existing Coal-fired Power Plants," dated March 8, 2001. B-5 Exemption - Withheld was a draft two-pager consisting of a strategy for the above subject matter, a topic of the NEPDG deliberative material. 2 pages. #3953-3954 Withheld

308. Undated document entitled "National Energy Policy/Policy Options." B-5 Exemption - Withheld information consisted of policy options for the NEPDG. 1 page. #3955 Withheld

309. Undated document entitled "National Energy Policy Carbon Free Electricity Portfolio Standard." B-5 Exemption - Withheld was the policy option on the above subject. 1 page. #3956 Withheld

310. Document entitled "Clean Liquid Fuels," dated March 8, 2001. B-5 Exemption - Withheld was the draft strategy to Clean Liquid Fuels for the NEPDG. 2 pages. #3957-3958 Withheld

311. Document entitled "Policy Goal Addressed: Enhance Supply and Productivity," dated Mach 11, 2001. B-5 Exemption - Withheld were the draft policy goals of the draft NEPDG. 4 pages. #3959-3962 Withheld

312. Document entitled "Technology Development to Increase Electricity Production From Existing Coal-fired Power Plants, dated March 8, 2001. B-5 Exemption - Withheld document is a policy goal and strategy of the subject which is a part of the NEPDG. 1 page. #3963 Withheld

313. E-mail to Andy Kydes from Margot Anderson, dated March 12, 2001. Subject: RE: Template. B-5 Exemption - Information redacted is guidance, recommendations, and suggestions on templates and goals for the NEPDG. 2 pages. #3964-3965 Released in Part

314. E-mail to James Mackey and Paul Carrier from Joseph Kelliher, dated March 19, 2001. Subject: RE: CA Problems Update 3/19/01 1:30 EST: Possible Stage III. B-5 Exemption - Information redacted (under Exemption 5) consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 1 page. #3966 Released in Part

315. E-mail to James Mackey and Paul Carrier from Joseph Kelliher, dated March 19, 2001. Subject: RE: CA Problems Updated 3/19/01 1:30 EST: Stage III & rolling blackouts ON GOING. B-5 Exemption - Information redacted (under Exemption 5) consists of deliberative material reflecting the process of commenting, recommending and revising draft documents relating to NEPDG. 2 pages. #3967-3968 Released in Part

316. E-mail to Robert Kripowicz from Joseph Kelliher, dated March 19, 2001. Subject: clean coal technology. B-5 Exemption - Information redacted (under Exemption 5) consist of deliberative material seeking guidance, comments, and recommendation regarding the above topic related to NEPDG. 1 page. #3969 Released in Part

317. E-mail to Margot Anderson from Joseph Kelliher, dated March 20, 2001, with one attachment (Bates #3971-3976). Subject: RE: a request. B-5 Exemption - Information redacted (under Exemption 5) consists of request for deliberative material reflecting the process of commenting, recommending, revising or requesting guidance for draft documents relating to NEPDG.1 page. #3970 Released in Part

318. Undated document entitled "National Energy Policy Elements." B-5 Exemption - Information withheld (under Exemption 5) consist of deliberative material reflecting comments, recommendations and revisions of policy elements within the NEPDG documents. 6 pages. #3971-3976 Withheld

319. Memorandum to Margot Anderson from Andy S. Kydes, dated February 28, 2001. Subject: New material Forwarded. B-5 Exemption - Information redacted under (Exemption 5) consists of deliberative material reflecting comments, recommendations, and revisions of draft NEPDG documents. 2 pages. #3977-3978 Released in Part

320. Undated document entitled "Introduction: U.S. Energy Supply and Demand Overview." B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting the comments, recommendations and revisions of draft NEPDG documents. 14 pages. #3979-3992 Withheld

321. Undated document entitled "The Next Six Months: Regional Issues." B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material that reflect the comments, recommendations and revisions of draft NEPDG documents. 3 pages. #3993-3995 Withheld

322. E-mail to Larry Pettis from Margot Anderson, dated March 2, 2001, with two attachments (Bates #3997-4019). Subject: Attachments for Monday NEP meeting. B-5 Exemption - Information redacted (under Exemption 5) consist of deliberative material reflecting the comments, recommendations and revisions of draft NEPDG documents. 1 page. #3996 Released in Part

323. Undated document entitled "Over-riding Principle." B-5 Exemption - Information withheld (under Exemption 5) consist of deliberative material reflecting comments, recommendations, and revisions of draft NEPDG documents. 8 pages. #3997- 4004 Withheld

324. Undated document entitled "U.S. Energy Supply and Demand Overview." B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting the internal deliberation process of strategy for the drafting of NEPDG documents. 15 pages. #4005- 4019 Withheld

325. Undated document entitled "Over-riding Principle." B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting comments, recommendations, and revisions of draft documents relating to NEPDG documents. 1 page. #4020 Withheld

326. E-mail from to Andy Kydes from Phyllis Martin, dated March 6, 2001. Subject: RE: Please check the gas portions of this chapter 10 discussion. B-5 Exemption - Information

redacted (under Exemption 5) consist of deliberative material reflecting guidance, comments, recommendations and revisions of draft documents relating to NEPDG. 1 page. #4021 Released in Part

327. Undated document entitled "Section 6 Infrastructure Investment, Integrity and Safety." B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 5 pages. #4022- 4026 Withheld

328. Document entitled "Informal Draft-- Section10 National Energy Security and International Affairs," dated March 22, 2001. B-5 Exemption - Information withheld (under Exemption 5) consist of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 14 pages. #4027-4040 Withheld

329. Document entitled "Informal Draft --Section 10 National Energy Security and International Affairs," dated March 22, 2001. B-5 Exemption - Information withheld (under Exemption 5) consist of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 14 pages. #4041-4054 Withheld

330. Undated document from Michael Grillot. Subject: Comments on Section 10 National Energy Security and International Affairs. B-5 Exemption - Information withheld (under Exemption 5) consist of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 1 page. #4055 Withheld

331. Document entitled "Informal Draft-- Section 10 National Energy Security and International Affairs," dated March 26, 2001. B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 14 pages. #4056-4069 Withheld

332. Undated document entitled "Informal Draft Section 10." B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 11 pages. #4070-4080 Withheld

333. Undated document entitled "Section 10 National Energy Security & International Affairs." B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 10 pages. #4081- 4090 Withheld

334. E-mail to Linda Doman and George Butler from Andy Kydes, dated March 2, 2001, #4091 with one attachment (#4092-4100). Subject: FW: National Energy Policy Paper. B-5 Exemption - Information redacted (under Exemption 5) consists of deliberative

material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 1 page. #4091 Released in Part

335. Undated document email attachment entitled "Section 10 National Energy Security & International Affairs." B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 9 pages. #4092-4100 Withheld

336. Document entitled "Section 10 National Energy Security & International Affairs,"dated March 5, 2001. B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 8 pages. #4101-4108 Withheld

337. Undated document entitled "Section 10 National Energy Security & International Affairs." B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 9 pages. #4109-4117 Withheld

338. E-mail to Andy Kydes and Jay Braitsch from Donald Juckett, dated March 22, 2001, #4118, with one attachment (Bates #4119-4133). Subject: NEP Chapter 10 - Resource Base Potential. B-5 Exemption - Information redacted (under Exemption 5) consist of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 1 page. #4118 Released in Part

339. Document email attachment, entitled "Informal Draft-- Section 10 National Energy Security and International Affairs," dated March 22, 2001. B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 15 pages. #4119-4133 Withheld

340. Document entitled "Existing Coal Power FE," dated March 8, 2001. B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 1 page. #4134 Withheld

341. Document entitled "Access to Oil and Natural Gas Resources on Federal Lands," dated March 8, 2001. B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 2 pages. #4135-4136 Withheld

342. Undated document entitled "National Energy Policy Federal Electricity Restructuring Legislation." B-5 Exemption - Information withheld (under Exemption 5) consists of deliberative material reflecting comments, recommendations and revisions of draft documents relating to NEPDG. 2 pages. #4137-4138 Withheld