STATE CLEAN ENERGY-ENVIRONMENT TECHNICAL FORUM
State Energy Forecasting
Thursday, June 19, 2008, 2:00 – 3:30 pm Eastern Time

Overview: What is an energy forecast and why would a state develop one?

An energy forecast documents the historic, current and projected pattern of energy supply and demand within a state. The baseline (or Business As Usual (BAU) case) forecast illustrates what state energy use will look like in the absence of additional policies beyond what is already planned, and is a reference case against which to measure the energy impacts of policy initiatives or system shocks. It can include current programs, such as regulations, standards or energy efficiency programs.

A state develops an energy forecast baseline and alternative scenarios to:

- understand how energy within its jurisdiction was and is projected to be supplied and used;
- estimate energy-related greenhouse gas and air pollution emissions;
- set specific targets with respect to energy usage, such as renewable energy or energy efficiency targets;
- identify specific sectors that could be targeted with policies and programs;
- analyze actions and measures that could help achieve targets and goals; and
- predict alternative future energy profiles that can ensure the state can meet the needs of its residents and industries with clean, cost-effective strategies.

This background document provides an overview of the process of developing an energy forecast, the approaches available, the issues states should consider and resources for more information. Appendix A includes a summary of the methods, models and data used by states to develop state energy forecasts and plans with links to the plans.

How does a state create a baseline forecast?

There are six steps involved in creating a baseline forecast –

1. Define objectives and parameters;
2. Develop an historic baseline;
3. Choose method to forecast historic baseline;
4. Determine assumptions and review data;
5. Apply the model or approach; and
6. Evaluate forecast output.

These steps are presented in Figure 2-1, *Sample Framework for Energy Forecasting* and described in greater detail below.

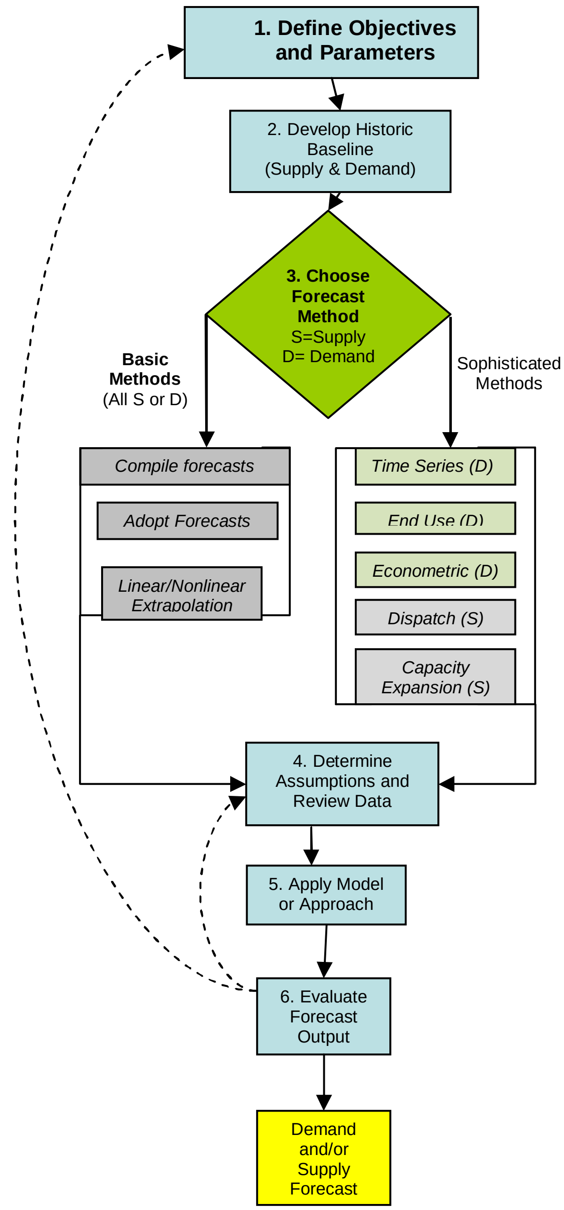
STEP 1. Define Objectives and Parameters

It is important for states to understand the objective(s) behind developing an energy forecast. They should identify the use(s)/purpose(s) of the forecast (e.g. to obtain a general energy profile or conduct a detailed analysis) and consider several factors as they begin. At a minimum, states should:

- Determine if the forecast will be short-term or long-term and bottom-up or top-down;
- Establish the level of rigor necessary;
- Consider the availability of financial, labor and time resources to complete the forecast; and
- Verify the amount of energy data that they can readily acquire to develop the forecast.

These factors will help states choose between basic and more sophisticated forecasting approaches based upon its needs and circumstances. The approaches are discussed in greater detail below.

Figure 2-1 Sample Framework for Energy Forecasting



STEP 2. Develop an Historic Baseline

A comprehensive energy baseline profile includes the following historical energy data:

- consumption (demand) by sector and fuel and
- generation (supply) by fuel and/or technology.

Energy consumption (demand) data is typically compiled by fuel type.[1] A comprehensive baseline includes non-renewable and renewable fuels. Non-renewable fuels include uranium, coal, natural gas and petroleum fuels such as: asphalt/road oil, aviation gasoline, distillates, jet fuels, kerosene, LPG, motor gasoline, and residual fuel. Electricity can also be included as a fuel. Depending upon a state's definition of "renewable," renewable fuels can include: wood, landfill gas, biodiesel/bioheat, ethanol, sewer/manure gas, pyrolysis liquid/gas, geothermal, hydro, solar PV/thermal, wind, and municipal solid waste.

[1] While the fuel may be distributed or consumed in tons, gallons or cubic feet, the data is typically presented in the same units, such as kilowatt-hours (kWhs) or British Thermal Units (Btus), in order to facilitate comparison.

Consumption data is often broken down by the sectors that consume the fuels, including commercial, residential, industrial, transportation and utility sectors. This top-down baseline helps a state understand the large and small consumers within a state and helps target sectors for policy interventions. Each sector can also be further disaggregated to show the types of consumption within. For example, if a state is interested in targeting residential sector demand, they may want to develop a bottom-up baseline that depicts the amount of residential consumption attributed to hot water heating or to appliances and cooling. This type of forecast would be very data intensive but would provide more information than an aggregated baseline that is useful if the state is interested in understanding trends and opportunities within a specific sector. Historic and forecast demand for energy is a product of the economic and weather conditions of the state as well as the types and efficiencies of end-use appliances and equipment.

On the **supply side, electricity generation data** can also be categorized by fuel type and sector.[2] A baseline energy forecast requires data about the types and amounts of fuel used to generate electricity including uranium, coal, natural gas, municipal solid waste, wood; landfill gas, hydro and petroleum fuels, such as distillates and residuals.

Electricity generation data typically includes electricity generation that has occurred within the state and electricity imported into or exported out of the state under contractual arrangements. It also accounts for transmission and distribution losses.

If using a forecast to estimate a state's greenhouse gas or air pollution emissions, treatment of electricity imports and exports in a baseline is important to understand. Obtaining a clear emissions baseline that can be attributed to satisfying the electricity demand of a state requires an understanding of the amount of electricity consumption which is generated in-state, the amount imported from other places and the fuels used to generate either. For example, if a state generates and consumes all of its own electricity which is produced using only hydropower, its emissions footprint will be quite different than a state that generates in-state electricity using only hydropower but imports electricity from a neighboring state that uses coal to generate its electricity. Understanding where and how all of a state's electricity is generated and consumed will provide a clear reference case for estimating emissions.

Data Resources

Consumption and/or generation data can be obtained from several sources, including:

- utilities,
- public utility commissions,
- state energy offices,
- departments of transportation,
- independent system operators (ISOs),
- EPA's Emissions & Generation Resource Integrated Database (eGRID) model,
- DOE's Energy Information Administration (EIA) and
- North American Electric Reliability Corporation (NERC) among others.

[2] Local energy baselines may focus on the end use sectors and allocate the fuel used to generate electricity across the other sectors that consumed the electricity.

The data available from these sources varies, as indicated in Table 2-1. Most sources listed include historical data and some include forecasted energy data a state can use. For a summary of available data and more information on these data sources, go to the Resources section at the end of this document or EPA's Clean Energy-Environment Technical Forum Backgrounder on Gathering and Using State-Level Energy Data from May 22, 2008 http://keystone.org/Public_Policy/2007_8DOCS_CLEANENERGY/05_22_2008Background_State%20Energy%20Data.pdf .

Table 2-1 Sample Energy Data Sources for BAU Forecasts

Sources	Electricity		Natural Gas		Other Fuels	
	Historic	Forecast	Historic	Forecast	Historic	Forecast
Utilities; by service territory	X	X	X	X	X	X
Public Utility Commissions; also State Energy Offices for Other fuels	X	X	X	X	X	X
Independent System Operators / RTOs	X	X				
North American Electric Reliability Corporation (NERC) Electricity Supply and Demand database	X	X				
EIA Electric Power Annual	X	X			X	
EPA Emissions & Generation Resource Integrated Database (eGRID)	X					
EIA State Energy Data (SEDS)	X		X		X	
EIA Electric Sales, Revenue, and Price tables or EIA Annual Electric Utility data—EIA-861 data file	X					
EIAs Manufacturing Energy Consumption Survey (MECS); Commercial Buildings Energy Consumption Survey (CBECS); Residential Energy Consumption Survey (RECS) Consumption data	X		X		X	
EIA Annual Energy Outlook (AEO)	X	X	X	X	X	X
NREL						X

STEP 3. Choose Method to Forecast the Historical Baseline

States can use basic or sophisticated modeling approaches to forecast its energy baseline and predict energy supply and demand based on the expectations of future population changes and economics. Basic methods may require the state to adopt others' assumptions about the projected population and the economy or compile and develop its own. These approaches are generally appropriate when conducting screening analyses or developing highly aggregated forecasts, when the amount of time or funding to support a forecast is limited, or when the time period of the forecast is short.

More sophisticated models can be used for short-term or long-term analyses. They provide greater detail than the basic methods, can capture the complex interactions within the electricity and/or energy system, but may be data, time and labor intensive, lack transparency and require significant technical expertise.

Basic Forecast Methods – Demand and Supply

There are a range of basic methods states can use to project its energy baseline without using rigorous, complicated, and sometimes costly software models. The basic approach generates high-level information about a state's energy future.

Basic approaches for forecasting energy demand and supply include: (1) compilation of individual forecasts by others into one state forecast; (2) adoption of a pre-existing forecast that someone else may have developed for the state; and (3) extrapolation of historic rates of demand growth and electricity production which are applied to the baseline. Advantages and disadvantages to each approach are described in Table 2-2. Each approach is explained in greater detail below.

- *Compilation of individual forecasts by others*: Generally, current energy plans from utilities, ISOs, and regulatory agencies will include a demand forecast that is reduced by estimated energy savings from energy efficiency programs. Likewise, the corresponding supply plan may include renewable energy sources, including combined heat and power plants, if significant. States can aggregate individual load forecasts, generation expansion plans, and energy efficiency program and renewable energy evaluations from state agencies, utilities, ISOs, local educational institutions, and special interest groups, such as interveners in rate cases. Compiling forecasts created by different entities can be challenging because they can vary significantly from each other in terms of underlying assumptions, proprietary concerns, data transparency (e.g., unit generation, costs), and time frame.

- *Adoption of a forecast used by others:* In some states, an energy office, utility commission, revenue department, or academic organization may have prepared a suitable energy forecast. Also, utilities and ISOs may have available forecast plans. A regulatory filing requirement (e.g, Integrated Resource Plan) will provide a comprehensive long-term plan that includes impacts from energy efficiency, reliable demand response, if any, and existing renewable energy plans. However, there may be proprietary constraints to obtaining this information.

Table 2-2 Comparison of Basic Methods for Forecasting Energy Demand and Supply			
Methods	**Advantages**	**Disadvantages**	**When to use**
Compilation of individual forecasts by others	Easy to gather	May not be compatible; proprietary concerns; possible short horizons; may or may not provide information on construction requirements, fuel use, emissions, and costs.	High level, preliminary and quick analysis
Adoption of a complete forecast used by others	Easiest method	May not have the long-term outlook	High level, preliminary and quick analysis
Linear and/or Nonlinear Extrapolation of Baseline	Quick	May not capture impact of significant changes (e.g., plant retirements)	High level with simple escalation factors from history
	More robust data analysis	Possible errors in formulas, inaccurate representation of demand and supply	Knowledge in generation dispatch modeling by type of plant

- *Linear / Non Linear Extrapolation* involves spreadsheet analysis where historical demand growth rates and electricity production are extrapolated. The accuracy of this approach depends on the knowledge and experience of the analyst. An advantage to this approach is that it is easy to develop in a spreadsheet and use for preliminary forecasting. A disadvantage is that the exclusion of important variables beyond demand growth factors and electricity, such as weather, season, plant retirements or construction, operation or capital costs, emissions or macroeconomic growth, may result in an inaccurate forecast.

Sophisticated Forecast Methods

Most states initiate a demand forecast using a basic approach, which may be due to the perception that the demand rate will more than likely follow historic trends and there are no foreseeable significant impacts to change the demand. However, some states have used sophisticated modeling for both its demand and supply forecasts. These modeling approaches are discussed separately below.

Demand Forecast

Once the historic baseline is developed, states can choose from three model types to develop a forecast as shown in the gray boxes. These include: time series, end use and econometric. Each model has advantages and disadvantages as described below.

- ***Time Series-based Models*** use inputs that are based on historic patterns relative to time, and forecast future events based on known past events and patterns. Inputs require an analysis of historic patterns in demand for electricity. This can be a simple look at the aggregate demand and a forecast of the pattern, or a breakdown of the demand into customer type (residential, commercial, industrial) and application of each cyclical pattern over time to develop the total demand forecast.

- *Advantages* are:
  - it's easy to use and fast; and
  - historical data are widely available by year, fuel and end use sector.
- Disadvantages are:
  - data may relate to a historical baseline that may have undergone major structural changes, such as a switch from heavy manufacturing to high-technology industries, that are unlikely to occur again thus, complicating or invalidating the forecast;
  - it is hard to reflect future structural changes even if they are anticipated; and
  - It cannot reflect supply-demand-price feedbacks.

- ***End Use model*s** develop the load profiles of customer types by analyzing the historical consumption of appliances and equipment (including any DSM programs) and may use specific surveys from customers about future growth and contraction. It can also include an economic forecast that provides GSP and consumer electricity prices.
  - An *advantage* is that this approach uses a load profile for each customer class being served, providing a reasonable estimate of demand.
  - A *disadvantage* is the time to collect the data and the cost to develop the data. Users may elect to use project specific models to help with assessing building demand estimates (see Table2-3).

- ***Econometric models*** provide a more complex and robust analysis that uses inputs for inflation, demographics, gross state product, consumer energy prices, gross/disposable income, housing starts, business starts/ failures, birth/death rates, surveys of business expansion plans, historical energy consumption, and other variables for structural changes and economic inputs. The output includes data correlations for demand and energy consumption that can be used in detailed demand and energy consumption forecasting.
  - *An advantage* of using this method is that it creates a robust demand forecast consistent with a robust economic forecast.
  - *A disadvantage* is the time and cost to prepare the inputs and review the results.

Supply Forecast

Utilities, ISOs and other sophisticated energy market participants use these models for hourly, daily, monthly, short-term and long-term forecasting. Sophisticated supply forecasting models require large volumes of data on electricity production plants, transmission capabilities and a demand forecast. As with any model, the better the data, the better the results. Although the costs to acquire the software and data may be prohibitive for some users, these models generally provide more robust estimates on energy and capacity output than Basic modeling approaches. Two types of models, as summarized in Table 2-4, are Electricity Dispatch and Capacity Expansion or Planning.

- *Electricity Dispatch models* simulate dynamic operation of the electric system, generally on a least-cost system dispatch. These models are helpful in assessing which plants are displaced and when they are displaced with alternative sources and energy efficiency. This model type is used for generation project financial evaluations, short-term planning and regulatory support. Typically, Electricity Dispatch models may be run to develop a BAU and multiple sensitivity cases to assess the impact on various planning parameters (e.g., transmission, plant dispatch, and avoided costs). Usually, due to the cost of operating the model, agencies and stakeholders coordinate with utilities and consultants for regulatory proceedings.

Table 2-4 Examples of Sophisticated Supply Forecasting Models

Modeling Types	Sampling of models	Advantages	Disadvantages	When to Use this Method
Electricity Dispatch	• **PROSYM** • **GE-MAPS** • **PROMOD** • **EGEAS**	• Provides very detailed estimations about specific plant and plant-type effects within the electric sector • Provides highly detailed, geographically-specific, hourly data	• Often lacks transparency • Labor and time intensive • Often high labor and software licensing costs • Requires establishment of specific operational profile of the clean energy resource	Often used for evaluating • specific projects in small geographic areas, • short-term planning (0-5 years) and • Regulatory proceedings.
Capacity Expansion or Planning	• **NEMS** • **IPM®** • **ENERGY 2020** • **LEAP** • **Strategist** • **Aurora** • **Plexos**	• Model selects optimal changes to the resource mix based on energy system infrastructure • May capture the complex interactions and feedbacks that occur within the entire energy system • Provides estimates of emission reductions from changes to the electricity production and/or capacity mix • May provide plant-specific detail (IPM)	• Requires assumptions that have large impact on outputs • May require significant technical experience • Often lacks transparency • Labor and time intensive • Often high labor and software licensing costs	Long-term studies (5-25 years) over large geographical areas such as: • State Implementation Plans • Late-stage resource planning • Statewide Energy plans • Greenhouse Gas Mitigation Plans

- *Capacity Expansion or Planning models* are designed to make decisions on how the electric system builds capacity to meet demand. For example, the model will input parameters that simulate options to choose to build new energy or peaking capacity or retire plants relative to signals derived from changes in demand and prices. Underlying these decisions are inputs that reflect changes in regulatory or market dynamics (stricter emission policy, introduction of a renewable portfolio standard, for example). These models are typically used for Integrated Resource Plans and can also be used for economic potential studies.

STEP 4 Determine Assumptions and Review Data

After choosing the forecasting approach or model type, the next steps are determining or reviewing the assumptions about population and economic variables, such as energy prices, productivity, gross state product, and the labor force upon which future projections of energy demand and supply depend.

States can use **population data** to estimate the amount and types of demand expected in the future and to examine trends. The US Census Population Estimates Program provides historic and projected population data (http://www.census.gov/popest/estimates.php).

A forecast depends upon assumptions about the economy that the analyst projects into the future. States can examine **economic variables** as they relate to energy in order to better understand the historic relationships between energy and the economy and to anticipate how the relationships may exist in the future. The Bureau of Economic Analysis (http://www.bea.gov/), Bureau of Labor and Statistics (http://www.bls.gov/) and the U.S. Census Economic Census (http://www.census.gov/econ/census02/) all provide macroeconomic data states can use.

The forecast requires assumptions about the **energy and fuel prices** the state should expect in the future. EIA provides energy and fuel price forecasts out to 2030 (http://www.eia.doe.gov/oiaf/forecasting.html). Price projections may also be available from PUCs and ISOs although proprietary constraints may limit the amount available.

Many sophisticated energy models will already contain assumptions about the projected population and economic variables. These models may not be transparent and so it is important to understand and ensure that the analyst either agrees with or modifies the assumptions that underlie the forecast.

At this point in the process, it may also be necessary to "clean the data" or fill in any missing data gaps. If data points are missing for particular years, it may be necessary to interpolate the existing data to fill in gaps. This will minimize the likelihood of generating a strange forecast.

STEP 5 Apply Model or Approach

States can apply the selected model or approach to the historical baseline energy data based on the assumptions about future population, economic and energy expectations.

STEP 6 Evaluate Forecast Output

Once generated, it is important to evaluate the output to ensure that it makes sense and meets the original objectives. The state may determine that some or the entire forecast does not seem reasonable. This situation may require a revisiting of the assumptions and re-application of the approach or model to achieve an acceptable demand forecast.

Some Issues and Considerations:

- Typically the data available for a historical forecast lags behind several years. For this reason, the current and most recent years will be part of the forecast and not the history. It is important, therefore, to ensure that the data derived for recent years reflects the current energy supply and demand as much as possible.

- As with all analyses, transparency helps credibility so make sure all sources and assumptions are documented.

- Forecasts, in particular, should very clearly state what is and is not included regarding assumptions about what will take place without any new initiatives. For example, many state forecasts include some level of conservation which is assumed to happen over time. It is important to understand that amount to avoid double-counting when examining future program potential or impacts. Other key examples include assumed regulatory policies (e.g., greenhouse gas reductions).

Resources

General Resources

Energy Portfolio Management: Tools & Resources for State Public Utility Commissions. Prepared by Synapse Energy Economics (2006). http://www.synapse-energy.com/Downloads/SynapseReport.2006-07.NARUC.Portfolio-Management-Tools-and-Practices-for-Regulators.05-042.pdf.

National Action Plan for Energy Efficiency Guide to Resource Planning with Energy Efficiency. Prepared by Snuller Price et al., Energy and Environmental Economics, Inc. (2007) http://www.epa.gov/cleanenergy/documents/resource_planning.pdf.

Sources of Energy Data: Historic and/or Forecasts

EPA's Clean Energy-Environment Technical Forum Backgrounder on Gathering and Using State-Level Energy Data. Prepared by U.S. Environmental Protection Agency (2008). http://keystone.org/Public_Policy/2007_8DOCS_CLEANENERGY/05_22_2008Background_State%20Energy%20Data.pdf.

North American Electric Reliability Corporation (NERC) Electricity Supply and Demand database, http://www.nerc.com/~esd/ .

Energy Information Administration (EIA) Electric Power Annual http://www.eia.doe.gov/cneaf/electricity/epa/epa_sum.html .

Emissions & Generation Resource Integrated Database (eGRID) http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html .

EIA State Energy Data (SEDS), http://www.eia.doe.gov/emeu/states/_seds.html .

EIA Electric Sales, Revenue, and Price tables (by state, census region, or national) or EIA Annual Electric Utility data—EIA-861 data, http://www.eia.doe.gov/cneaf/electricity/page/eia861.html .

EIA Annual Energy Outlook (AEO), http://www.eia.doe.gov/oiaf/aeo/ .

National Renewable Energy Laboratories (NREL), http://www.nrel.gov/rredc/ .

Sources of Population, Macroeconomic and Price Forecasts

US Census Population Estimates Program, http://www.census.gov/popest/estimates.php.

The Bureau of Economic Analysis, http://www.bea.gov/.

The Bureau of Labor and Statistics, http://www.bls.gov/.

The U.S. Census Economic Census, http://www.census.gov/econ/census02/.

Energy information Administration, http://www.eia.doe.gov/oiaf/forecasting.html.

*Examples of Sophisticated Demand Forecasting Models**

LOADCASTER, www.econsci.com.

ESM, www.econsci.com.

Nostradamus, www.newenergyassoc.com.

Metrix models,
http://www.itron.com/pages/products_category.asp?id=itr_000391.xml&pgtype=Subpg
.

*Examples of Sophisticated Supply Forecasting Models**

Dispatch Models

Proprietary Hourly Power System Evaluation Model (PROSYM), http://www.globalenergy.com/index.asp.

GE MAPS, http://www.gepower.com/prod_serv/products/utility_software/en/downloads/10320.pdf .

PROMOD, http://www1.ventyx.com/analytics/promod.asp .

Capacity Expansion or Planning Models

Integrated Planning Model (IPM®), http://www.icfi.com/markets/energy/doc_files/ipmglobal.pdf .

U.S. DOE's National Energy Modeling System (NEMS), http://www.eia.doe.gov/oiaf/aeo/overview/ .

MARket Allocation (MARKAL) Model, http://www.etsap.org/markal/main.html .

Energy 2020,
http://dnr.wi.gov/environmentprotect/gtfgw/documents/MaTAG20071108.pdf
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*Inclusion of models in the document is for illustrative purposes only and does not constitute endorsement by USEPA.

Appendix A. Summary of State Energy Forecast Models and Data Used in State Energy Plans

State	Title	Year	Baselines and Projections (models used)	Data included	Data sources	Link
Connecticut	State Energy Plan	2007	Forecast Report of Capacity, Energy, Loads and Transmission 2004 – 2013 (NEPOOL)	Supply and demand data for electricity, natural gas, petroleum, renewables.	ISO-NE, NEPOOL, Connecticut Energy Advisory Board, EIA	http://www.ctenergy.org/pdf/2007_Energy_Plan.pdf
Delaware	Bright Ideas for Delaware's Energy Future	2003	BAU forecasts and alternative forecasts (U of Delaware developed modeling)	Energy consumption by sector, electricity consumption by source, electricity prices, fuel use	EIA	http://www.delaware-energy.com/Download/Delaware%20Energy%20Task%20Force%20-%20Full%20Text%20Version.pdf
Florida	Florida Energy Plan	2006	None	Energy consumption and demand by source	EIA, Florida Energy 2020 Study Commission Report	http://www.oe.netl.doe.gov/docs/prepare/florida2006energy_plan.pdf
Georgia	State Energy Strategy	2006	Report calls for the state to establish a reliable baseline. Also calls for energy efficiency, which was analyzed by an outside report using ICF's EEPM and IPM. Also included macroeconomic effects using the Georgia Economic Modeling System (GEMS).	Data on energy supply, energy demand and reliability	EIA, GEFA	http://www.gefa.org/Modules/ShowDocument.aspx?documentid=6
Hawaii	Hawaii State Energy Strategy 2000	2000	Energy 2020, REMI. Used both models separately, and then ran both together to produce estimates of the effects of alternative energy policies on a variety of economic factors, including personal income and Gross State Product.	Energy consumption and demand by source. Fossil fuel import data and renewable potential	EIA, FERC, utilities	http://hawaii.gov/dbedt/info/energy/planning/hes/hes2000.pdf
Illinois	IL Sustainable Energy Plan	2005	None, but outside study analyzes benefits of plan using ILREIM model.	None included	none	http://www.icc.illinois.gov/en/ecenergy.aspx

State	Title	Year	Baselines and Projections (models used)	Data included	Data sources	Link
Indiana	Hoosier Homegrown Energy	2006	None	Lists goals and potential for various technologies. Includes energy price data from EIA	EIA	http://www.in.gov/oed/files/Energy_Strategic_Plan_1-2.pdf
Iowa	Analysis of Energy Supply and Usage in the Iowa Economy	2005	IMPLAN used for energy and economic impacts of energy supplies	Energy Consumption by Source, Volume, Energy Content, and Expenditures	EIA	http://www.iowadnr.com/energy/info/files/economy.pdf
	Iowa Plan for Energy Independence	2007	None	Energy Consumption by Source, Volume, Content, and Expenditures. Renewables	EIA, Iowa DNR	http://www.energy.iowa.gov/OEI/docs/Final_Plan.pdf
Kansas	Kansas Energy Plan	2008	Only 3 of 12 chapters are completed. No model or baseline development yet.	Historical production data, historical consumption data (petroleum products, natural gas, electricity)	EIA	http://kec.kansas.gov/energy_plan/energy_plan_08.pdf
Kentucky	Kentucky's Energy. Opportunities for our Future	2005	None	Coal supply	EIA, KY Environment and Public Protection Department, KY Public Service	http://www.energy.ky.gov/NR/rdonlyres/8E6F3FFE-5DC6-4FC6-9B5A-EA9D2AC89E7A/0/KentuckyEnergyPlan.pdf
Maryland	Maryland Strategic Electricity Plan	2008	No modeling in report. Modeling and projections are a part of recommendations	Electricity generation, consumption	EIA	http://energy.maryland.gov/about/reports/documents/MEASTRATEGICELECTRICITYPLAN.pdf
Michigan	21st Century Electric Energy Plan	2007	Mentions extensive forecasting and modeling were used. Does not detail methods or tools.	electricity and available resource consumption and generation	MISO	http://www.michigan.gov/documents/mpsc/21stcenturyenergyplan_185274_7.pdf
Nevada	2005 Status of Energy in Nevada	2005	Report uses electricity modeling results from PUC, WECC and several individual utilities.	Electricity load forecasts, generation capability, natural gas consumption	Utilities, PUCs, EIA	http://energy.state.nv.us/2005%20Report/2005%20Report.htm

State	Title	Year	Baselines and Projections (models used)	Data included	Data sources	Link
New Hampshire	10 Year State Energy Plan	2003	REMI, Energy 2020- ENERGY 2020 addresses both demand-side and (conventional and renewable-fuel) supply option impacts on financial health, rates, and the customer. REMI offers economic impacts of energy plan options.	Consumption	EIA	http://www.nh.gov/oep/programs/energy/StateEnergyPlan.htm
New Jersey	NJ Energy Master Plan	2007	Rutgers (R/ECON), DAYZER- The modeling included a BAU scenario that assumed no major changes in state policies and actions, as well as an "alternative scenario" reflecting changes outlined. The modeling outlines how each could affect energy use, economic growth, air quality, and greenhouse gas emissions.	Consumption, prices, generation for electricity, petroleum, natural gas and renewables	EIA, Rutgers, PJM, FERC, EPA	http://www.state.nj.us/emp/
New York	Patterns and Trends - New York State Energy Profiles	2006	None, historical data	Consumption data, expenditures and prices. Energy supply	NYSERDA	http://www.nyserda.org/publications/Patterns%20&%20Trends%20Final%20-%20web.pdf
	New York State Energy Plan	2002	NYCA Market Assessment and Portfolio Strategies (MAPS) electricity market model, NEMS, SYSTAT® 9.0, ARIMA (econ)		NYSERDA	http://www.nyserda.org/publications/Strategic%20Plan-web.pdf
North Carolina	NC State Energy Plan	2005	Plan recommends that the state should establish a central repository for energy information. This energy data and policy analysis center should develop baseline information on energy consumption by state and local governmental entities.	Historical production data, historical consumption data (petroleum products, natural gas, coal, renewables, nuclear, and electricity)	EIA	http://www.energync.net/epc/docs/Energy%20Plan%202005.pdf
Oklahoma	Oklahoma's Energy Future	2002	None	Summarizes, oil and natural gas sectors. Coal and electricity and alternative energy potential	Not listed	http://files.harc.edu/Sites/GulfcoastCHP/Publications/OklahomaEnergyFuture2002.pdf

State	Title	Year	Baselines and Projections (models used)	Data included	Data sources	Link
South Carolina	Strategic Energy Action Plan	2007	None	Plan lists all activities the state is undertaking or will undertake		http://www.energy.sc.gov/publications/06-07%20Strategic%20Plan.pdf
Texas	Texas Energy Plan for 2005	2005	None	Provides historical and projected Texas energy consumption, and comparisons of natural gas consumption.	Texas Energy Planning Council	http://www.rrc.state.tx.us/tepc/finalenergyplan.pdf
	Texas Energy Overview	2004	None	Supple, consumption, infrastructure- oil, coal, natural gas, electricity, renewables	EIA, The Texas State Energy Conservation Office	http://www.rrc.state.tx.us/tepc/TexasEnergyOverview.pdf
Utah	State Energy Program Plan		None	Website (no hard copy report) provides consumption, generation and price data for electricity and fossil fuels	EIA	http://www.utah.gov/energy/index.html
Vermont	Vermont Electric Plan	2005	REMI, ISO-NE capacity model, baseline consumption data provided by ISO-NE	electricity supply, consumption and capacity	EIA, ISO-NE	http://publicservice.vermont.gov/pub/state-plans/state-plan-electric2005.pdf
	Comprehensive Energy Plan	1998	None	Outlines the state's present energy situation, projects future energy use, and models and recommends energy policies for the next 20 years.	EIA	http://publicservice.vermont.gov/pub/state-plans-compenergy.html
Virginia	Virginia Energy Plan	2007	VT Center for Energy and Global Environment- Critical Infrastructure Modeling and Assessment Program used to analyze new energy proposals	Energy consumption and demand by source		http://www.governor.virginia.gov/TempContent/2007_VA_Energy_Plan-Full_Document.pdf

State	Title	Year	Baselines and Projections (models used)	Data included	Data sources	Link
Washington	Washington State Energy Indicators	2005	None	contains energy data by source, consumption, generation and price	EIA	http://www.cted.wa.gov/DesktopModules/CTEDPublications/CTEDPublicationsView.aspx?tabID=0&alias=CTED&lang=en&ItemID=2550&MId=863&wversion=Staging
	Biennial Energy Report	2007	None	Presents energy data in trends	EIA	http://www.cted.wa.gov/DesktopModules/CTEDPublications/CTEDPublicationsView.aspx?tabID=0&ItemID=4405&MId=863&wversion=Staging
Wisconsin	Wisconsin Energy Statistics	2007	All data normalized to 1.0 in 1970, an arbitrary baseline to which all other years can be compared. Calculated by WI OEI.	Report presents the most current information available energy supply system and use patterns. 23 years of continuous energy data collection and analysis.	Wisconsin Office of Energy Independence, EIA	http://power.wisconsin.gov/docview.asp?docid=11632&locid=131