

**U.S. Energy Collaborative Analysis Workshop
Summary Baseline Characterization – Attendee Input**

1. Tools and methods for R&D and deployment planning and portfolio analysis.			
	Who	What	How being used or could be useful or associated issues
Current and/or planned analysis activities?	A. DOE-NETL B. CEC C. USDA-USFS D. EPA-ORD E. NREL F. ACEEE	A1. Expert Choice software A2. Aspen Plus software B. The Public Interest Energy Research Program (PIER) Renewables Area C1. Logic model C2. RPA Assessments C3. National models D1. Multi-sector database for use with MARKAL D2. Scenario analysis strategy D3. Assembled a suite of uncertainty analysis tools E. ESE Laboratory Working Group F1. Lexicon of terms (together with initial range of impacts) F2. Heuristic spreadsheet analysis	A1. Analytical hierarchical portfolio decisions A2. Characterize baseline technology B. Roadmaps to direct and prioritize RD&D efforts C1. Management and utilization of wood for bioenergy and biobased products C2. Assess forests and their products in the market, including biomass for energy. C3. Link demographic changes and supply/demand of forest products D1. Environmental impacts of different energy technology pathways. D2. What conditions favor one technology pathway over another? D3. Assess sensitivity of specified market penetration; identify key research, development, and deployment needs E. Deep dive analyses rather than a portfolio wide assessment. Areas might include: solar, storage, biofuels, electric grid issues, carbon sequestration, and/or nuclear F1. Framework to evaluate full benefits and full costs (firms and households beyond normal market transactions) F2. Energy technology choice evolution as benefits and costs are integrated into choice
Improvement to tools & activities?	G. DOE-NETL H. EPA-ORD I. NREL	G. LCA using a common framework and established (shared) data sets G2. Application of stochastic techniques H1. Working to update models H2. Working to develop additional sensitivity analysis tools I1. Current tools (inc. NEMS)	G1. Improve portfolio analysis by providing a consistent way to assess all of the impacts (intended and unintended) of energy RD&D activities G2. Process modeling and financial performance analyses H1. Improve the representation of future energy technologies (costs, efficiencies, etc.) H2. Examine how these assumptions affect results I1. Increase transparencies of data and assumptions to increase usefulness
New tools & activities?	K. DOE-NETL L. EPA-ORD M. NREL N. ACEEE	K. Risk assessment tools (technology, market, and project performance) L. Portfolio analyses M1. Simplified tools M2. Practical potential N. Modeling concepts	K. Inform decision-makers regarding progress made (or potential to) reduce risk in establishing a research portfolio L. Account for 1) behavioral issues associated with the adoption of new technologies (perceived riskiness) 2) effects of synergies and network effects M1. Transparent and can address technical and practical potential on an apples to apples basis. M2. Consider infrastructure issues N. Integrate multi-agent, multi-attribute perspective into modeling

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1. Enhance *tools and methods for R&D and deployment planning and portfolio analysis*. Improve portfolio analysis best practices, including tools for establishing priorities and methods and use of these methods for uncertainty and risk analysis and development of integrated R&D and deployment plans.

Current/planned analysis activities?

- A. Analytical Hierarchy Process applied to portfolio decisions using Expert Choice software tool. Also characterize baseline technology using Aspen Plus. (DOE-NETL)
- B. The Public Interest Energy Research Program (PIER) Renewables Area is developing detailed roadmaps to better direct our RD&D efforts. The roadmaps are based on CA policy directives and will be used to prioritize how our limited resources will be used. (CEC)
- C. Logic model was used to develop an integrated approach to the management and utilization of wood for multiple products and benefits, including bioenergy and biobased products. As part of the process, stakeholder meetings were held in several regions. Forest Service is also mandated by Congress by the Resource Planning Act to do periodic assessments (referred to as the RPA Assessment) of forests and their products in the marketplace, including biomass for energy. National models are used to assess changes in the supply/demand of forest products as correlated with predicted demographical changes. (USDA FS)
- D. We (EPA's Office of Research and Development) have developed a multi-sector database for use with the MARKAL energy systems model to examine the environmental impacts of different energy technology pathways. Our scenario analysis strategy enables us to examine the conditions that favor one technology pathway over another, and we have assembled a suite of uncertainty analysis tools to assess sensitivity to modeling assumptions. This analytical framework also allows us to work backwards and examine the conditions that must be met for a given technology to achieve a specified market penetration, thereby helping identify key research, development, and deployment needs. (EPA-ORD)
- E. NREL will continue to engage in the ESE Laboratory Working Group. LWG recommendation for next year is to do deep dive analyses in several areas, rather than a portfolio wide assessment as was done this year. Areas might include solar, storage, biofuels, electric grid issues, carbon sequestration, and/or nuclear (NREL)
- F. (a) create a lexicon of terms (together with initial range of impacts) that provide a more complete framework for evaluating full benefits and full costs, both within firms and households, and beyond the normal market transactions; (b) provide a heuristic spreadsheet analysis to examine how choices of energy technologies evolved as more of the benefits and costs are integrated into choice patterns. (ACEEE)

Improvement to tools & activities?

- G. More extensive application of LCA using a common framework and established (shared) data sets would improve portfolio analysis by providing a consistent way to assess all of the impacts (intended and unintended) of energy RD&D activities. Application of stochastic techniques to process modeling and financial performance analyses. (DOE-NETL)
- H. We are working to improve the representation of future energy technologies (their costs, efficiencies, etc.) in our model and develop additional sensitivity analysis tools to examine how these assumptions affect results. (EPA-ORD)
- I. Current tools (NEMS), while suitable for benefits projections for GPRA purposes, are inadequate for portfolio analysis because they are not transparent, they are too cumbersome to use, and they don't address some of the major issues that need to be addressed in portfolio analysis. (NREL)
- J. Depends on how information unfolds from the above effort (current and planned activities). (ACEEE)

New tools & activities?

- K. Tools to allow assessment of risk (technology, market, and project performance) and inform decision-makers regarding progress made (or potential to) reduce risk in establishing a research portfolio. (DOE-NETL)

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- L. In addition to technical and economic factors, portfolio analyses need to do a better job of accounting for behavioral issues associated with the adoption of new technologies (such as their perceived riskiness) as well as the effects of synergies and network effects on market penetration. (EPA-ORD)
- M. Simplified tools that are transparent, that can address technical and practical potential on an apples to apples basis. Practical potential needs to consider infrastructure issues. (NREL)
- N. Explore ways to integrate multi-agent, multi-attribute perspective within modeling framework. (ACEEE)

Potential Collaborators

EERE Programs, DOE-OS, DOE-OEDER, DOE-EIA, DOE-NETL, EPA-OAP, EPA-OTAQ, EPA-NCEE, DOD, DHS, USDA, HUD, Ntnl. Labs, Academia, NYSERDA, CEC, NASEO, ECOS, ASERTTI, WGA, NEGC, CESA, MN RE RD&D, EPRI, DOT, DOT-FHWA, Other States

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2. Improve representation of energy technologies and demand response in energy models.			
	Who	What	How being used or could be useful or associated issues
Current and/or planned analysis activities?	A. ORNL B. CEC C. USDA- USFS D. DOE-EERE E. ACEEE	A. Rebound effects in transportation B. PIER Renewables Area created models C. NEMS D1. Biomass supply curve D2. Developing state level data E1. Match several discrete technology characterizations with choice patterns E2. Better document the contribution of energy efficiency	A. Updated assessment B. Calculates LCOE for electricity generation technologies utilizing renewable resources (e.g. wind, geothermal, biomass) C. Provided a review of NEMS for woody biomass supply and costs D1. Updated feedstock data D2. Biomass price-quantity relationships E1. Test impact on firm and household decisions E2. Satisfy future and evolving energy service demands
Improvement to tools & activities?	F. DOE-EERE G. ACEEE	F1. Supply curves F2. Quantify market potential G. Extend information	F1. More accurate representation of corn ethanol F2. Ethanol production from other crops such as sorghum, sugarcane, beets G. Cover a wider range of demand and supply-side technologies
New tools & activities?	H. DOE-EERE	H. Funding considerations	H. Important to note that the next version of NEMS will depend on availability of funding for EIA, which is questionable

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2. Improve *representation of energy technologies and demand response* in energy models, including the next version of NEMS.

Current/planned analysis activities?

- A. Updated assessment of rebound effects in transportation. (ORNL)
- B. The PIER Renewables Area has created models that calculates LCOE for electricity generation technologies utilizing renewable resources (e.g. wind, geothermal, biomass) (CEC)
- C. Forest Service provided a review of the NEMS model for woody biomass supply and costs (USDA FS)
- D. Biomass feedstock supply curve data are being updated. State level data are being developed for biomass price-quantity relationships. (DOE-EERE)
- E. (a) Match several discrete technology characterizations with A1 above to test impact on firm and household decisions; and (b) better document the contribution of energy efficiency to satisfy future and evolving energy service demands. (ACEEE)

Improvements to tools & activities?

- F. Better representation of corn ethanol supply curve is needed. Potential for ethanol production from other crops such as sorghum, sugarcane, beets needs to be quantified. (DOE-EERE)
- G. Extend both topic A and topic D information to cover a wider range of demand and supply-side technologies. (ACEEE)

New tools & activities?

- H. It is important to note that the next version of NEMS will depend on availability of funding for EIA, which is questionable. (DOE-EERE)
- I. Depends on evaluation of items above. (ACEE)

Potential Collaborators

EERE Programs, DOE-EIA, DOE-PI, DOE-OEDER, DOE-NETL, EPA-OAP, EPA-OTAQ, EPA-ORD, EPA-NCEE, USDA, USDA-USFS, USDA-Rural Dev., DOI-BLM, DOI-BIA, DHS, FERC, Ntnl. Labs, Academia, BPA, NYSERDA, CEC, NASEO, NCSL, ECOS, ASERTTI, WGA, NEG, MN RERD&D, EPRI, SSG-WI, DOT-FHWA, DOD, Other States

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3. Impact evaluation tools and best practices to quantify benefits (metrics).			
	Who	What	How being used or could be useful or associated issues
Current and/or planned analysis activities?	A. DOE-NETL B. ORNL C. CEC D. USDA-USFS G. ACEEE	A. NEMS B. Assessment of benefits C. PIER Renewables Activities D1. Several regional models D2. Forest Inventory & Analysis G1. Lexicon of terms (together with initial range of impacts) G2. Heuristic spreadsheet analysis	A. Apply to assessments of economic and environmental benefits B. Oil security benefits of EERE programs C. Funding several projects that could fall in this area D1. Long-term site productivity as a function of biomass removal. D2. National inventory of forest residues available for use as bioenergy G1. Framework to evaluate full benefits and costs (firms and households beyond the normal market transactions) G2. Energy technology choice evolution as benefits and costs are integrated into choice
Improvement to tools & activities?	H. DOE-NETL I. ORNL J. USDA-USFS K. DOE-EERE L. NREL F. NREL	H. Improvements to NEMS I. Oil Security Metrics Model J. Long-term projections for biomass K. New tools are needed. L. Develop process simplification F. Proposed efforts	H. Extend the forecast horizon to 2050, represent all DOE R&D programs, model carbon sequestration sinks and water as resources, include all sources of alternative liquid fuels, updated econometric relationships, better endogenous determinations of oil and gas price, represent unconventional oil and gas resources, include methane hydrates as a resource, represent production and consumption of hydrogen, increased technology detail in the oil and gas module, faster optimization algorithm, and ability to calculate complete set of metrics (e.g., consumer and producer surplus) I. Development, updating and enhancement of the model J. More spatial refinement and improvements in long-term projections of the amount of biomass available for energy use K. NA L. Impact and benefits estimation for both economic and non-economic benefits F. Strengthen portfolio analysis approaches across DOE portfolio. Common foundation of energy data and trend analysis, methodology for benefits estimation and market assessment, forecasts and alternative scenarios, and models and tools
New tools & activities?	N. DOE-NETL O. ORNL P. DOE-EERE Q. NREL	N. Additional tools O. OSMM P. Additional metric of fuel price volatility Q. Metrics for reliability of energy infrastructure	N. Ability to use probability distributions for benefits forecasts. For example, NETL has piloted the use of decision trees with Delphi-technique anchor scales to determine risk-adjusted benefits of the FE Coal and Power Systems Program O. NA P. Global conventional and unconventional transportation fuel resource limitations. Include insights into peak oil Q. Existing metrics are lacking and need to be addressed

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<p>3. <i>Improve impact evaluation tools and best practices to quantify benefits: (a) economic development, (b) energy security, and (c) environmental impacts, including integration of all three.</i></p>
<p>Current/planned analysis activities?</p>
<p>A. NEMS applied to assessments of economic and environmental benefits. (DOE-NETL) B. Assessment of oil security benefits of EERE programs. (ORNL) C. The PIER Renewables Area is currently funding several projects that could fall in this area. (CEC) D. Forest Service has several regional models to evaluate long-term site productivity as a function of biomass removal. Also have a national inventory (Forest Inventory & Analysis) of the forest resources in the U.S. that is used to evaluate the amount of wood available for use as bioenergy. (USDA FS) E. This is important but no activities are currently planned. (DOE-EERE) F. Proposed efforts would strengthen portfolio analysis approaches across the DOE energy portfolio; a common approach would be developed that would rely on a common foundation of energy data and trend analysis, methodology for benefits estimation and market assessment, forecasts and alternative scenarios, and models and tools (NREL) G. (a) create a lexicon of terms (together with initial range of impacts) that provide a more complete framework for evaluating full benefits and full costs, both within firms and households, and beyond the normal market transactions; (b) provide a heuristic spreadsheet analysis to examine how choices of energy technologies evolved as more of the benefits and costs are integrated into choice patterns. (ACEEE)</p>
<p>Improvements to tools & activities?</p>
<p>H. Improvements to NEMS to extend the forecast horizon to 2050, represent all DOE R&D programs, model carbon sequestration sinks and water as resources, include all sources of alternative liquid fuels, updated econometric relationships, better endogenous determinations of oil and gas price, represent unconventional oil and gas resources, include methane hydrates as a resource, represent production and consumption of hydrogen, increased technology detail in the oil and gas module, faster optimization algorithm, and ability to calculate complete set of metrics (e.g., consumer and producer surplus). (DOE-NETL) I. Development, updating and enhancement of the Oil Security Metrics Model. (ORNL) J. Needs more spatial refinement and improvements in long-term projections of the amount of biomass available for energy use. (USDA FS) K. New tools are needed. (DOE-EERE) L. Proposed that a simplified process be developed for impact and benefits estimation that accounts for both economic and non-economic benefits (NREL) M. Depends on how information unfolds from the above effort (current and planned activities). (ACEEE)</p>
<p>New tools & activities?</p>
<p>N. Tools to allow determination of probability distributions for benefits forecasts. For example, NETL has piloted the use of decision trees with Delphi-technique anchor scales to determine risk-adjusted benefits of the FE Coal and Power Systems Program. (DOE-NETL) O. OSMM is a newly developed tool. (ORNL) P. Possible additional metric could be: fuel price volatility. Need analysis to understand global conventional and unconventional transportation fuel resource limitations. This tool needs to be able to provide insights into the issue of peak oil. (DOE-EERE) Q. Broadly acknowledged that metrics for reliability of energy infrastructure are lacking and need to be addressed. (NREL)</p>
<p>Potential Collaborators</p>
<p>EERE Programs, DOE-OEDER, EPA-OAP, EPA-OTAQ, EPA-NCEE, DOI-BIA, DOD, DHS, USDA-Rural Dev., USDA-USFS, HUD, NYSERDA, CEC, EPRI, Ntrl. Labs, Academia</p>

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4. Biofuel resource potential and infrastructure.			
	Who	What	How being used or could be useful or associated issues
Current and/or planned analysis activities?	A. CEC B. USDA-USFS C. DOE-EERE D. NREL	A. The PIER Renewables Area B. The national FIA inventory, FTE, and BioSum C. Four models are available: ELSAS, GREET, MARKAL, and NEMS. D. Lab working group info	A. Planning to undertake activities in this area. (CEC) B. Primary tools of the Forest Service in coordination with the <i>RPA Assessment</i> models to analyze the biofuels resource potential C. Estimates of biomass resource potential – more limited information on infrastructure D. Look at biofuels as a deep dive analysis
Improvement to tools & activities?	E. DOE-EERE	E. Need better understanding	E. Interactions with petroleum markets, infrastructure constraints, vehicle market constraints, risk of building pioneer plants
New tools & activities?	F. DOE-EERE	F. Biomass transition model	F. Being developed that will address some of these issues. This is a huge task and this will be an on-going process

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4. Enhance analysis of and tools for transportation fuel resource potential and infrastructure; initial topic is biofuels.
Current/planned analysis activities?
A. The PIER Renewables Area is planning to undertake activities in this area. (CEC) B. The national FIA inventory, FTE, and BioSum are the primary tools of the Forest Service in coordination with the <i>RPA Assessment</i> models to analyze the biofuels resource potential. USDA FS) C. Four models are available: ELSAS, GREET, MARKAL, and NEMS. (DOE-EERE) D. LWG recommendation to look at biofuels as a deep dive analysis. (NREL)
Improvements to tools & activities?
E. Need better understanding of interactions with petroleum markets, infrastructure constraints, vehicle market constraints, risk of building pioneer plants. (DOE-EERE)
New tools & activities?
F. Biomass transition model is being developed that will address some of these issues. This is a huge task and this will be an on-going process. (DOE-EERE)
Potential Collaborators
EERE Programs, DOE-OS, DOE-OEDER, DOE-EIA, EPA-OAP, EPA-OTAQ, EPA-NCEE, DOD, DHS, DOT-FHSA, DOT-FHWA, USDA, Ntnl. Labs, NYSERDA, CEC, Academia, NASEO, ECOS, ASERTTI, NCSL, NEGC, Biofuel Rich States

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5. Deployment partnerships between industry and state/federal government.			
	Who	What	How being used or could be useful or associated issues
Current and/or planned analysis activities?	A. DOE-NETL B. ORNL C. CEC D. USDA-USFS E. DOE-EERE F. NREL	A. Cooperative agreements B. Market potential C. PIER Renewables Area has established the Wind, Geothermal and Biomass collaboratives D. Agenda 2020, a formal agreement with the forest industry in collaborative research E. Fact sheets, papers and presentations F. Lab working group info	A. Integrate commercialization approach with R&D projects B. Assessment of potential for diesel and hybrid vehicles C. Consisting of stakeholders (including. utilities, industry, universities, national labs and other agencies.) Hoping to form the Solar collaborative this coming fiscal year D. Looks to reduce energy and provide renewable energy from forest resources E. At conferences, outreach and communication activities are on-going F. Acknowledged two critical interfaces: 1) between basic science and applied R&D, and 2) between applied R&D and the commercial marketplace.
Improvement to tools & activities?	None mentioned		
New tools & activities?	H. NREL	H. More robust tools	H. Need robust financial analysis tools from several perspectives: a) commercial entity that will bring it to market b) energy project developer and c) enduser. Beyond LCOE to infrastructure

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5. Improve knowledge of lessons, opportunities, and best practices for tech. commercialization and *deployment partnerships between industry and state/federal government.*

Current/planned analysis activities?

- A. Use integrated commercialization approach with R&D project cooperative agreements. (DOE-NETL)
- B. Assessment of market potential for diesel and hybrid vehicles. (ORNL)
- C. The PIER Renewables Area has established the Wind, Geothermal and Biomass collaboratives consisting of stakeholders (including. utilities, industry, universities, national labs and other agencies. We are hoping to form the Solar collaborative this coming fiscal year. (CEC)
- D. Forest Service has a formal agreement with the forest industry in collaborative research called Agenda 2020 which looks to reduce energy and provide renewable energy from forest resources. (USDA FS)
- E. Fact sheets, papers and presentations at conferences, outreach and communication activities are on-going. (DOE-EERE)
- F. LWG recommendations acknowledged two critical interfaces: 1) between basic science and applied R&D, and 2) between applied R&D and the commercial marketplace. The latter was not addressed by the LWG in the portfolio review. Conceivably, it could be addressed in future portfolio evaluations (but perhaps not by the LWG) (NREL)

Improvements to tools & activities?

- G. Would like to learn from other meeting participants. (DOE-EERE)

New tools & activities?

- H. Current analysis tools are not robust relative to financial analysis from the supplier perspective (i.e., the commercial entities that will adopt new technology and take it to the market in the form of new products or services), the energy project developer perspective, or the user perspective. Analysis that look just at the cost of energy assume that the infrastructure will be there to deliver the energy from the supplier to the end user and don't include this in the cost of energy. (NREL)

Potential Collaborators

EERE Programs, DOE-OS, DOE-OEDER, DOE-EIA, DOE-NETL, EPA-OAP, EPA-OTAQ, EPA-NCEE, DOD, DHS, USDA, HUD, Ntnl. Labs, NYSERDA, CEC, NASEO, ECOS, ASERTTI, Academia, WGA, NEGC, CESA, EPRI, MN RE RD&D, DOT, Other States

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6. Improve models to better represent regional technology characterizations and transmission constraints.			
	Who	What	How being used or could be useful or associated issues
Current and/or planned analysis activities?	A. DOE-NETL B. CEC C. USDA-USFS D. EPA-ORD	A. GEMSET B1. The PIER Renewables Area funded the Strategic Value Analysis project B2. Project with PG &E C1. BioSum was developed by the Forest Service C2. Fuels Treatment Evaluator (FTE) D. In the process of disaggregating EPA's national MARKAL database	A. Assessments of regional power markets B. Systems approach to modeling the CA transmission system including renewable resources and the optimum injection of renewable generation to mitigate transmission constraints to meet CA Renewable Portfolio Standard Goals. B2. Specifically focus on the Northern CA area to model transmission and possible renewable generation C1. Assess the supply potential for site-location and analysis of costs for biomass for energy. C2. Provides an assessment of biomass from forest treatments to reduced overstocked stands D. Improving the model's representation of energy service demand, fuel transportation costs, and technology availability in nine regions. Will not address a rigorous analysis of transmission issues
Improvement to tools & activities?	F. EPA-ORD G. DOE-EERE	F. Improving transmission, energy models G. EIA attempted to develop dynamic models of transmission systems	F. Account for regional differences in resource availability (and transportation costs), demand patterns, and the suitability of specific technologies G. Was not successful and it was never integrated into NEMS
New tools & activities?	H. EPA-ORD I. DOE-EERE	H. Data availability I. Integration with existing static models	H. Below the state level, coverage across the nation is uneven and, when it exists, regional and local energy-related data is rarely available from a readily-identifiable source: a major constraint I. Can be problematic

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6. Improve models to better represent <i>regional technology characterizations</i> ; improve <i>transmission constraint</i> representation.
Current/planned analysis activities?
<p>A. Conduct assessments of regional power markets using GEMSET. (DOE-NETL)</p> <p>B. The PIER Renewables Area funded the Strategic Value Analysis project that applied a systems approach by modeling the CA transmission system, adding the location of the renewable resources and determining the optimum injection of renewable generation to mitigate transmission constraints while still trying to meet CA Renewable Portfolio Standard Goals. We also plan on funding a project with PG &E to specifically focus on the Northern CA area to model transmission and possible renewable generation. (CEC)</p> <p>C. BioSum was developed by the Forest Service to assess the supply potential for site-location and analysis of costs for biomass for energy. Fuels Treatment Evaluator (FTE) provides an assessment of biomass from forest treatments to reduced overstocked stands. (USDA FS)</p> <p>D. We are in the process of disaggregating EPA's national MARKAL database into a nine-region framework, with the goal of improving the model's representation of energy service demand, fuel transportation costs, and technology availability. The regionalized model, however, will lack the resolution needed to conduct a rigorous analysis of transmission issues and we do not have plans to examine this issue. (EPA-ORD)</p> <p>E. This is a huge task, funding is a big issue. (DOE-EERE)</p>
Improvements to tools & activities?
<p>F. In addition to improving transmission, energy models also need to account for regional differences in resource availability (and transportation costs), demand patterns, and the suitability of specific technologies. (EPA-ORD)</p> <p>G. New tools needed. EIA attempted to develop dynamic models of transmission systems but this but was not successful and it was never integrated into NEMS. (DOE-EERE)</p>
New tools & activities?
<p>H. Data availability is often the constraining element in regional energy analyses and modeling activities. Below the state level, coverage across the nation is uneven and, when it exists, regional and local energy-related data is rarely available from a readily-identifiable source. (EPA-ORD)</p> <p>I. Integration with existing static models can be problematic. (DOE-EERE)</p>
Potential Collaborators
EERE Programs, DOE-EIA, DOE-OEDER, DOE-NETL, EPA-OAP, EPA-ORD, EPA-OTAQ, USDA-USFS, DOI- BLM, DOD, DOT, Ntnl. Labs, ECOS, FERC, Academia, WPA, NYSERDA, CEC, NASEO, NCSL, ECOS, ASERTTI, NEG, WGA, MN RE RD&D, EPRI, SSG-WI, Other States

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7. Improve and link policy analysis tools at state and national levels.			
	Who	What	How being used or could be useful or associated issues
Current and/or planned analysis activities?	A. DOE-NETL B. ORNL C. USDA-USFS D. EPA-ORD F. NREL	A. IPM, NARE, AMIGA, EIO-LCA, GEMSET, VENSIM, and domestic and global power generation unit databases B. Ongoing development of HyTrans model C. The <i>RPA Assessment</i> model D. Working to link MARKAL energy system model to a suite of economic, air quality, and (possibly) impact assessment models F. Lab working group scenario analysis recommendations	A. Conduct technology impact assessments B. Assess the transition to hydrogen-powered transportation C. Policy model D. EPA's Global Change Program. Common interface allows non-technical users to structure their own scenarios, run the integrated set of models, and view results. Long-term, we hope to tailor to the needs of specific policy makers at state and regional levels F. Portfolio assessment
Improvement to tools & activities?	G. ORNL H. EPA-ORD I. ACEEE	G1. HyTrans G2. EIA's FERAM model H. Existing tools and analyses I. Tool availability	G1. Also hope to incorporate dynamic assessment of fiscal and regulatory policies to increase light-duty vehicle fuel economy G2. Make it suitable for incorporation in NEMS H. Formal uncertainty analysis, with useful scenarios and a means of communicating sensitivity to modeling assumptions and the robustness to variation in input assumptions and modeling framework I. Look for ways to make tools available to state agencies and others
New tools & activities?	K. ORNL L. EPA-ORD M. DOE-EERE N. ACEEE	K. Dynamic feebates analysis model L. Understand what tools and information all levels of policymakers need M. Global and Brazilian ethanol N. Simplified web-based tools	K. NA L. Will they use these tools? If not, how to communicate the insights from developing and using the tools – nuances difficult to capture in a summary of results? M. Potential for imports as a result of national policies N. Identify policy impacts without being overly data intensive

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7. Develop *improved policy analysis tools* at the state and national levels, including scenario analysis tools; identify ways to link/integrate policy tools at the state and national levels.

Current/planned analysis activities?

- A. Conduct technology impact assessments using IPM, NARE, AMIGA, EIO-LCA, GEMSET, VENSIM, and data bases of domestic and global power generation units. (DOE-NETL)
- B. Ongoing development of HyTrans model to assess the transition to hydrogen-powered transportation. Planned development of model for dynamic assessment of fiscal and regulatory policies to increase light-duty vehicle fuel economy. (ORNL)
- C. The *RPA Assessment* is a policy model. (USDA FS)
- D. As part of EPA's Global Change Program, we are working to link our MARKAL energy system model to a suite of economic, air quality, and (possibly) impact assessment models. A common interface will allow non-technical users to structure their own scenarios, run the integrated set of models, and view results. Long-term, we hope to tailor similar decision support tools to the needs of specific policy makers at state and regional levels. (EPA-ORD)
- E. None currently planned. (DOE-EERE)
- F. LWG has recommended incorporating scenario analysis as part of portfolio assessment. (NREL)

Improvements to tools & activities?

- G. Continued improvement and enhancement of HyTrans. Enhancements to EIA's FERAM model to make it suitable for incorporation in NEMS. (ORNL)
- H. Existing tools and analyses would benefit from a better representation of uncertainty and a means of communicating sensitivity to modeling assumptions. Scenario-based analyses tend to focus on a limited set of assumptions. Formal uncertainty analysis methods seek to identify those model parameters to which results are most sensitive, and therefore provide a basis for constructing useful scenarios. The analytical community also needs to help policy makers understand the misleading nature of results presented without any indication of their robustness to variation in input assumptions and modeling framework. (EPA-ORD)
- I. Need new tools. (DOE-EERE)
- J. Look for ways to make a similar tool available to state agencies and others. (ACEEE)

New tools & activities?

- K. Dynamic feebates analysis model. (ORNL)
- L. The greatest need in this area may simply be a thorough understanding of what specific policy makers at all levels need by way of decision support tools and related analyses. Do they have the inclination to use these tools? If not (as is likely), how can modelers and analysts communicate the insights they gain from developing and using the tools – nuances that are difficult to capture in a summary of results? (EPA-ORD)
- M. Topic of interest would be potential for global and Brazilian ethanol imports as a result of national policies. (DOE-EERE)
- N. Simplified web-based tools that provide satisfying estimates of policy impacts without being overly data intensive. (ACEEE)

Potential Collaborators

EERE Programs, DOE-EIA, DOE-OEDER, DOE-PI, EPA-OAP, EPA-OTAQ, EPA-NCEE, DOT, DOI-BLM, USDA, DHS, DOT-FHWA, Ntnl. Labs, NYSERDA, CEC, NASEO, Academia, NCSL, ASERTTI, NEGCE, WGA, MN RE RD&D, EPRI, Other States

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Additional Suggested Analysis Topics

Additional topics identified by NREL:

- a) Trade offs between electricity and fuels pathways from a life cycle perspective (e.g., putting all transportation fuel options on an apples-to-apples basis that would look not only at the cost of energy, environmental issues, but also the infrastructure implications. That is, which pathways would increase/reduce the reliability of the infrastructure and at what cost
- b) Environmental and security tradeoffs between alternative supply options
- c) If a particular benefit is to be realized in a particular timeframe, what are the critical success factors (e.g., implications for skilled labor force, ability to access the energy resources or ancillary resources (water), availability of infrastructure (manufacturing capacity, transport & delivery capacity, and/or ramp rate and cost to build new, etc).

Additional topics identified by ACEEE

- a) How to develop a more theoretically satisfying characterization of technologies in existing energy-economic policy models. This includes a better understanding of how technologies are chosen in the real world compared to how the models might otherwise anticipate technology choice, and their direct and indirect impacts will affect the economy.
- b) What data needs to be collected to produce future technology assessments, and how that collection might be actually made to happen to ensure credibility and quality control.

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Input Gathered During Decision Maker Interviews		
Tools & Information Sources Utilized	Specific Tools and Information Sources Sited	Type of Organization Utilizing the Tools and Information Sources
Trade Publications/Technical Journals	Public Utilities Fortnightly, Energy and Environment Daily, Green Wire	Industry, Transportation, Governor's Office
Trade Associations	AGA, INGAA	Industry, Transportation, Governor's Office
EERE	EERE News	Industry, Transportation, Governor's Office
IEA		Industry
Regulatory Groups	Regulatory Affairs Group, FERC, USCAR	Transportation
Platts		Transportation, Governor's Office
EIA	Supply and cost data	Governor's Office, USDA, State, Industry
NETL	Coal technologies and carbon sequestration	Governor's Office
National Labs	LBNL, NREL, PNNL, ORNL	Governor's Office, State, Industry, Utilities
State and Regional Energy Offices, Commissions and Councils	Western Electricity Coordinating Council, California Energy Commission, National Energy Commission, NASEO, CESA	Governor's Office, Industry, State
Academic Institutions	IA State	USDA
Consultants/Contractors	Cambridge Energy Research, INFORMA, ACEEE, Navigant, McKenzie, Financial Community	USDA, State, Industry
EPA	EPA's Guide to Action	State
Models/Software	NEMS, WinDS, Homer, H2S, DSTAR, MARELI, STRATEGIST, EPRI, ProSim, IPM	Utilities, Industry, Federal