INTERNATIONAL ENERGY AGENCY

WORKSHOP REPORT 2012

Policies for Energy-Provider-Delivered Energy Efficiency

North American Regional Workshop, 18-19 April 2012

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This workshop report was prepared for the North America PEPDEE Workshop held in April 2012 in Washington, DC. It was drafted by the IEA's Energy Efficiency and Environment Division. This paper reflects the views of the International Energy Agency (IEA) Secretariat, but does not necessarily reflect those of individual IEA member countries. For further information, please contact the Energy Efficiency and Environment Division by emailing Grayson.heffner@iea.org.

INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its primary mandate was – and is – two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply, and provide authoritative research and analysis on ways to ensure reliable, affordable and clean energy for its 28 member countries and beyond. The IEA carries out a comprehensive programme of energy co-operation among its member countries, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports. The Agency's aims include the following objectives:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
- Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
- Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

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The workshop included break-out discussions on PEPDEE policy issues, each of which featured expert speakers, discussion session moderators, and raporteurs. We thank Marc Breslow (Director, Electric Power Division, Massachusetts Department of Public Utilities), Michael Sciortino (Program Analyst, ACEEE), Walter Auburn (Director of Energy Efficiency, Maryland Energy Administration), Mark Zimring (Senior Research Associate, LBNL), Peter Krajsa (CEO, AFC First Financial Corporation), Michael Couick (CEO, Electric Cooperatives of South Carolina), Tyson Slocum (Director, Public Citizen Energy Program), Jack Laverty (DSM Manager, Columbia Gas), Meg Power (Economic Opportunity Studies, Inc.), Dan York (Utilities Program Director, ACEEE), Sue Coakley (Executive Director, Northeast Energy Efficiency Partnership), Margie Harris (Executive Director, Energy Trust of Oregon), Tom Catania (Executive in Residence, Erb Institute, University of Michigan), Anand Gopal (Senior Scientist, LBNL), and Joanna Mauer (Technical Advocacy Coordinator, Appliance Standards Awareness Project) for their expert presentations. We also thank our discussion group moderators and raporteurs, including Katrina Pielli (Senior Policy Advisor, US DOE), Tracy Narel (ENERGY STAR Program, US EPA), Joel Eisenberg (Weatherization Support Programme Manager, ORNL), Rick Morgan (former DC Public Service Commissioner), Christine Egan (Executive Director, CLASP), Steve Nadel (Executive Director, ACEEE), Graham Pugh (Office of International Climate Change Policy, US DOE), Miles Keogh (Director of Grants and Research, NARUC), Ursula Schryver (VP of Education and Customer Programs, APPA), and Christine Salembier (COO, RAP) for their hard work.

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Executive Summary

The United States and Canada account not only for most of the global energy efficiency (EE) spending by energy providers, but much of the global diversity in regulatory mechanisms. There are twenty-nine distinct Energy Efficiency Obligations (EEO) policies in the United States and Canada, along with a wealth of other regulatory mechanisms, including integrated resource planning requirements, system benefit charges, performance incentives, and independent energy efficiency providers. Together these mechanisms mobilized USD 9.1 billion in energy efficiency spending in 2011 (Consortium for Energy Efficiency, 2012). A North America regional policy dialogue held 18-19 April in Washington, DC focused attention on key energy efficiency policy issues facing energy regulators, energy providers and the energy efficiency industry in North America.

The PEPDEE North America workshop was convened by US DOE and delivered by the IEA in partnership with the Regulatory Assistance Project (RAP). The workshop was hosted by the American Gas Association (AGA) and co-sponsored by the American Public Power Association (APPA), Edison Foundation's Institute for Electric Efficiency (IEE), National Association of Regulatory Utility Commissioners (NARUC), and the National Rural Electric Cooperative Association (NRECA). IEA and RAP worked with US DOE and North American networks of energy regulators and energy providers to develop the technical programme and identify speakers and participants.

The workshop had two objectives: (i) share knowledge on global and regional trends in energy efficiency policies for energy providers; and (ii) stimulate dialogue on the key issues and questions facing governments and regulators as they develop and refine energy provider-energy efficiency policies.

The technical programme included 55 speakers, moderators, and raporteurs over two days of plenary sessions and group break-out discussions. More than 110 energy efficiency experts attended. The attendees included 13 regulators, 27 energy providers, 32 government (state and federal) energy officials, 18 energy and consumer NGO staffers, and 23 energy efficiency industry and consultancy experts. All of the presentations may be found in their entirety on the IEA web site (http://www.iea.org/newsroomandevents/workshops/name,26627,en.html) and the RAP website (http://www.raponline.org/event/policies-for-energy-provider-delivery-of-energy-_1).

The policy dialogue underscored several emerging trends in North America. More and more energy providers, including gas and electricity distributors, regional network and system operators, and even generators, now include energy efficiency in resource planning. Over the past decade energy efficiency has been accepted as a legitimate resource option. This mainstream acceptance has been led by a few key states and regions (*e.g.* California, New York, Ontario, the Pacific Northwest, and New England) and supported by institutional arrangements such as the Northwest Power Planning Council, the National Action Plan for Energy Efficiency, and the State Energy Efficiency Action (SEE Action) Network.

Resource plans consistently find energy efficiency to be both the lowest cost and lowest risk resource option. However, a countervailing trend which may affect the economics of energy efficiency is reductions in the price of natural gas. Since natural gas is increasingly used both as a direct source of energy and as a fuel for power generation, low gas prices affect the viability of energy efficiency both as an energy cost savings option and as a resource option. Regulators and policy makers need to make programme decisions now that anticipate natural gas price projections.

There is much for energy providers, regulators and the energy efficiency industry to learn about

best practices for delivering energy efficiency programs to consumers, including the optimal role that energy providers can play in the delivery process. Overall, the industry needs simpler approaches for measurement and valuation of energy savings, and program designs that are more attractive, more affordable, and more understandable for consumers. Programs targeted to specific market segments, and larger-sized customers in the commercial and industrial sectors, remain among the most cost effective energy efficiency strategies. Implementing simple and cost-effective energy provider-led programmes for reaching mass markets has moved forward in some regions, but there is room for more progress overall. Energy providers can also play an important role in furthering codes and standards and other market transformation efforts.

Introducing new technologies is a high value-added element of energy provider-led energy efficiency programs. For example, the transformation of business practices made possible by Information Technology (IT) has not spread fully to the energy efficiency industry. There are promising IT products and services, notably advanced metering infrastructure, which might improve the efficacy of some energy efficiency programmes. Energy providers are uniquely capable of leading the development of new technologies, tools, and techniques and finding applications that enhance energy efficiency programmes and implementation strategies.

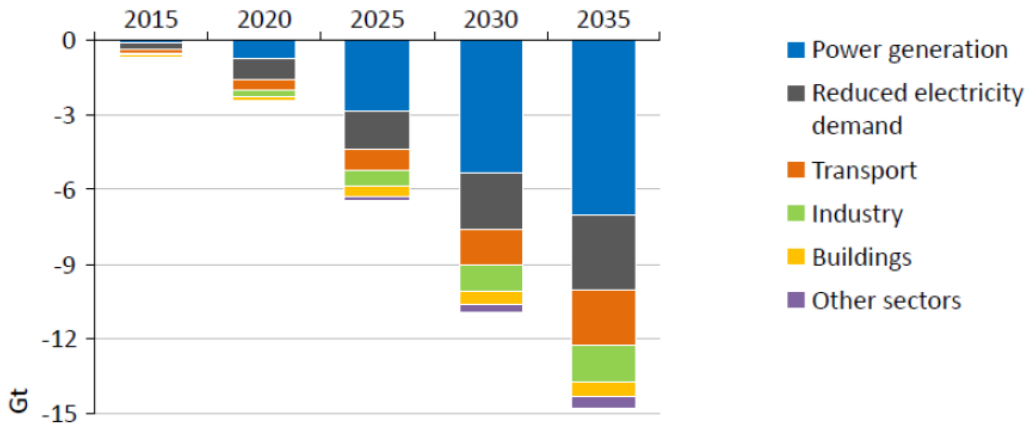
While energy policy priorities may change, energy efficiency will remain attractive to governments and consumers under a range of growth and price scenarios. If sustainable development or energy security is the policy driver, energy efficiency becomes attractive because less energy consumption translates into lower local and global environmental impacts and less need to import energy from abroad. When economic growth is the policy driver, energy efficiency becomes attractive because it results in lower energy bills together with jobs creation. Energy efficiency continues to be a “no regrets” energy resource and an effective alternative for managing risk given an uncertain future.

International PEPDEE Developments

Ambassador Richard H. Jones, Deputy Executive Director of the IEA, described the key role energy providers will play in improving not only power generation and delivery efficiency but customer end-use efficiency as well. According to the 2011 World Energy Outlook, the power sector will account for two-thirds of cumulative emissions abatement to 2035, through switching to less carbon-intensive generation, more efficient plant operations, and lower electricity demand (IEA, 2011a). Reducing electricity end-use demand alone accounts for one-third of reduced GHG emissions over the next ten years in the IEA's 450 ppm scenario (Figure 1).

Governments and regulators turn to energy providers to deliver energy efficiency for many reasons. Energy providers are well-positioned to deliver energy savings, given their role in energy markets, access to capital, ready-made commercial relationships with end users, and familiar brand names. Energy providers have a ready-made delivery structure including offices and staff in their service territories. Perhaps most important for governments, spending on energy efficiency by energy providers is an alternative to public spending. The IEA is supporting development of energy efficiency policies directed towards energy providers, through its 25 Energy Efficiency Policy Recommendations and through a new work programme on policies for energy provider-delivered energy efficiency (IEA, 2011b). RAP has also been working with regulators and other stakeholders in North America to promote sustainable energy efficiency policies and practices.

Figure 1: World energy-related CO_2 abatement by sector in the 450 ppm scenario[1]



Source: Jones, 2012

Energy efficiency obligations (EEO) are the most common policy for energy provider-delivered energy efficiency, with over 30 programmes around the world. The IEA and RAP estimate that in 2011 over EUR 8 billion in energy efficiency was funded by or through energy providers. Much of this spending stems from national and state/provincial efforts in Europe and North America.

[1] The vast majority of material contained in this report reflects presentations delivered and discussions held during the 18-19 North America regional PEPDEE policy dialogue held in Washington, DC. Relevant presenters are named at the start of such material and all presentations are available on the IEA web site at http://www.iea.org/newsroomandevents/workshops/name,26627,en.html. Standard in-text citations are given for any content not generated by the IEA.

Europe

Eoin Lees of RAP-Europe described the discussions within the European Union (EU) regarding the role of energy suppliers in meeting the EU's 20/20 target.[2] A growing number of EU member states have introduced EEOs in recent years (Table 1). Major programmes include the UK Carbon Emissions Reduction Target (CERT), the Italian and French White Certificates Programmes, and smaller programmes in Belgium and Denmark. Taken together these programmes accounted for almost EUR 2.5 billion in 2011 energy efficiency spending.

Table 1. Energy efficiency obligations in the European Union

Country	Obligated Energy Provider	Eligible Customers	Administrator	Savings Target	Targeted Amount	Annual total spend (EUR M)
Belgium-Flanders	Networked Distributors	Residential and non-energy intensive business	Government	1st year primary energy	0.6 TWh	60
France	Retailers of non-transport energy + transport fuel importers	All except entities covered under the EU ETS	Government	Lifetime delivered energy	345 TWh over 3 years to end-2013	340
Italy	Networked Distributors	All	Regulator	5 year Cumulative primary energy	5.3 MTOE	530
UK	Retailers	Residential	Regulator	Lifetime CO_2	293 $MtCO_2$ to end-2012	1,440
Denmark	All energy distributors except transport	All except transport	Government	1st year delivered energy	6.1 PJ	100

Source: Lees, 2012

EEO designs have some common elements but many differences reflective of country conditions and policy priorities. All of the programmes shown in Table 1 obligate downstream energy providers, either retailers or distributors. Only the UK programme is restricted to just households, but in practice most of the savings in all of the programmes have come from the residential sector. Third party energy efficiency providers play important roles in all of the programmes, via bilateral contracts between obligated providers and delivery partners, or via Energy Services Companies (ESCOs) creating tradable energy savings certificates. Other distinguishing details include how the energy savings targets are defined, which sectors are eligible to provide energy savings, how costs are recovered, what efficiency measures are allowed, and measurement and verification protocols.

Despite diverse approaches, all of the EU EEO programmes have been successful. France, the United Kingdom, and Italy have gradually increased energy savings targets over time. This may

[2] In 2008 the European Commission agreed an energy savings target for 2020 of 20 percent savings compared with 2008 primary energy consumption. There are also targets for renewable energy and carbon emissions reductions.

explain why the European Commission in 2011 proposed a new EU-wide directive requiring all EU member states to obligate energy providers to meet energy savings targets.

Australia

Margaret Sniffin of the New South Wales (NSW) Independent Pricing and Regulatory Tribunal (IPART) described energy provider obligations in Australia (Table 2). New South Wales, Victoria, South Australia, and the Australian Capital Territory have all adopted or proposed energy provider obligations; New South Wales and Victoria supplement their obligations policy with markets.[3] These programmes are delivering energy efficiency at a market price of AUD 31/$tCO_{2\text{-eq}}$ (USD .032 US cents/kWh).[4] Both Victoria and New South Wales plan to increase their annual energy savings targets, and the Australian Commonwealth Government is considering a national energy provider obligation which would harmonize the existing state programmes and address operational concerns, such as high administrative overhead (now over 5% of energy savings costs), and the need to find additional energy savings measures for households and businesses.

Table 2. Australian energy efficiency programmes

ESS (NSW)	VEET (VIC)	EEI (ACT - proposed)	REES (SA)
Currency = Energy Savings Certificate (ESCs)	Currency = Efficiency Certificates (VEECs)	Not yet defined but likely to be non certificate based	Not a trading Scheme. Energy retailers must provide energy audits & EE activities
1 ESC = 1 tonne CO_2e	1 VEET = 1 tonne CO_2e	Not yet defined	Measured in CO_2e
Population NSW = 7,303,700	Population Vic = 5,624,100	Population ACT = 365,400	Population SA = 1,657,000
Started 1 July 2009 2012 Target ~ 2.4 Million ESCs Calendar year based	Started 1 Jan 2009. Target in 1st 3 yrs = 2.7 Million tonnes pa 2012 -15 Target - 5.4 Million VEECs pa Calendar year based	Targets will be defined each year, but not due to commence until 1 January 2013	Started 2009 2012 Target = 255,000 tonne CO_2e
Operate until 2020 or replaced by a national scheme	Operate in 3 year phases until 2029	3 Year phases subject to review, operate until 2015 or replaced by a national scheme	6 year Scheme, operated in 3 year phases until 2014
Majority of activities in business sector, some residential and industrial activities	Was focused on residential sector activities solely, but recently expanded into business sector	Residential and small and medium-sized enterprise sector – priority for low income hsehlds	Focused solely on residential sector
Only electricity based energy savings are eligible	Both electricity and gas savings are eligible	Both electricity and gas savings are eligible	All household energy consumption eligible
Liable Parties: All Electricity Retailers, Generators & NEM Market Customers (33 Mandatory Participants). Obligation enforced through license conditions. Liability = % share of liable electricity sales.	Liable Parties: Only large energy retailers serving 5,000 or more customers (approximately 12 of 22 in VIC Mandatory Participants). Must surrender VEECs equal to liability. Obligation set out in Regulation.	Liable Parties: Tier 1 (at least 500GWh annual sales – only 1 in ACT) or Tier 2 (less than 500GWh annual sales Mandatory Participants)	Liable Parties: Only large energy retailers serving 5,000 or more customers (7 Mandatory Participants). Obligation set out in Regulation
Calculation methods flexible to accommodate several different activity types	11 categories of prescribed activity types	Includes both project-based flexible energy savings activities and predetermined list of prescribed eligible activities	Flexible activities available to all SA households and energy auditing made available for low income households

Source: Sniffin, 2012

The individual state programmes are enabled by legislation, and set increasing targets for obligated suppliers in each year. In NSW the annual energy savings target was set at 0.5% of liable final electricity sales at inception in 2009 and increases by 1% steps each year to a ceiling of 5% in 2014, where it will remain until expiration in 2020. Obligated parties may carry over 10 percent of their annual target to a subsequent year; any additional shortfall results in a penalty of AUD 34/ $tCO_{2\text{-eq}}$. With Australian electricity sales already lower than previous years, these energy

[3] The NSW programme is called the Energy Savings Scheme. The Victoria programme is called the Victoria Energy Efficiency Target. The Australian Capital Territory programme is the proposed Energy Efficiency Improvement Act. The South Australia programme is called the Residential Energy Efficiency Scheme.

[4] The unit for trading is an Energy Savings Certificate (ESC), equal to 1.06 $tCO_{2\text{-eq}}$ or 1 MWh of electricity

savings targets may result in a significant reduction in NSW electricity demand.

Only accredited parties can engage in energy savings activities that produce tradable certificates, or Energy Savings Certificates (ESCs). Accredited parties can be obligated entities, asset owners or third parties nominated by asset owners. An ESC once registered can be sold, via a registry that ensures an ESC has only one owner at a time. The registry also ensures that an ESC surrendered by an obligated party as part of their energy saving target is stricken from the registry. IPART estimates the average cost for each ESC created was AUD 15 compared with avoided energy costs of AUD 40, yielding a net societal benefit of AUD 25 per ESC.

With trading comes additional complexity, as ESCs must be measured and verified and their ownership tracked until they are surrendered (Figure 2). A key metric for performance of accredited parties is ESC forfeitures, *e.g.* energy savings activities that were recognized and registered but did not produce savings as expected. The NSW ESC scheme has enjoyed low forfeiture rates due to a risk management scheme that focuses attention on lumpier projects and projects undertaken by newly accredited parties.

Figure 2. The life cycle of an Energy Savings Certificate

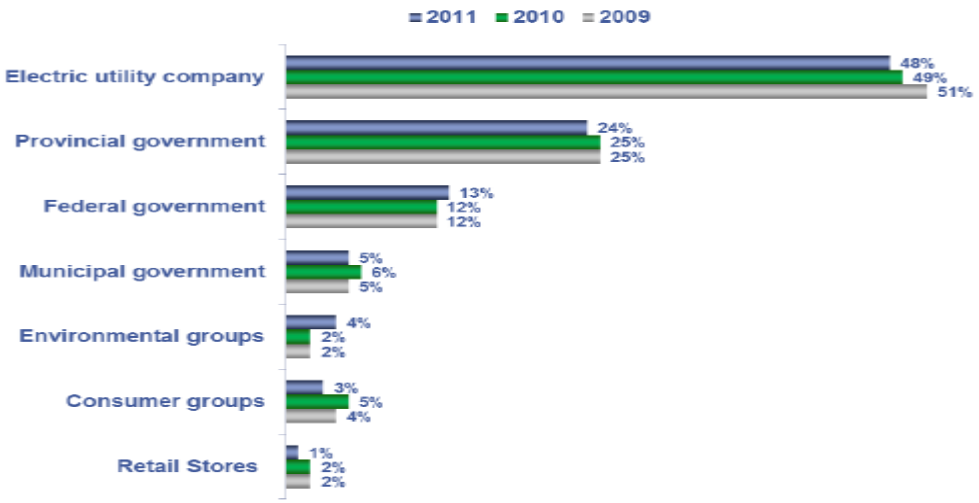
Source: Sniffin, 2012

Canada

Canadian energy efficiency programs are delivered by energy providers (*e.g.* BC Hydro), by arms-length government agency (*e.g.* Efficiency Nova Scotia), by not-for-profit agencies established by provincial legislation (*e.g.* Alberta's Climate Change Central), or by not-for-profit private corporations (*e.g.* Ontario Power Authority). Francis Bradley of the Canadian Electricity Association (CEA) described the results of energy provider-delivered energy efficiency over the past twenty years – CAD 3 billion in investment and sufficient energy savings to supply 3 million homes. The CEA and CGA (Canadian Gas Association) are developing cross-fuel partnerships in order to facilitate joint branding and marketing to gas and electricity consumers. The strength of energy provider-delivered energy efficiency in Canada has led consumers to regard energy

providers as the preferred channel for delivering energy efficiency (Figure 3).

Figure 3. Survey response: what is the ideal channel for energy efficiency delivery?



Source: Bradley, 2012

Mexico

Laura Rojas Sanchez of the Inter-American Development Bank (IDB) described the importance of energy efficiency to economic development in the Latin America and Caribbean (LAC) region, as well as IDB's efforts to support development and implementation of the Mexican National Commission for the Efficient Use of Energy's (CONUEE) National Program for the Sustainable Use of Energy (PRONASE). A recent IDB study estimated that 10 percent (143,000 GWh) of electricity consumption in the region could be displaced by energy efficiency over the next decade, producing savings of $50 billion in new energy infrastructure investment against a cost of $17 billion.

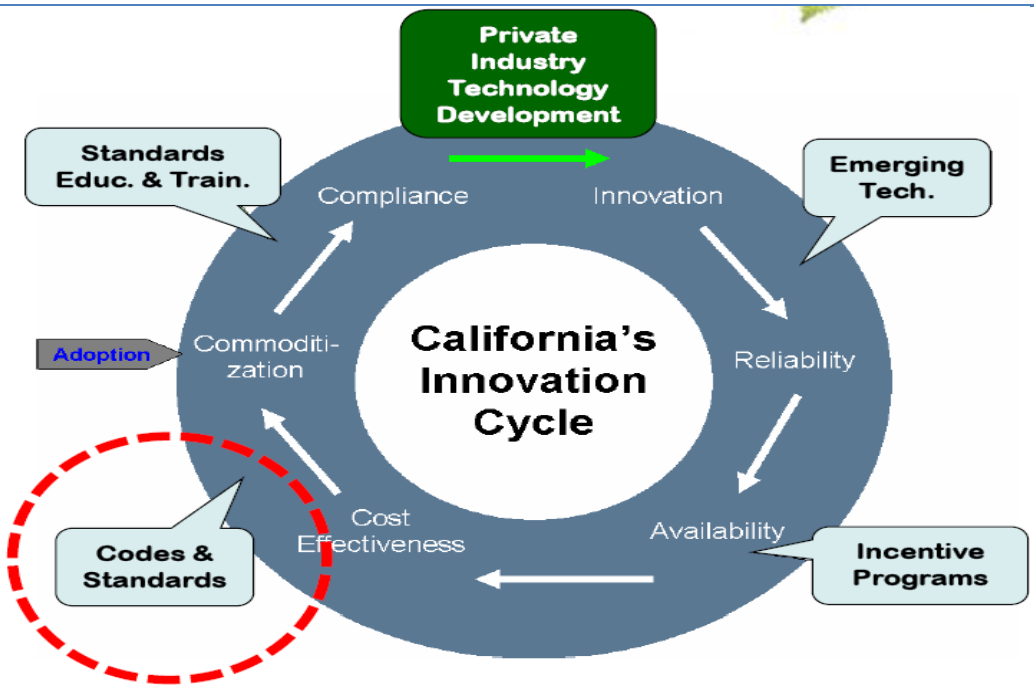
North American PEPDEE Developments

Deputy Assistant Secretary Rick Duke described US progress on energy provider-delivered energy efficiency. A milestone was recently reached in preventing lower volumetric sales from affecting the revenues of energy providers (*e.g.* decoupling). Two-thirds of US gas utilities are now protected from revenue losses due to energy efficiency implementation, thus removing disincentives for energy providers to deliver energy efficiency. US experience shows that utilities are particularly effective in coordinating their efforts with state and local agencies, making it possible for ratepayers, state budgets, and federal block grants to co-fund energy efficiency.

Ruth Kiselewich presented Baltimore Gas and Electric (BGE) progress in supporting construction of energy efficient new homes. Energy Star-branded new homes have a 40% share of the new homes market as a result of BGE's energy efficient home incentives and its network of trade allies. BGE maintains and supports an extensive network of trade allies through vehicles such as outreach, technical training, an online directory of participating contractors, and efforts to engage throughout the energy efficient product value chain (*e.g.* distributors and manufacturers). The trade ally network leverages BGE's influence with its customers and with appliance retailers, helping to increase consumer awareness, maintain programme credibility by quickly resolving problems, and avoiding the cost of building its own sales force.

Gene Rodrigues of Southern California Edison (SCE) described how energy providers in California support a broad range of energy efficiency policies, including building codes, energy performance standards for appliances, and federal programmes (Figure 1). This involvement is important because 80% of future energy savings will come from building codes and appliance standards. Energy provider involvement in codes and standards policies includes advocacy, compliance enhancement, and participation in "reach codes" such as the near-zero energy buildings and super-efficient appliances, all within the framework of continuous market transformation.

Figure 4. **California's energy efficiency innovation cycle**



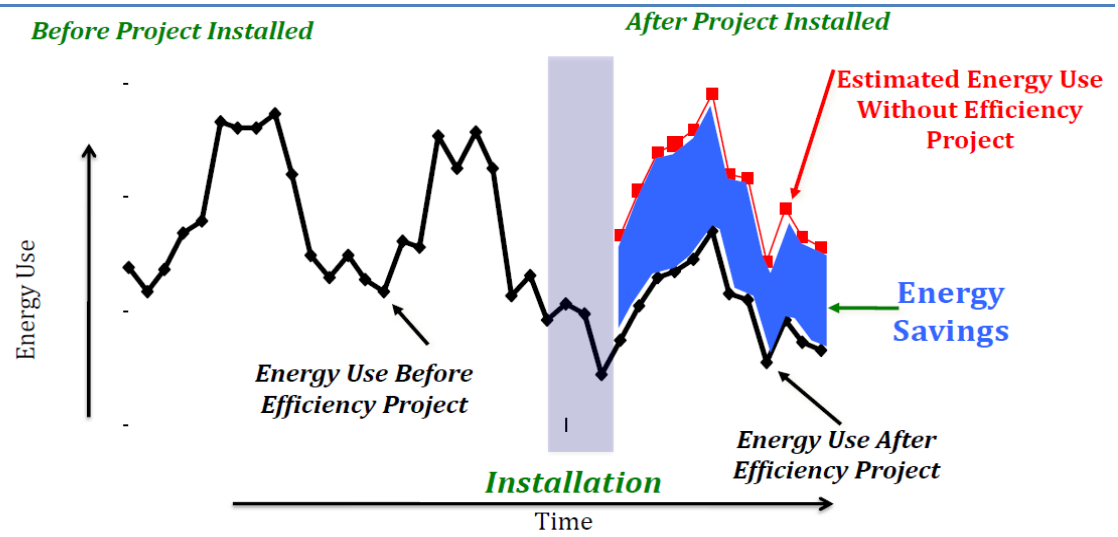
Source: Rodrigues, 2012

"Reach codes" are voluntary standards that go beyond the minimum requirements of buildings codes. "Reach codes" are a key strategy in attaining California's long-term goal of Zero Net Energy Buildings (California Public Utilities Commission, 2008). SCE is providing technical assistance to help local governments to adopt "reach codes".

Commissioner Phyllis Reha of the Minnesota Public Utilities Commission (PUC) described the work of the State and Local Energy Efficiency Action Network (SEE Action). SEE Action is a state- and local-led effort facilitated by the U.S. DOE and the U.S. Environmental Protection Agency (EPA) with the objective of achieving all cost-effective energy efficiency by 2020 (US EPA, 2008). SEE Action is composed of more than 200 leaders from state and local governments, associations, businesses, non-government organizations, and their partners working toward a goal of achieving all cost-effective energy efficiency by 2020. One of the SEE Action initiatives focuses on driving ratepayer-funded efficiency through regulatory policies (US DOE, 2012a).

Steven Schiller of Schiller Consulting, Inc. described progress in measurement and verification (M&V) of energy efficiency. Evaluation is fundamental to every step of energy efficiency policy and programme development. It is used to quantify the outcomes of policies and programmes, to understand why desired outcomes did or did not occur, and to provide feedback for programme improvement. Evaluation takes on even more importance in a resource planning context, as energy efficiency must meet a strict standard when substituting for supply. Evaluating energy efficiency is complicated because energy savings can never be directly and physically measured but rather only estimated within a certain confidence interval (Figure 5). The challenge in evaluating energy efficiency lies in determining how good an estimate is good enough. Developing an evaluation scheme requires finding a balance between degree of complexity (and cost) of the estimation approach and the risk associated with an incorrect estimate. Over three decades evaluators have worked to get the complexity-confidence balance right, and have developed innovative approaches including Top-Down Evaluations and Stipulated Savings.

Figure 5. Savings cannot be measured – only estimated



Source: Schiller, 2012

Evaluators continue to face new challenges and develop new methods even while documenting the successful approaches developed in the past decade. New US DOE/US EPA initiatives being taken forward under the SEE Action Network include the Uniform Methods Project, the Data

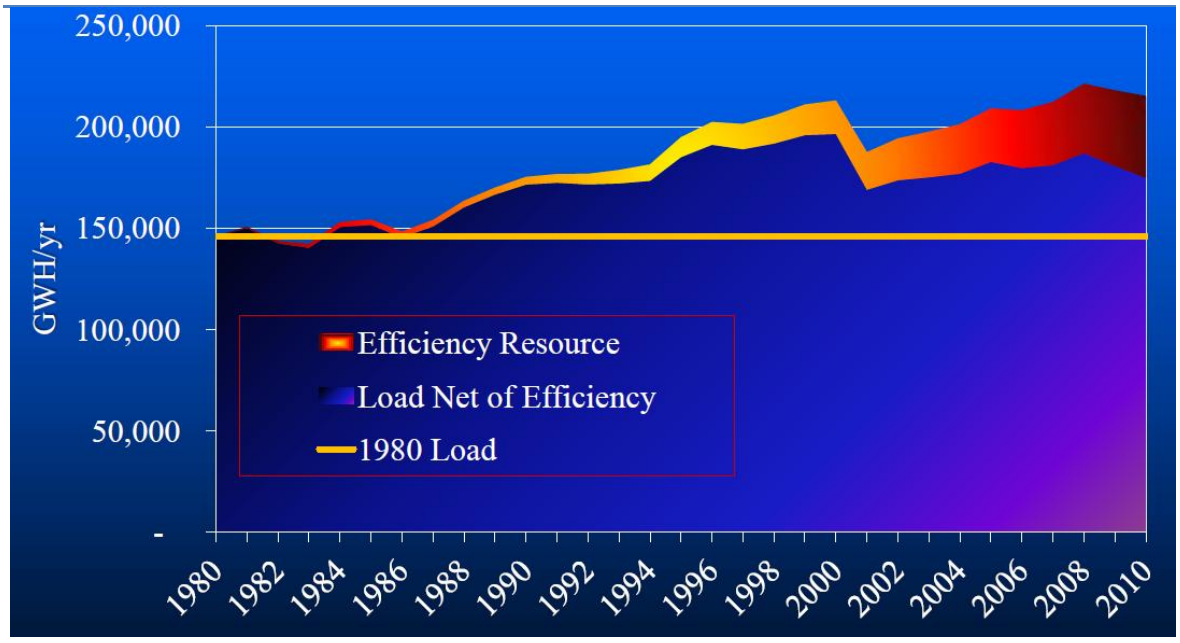
Warehouse Project, the Model Impact Evaluation Guide, and new projects focused on evaluating behaviour programmes and non-energy benefits (US DOE, 2012a).

Making the case for energy efficiency

The growth of energy-provider-delivered energy efficiency has revealed additional benefits beyond energy savings. The PEPDEE North America workshop included a session on these benefits, including resource adequacy, network investment deferral, reduced wholesale market prices, and resource portfolio risk mitigation.

Tom Eckman of the Northwest Power and Conservation Council (NPCC) presented experience from three decades of integrated regional resource planning (IRP) in the Pacific Northwest. The Pacific Northwest has realized 40,000 GWh of annual energy savings since integrated planning began in 1980 (Figure 6). Fully one-third of today's regional resource stack is comprised of energy efficiency, with loads stable or decreasing in the region due in large part to energy efficiency programmes. The role of energy efficiency will increase, as new programmes will replace two coal-fired power plants scheduled to retire in 2020. The rational for scaling-up energy efficiency as a resource in the Pacific NW is three-fold: (i) at an average cost of USD .024 cents/kWh, it is the least-cost resource; (ii) it provides a hedge against energy price volatility; and (iii) it is the least-risk resource, as energy efficiency provides option value by delaying the decision to build new generation.

Figure 6. Long-term contributions of energy efficiency to Pacific Northwest Power Plans



Source: Eckman, 2012

Rebecca Craft described Consolidated Edison's efforts to integrate energy efficiency and demand response into distribution network infrastructure planning. Con Edison has developed new planning and business models to capture the value of demand-side resources in deferring network additions (Figure 7). Deferring network projects has particular value in Con Edison's service territory because of the high cost of building in New York City. Integrating demand-side resources into network planning offers both a hedge against demand growth that is less than forecasted as well as improved option value, as it becomes possible to defer projects until they are really needed without introducing undue risk from weather-related demand spikes and

overloads and this in turn can mitigate bill increases over the long run. The planning and business models include creating load duration curves for each network, identifying the localized impacts of demand-side investments, and occasional targeting of programmes to defer the addition of specific assets. Transmission and distribution network forecasts include the impacts of demand response and energy efficiency, and Con Edison's planning guidelines call for planners to first consider leveraging demand side resources before considering capacity additions.

Figure 7. Integrating demand-side management into network planning at Con Edison

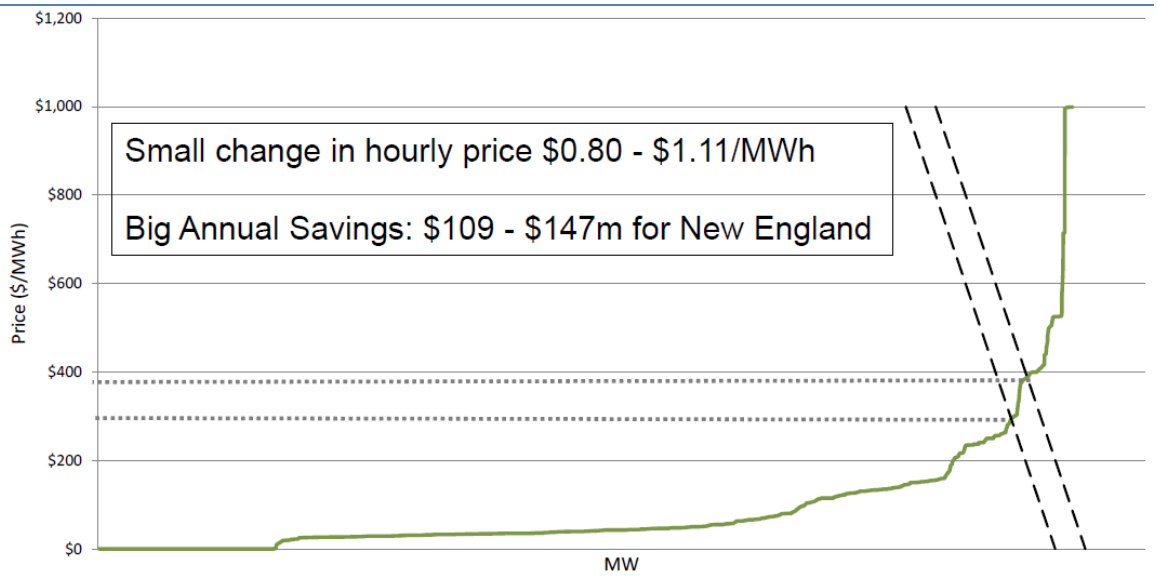
Generic 10-Year Load Relief Program Example

(all values in MW)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	RELIEF WORK
Area Substation											2016 - Load relief project in increase station capability
Network Load	224	226	228	231	235	238	240	243	246	249	*Load includes DG and DR forecasted reductions*
Less DSM	-1	-2	-2	-3	-4	-4	-4	-5	-5	-5	*Less DSM = energy efficiency programs*
Net Load	223	224	226	228	231	234	236	238	241	244	
Station Capability	228				245						

Source: Croft, 2012

Doug Hurley of Synapse Economics described the market benefits of energy efficiency, which are usually not included in cost-effectiveness evaluations. In New England, market benefits come from several sources - ISO New England's Forward Capacity Market (FCM), ISO New England's spot and day-ahead energy markets, and bilateral procurement through power contracts. In 2010 the total demand reduction-induced price effects (DRIPE) of energy efficiency was estimated at USD 110-150 million (Figure 8). This figure was based on small changes in hourly price (USD 0.80 - 1.11/MWh) spread across a very large volume of energy transacted in the market. These DRIPE benefits are roughly comparable to the direct energy savings benefits enjoyed by energy efficiency programme participants, but spread across all New England retail customers.

Figure 8. Estimating the impact of energy efficiency on wholesale market prices



Source: Hurley, 2012

Rich Sedano of RAP described a new study, developed in conjunction with CERES, entitled Practicing Risk Aware Electric Utility Regulation – What Every State Regulator Needs to Know (CERES, 2012). The report describes why regulators should pay special attention to both the cost and risk differentials between demand-side resources such as energy efficiency and supply-side

resources. An analysis of the major resource alternatives suggests that energy efficiency scores best on both cost and risk parameters (Figure 9). Despite the attractiveness of demand-side investments in reducing risk, there is a danger that institutional and regulatory bias (*e.g.* information asymmetry and the Averch-Johnson Effect) may skew regulatory decisions towards supply vs. demand side options. Risk-aware strategies that regulators can adopt include diversifying utility resource options, establishing robust planning processes, employing transparent ratemaking practices, requiring financial and physical hedges, and holding utilities accountable for outcomes.

Figure 9. Relative cost and risk of utility generation resources in 2015

Source: Sedano, 2012

PEPDEE Policy Dialogues

The PEPDEE North America workshop provided opportunities for dialogue on policies for energy-provider-delivered energy efficiency via a plenary stakeholder panel session and parallel half-day policy dialogues focused on specific PEPDEE issues.

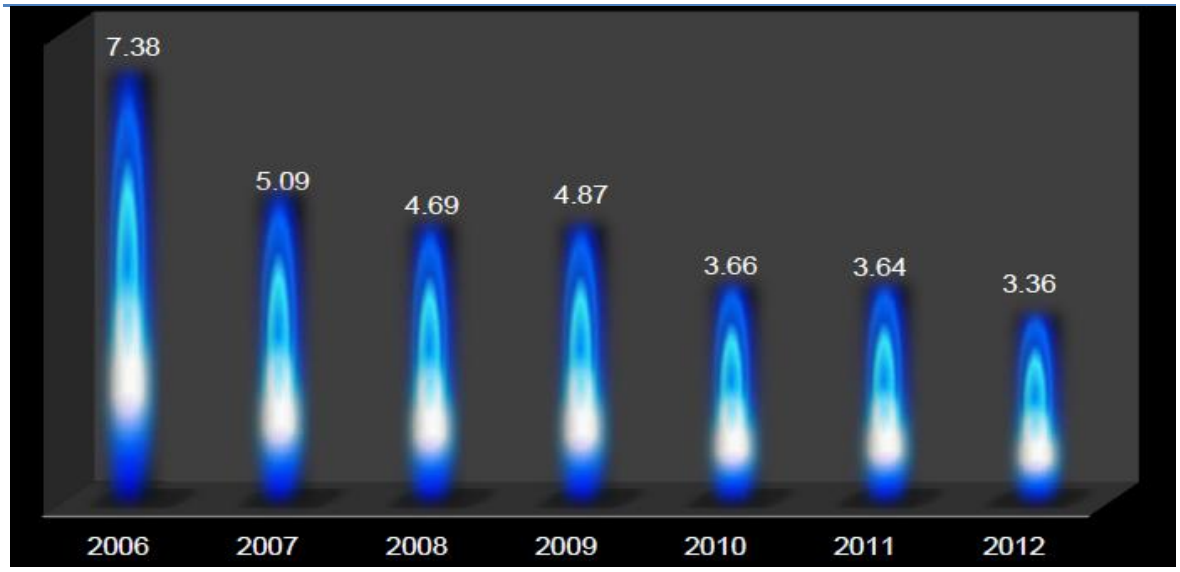
Stakeholder panel session on PEPDEE in the post-ARRA era

A plenary session empanelled representatives from the electricity, gas, and energy efficiency industries together with the regulatory, consumer advocates, and environmental communities.

The US energy efficiency industry benefitted greatly from the American Recovery and Reinvestment Act (ARRA). As stimulus funding winds down, these gains in energy efficiency capacity may be lost. The stakeholder panellists were asked to present their views on the role that energy providers can play in filling the gap created by the wind-down of stimulus spending.

Timothy Melloch of Commonwealth Edison summarized the opportunities and risks faced by energy providers today. Although technology advances, changing consumer mindsets, and new financing options have created new energy savings opportunities, there are countervailing trends as well – low gas prices, flagging consumer interest, and unknown and often volatile statehouse politics. Steve Bateson of Questar Gas (Utah) described their efforts to keep the momentum going in the face of declining federal spending. Total federal spending on the Weatherization Assistance Program (WAP) in Utah jumped from USD 5 million in 2007 to USD 25 million in 2010, only to return to USD 5 million for 2012 and beyond. To fill this gap Questar Gas has added new measures, scaled up low-income weatherization spending, and increased promotion of super-efficient furnaces. However, maintaining this momentum is difficult given the falling price of natural gas (Figure 10) and the expiration of tax credits for high-efficiency appliances.

Figure 10. Natural gas price trend in North America (USD/mmBTU)



Source: Bateson, 2012

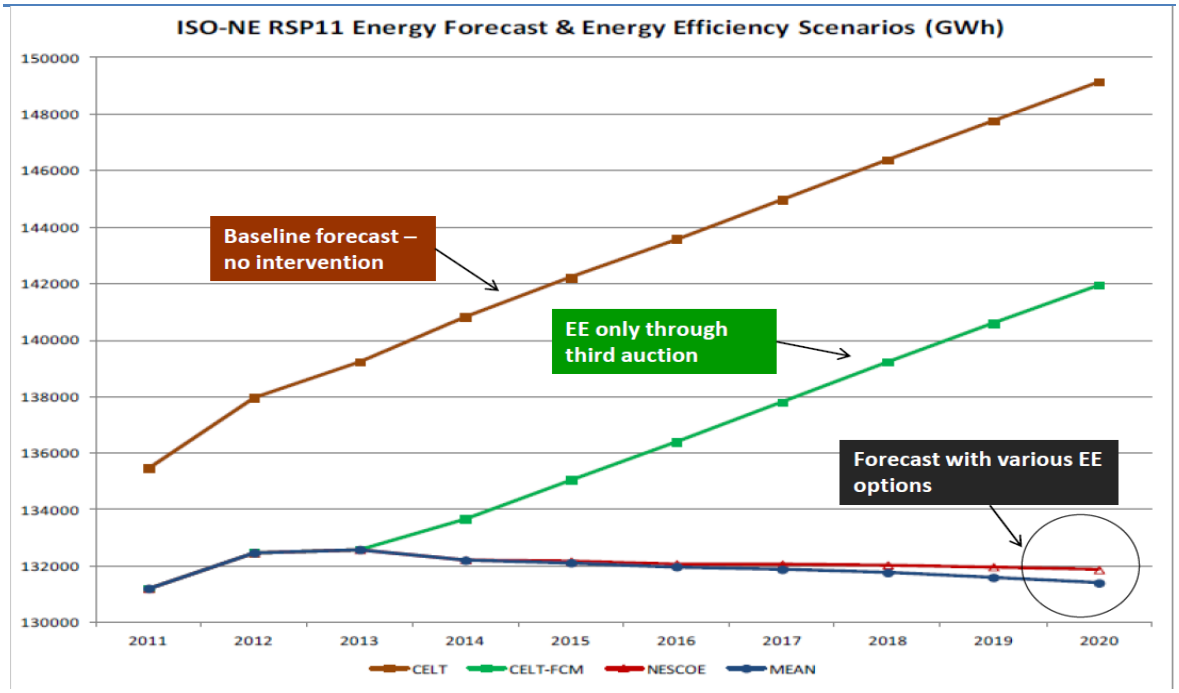
Commissioner Greg White of the Michigan Public Service Commission described regulatory policy challenges in the post-ARRA era. Regulators are facing politically volatile legislatures, hostile judiciaries, and historically-low gas prices. Governments need to look beyond today's price

volatility and consider the long-run benefits of energy efficiency improvements. Increased efforts to educate civil society are also needed to justify the need to continue energy efficiency policies.

Paula Carmody, Maryland People's Counsel, described the many challenges facing the energy efficiency community - no clear national energy policies, reduced federal funding, expiring tax credits, declining energy prices, and a slow economic recovery. The availability of ARRA funding for 3 years was a good thing as it jump-started a lot of activity; however, volatile funding levels create a "start-stop" approach that threatens the long-run effectiveness of programmes. Fortunately the energy efficiency community and industry is in a better position than a decade ago to maintain and enhance demand-side programmes. In Maryland and many other states there is new legislation on energy savings targets and efficiency regulations, plus scaled-up utility provided programmes and improved alliances with customer and community-based entities.

Steve Cowell, CEO of Conservation Services Group, described the importance of policies in unlocking energy efficiency potential. Policies such as decoupling, reform of wholesale competitive markets, creation of efficiency utilities, and regulatory policies encouraging effective programs and new technologies have led to rapid progress on energy efficiency. In New England energy savings now outstrip demand growth for gas and electricity providers due to such policies. The latest ISO-New England forecast shows that energy efficiency will more than offset regional electricity demand growth over the next decade (Figure 11).

Figure 11. Impact of demand-side management on peak demand growth in New England



Source: Cowell, 2012

Kit Kennedy of the Natural Resources Defence Council pointed to bipartisan support for clean energy initiatives, including conservative governors such as Gov. Christie of New Jersey. New York is a good example of the policies needed to scale-up energy efficiency, starting with a goal of delivering all cost-effective energy efficiency through many market actors, including energy providers. Utility business models and consumer needs should be aligned using regulatory frameworks and programme designs that make energy efficiency less risky for energy providers and more affordable for consumers. M&E approaches are needed that get the job done with confidence and credibility but without excessive cost. New programme approaches must also be

pursued, especially those that unlock the energy savings potential of behaviour change.

Session A: Energy savings - legislate or regulate?

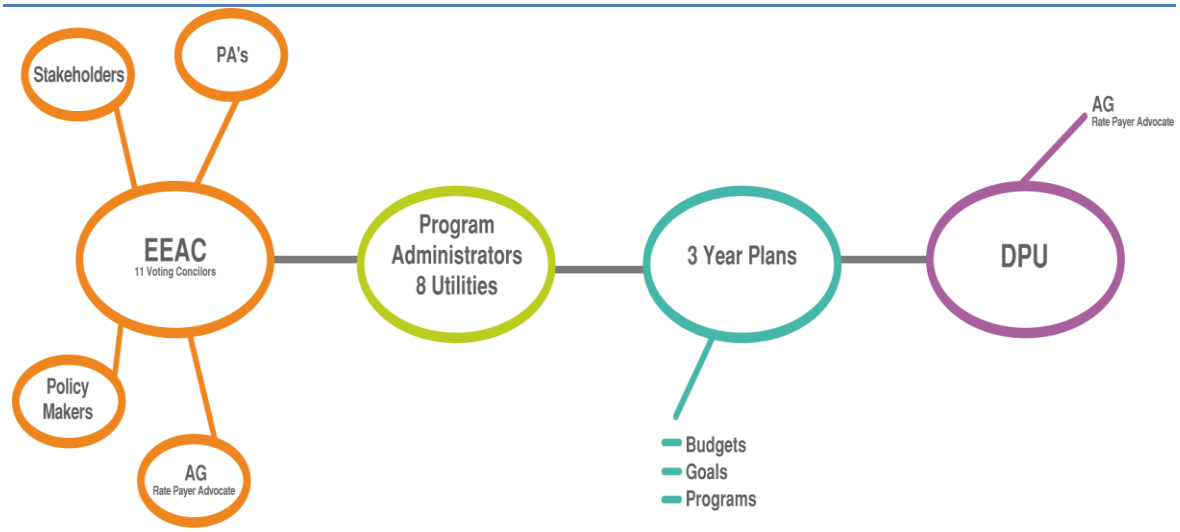
The first break-out session considered alternative approaches to setting energy savings targets for energy providers. In North America there have been two main avenues – through legislation setting state-wide energy savings targets for all energy providers, and through regulatory approaches which establish obligations or portfolio requirement for individual regulated entities. This session featured presentations by three speakers - Marc Breslow (Director, Electric Power Division, Massachusetts Department of Public Utilities), Michael Sciortino (Program Analyst, ACEEE), and Walter Auburn (Director of Energy Efficiency, Maryland Energy Administration) – followed by a group discussion. The session was moderated by Katrina Pielli (Senior Policy Advisor, US DOE) with Steve Nadel (Executive Director, ACEEE) serving as raporteur.

Marc Breslow described the Massachusetts experience with setting energy savings targets for energy providers. Massachusetts combines the legislative and regulatory approaches. The ground-breaking Green Communities Act (GCA), enacted in 2008, sets a qualitative goal for electric and gas utilities - to do “all cost effective energy efficiency”. The Massachusetts Department of Public Utilities (DPU) is charged with overseeing a process whereby utilities propose savings targets over a three-year cycle that meet the legislative intent.

New institutional arrangements have been established to implement the GCA. A state-wide approach with active collaboration by program administrators has established uniform programs across all utilities. Gas and electric efficiency programs are being substantially integrated to encourage comprehensive implementation and eliminate cross-fuel competition. Evaluation, Measurement & Verification is also being undertaken as a state-wide enterprise. New financing tools have been established for commercial and residential customers, and there is state-wide cooperation to test new energy savings measures.

This state-wide, multi-year, all-fuel integration process is overseen by an Energy Efficiency Advisory Council (EEAC) comprising 11 voting members, including the Attorney General, state agencies, and stakeholder representatives (Figure 12). Stakeholders have an opportunity to advocate, while Council consultants provide 3rd party expertise and review. The three-year planning cycle begins with EEAC review of utility plans. Program Administrators negotiate details with EEAC and then submit plans to DPU, along with EEAC approval and recommendations. DPU has 90 days to review plans, and can approve, amend, or require resubmission.

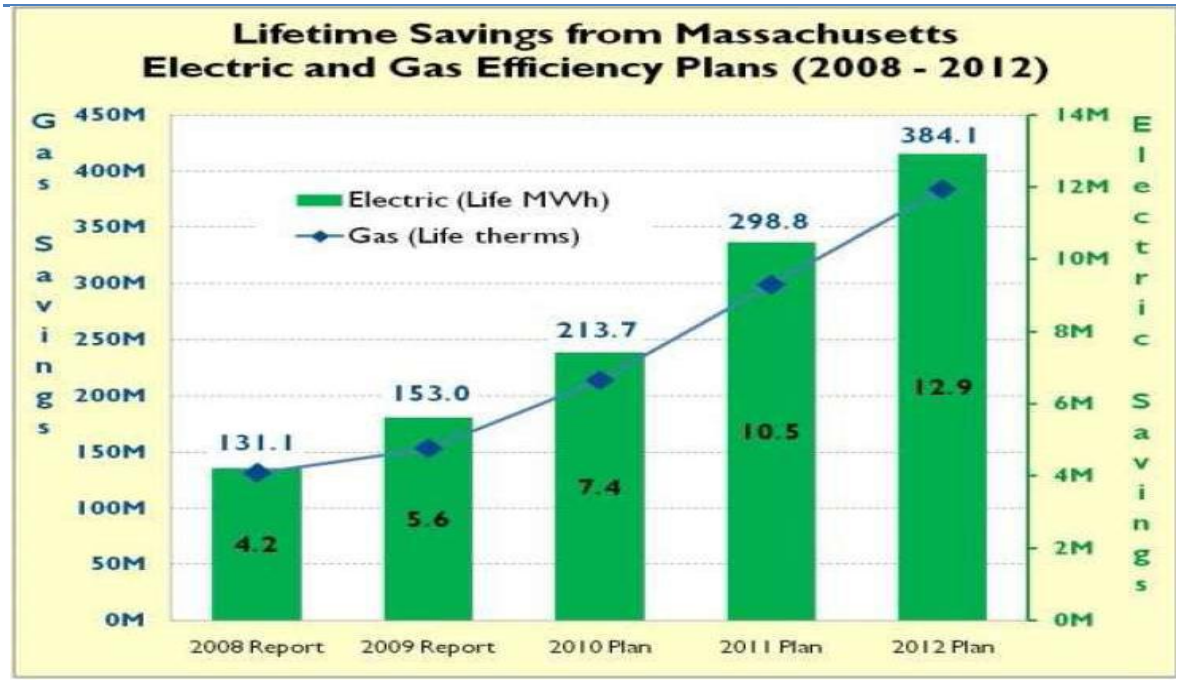
Figure 12. **Processing energy provider-delivered energy efficiency plans in Massachusetts**



Source: Breslow, 2012

The results of two 3-year planning cycles (2009 and 2012) has been a dramatic increase in energy savings targets, with a 2012 state-wide target of 2.4% of total electricity sales or 13 million MWh. This is three times the energy savings targets prior to the GCA legislation (Figure 13).

Figure 13. **Trend in gas and electricity energy savings in Massachusetts**



Source: Breslow, 2012

Michael Sciortino summarized the state-of-play as regards energy efficiency resource standards (EERS), which create energy efficiency obligations on energy providers. An EERS (sometimes referred to as an Energy Efficiency Portfolio Standards or an Energy Efficiency Standard) sets multi-year electric or natural gas efficiency targets, typically measured against a baseline of retail

sales. EERS policies have proven effective in accelerating and expanding the scale of energy savings achieved through energy provider-delivered and energy ratepayer-supported energy efficiency programmes.

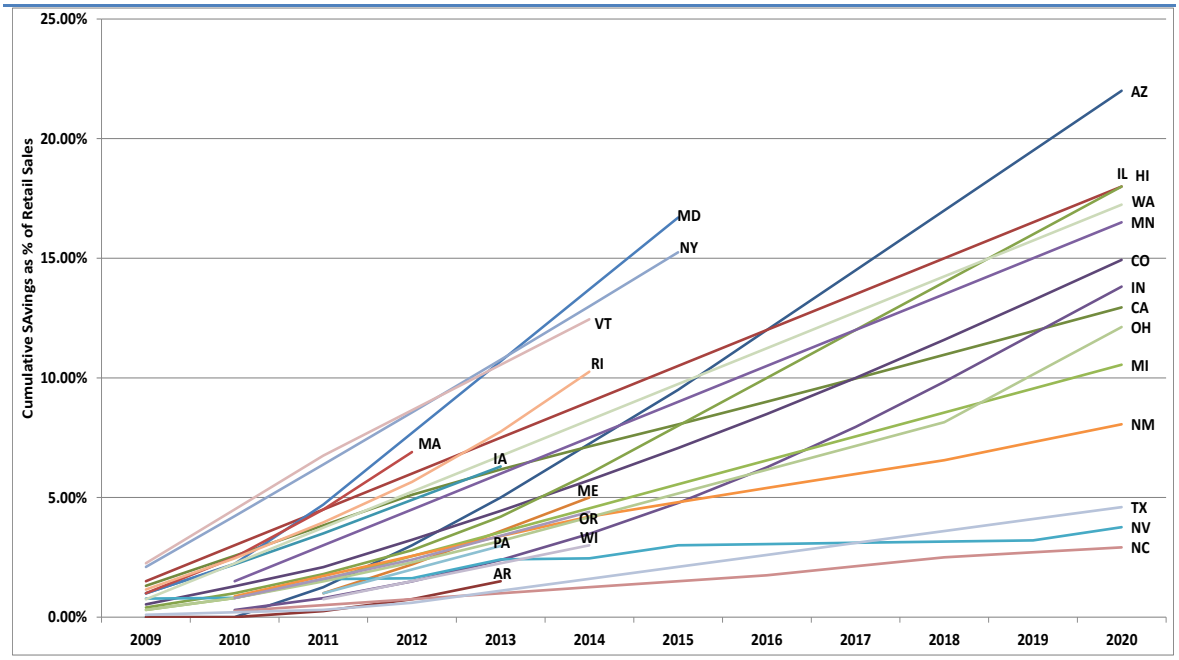
As of 2012 there are 25 US states with EERS; 18 incorporate progressive annual energy savings targets that will exceed 10% cumulative energy savings by 2020 (Figure 14). Although still early days, it is noteworthy that just two out of 18 EERS states are falling short of their targets.

There are two approaches to creating EERS policies – state-wide approaches, usually legislated, and energy savings targets for specific energy providers, usually regulated. State-wide approaches setting savings targets have been taken in many states (New York, Maryland, Pennsylvania, Michigan, Ohio, and Illinois). A few states (California, Massachusetts, and Rhode Island) prescribe not the level of savings but the loading order, *e.g.* all cost-effective energy efficiency.

State-wide approaches have advantages, especially when legislated: broader coverage, including municipal and consumer-owned power; and the ability to set longer-term targets. Disadvantages include an inability to control for energy provider experience with energy efficiency or EE program implementation, and lack of expertise of legislators preparing the EERS statute.

Tailored approaches are better able to take into account differences between energy provider experience and end-use market potential. It also allows energy providers or third party administrators to participate, with stakeholders, in setting targets.

Figure 14. Expected cumulative savings from Energy Efficiency Resource Standards



Source: Sciortino, 2012

Regardless of the approach, experience has shown EERS policies to be a great equalizer of state energy efficiency activity. States with some experience with energy efficiency have been able to significantly deepen and broaden their energy savings results. Both Iowa and Washington State have doubled their annual energy savings results in a short period of time. Even states whose energy providers lacked experience in delivering energy savings have made good progress under an EERS scheme. Midwestern states including Michigan, Illinois, and Ohio have all raised their energy savings from negligible to significant levels in just a few years.

There are prerequisites for a successful EERS. Programmes must undergo cost-effectiveness tests before implementation. Short- and long-term rate impacts must be taken into account, and care must be taken to maximize participation and manage bill impacts. Some jurisdictions facing high avoided system costs, such as New England, can have net reductions in both rates and bills.

How the EERS is designed, which complementary policies are included, and which programmes are emphasized also make a difference. Creating and sustaining collaborative and stakeholder processes from the beginning of EERS design is key. Complementary regulatory policies such as decoupling, shareholder and management performance incentives, and preferential loading in resource plans all help the energy provider to engage. Sequencing what energy efficiency is delivered - capturing lighting savings early and adding new, higher- efficiency technologies later – helps balance benefits and rate impacts.

Walter Auburn described the break-through EmPOWER Maryland Energy Efficiency Act of 2008. This legislation set a 2015 goal to reduce state-wide per capita consumption and peak demand by 15% compared to 2007. This is the most aggressive of the state EERS targets. EmPOWER Maryland responded to three political considerations – growing energy demand threatening to outstrip available capacity, large increases in residential and commercial electricity rates as rate freezes from earlier deregulation expired, and a desire to create new jobs through energy efficiency programmes. The Maryland Public Service Commission (PSC) was empowered to establish electricity and peak demand reduction goals for Maryland's investor-owned, municipal, and rural energy providers. Regulators and state energy officials created the administrative procedures to develop and file programmes, conduct cost-benefit analysis, and establish M&V procedures. Maryland PSC and MEA staff led work groups to establish format for program filings including program descriptions, participants and cost benefit analysis.

Early results reflect the difficulty of catching-up with other states more experienced in delivering energy efficiency. Although over 270,000 Marylanders have taken advantage of EmPOWER programs, and implemented measures that will save over USD 2 billion in energy costs, most energy providers are lagging well behind their midterm goal of a 3% reduction in per-capita energy consumption by 2010. The programme plan for 2012-2014 has been strengthened to include incentives and penalties for energy providers, clearer and more consistent cost-effectiveness measurement, new and larger programs such as Combined Heat and Power (CHP), and existing programme enhancements including higher rebates for appliances and whole-house improvements and efficiency programmes for apartment buildings. These refinements together with more spending should allow Maryland the opportunity to catch up with other states that currently spend more and save more through their EERS policies (See Table 3).

Table 3. Comparison of energy efficiency spending and energy savings in 4 EERS states

Maryland Utility Energy Efficiency Spending—Per Capita Comparison				
	2010 Spending (Actual)	2010 Energy Savings (MWh)	2010 Energy Savings (% of Sales)	2011 Spending (Forecast)
Maryland	**$14.31**	**387,452**	**0.6%**	**$26.63**
Massachusetts	45.60	625,000	1.4%	82.80
Vermont	60.20	114,000	2%	70.60
Connecticut	48.30	423,000	1.4%	43.60

Source: Auburn, 2012

Following these presentations, a group of 16 discussants took up key issues related to how to establish an EERS. The trade-offs between a legislative and a regulatory approach to establishing an EERS was reviewed. Although a legislative approach has some drawbacks, the advantages of

state-wide coverage, long-term targets, avoidance of a lengthy IRP process, and political visibility are hard to beat. The lack of expertise of legislators can be overcome by keeping the legislation general and entrusting the development of regulatory and administrative apparatus to executive agencies and regulators.

A practical issue for policymakers is what to do about the 25 states that do not yet have an EERS. A good starting point for these states would be a stakeholder collaborative process, such as is presently underway in Arkansas. A stakeholder collaborative is useful in gaining utility buy-in, building credibility around the value of energy efficiency, and highlighting EERS success stories elsewhere. Whether or not an EERS approach or some other approach is developed will of course depend on local appetite and myriad other issues.

The discussants agreed that buy-in and leadership by utilities, regulators and key stakeholders is imperative. It is also important to set rules and stick to them through each programme or policy cycle. Incentives and recovery of costs and lost revenue is helpful but should not be overly generous. M&V must be robust and transparent to comfort regulators.

There were some areas of disagreement, especially around how specific legislative language should be. More specificity might be needed when parties lack experience or don't fully trust the regulator to fill in the details.

Further work is needed on rate and bill impacts, strategies to capture deep savings and discourage cream skimming, continued evaluation of existing efforts, treating Energy Efficiency as a resource, including obligations or energy efficiency resource standards for other fuels (*e.g.,* propane, heating oil), and synchronizing EERS with other state goals.

The group concluded that:

- Targets can motivate action;
- Both legislative and regulatory approaches can work;
- Both include a strong and necessary regulatory component;
- Leadership is important; and
- Continued evaluation and refinement is needed.

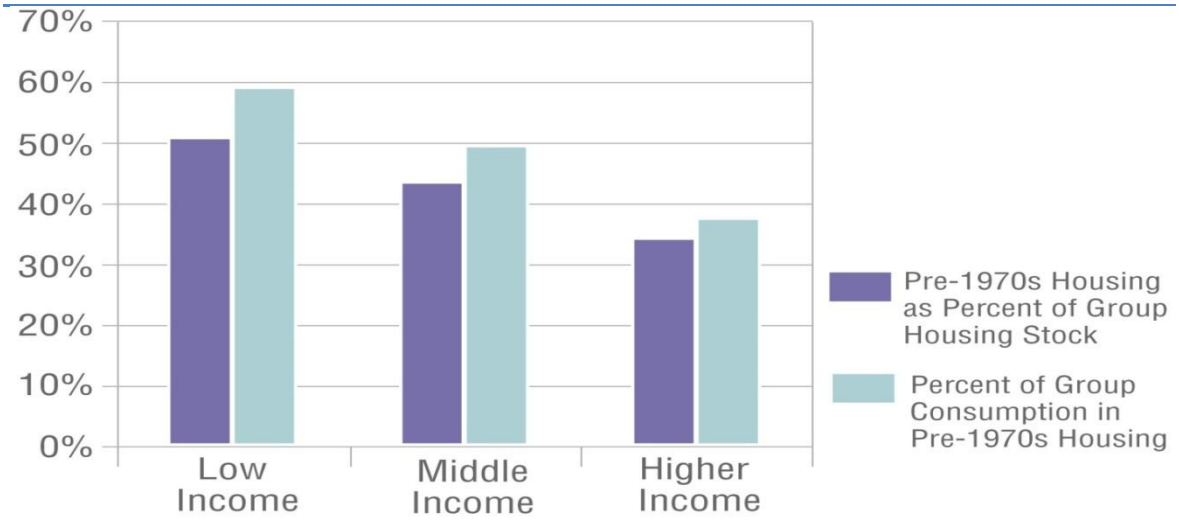
Session B: Role of energy providers in deep building retrofit

This break-out session considered how energy providers could contribute to the difficult task of mobilizing deep building retrofits for homes and businesses. In North America energy providers have only recently become involved in deep building retrofits as opposed to lower-cost weatherization or single-measure energy efficiency improvements. This session explored some of the benefits, complexities and consumer protection concerns associated with energy provider involvement. The session began with presentations by Mark Zimring (Senior Research Associate, LBNL), Peter Krajsa (CEO, AFC First Financial Corporation) and Michael Couick (CEO, Electric Cooperatives of South Carolina) followed by a group discussion of key issues. The session was moderated by Tracy Narel (Program Analyst, US EPA), with Graham Pugh (Office of International Climate Change Policy and Technology, US DOE) serving as raporteur.

Mark Zimring presented the results of a recent LBNL study of enabling middle income (M-I) single family households to undertake comprehensive energy upgrades (LBNL, 2011). M-I households consume one-third of residential energy, plus they pay many of the taxes and utility bills that fund public energy efficiency programs (Figure 14Figure 15). Most (83%) M-I households live in single family homes; two-thirds own their homes or apartments. On average, M-I homes are older than the homes of higher income households, and M-I households tend to stay in their

homes longer. This suggests that not only are the potential benefits of energy upgrades considerable, but M-I homeowners will stay in place long enough to realize them.

Figure 15. Comparison of vintage and energy consumption by income cohort



Source: Zimrick, 2012

The upfront cost of home energy upgrades is a significant barrier to investment. Energy upgrades for just one-third of the 32 million M-I single family households would require USD 30-100 billion. Moreover, declining home prices have restricted access to financing. Single family home values, the primary vehicle for M-I home improvement financing, have declined by 32% since 2006. As access to home-secured financing declined, household energy efficiency programmes offered unsecured loans to applicants. The effect has been that energy efficiency loan programs reject as many as 50% of applicants.

M-I households spend quite a lot on their homes – roughly USD 40 billion a year – and more than one of every five dollars was spent on energy-related improvements (*e.g.* installation, replacement or repairs to insulation, roofing, central heating, or central air conditioning systems). There may be scope to "nudge" households towards introducing efficient materials and equipment through incentives and other inducements. Possible ways to mobilize MI homeowners to include energy upgrades in their home renovation projects include using trusted messengers, solving problems that households recognize such as drafty windows and doors, reducing the cost of energy upgrades, and reducing perceived risks.

Peter Krajsa described what AFC Financial has found out about households wishing to finance energy efficiency improvements. From a financing provider perspective, the key ingredients of a successful deep buildings retrofit programme are engaged contractors and well-designed financing schemes. Market research shows the importance of financing to energy efficiency improvements in residences. Over two-thirds of all home improvements under USD 15,000 are financed in one way or another, and virtually all (90%) of improvements greater than USD 15,000 are financed. Rebates and tax credits are great, but homeowners still provide the bulk of the money. Market research has identified two types of homeowner renovation customers – Reactors and Thinkers. Reactors need "urgent" heating, ventilation and air conditioning (HVAC) or home repairs whose cost is too big for a credit card but too small for a home equity loan. These customers are time sensitive – they need the work done as soon as possible, don't want a lien on their home, and are particularly attracted to concessional terms - longer term or lower rate - than available from a bank. A perfect financing scheme for them will be unsecured, easy to

apply for, and sweetened with incentives provided by an energy provider or government programme.

Larger "whole house" improvements generally require financing, are more project driven, and less time sensitive. These projects are typically undertaken only after considerable thought, and the contractor plays a consultancy role, engaging with the homeowner in the planning process. An effective programme design for this market segment might be ENERGY STAR endorsement branding, energy audit with recommendations, and concessional financing.

Contractor-driven programmes have been the easiest to implement and are having the greatest success (Pennsylvania's Keystone Home Energy Loan Programme or HELP; Connecticut's Solar Leasing). "On-Bill" utility programs are a hot topic, but have a limited track record and raise concerns regarding who takes the risk of potentially increased delinquency from utility loan servicing. The real estate tax model (Property Assessed Clean Energy or PACE) is a good concept, but so far only addresses a small part of the market.

As a general rule, programme administrators should avoid overly complex designs. The most effective programmes are easily accessible, contractor-driven, fast and easy to apply for. Energy efficiency lending programs are essentially competing against credit cards, as consumers and contractors alike will follow the path of least resistance, even if it is more costly.

Michael Couick presented the experience of South Carolina rural cooperatives. Compared to those served by investor-owned utilities, rural co-operative customers are 3 times more likely to live in manufactured housing, 50% more likely to live below the poverty line, and in some months may spend 60% to 80% of their income on energy. With the cost of new generation soaring, South Carolina cooperatives have set a goal of saving 20 percent of residential energy use through a combination of weatherization, removing resistance heating, and installing heat pumps. Taken together these measures could save 1 TWh annually, or 10% of residential energy consumption, and save customers over USD 100 million on their annual electricity bills. On an individual level the savings can be as much as two-thirds of consumption for a manufactured home with electric resistance heating. The Rural Electric Savings Plan (RESP) provides low-interest loans made available through the Rural Utilities Service of US Department of Agriculture for energy upgrades. The money saved repays loans which are paid through the co-operative power bill. Project costs for an average home are USD 7,262 with annual savings of USD 1,240, slightly less than a six-year payback.

Following these presentations the group of 13 discussants raised key issues associated with energy provider-aided deep building retrofits. The first order of business was to define what constitutes a deep building retrofit (DBR). One definition offered was that a DBR should be multi-measure (*e.g.* comprehensive) and deliver a minimum 20% savings. This definition was acceptable because it roughly corresponds to a cost-effective level of retrofit, the key metric against which almost all energy provider-delivered programmes are evaluated. It was agreed that recognizing the constraint of cost-effectiveness would drive the discussion away from aggressive deep retrofits.

Another challenge in energy provider-delivered DBR is moving from a single-measure approach to a comprehensive approach. Comprehensive retrofits face a number of real and perceived barriers, even though there are many successful examples. The value proposition for comprehensive, deep building retrofits can be constructed from several perspectives. For consumers, it offers the potential not only to save money but to increase comfort and achieve a social normative. For contractors it is an opportunity to Increase business and provide a higher-quality outcome. For utilities it is useful way to reduce load growth, meet regulatory requirements, and keep customers satisfied.

How do you gauge market readiness of comprehensive, deep building retrofits? Consumers gauge DBRs to be market-ready when there are trusted providers offering simple choices that are easy to access and understand and deliver a quality result. Programme administrators judge DBRs to be market ready when trained and effective contractors are available, measure designs are easy to implement, and timely, and there is sufficient data and evaluation methods available to satisfy regulatory authorities. Contractors will judge DBAs to be market-ready when there are transparent and simple processes for accreditation and clear guidelines for collected data needed by evaluators.

There is currently a credibility gap between DBR market participants and lenders. Lenders perceive higher risk due to lack of familiarity with retrofit performance track record and uncertainty as to how to give loans and collect repayments. This gap arises from a lack of standardized instruments for DBR financing and inconsistent metrics to gauge loan performance.

In conclusion the discussants underscored the need for comprehensive policy approaches that are consistent with the different needs of consumers, contractors, and administrators.

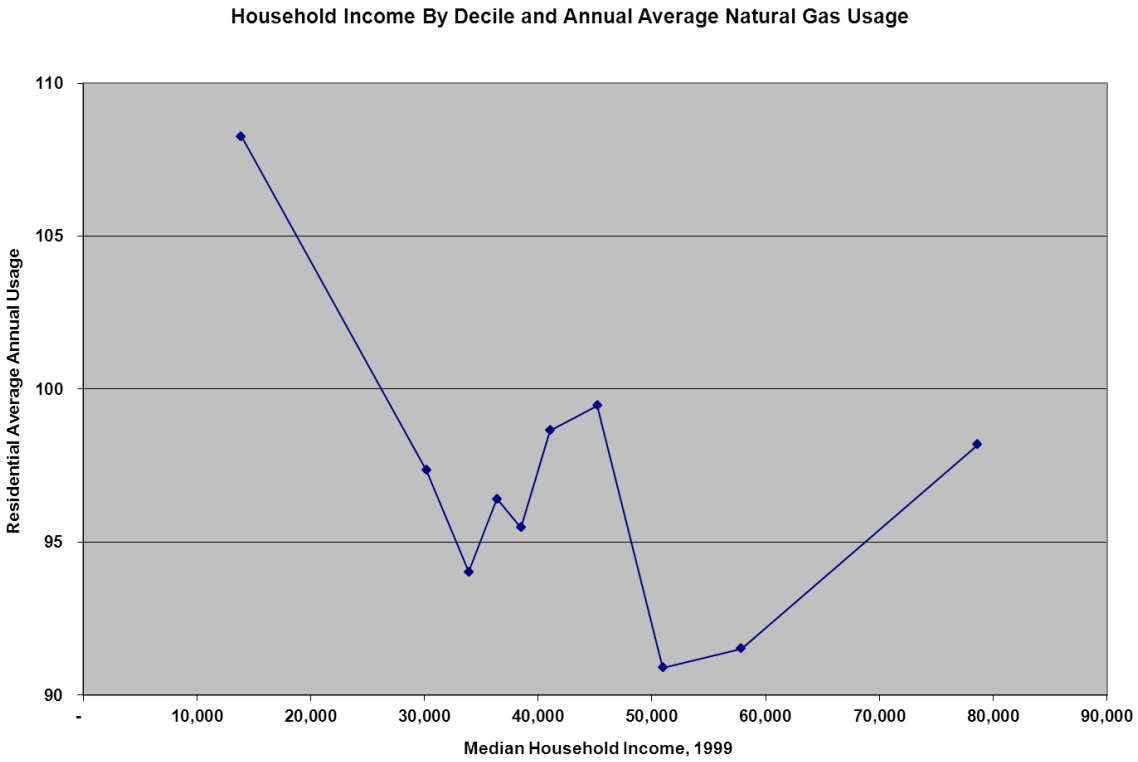
Session C: Incorporating equity and social considerations

This break-out session considered different approaches to incorporating equity and social considerations into energy provider-delivered EE programs and policies. In North America most energy providers deliver specialized energy efficiency and other services to low-income households and other vulnerable customers. These activities are often undertaken in co-operation with local, state and federal governments and community based organizations (CBOs). Such low-income energy efficiency programmes face special problems – integrating multiple programmes, funding fluctuations, mobilizing consumer demand, and justifying benefits vs. costs. This session began with presentations by Tyson Slocum (Director, Public Citizen Energy Program), Jack Laverty (DSM Manager, Columbia Gas), and Meg Power (Economic Opportunity Studies, Inc.) followed by a group discussion. The session was moderated by Joel Eisenberg (Weatherization Support Programme Manager, ORNL) with Miles Keogh (Director of Grants and Research, NARUC) serving as raporteur.

Tyson Slocum described why decentralized, affordable energy approaches are particularly effective for working families. Policy makers should consider refocusing federal subsidies and incentives away from the nuclear, oil and coal industries and towards rooftop solar and wind energy, energy efficiency and mass transit.

Jack Laverty presented the experience of Columbia Gas with delivering low-income energy efficiency services. Columbia Gas is the largest natural gas local distribution company (LDC) in Ohio, serving 61 of 88 counties and 1.4 million customers. Columbia Gas faces particular challenges addressing low-income household consumption in its service territory. With households in poverty estimated at over 14%, there is a gap between income and ability to pay energy bills. The vintage and poor condition of low-income housing stock means the poorest households often have the highest energy consumption (Figure 16). Over three-quarters of the housing stock predates introduction of building energy codes in the 1970s, while the fuel bill assistance available from federal programs such as LIHEAP (Low-Income Home Energy Assistance Programme) covers less than half of eligible low-income households.

Figure 16. The need for low-income weatherization in Columbia Gas' service territory



Source: Laverty, 2012

Columbia Gas has operated its WarmChoice programme for many years, with a current funding level of USD 12 million. The programme design was developed in cooperation with CBOs and is closely aligned with federally-funded Low-Income Home Energy Assistance Programme (LIHEAP) and WAP efforts. WarmChoice has taken on board many WAP innovations, including energy conservation measure (ECM) inspection, installation and post-inspection along with diagnostic inspections and work orders for installers, building science and Installation practices that result in improved performance and risk mitigation, competency-based training of installers, continuous quality assurance, and billing analysis-based impact evaluation methods.

Candidate homes are identified through billing analysis, as gas consumption is the best predictor of savings opportunities. A standard fee structure is offered for ECM retrofits, and diagnostics including combustion analysis, blower door testing, and infrared thermography are required. Close coordination with WAP helps provide referrals and reduces programme costs, and different implementation models for ESCOs and community-based organizations (CBOs) helps maintain service provider diversity.

Key results and lessons learned from two decades of the WarmChoice programme include:

- Partnering and cost-sharing with the federal WAP and state and local agencies is critical (of 57,000 low-income households weatherized through WarmChoice, 70% were cost-shared);
- Targeting high-usage households delivers very high energy savings – average savings of 26-29%, equivalent to 32 mcf/year per household;
- Long-lived measures yield impressive cumulative energy savings; WarmChoice cumulative savings are estimated at 25 million mcf.
- Capacity building is time consuming and must be planned, as most weatherization tasks cannot be performed by unskilled labour.

- Columbia Gas and other low-income energy efficiency programme administrators face two main barriers going forward - reduced federal funding for low-income energy and weatherization assistance, and lower gas prices, which affect programme cost-effectiveness.

Meg Power described the distinct characteristics of the low-income energy efficiency "market": customers who are income-qualified households for government grant programmes (just over a third of US households) and suppliers of energy services, primarily CBOs and local government offices.

The consumer "demand" is not translated to expenditures by this cash-and-credit-deprived group. Grants substitute for customer payments. CBOs have working models adapted to this market as well as technically skilled personnel. They enjoy community trust and 'brand recognition' because of their charitable work. Their access to low-income households lowers transaction costs. Most are adept at integrating delivery of the efficiency resources from different federal and state agencies with utility grant programmes.

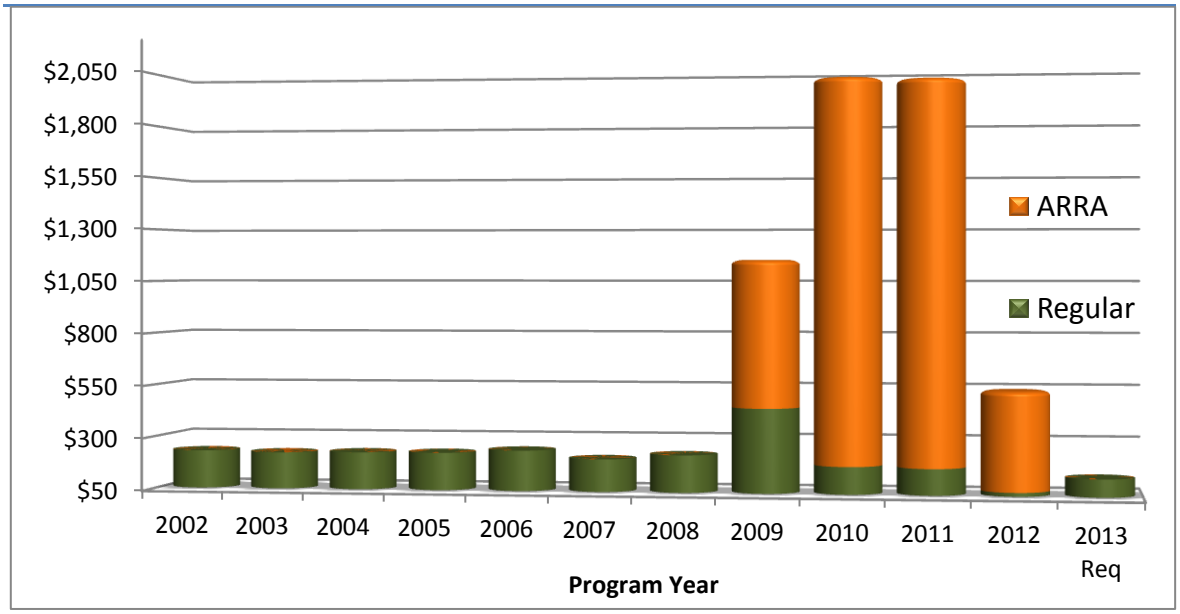
This last skill is valuable because only a quarter of the US spending for retrofitting low-income homes (about USD 900 million in 2008), came from the federal Weatherization Assistance Program (WAP). Another 40% was a mix dominated by utility programmes but including diverse state and energy vendor programs. States varied dramatically in the scale of low-income programme resources.[5]

The delivery protocol is typically that required by the WAP. That means a 'whole–house' diagnostic process and menu of treatment options is applied, subject to strict cost-tests. Different measures, including some not allowed in WAP, are billed to different funders per agreed terms.

While the ARRA briefly increased spending under the WAP by ten-fold (to USD 2 billion in FY 2010 and 2011), no alternative resources have emerged to replace those funds (Figure 17). Further, the program faces significantly lower appropriations than in the pre-stimulus era. As a result the share of low-income weatherization spending for 2013 represented by the WAP will shrink to 15% or less. The WAP will continue to be useful for states and localities by providing exemplar procedures for safety, diagnostics, measures, accounting, and quality assurance, as long as other funders' rules do not push cost limits too far below the federal programme average.

[5]These calculations exclude California's utility low-Income energy efficiency programme, which has invested about USD 410 million annually since 2008, but do generally not involve delivery

Figure 17. WAP spending – past and future



Source: Power, 2012

A moderated discussion followed on key findings, key issues for incorporating equity and social considerations into energy provider delivered energy efficiency, and conclusions.

Key findings include:

- The outlook for funding of low-income energy efficiency programs is of great concern. Historically, WAP has provided one-third of national spending on low-income weatherization, with LIHEAP and ratepayer funding providing the rest. It would be difficult for ratepayer funding alone to offset losses from lower funding of federal programmes.
- Energy poverty continues to grow, and is affects far more consumers than those in true poverty. This is evidenced by growing service shutoffs for non-poor customers.
- Cost-effectiveness evaluation may be a limit on rule-driven investment, especially with gas prices at historically low levels.
- Programmes that leverage innovation and economies of scale (such as joint electric/gas programs and fuel-blind programs) have proven especially effective.
- Low-income energy efficiency programmes developed with the input of stakeholders, including those being targeted, have also proven especially effective.

Key (unresolved) issues include:

- Should social equity considerations be a core principle in developing comprehensive energy efficiency portfolios?
- How will greater reliance on markets and IRP affect low-income EE programmes?
- Most targeted energy efficiency programmes always be grants-based, or is there scope for cost-sharing with low-income households?
- Should different evaluation frames apply to targeted energy efficiency programmes (e.g., which cost-effectiveness test to use, and whether to include non-energy benefit)?

Areas for further research include:

- Improved methods to determine eligibility and target programmes;

- Determining which entities should be obligated to fund or deliver targeted energy efficiency programmes - energy distributors, network operators, generators?
- Institutional arrangements for delivering targeted energy efficiency - should energy providers implement as well as fund, and if not, who else should deliver?

Session D: Outlook for hybrid EE institutional arrangements

This break-out session focused on trends in institutional arrangements for delivering ratepayer-funded energy efficiency programmes. The objective was to review the two main institutional arrangements – administration by energy providers, and administration by third parties including government agencies and energy trusts – and discuss the potential for middle ground on and hybrid approaches. The session began with presentations by Dan York (Utilities Program Director, ACEEE), Sue Coakley (Executive Director, Northeast Energy Efficiency Partnership, and Margie Harris (Executive Director, Energy Trust of Oregon) followed by a group discussion. The session was moderated by Rick Morgan (former Commissioner, DC Public Service Commission), with Ursula Schryver (VP of Education and Customer Programs, APPA) serving as raporteur.

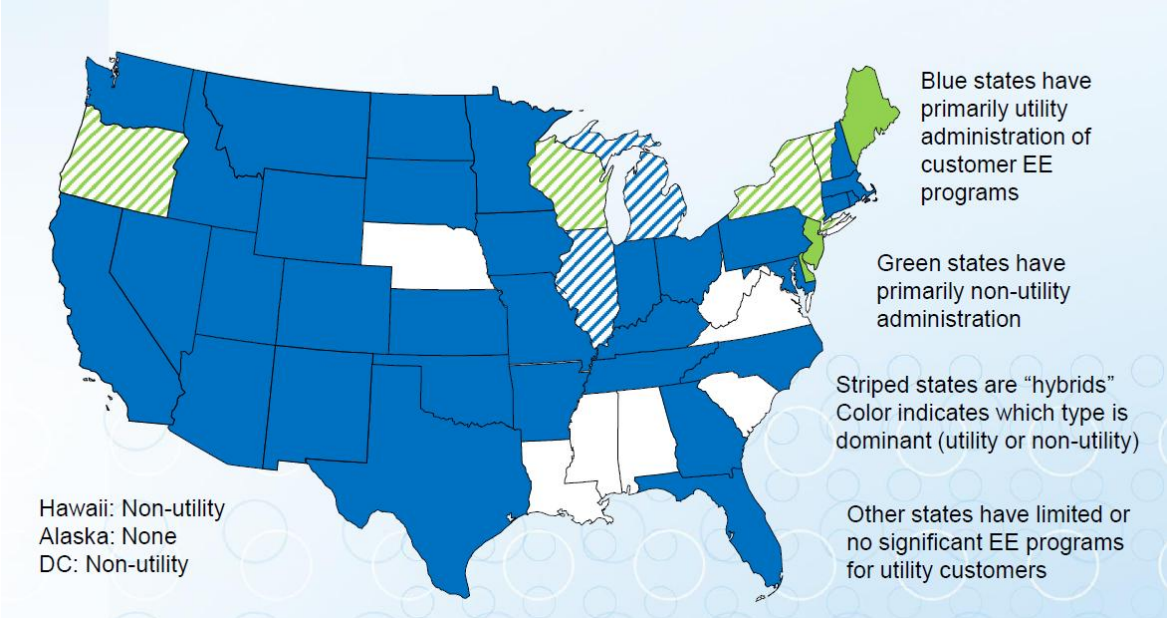
Dan York presented the history of energy provider spending on energy efficiency over the past twenty years, noting how restructuring affected spending in the mid to late 1990s. Spending since 2000, however, has grown steadily and rapidly.

Utility administration of energy efficiency programmes is the most common institutional arrangement throughout the United States, including several states with the largest EE spending (California, Massachusetts, and Connecticut). Utilities administer programs as required by regulation or legislation, are overseen by state regulatory authorities, and recover their program costs via regulated tariffs or energy surcharges. The other principle arrangement is non-energy provider third parties (state government, contractors, non-profit organizations) which administer programs funded by energy surcharges or other targeted funds. Several states with large energy efficiency spending (New York, Oregon, New Jersey, and Vermont) utilize this arrangement. **Error! Reference source not found.** shows the US institutional arrangements landscape for dministering energy efficiency.

Energy providers can be very effective energy efficiency programme administrators. They are large, well-established organizational entities structured to manage large numbers of customers and large amounts of financial and human resources. Energy providers also possess considerable expertise on customer energy use, along with other aspects of administering and delivering program (e.g., marketing, accounting, field services, customer representatives, and programme evaluation). Finally, they have easy and direct access to customer energy data, and are attracted by the commercial opportunities in delivering energy services in addition to energy commodities.

Relying on energy providers has drawbacks, too. Markets don't stop at utility service territory boundaries, affecting economies of scale for marketing and working with major suppliers/other market actors. In some states (e.g., Vermont) the energy providers are simply too small to mount effective energy efficiency programmes. Multiple programme offerings in adjacent service territories can confuse customers. Some energy providers face conflicts between selling gas or electricity and their EE obligations. Energy efficiency may also be too small an operation to gain management attention or support. Funding is often tied to rate cases, and funding levels can fluctuate as a result. Rate case and funding cycles may not be conducive to the long planning and implementation cycles needed for customer engagement and market transformation.

Figure 18. US landscape for delivering ratepayer-funded energy efficiency programmes



Source: York, 2012

Third party administration also has distinct advantages. Energy providers are constrained to their service territories, whereas a third party administrator can take a state-wide approach. Third party administrators are "fuel-blind", and can integrate EE offerings and mount ad campaigns that take advantage of economies of scale for marketing and working with trade allies. Third party administrators generally have a single purpose - saving energy through improved customer energy efficiency, which confers certain cultural advantages and can attract a highly-motivated work force. Third party administrators can become a trusted, independent authority on energy efficiency to a degree that energy providers may never be able to achieve. In sum, utilizing third party administrators also eliminates the drawbacks that energy providers bring - internal business conflicts (*e.g.,* the effect of energy savings on utility revenues under traditional regulation and rate structures) that can arise within utilities doing energy efficiency programs.

There is diversity within the third party administrator model. In Vermont contractors bid for an "energy efficiency utility" franchise to deliver energy efficiency subject to state regulation. In New York the State Energy Research and Development Authority (NYSERDA) implements state-wide energy efficiency programmes. Some third party administrators are selected by state agencies or regulators (New Jersey Clean Energy Programme, contracted to the New Jersey Board of Public Utilities; Delaware Sustainable Energy Utility, contracted to the Department of Natural Resources and Environmental Control; Focus on Energy, contracted to Public Service Commission of Wisconsin) while others are independent Trusts with a statutory basis and an independent governance structure (Energy Trust of Oregon, Efficiency Maine Trust).

Third party administrators have drawbacks also. Any new entity must work to gain customer recognition and trust and establish credibility. Third party administrators need time to build infrastructure, develop programmes, and create delivery capacity. Changes in contractors can be disruptive, customer data/account information may not be readily available, and oversight and funding can be less stable and more subject to political winds.

ACEEE's evaluation of institutional arrangements for administering ratepayer-funded energy efficiency suggests there is no one best model. ACEEE found exemplary programs operating with

all administrative models. Utility administration is still the dominant model (if measured by program budgets and customers served). The ACEEE's Annual State Energy Efficiency Scorecards show that the top-ten states employ a variety of administrative structures for EE programs, but the energy provider programme administrator arrangement is predominant (Table 4).

Table 4. Comparing institutional arrangements for top-ranked energy efficiency states

Top-10 ACEEE-Ranked states for energy efficiency	Dominant Institutional Arrangement
Massachusetts	Energy providers
California	Energy providers
New York	3rd party - state agency
Oregon	3rd party – statutory energy trust
Vermont	3rd party - energy efficiency utility
Rhode Island	Energy providers
Washington	Energy providers
Connecticut	Energy providers
Minnesota	Energy providers
Maryland	Energy providers

Source: ACEEE, 2011

The north-eastern region of the US has produced an exceptional record of ratepayer-funded energy efficiency. This is evidenced by the most-recent ACEEE State Energy Scorecard, which lists six north-eastern states (Massachusetts, New York, Vermont, Rhode Island, Connecticut, and Maryland) among the top ten. Sue Coakley, Executive Director of the Northeast Energy Efficiency Partnership, described the considerable diversity in institutional arrangements for delivering ratepayer-funded energy efficiency in the North-eastern United States, including several relatively new entities. There are three basic arrangements:

- State-wide energy efficiency utilities (e.g. Efficiency Vermont, Efficiency Maine, and the Sustainable Energy Utilities in Washington, DC and Delaware);
- State authorities (e.g. the New Jersey Board of Public Utilities and NYSERDA)
- Energy providers in Maryland, Pennsylvania, Massachusetts, Connecticut and elsewhere.

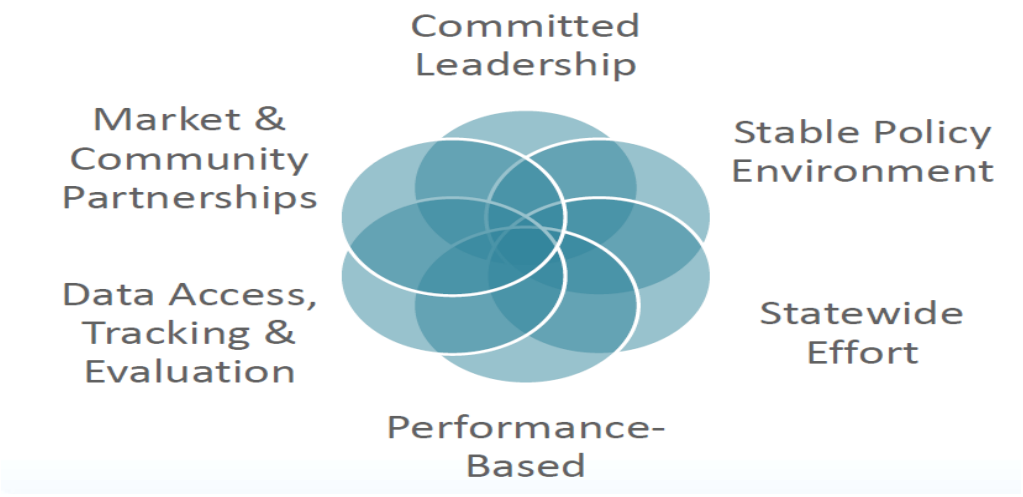
Other factors are as important to effective ratepayer-funded energy efficiency as institutional arrangements (Figure 19). Committed leadership is critical, as politicians in the executive and legislative branch must cooperate to develop the legislation or regulations needed to enable energy efficiency policies and programmes. Gov. O'Malley in Maryland, Gov. Patrick in Massachusetts, and Gov. Malloy were instrumental in bringing about major new energy efficiency initiatives in their states. A stable and supportive policy environment enables energy efficiency efforts to be scaled-up and sustained. Legislation, regulatory policies, state-level strategies and action plans, standing arrangements for public consultation, and regular mechanisms for multi-agency coordination all contribute to the maintaining policy consensus.

Taking a state-wide approach is practical and strategic. State-wide branding and promotion builds consumer awareness, while involving municipal and rural energy providers brings inclusiveness. State-wide approaches also bring advantages of scope and scale, facilitating cost- and knowledge-sharing. Establishing performance-based policies and programmes creates correction mechanisms and enhances credibility. Including both financial incentives and penalties, tying program results to budget, providing for continuous improvement through monitoring, and evaluation and ensuring independent oversight of impact evaluations all contribute to overall effectiveness and legitimacy. The importance of data access cannot be overstated.

Access to data and funding are the two most important ingredients in any energy efficiency

programme. Developing and sharing data on customer energy use, EE programme history, M&V, and consumer surveys increase programme effectiveness. Equally important is effective partnerships with market actors and communities. Enlisting retailers, manufacturers, and distributors as trade allies, entering into alliances with financial service providers, developing partnerships with key services providers such as ESCOs are all essential to least-cost delivery of energy efficiency. Partnerships with local governments, NGOs, and CBOs are important, especially in accessing hard-to-reach markets, such as inner-city households and businesses.

Figure 19. Key elements in effective delivery of ratepayer-funded energy efficiency



Source: Coakley, 2012

Margie Harris, Executive Director of the Energy Trust of Oregon (ETO), presented Oregon's approach to ratepayer-funded energy efficiency. The Pacific Northwest has long been fertile ground for energy efficiency policies, dating back to the 1980 NW Power Planning and Conservation Act. The ETO was created by the Oregon regulator as a third party administrator for ratepayer-funded energy efficiency and renewable energy spending. Since inception in 2002, ETO has established a network of 2100 trade allies and delivered USD 170 million in energy efficiency and renewable energy investments to 1.5 million Oregon customers. These investments have displaced 426 MW of generation and saved USD 1 billion. ETO closely coordinates with regional initiatives on least-cost resource procurement and regional market transformation. ETO is regulated by its own Board of Directors as well as the Oregon regulator, and utilizes 3rd party evaluators to review and suggest improvements to all its programmes.

An entity such as ETO has advantages in delivering energy efficiency and renewable energy. ETO is mission-driven, enjoys stable funding, provides comprehensive services to energy customers, conveys an objective view of energy alternatives, embodies a strong evaluation culture, leverages investments and markets through its network of trade allies, maintains low administrative costs reviewed by its regulator, emphasizes transparency and accountability through its governance structure, and is dedicated to sharing lessons learned at the state, regional and national levels.

A lively group discussion followed the presentations. Clearly a state-by-state approach is needed to developing administration of ratepayer-funded energy efficiency. Ultimately institutional arrangements are a political choice driven by technical and economic considerations. Myriad factors - history of energy efficiency policies, ownership structure of energy providers, degree of market liberalization, energy efficiency market potential, contributions of energy efficiency to resource planning, regulatory preferences – will come into play.

A few fundamentals are worth noting. If you are going to involve energy providers, you need to support the basic energy provider business model. Key issues include programme cost recovery, addressing lost margins, creating incentives to develop good programmes. The issue of decoupling profits from throughput must be addressed regardless of programme administrator.

An energy efficiency programme administrator needs time to build capacity, develop name recognition, and build partnership networks. Energy providers are in place already; third party administrators are often created from whole cloth. A statutory basis may give third parties a boost, especially by ensuring access to funding and access to customer data.

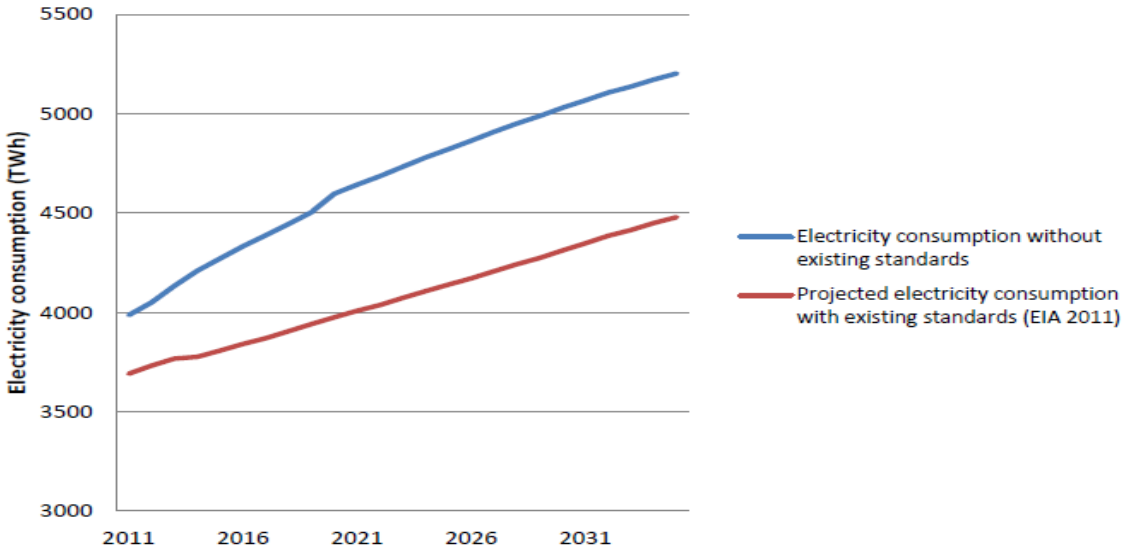
Any of these arrangements can work – there is no silver bullet. Each arrangement has pros and cons, and the solutions will be driven by local circumstances, politics and institutional history.

Session E: Energy providers and appliance efficiency standards

The final break-out session considered how energy providers can broaden and deepen appliance efficiency standards. Tom Catania (Executive in Residence, Erb Institute, University of Michigan), Anand Gopal (Senior Scientist, Lawrence Berkeley Lab), and Joanna Mauer (Technical Advocacy Coordinator, Appliance Standards Awareness Project) gave presentations, which were followed by discussion. Christine Egan (Executive Director, CLASP) moderated the session, while Christine Salembier (Chief Operating Officer, Regulatory Assistance Project) served as the raporteur.

Joanna Mauer presented a study undertaken by ACEEE and the Appliance Standards Awareness Project (ASAP). There are now 55 energy-consuming products covered by federal MEPS. The savings from several generations of Minimum Energy Performance Standards (MEPS) dating back to 1987 are truly astounding, as indicated in Figure 20. Total energy and bill savings of existing standards through 2035 are over 200 quadrillion British Thermal Units (BTUs) and USD 1.1 trillion.

Figure 20. Electricity savings from existing standards



Source: Mauer, 2012

Tom Catania, former VP of Government Relations with Whirlpool, described the evolution of appliance efficiency standards over the years. There is certainly cause for celebration, as dramatic energy savings have been captured from requiring MEPS for refrigerators, washing machines, dishwashers and other appliances. However, other than for a few exceptions such as

set top boxes, absolute appliance product efficiency gains have mostly been realized.

There are other opportunities, however, hiding in plain sight. A new generation of smart grid-connected appliances could liberate additional cost savings – from demand as well as energy– for customers and energy providers. Residential loads can be significantly shifted away from peak times with modest consumer behavioural change, and this has value for grid operators. Smart, grid-connected appliances could mobilize additional savings from load-shifting. However, new policies will be needed to accelerate the introduction of smart appliances. Manufacturers need credit for making a product demand-responsive, such as giving credit towards an Energy Star rating for demand-response capability. Energy providers could also provide credits for demand-responsive appliances, if customers agree that grid operators can control certain functions under certain agreed conditions.

Anand Gopal described a study of whether it would be economical for governments that subsidize energy tariffs to provide financial incentives for manufacture of more-efficient appliances. The cost-effectiveness metric for raising appliance standards is based on benefits to appliances owners, e.g., energy consumers. If energy is subsidized, then it becomes politically difficult to justify higher efficiency standards, the cost of which is passed along to customers. However, if government were to pay incentives to manufacturers to produce more-efficient appliances, there might be net savings in the form of lower subsidy fiscal drain due to energy subsidies. The LBL Financial Incentives Revenue Analysis Tool was used to evaluate incentives to manufacturers to produce more efficiency room air conditioners, LED TVs, and refrigerators. The analysis suggests that efficiency improvements beyond current MEPS of 28% for window air conditioners and 25% for refrigerators with no net cost to the Mexican Government.

Group discussion highlighted different views of the participating stakeholders. For example, many energy providers have no incentive to promote codes and standards, as these programmes don't figure in meeting energy savings targets, decoupling calculations or shareholder incentive calculations. As codes and standards become more stringent, it becomes more difficult to develop programmes that demonstrate additional benefits. Energy Providers are willing to participate in advancing energy efficiency codes and standards, in exchange for attribution and shareholder incentives on the energy savings from more-stringent codes and standards.

Manufacturers developing next-generation appliances, including grid-connected devices, often find themselves torn between designing products that consumers like vs. products that have features grid operators and energy providers are looking for. From the manufacturer's viewpoint, however, the customer is king, which is why progress towards grid-connected appliances is slow.

The MEPS system is focused on energy savings, not demand savings. Neither MEPS nor Energy Star recognize the benefits of smart grid enabled appliances that deliver grid benefits. There is clearly a need for more and better dialogue on benefits and technical approaches between manufacturers, energy providers, and government policymakers.

PEPDEE challenges and opportunities

The closing plenary session focused on the future of energy efficiency policies for energy providers. Commissioner Cheryl Roberto of the Ohio Public Utilities Commission described the complicated task faced by regulators in ensuring that cost-effective energy efficiency is funded and delivered. Regulators must increasingly navigate three different market milieus existing simultaneously: (i) fully regulated markets, where utilities are bound to deliver energy efficiency as well as high reliability under conditions of price volatility and area constraints; (ii) emerging energy markets, where partially-deregulated energy providers compete for advantage in a complicated and changing regulatory environment replete with new and unproven regulatory mechanisms; and (iii) fully competitive energy efficiency markets, with new entrants and new technologies creating new opportunities for consumers and providers alike. The complexity and novelty of this changing marketplace is one reason why regulators are working with NARUC and DOE through the SEE Action network to better understand how regulatory policy decisions affect market outcomes.

Annamaria Garcia of DOE's Office of Weatherization and Intergovernmental Programmes described the key federal programmes which are scaling-up investment in energy efficiency. These include the Blueprint for a Secure Energy Future, the Better Buildings Challenge designed to cut buildings energy use by 20% by 2020, the ARRA-funded efforts to create state-level sustainable investment authorities, and collaborative efforts with state and local governments such as the SEE-Action Network (The White House 2011, US DOE 2012a-b). The SEE Action Network is particularly relevant to energy provider-delivered energy efficiency, as it brings together public and private sector leaders from states, local governments, NGOS, and businesses to develop and share model policies, best practices, and recommendations and access detailed technical assistance from US DOE and US EPA.

Figure 21. The SEE Action Network

Source: Garcia, 2012

Chris Golding of the Australian Department of Climate Change and Energy Efficiency described key elements of the Commonwealth Government's climate change and energy efficiency policy. A cornerstone Australian policy is the recently-established Carbon Price Mechanism. Pricing carbon is viewed as the most environmentally effective and cheapest way to cut GHG emissions and encourage uptake of energy efficiency and renewable energy. Rather than relying on government decisions to regulate or subsidise activities, a carbon price leaves it to businesses to find the most effective ways of reducing carbon pollution.

Commencing in July 2012 with a fixed price of AUD 23/t$CO_{2\text{-eq}}$, the pricing mechanism will become a cap-and-trade scheme in July 2015. It covers less than 500 of Australia's biggest polluters, mainly electricity generators and large industrial facilities, and recycles the carbon tax revenues towards tax cuts and payments weighted towards lower-income households, a new Clean Energy Finance Corporation, assistance to emissions-intensive trade-exposed industries, and a range of other renewable energy, land sector and energy efficiency programs.

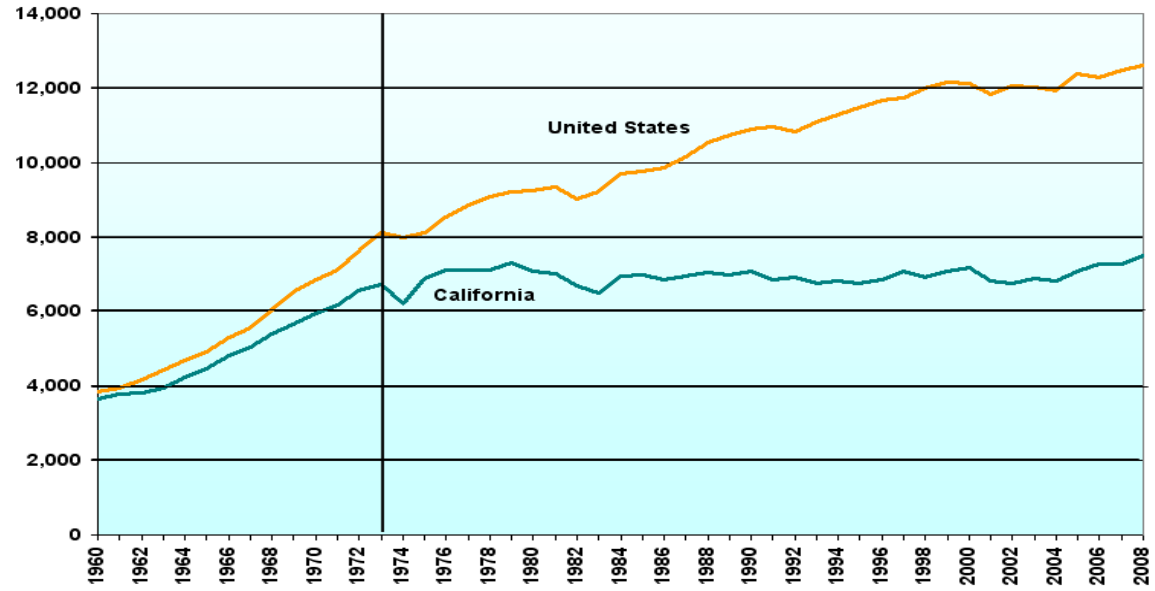
Pricing carbon will not be the only policy encouraging more energy efficiency. A National Energy Savings Initiative (NESI) is also being considered as a complementary measure to the Carbon Price Mechanism and other targeted policies and market mechanisms. The NESI would be a WhC Scheme, under which energy retail companies would be obliged to help their residential, commercial and industrial customers to find and implement energy savings. Particular attention is being given towards whether the NESI could be designed to create new incentives or requirements to undertake energy efficiency activities in low-income homes and mobilize peak electricity demand response. If adopted, the NESI would build on several existing state-based EEO schemes. Consultation and evidence gathering to support the specifics of a NESI is underway, with a Regulatory Impact Analysis and negotiations with state and territory governments expected for later in 2012.

Steven Malnight of Pacific Gas and Electric described the accomplishments of California energy providers in delivering thirty years of energy efficiency. In addition to stabilizing per-capita energy use over three decades (See Figure 22), the programmes save 60,000 GWh annually and have deferred over 15,000 MW of generation. Over the past 30 years, California per capita energy use has remained flat compared to a 50% increase for the rest of the US.

These accomplishments are being carried forward today, with additional and even more aggressive policies being adopted. Assembly Bill 32, the Global Warming Solutions Act, aims to return California's GHG emissions levels to 1990 levels by 2020. This will be done through myriad measures including a Renewable Portfolio Standard (RPS) growing to 33% by 2020, a loading order preference for energy efficiency and demand-side reductions in resource plans, and a Cap and Trade system for larger energy users.

California's Investor Owned Utilities have designed and coordinated EE programs since the mid-1920s. PG&E believes energy providers are uniquely effective in offering a comprehensive EE portfolio. Energy providers understand the needs of different customer segments are can tailor offerings to all customers. Energy providers offer credible information and integrated solutions across a range of energy technologies (energy efficiency, pricing, distributed generation). Energy providers can also coordinate networks of technology and delivery partners, including third-party implementers, local governments and others.

Figure 22. Historical load growth in California vs. the rest of the US



Source: Malnight 2012

The current energy efficiency programme cycle (2010-2012) comprises USD 1.3 billion of ratepayer funded energy efficiency including a new USD 200 million Deep Building Renovation Pilot and establishment of an on-bill repayment scheme to be implemented state-wide in 2013 (Environmental Defence Fund 2012). PG&E is also partnering with other entities to develop new technologies and approaches, including a link-up with O-Power to create customized energy audits and neighbourhood energy savings comparisons and a partnership with DOE and Itron for the best Green Button application (PG&E 2012, The White House 2012).

Keys to the success of energy-provider delivered energy efficiency in California include:

- Decoupled revenue and sales
- Commitment by utilities, regulators, customers, and other stakeholders to improve the environment
- Incentives for shareholders of energy provider companies
- Aggressive efficiency improvements through building codes and appliance standards
- Manufacturers, distributors and third party delivery partners included in efficiency efforts.

Policy deliberations on energy provider-delivered energy efficiency are an ongoing affair in California. Issues under discussion for the 2013-2014 planning cycle include:

- Should the shareholder incentive continue in the future?
- What is the balance between local programmes, energy provider programmes, and state-wide programs?
- What entities born from ARRA funds should now continue to exist as part of on-going utility programs?
- Developing new marketing campaigns and on-bill financing options to encourage residential Deep Building Retrofits
- Expanded energy provider involvement in driving market transformation in energy efficiency for new products

Acronyms

ACEEE	American Council for an Energy-Efficient Economy
AGA	American Gas Association
APPA	American Public Power Association
ARRA	American Recovery and Reinvestment Act
ASAP	Appliance Standards Awareness Project
BGE	Baltimore Gas and Electric
BTU	British Thermal Unit
CBO	Community based organization
CEA	Canadian Electricity Association
CERT	Carbon Emissions Reduction Target (UK)
CGA	Canadian Gas Association
CHP	Combined Heat and Power
CONUEE	National Commission for the Efficient Use of Energy (Mexico)
CPUC	California Public Utilities Commission
DBR	Deep Building Retrofit
DOE	Department of Energy (US)
DPU	Department of Public Utilities (Massachusetts)
DRIPE	Demand reduction induced price effects
DSM	Demand-Side Management
ECM	Energy Conservation Measure
EE	Energy Efficiency
EEAC	Energy Efficiency Advisory Council
EEO	Energy Efficiency Obligations
EERS	Energy Efficiency Resource Standards
EPA	Environmental Protection Agency (US)
ESC	Energy Savings Certificate
ESCO	Energy Services Company
ETO	Energy Trust of Oregon
EU	European Union
FCM	Forward Capacity Market
GCA	Green Communities Act
GHG	Greenhouse Gas
HVAC	Heating, Ventilation and Air Conditioning
IDB	Inter-American Development Bank
IEE	Institute for Electricity Efficiency
IPART	Independent Pricing and Regulatory Tribunal (Australia)
IRP	Integrated Resource Planning
IT	Information Technology
LAC	Latin America and Caribbean
LED	Light-Emitting Diode
LIHEAP	Low-Income Home Energy Assistance Programme
LBNL	Lawrence Berkeley National Laboratory
M&V	Measurement and Verification
MEPS	Minimum Energy Performance Standards
M-I	Middle Income
MPSC	Maryland Public Service Commission

NARUC	National Association of Regulatory Utility Commissioners
NESI	National Energy Savings Initiative
NGO	Non-Governmental Organization
NPCC	Northwest Power and Conservation Council
NRECA	National Rural Electric Cooperatives Association
NSW	New South Wales (Australia)
NYSERSDA	New York State Energy Research and Development Authority
PACE	Property Assessed Clean Energy
PEPDEE	Policies for energy-provider-delivered energy efficiency
PRONASE	National Programme for the Sustainable Use of Energy (Mexico)
PSC	Public Service Commission
PUC	Public Utilities Commission
RAP	Regulatory Assistance Project
RESP	Rural Electric Savings Plan
RPS	Renewable Portfolio Standard
SCE	Southern California Edison
SEE Action	State and Local Energy Efficiency Action Network (US)
WAP	Weatherization Assistance Programme
WhC	White Certificates

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