Electricity Industry Restructuring for Efficiency and Sustainability: Lessons from the Australian Experience

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ABSTRACT

To reduce climate change emissions, electricity industry restructuring must deliver outcomes such as:

- Improved end-use efficiency, including building and equipment design
- Greater use of low-emission generation, including renewable energy and co-generation
- Greater use of actively managed energy storage facilities including some electrical loads
- Reduced losses in the energy conversion chain

It must also maintain appropriate supply reliability and quality despite greater reliance on time-varying renewable energy fluxes and small-scale distributed resources. Moreover, the need to achieve economically efficient outcomes remains as strong as ever, while energy security concerns (both short and longer-term) are receiving growing attention.

To deliver such outcomes requires a sophisticated approach to electricity industry restructuring that coordinates centralized and decentralized decision-making by policy makers, regulators, system operations, supply and demand side industry participants, equipment manufacturers and building designers. It is particularly important to establish a framework that allows Energy Service Companies (ESCOs) to play a key role in facilitating improved end-use decision-making. Advanced metering and communication and flexibility in demand are important in this regard.

This paper discusses the strengths and weaknesses of the Australian approach to electricity industry restructuring with particular attention to the role of ESCOs. It assesses the wholesale and retail energy and ancillary service market designs, tradable environmental instruments, advanced metering strategy and regulatory and policy framework with respect to efficient energy use, stochastic renewable energy generation and cogeneration, and energy storage. It makes suggestions on how to enhance participation by end-users, ESCOs, building designers, and equipment manufacturers.

Introduction and Context

There is now an urgent need to reduce the climate change emissions arising from fossil fuel use (Hansen 2005). The Australian electricity industry currently contributes around one third of Australian climate change emissions and has exhibited the highest emissions growth of any sector of the economy over the last decade.

The Australian economy is energy intensive in comparison with many other industrialized nations and has seen lower improvements in energy efficiency over recent decades (Australian Government, 2004). Despite some early expectations of improved climate change outcomes from restructuring, electricity generation remains predominantly from coal-fired generation with high greenhouse gas emissions (Australian Government 2004). Electricity consumption also continues to climb – it grew by 5% over 2003-4 and 3.4% the previous year (ESAA, 2005). This has important implications for the Australian electricity industry, including a need for (Australian Business Roundtable on Climate Change, 2006):

- improved end-use efficiency, including building and equipment design,
- greater use of low-emission generation, including renewable energy and co-generation,
- greater use of actively managed energy storage facilities including some electrical loads,
- reduced losses in the energy conversion chain, and
- maintenance of appropriate supply reliability and quality despite greater reliance on time-varying renewable energy fluxes and small-scale distributed resources.

In Australia as in many other countries this must take place in the context of a restructured electricity industry, a process that has usually concentrated on improving outcomes using traditional supply-side technology and that may not be well suited to accommodating the change in emphasis required to address climate change.

In particular, an effective climate change response in the electricity industry requires active and informed decision-making by end-users, with respect to so-called *distributed resource* options such as improved end-use efficiency, greater use of co-generation and small-scale generation options (including time-varying renewable energy technologies) and responsive electrical loads. Such a transition highlights the importance of ensuring that demand-side decision making is informed by price signals that reflect the time-varying, locational and uncertain (contingency dependent) value of electricity across the industry. This implies an expanded role for (broadly defined) Energy Service Companies (ESCOs), to assist end-users to meet their energy service requirements at minimum economic and environmental cost through appropriate use of distributed resources.

Thus we can define four new challenges for electricity industry restructuring with respect to the greater engagement of end-users and distributed resource owners, and the contribution of ESCOs towards achieving this (Outhred 2006):

- a technical framework that allows end-users, distributed resource owners and ESCOs to actively participate in the processes of managing quality and availability of supply,
- a commercial framework that induces efficient operation of, and investment in, cost-effective distributed resource options organized, where appropriate, via energy performance contracting,
- a policy framework that internalizes climate change externalities and that promotes socially desirable innovation in distributed resources and wise end-use decision-making,
- a legal framework that appropriately assigns risks and accountabilities to industry participants, regulators and system operators.

These challenges must be addressed in the context of the very significant short- and long-term uncertainty that characterizes the electricity industry as well as, in Australia, the mixed blessing of cheap coal and natural gas.

This paper commences with a review of the nature of, and outcomes from, electricity industry restructuring in Australia, including experience to date with end-user participation, distributed resources and ESCOs. We then discuss how the lack of a clear direction in climate change and energy efficiency policy has hampered development of distributed resources generally and the Australian ESCO industry in particular. After placing Australian experience in the international context, we suggest desirable future policy enhancements for Australia.

The Restructured Electricity Industry in Australia

Electricity industry restructuring in Australia formally commenced in 1991 under an agreement reached by the Council of Australian [Federal and State] Governments (COAG). This process is now largely complete at the wholesale level in the eastern and southern states. It includes the following features:

- disaggregation and in some cases privatization of the formerly state-owned monopoly supply industry structure,
- the formal introduction of the so-called National Electricity Market (NEM) in 1998,
- the creation of new policy frameworks and regulatory regimes for the NEM,
- partial or complete elimination of the retail franchise, and
- a parallel but less radical process of gas industry restructuring.

The outcome has been a largely consistent approach to electricity industry restructuring on an interconnected, multi-state power system that extends over 4000km. In particular, there is a single spot market and system operator for the whole of this system, called the National Electricity Market Management Company (NEMMCO). This is fortunate because the large geographical scope of this power system and its relatively small demand (about 30GW) mean that security issues are important and need to be linked closely to electricity trading.

The centerpiece of the NEM is a set of wholesale spot energy and ancillary markets that solve a security-constrained economic dispatch every 5 minutes. Commercial energy trading is based on 30-minute average spot prices and associated derivative instruments, particularly contracts for difference and call options. The transmission network is represented in the NEM spot energy market by a hub-and-spoke approximation to nodal pricing. Further information on the Australian electricity industry restructuring process is available in (Outhred 2004).

Experience to Date with Electricity Industry Restructuring

In traditional economic efficiency terms, the Australian electricity restructuring process has been very successful, with COAG recently stating that average real electricity prices have fallen by 19 per cent since the early 1990s, with the business sector being the major beneficiary although households also have gained (COAG, 2006). There has, however, been far less success in achieving other restructuring objectives such as reduced environment impacts and greater end-user participation in the electricity industry.

Recently, COAG agreed to establish an Australian Energy Regulator and an Australian Energy Market Commission (to develop and maintain electricity and gas market rules). It also set a new the objective for the National Electricity Market (section 7, National Electricity Law):

> *The national electricity market objective is to promote efficient investment in, and efficient use of, electricity services for the long term interests of consumers of electricity with respect to price, quality, reliability and security of supply of electricity and the reliability, safety and security of the national electricity system.*

Despite the seemingly confused characterization of 'electricity services' and the absence of any reference to the environmental sustainability, other recent COAG developments suggest that we may see an expanded role for distributed resources. A COAG communiqué (COAG, 2006) included further electricity industry restructuring commitments on the following issues:

- Maintain and increase reliance on market-based risk mitigation and hedging measures, and to remove barriers to full retail competition
- Progressive roll out of electricity smart meters to allow the introduction of time of day pricing and to allow users to respond to these prices and reduce demand for peak power
- Implement a comprehensive and enhanced Ministerial Council on Energy (MCE) work program, to establish effective demand-side response mechanisms in the electricity market, including network owner incentives, effectively valuing demand-side responses, regulation and pricing of embedded generation, and end user education
- Strengthen the national character of the transmission network and maintain the separation of generation and retailing from transmission
- Strengthen the equivalence between government-owned and private sector businesses
- Foster transparent and effective energy derivative markets
- Improve industry governance.

A high-level COAG Energy Reform Implementation Group is to be established to oversee the implementation of these commitments and advise on the need for further measures.

Experience to Date for End-users and ESCOs

With the exception of small customers in some NEM States, all energy users are able to participate directly in the NEM subject to metering and NEM membership requirements. However, all but a few very large energy consumers currently interface with the NEM via a retailer. Tariff arrangements offered by retailers for large industrial and commercial end-users typically involve a 2 or 3 period TOU energy tariff. Network charges will typically incorporate a 'peak load' component or may just be bundled together with the energy tariff (Energetics 2003). Few end-users have direct exposure to the NEM spot prices. Some large users with curtailable loads, however, do have interruption style contracts with retailers who are seeking to better manage their aggregate customer demand at times of very high wholesale prices.

Falling energy prices due to the success of supply-side electricity industry restructuring have engendered end-user complacency about electricity costs and discouraged effective management of electricity demand (Parer et al 2002, MacGill et al 2006). Many retailers offer 'energy services' consulting to larger customers however, current market arrangements mean that it is not generally in a retailers' financial interests to promote energy savings (Victorian Parliament 2005). A number of consulting firms offer energy procurement services but they have little influence on distributed resource outcomes. There have also been recent efforts to establish Demand Side Response (DSR) aggregators (see, for example, Energy Response Ltd 2006).

All but two States in the NEM now have 'so called' full retail competition where all small businesses and households can choose their retailer, although many choose to continue to receive supply from their default (franchise) provider. At present, most of these customers have only accumulation meters and 'profiling' is used to estimate varying usage over a typical day. Network pricing generally involves considerable smearing of augmentation and maintenance spending over all network customers.

The Australian Energy Performance Contracting Association (AEPCA, 2005) reports that "at March 2005 there were over 100 EPC's implemented in Australia with Commonwealth, State and Local Governments and the private sector, accounting for capital expenditure of $206 million, annual energy savings of $36 million, and annual CO2 reductions of 282,000 tonnes".

While this is a useful start, the level of activity is small in comparison to the Australian electricity supply industry, which has around $100 billion in assets, an annual turnover of nearly $20 billion (Energy Supply Association of Australia 2005) and annual climate change emissions of approximately 200 million tones. The Australian government expects that a further supply-side capital expenditure of at least $37 billion will be required by 2020 (Australian Government, 2004). Thus, a key question is how can the energy services sector develop to become a meaningful player in the future Australian electricity industry.

AEPCA argues that five policy elements will be required for ESCOs to achieve their potential – broad-based market signals for energy efficiency investment, making energy markets work on the demand-side, minimum performance regulations for the built environment, driving greater energy efficiency in manufacturing and developing the emerging energy services industry (AEPCA, 2005). As part of this latter point, AEPCA has established an accreditation process for ESCOs that includes technical skills as well as the financial stability required to support EPCs.

What is clear is that much more effort will have to be devoted to building both ESCO activity and end-user engagement if the industry is to deliver the significant reduction in Australian electricity consumption that will be required to meet climate change objectives (eg Saddler et al 2004; Australian Business Roundtable on Climate Change 2006).

Experience to Date with Embedded Generation

NEM-wide embedded generation – here defined as generation that does not participate in centralized dispatch – is currently around 2000 MW, with slightly less than half of this being cogeneration. This represents around 5% of total NEM installed generation capacity. Under so-called 'middle-of-the-road' policy settings, which actually assume increased policy support for embedded generation, it has been projected that this capacity may rise some 50% by 2010 and 100% by 2020 (NIEIR 2005). However, this would still represent well less than 10% of capacity given expected growth in conventional large-scale generation.

Embedded generation within the distribution network sees some price signals representing network losses and flow constraints. The Demand Management Code of Practice in State of NSW requires Distribution Network Service Providers (DNSPs) to consider distributed resource alternatives to network augmentation, and provides financial incentives to undertake them (IPART 2004). However, DNSPs still focus on network augmentation. As noted earlier, COAG has now committed to further progress in this area, including NEM rule changes to enhance the benefits of embedded generation and a National Code of Practice for Embedded generation (Utility Regulators Forum 2006).

Experience to Date with Climate Change Policy

Australia has, to date, been ambivalent about climate change policy. For example, it has not signed the Kyoto Protocol. It has, however, implemented some innovative climate change policies with more limited scope. In particular, Australia has been an early and enthusiastic adopter of market-based approaches to climate change regulation (MacGill et al 2006).

For example, the Federal Mandatory Renewable Energy Target commenced in 2001 and requires all Australian electricity retailers and wholesale electricity customers to source an increasing amount of their electricity from new renewable generation. They demonstrate compliance through the purchase of Renewable Energy Certificates (RECs) from eligible renewable generators that have been accredited by the scheme regulator. Generators commissioned after January 1997 are eligible to earn RECs for all of their output while pre-existing generators are eligible to earn RECs for generation above a historical baseline. The RECs provide an additional revenue stream for these generators beyond their energy sales in the NEM. The scheme saw considerable activity and investment by project developers including existing generator companies, retailers and new entrant companies. Now, however, investment has stalled due to the low renewable energy target. Several Australian States proposed that the MRET scheme be expanded but the Australian Government rejected this idea against the recommendation of the panel it appointed to review the scheme (MRET review panel 2003). Victoria is now considering a similar State-based scheme (Passey et al 2006).

Queensland has implemented a scheme that requires electricity retailers and other liable parties to source at least 13% of their electricity from gas-fired generation. The stated intention was to help meet Queensland's future energy requirements while reducing the growth in GHG emissions, and therefore ''reduce the vulnerability of the State's economy to the introduction of any national and international greenhouse gas abatement measures such as the introduction of emissions trading'' (Queensland Government 2002). This scheme has a similar design to MRET being based on Gas Electricity Certificates (GECs) from accredited new gas-fired generators. The scheme commenced in 2005 and has driven considerable investment in gas generation within the State, including a few small-scale industrial cogeneration projects.

NSW has implemented a Greenhouse Abatement Scheme (NGAS) that represents perhaps the most significant climate change regulation to date in Australia. This ambitious and innovative scheme sets emissions reductions targets for liable parties, primarily NSW electricity retailers. Retailers can demonstrate compliance through certified low-emission generation, energy efficiency and sequestration activities. In a similar manner to MRET, operation of this 'baseline and credit' trading scheme is built around NSW Greenhouse gas Abatement Certificates or NGACs, each representing a notional tCO2-e of 'avoided' GHG emissions.

Unfortunately, NGAS has some serious design flaws, in large part due to the difficulties of assessing the 'additionality' of claimed abatement actions, which is essential if the scheme is to be effective and efficient in achieving its objectives. Testing additionality is fraught because it requires a counter-factual assessment of what would have happened otherwise. The wide range of eligible abatement options (including energy efficiency and eco-system sequestration) adds to these challenges, and greatly increases the scheme's complexity (MacGill et al 2005a).

Nevertheless, NGAS has driven some demand-side initiatives including programs to distribute free CFL lights and water-efficient showerheads to the public. Projects in commercial buildings such as lighting and HVAC upgrades also earn NGACs (IPART 2006). Such activities, however, represent less than 5% of NGACs created to date.

NSW and other States have argued strongly for a national emissions trading scheme. However, the Federal Government has opposed such an approach, preferring to focus instead on technology-led RD&D for a range of emerging energy technologies (Australian Government 2004). In light of this, State Governments are exploring options for a multi-state scheme implemented under their own jurisdictions (National Emissions Trading Taskforce 2006).

Overall, experience to date with climate change policy for the Australian electricity industry has been mixed. Per-capita and per-$GDP emissions are high by comparison with most other industrialized nations and continue to increase. While some policies such as MRET have been innovative and successful within their limited environmental objectives, a coherent policy framework has not been achieved. In particular, there is no consistent price on greenhouse emissions. This is a major failure of Australian electricity industry restructuring to date because, without a carbon price signal, electricity prices remain very low by world standards and industry decision making has paid little attention to its large and rapidly rising greenhouse emissions.

Experience to Date with Energy Efficiency Policy

As noted earlier, Australia's economy has low energy efficiency levels in comparison with many other OECD countries. Energy efficiency policy instruments have typically been no-regrets actions that are cost-effective in direct cost terms.

However, there have been some notable exceptions including Australia's Minimum Energy Performance Standards (MEPS) regulations. There are now MEPS for refrigerators and freezers, electric storage water heaters, three phase electric motors, air conditioners, fluorescent lamp ballasts, distribution transformers and commercial refrigeration (Australian Government, 2006). There are also proposals to expand MEPS to gas water heaters and space heaters, home electronics and office equipment, swimming pool and spa equipment. There is an important caveat that individual performance standards are not always set at world's best practice.

In 2004 the MCE agreed to implement the first stage of a National Framework for Energy Efficiency (NFEE 2006) including minimum energy design performance standards for new and renovated homes and commercial buildings, mandatory requirements for large energy consumers to undertake energy audits, nationally coordinated training and accreditation for energy assessors, an expansion of MEPS both in coverage and stringency (with particular focus on industrial equipment) and enhanced government efforts to improve the efficiency of their own operations (Ministerial Council on Energy 2004). Governments have also committed to considering possible further second stage measures which could include broad-based incentives.

Both Victoria and New South Wales have implemented minimum energy performance standards for new residential housing in advance of any national approach through NFEE. Victoria has also established mandatory energy efficiency audits for industrial facilities licensed by the State Environmental Protection Agency. Companies are required to undertake any identified opportunities with financial paybacks of less than three years. NSW has recently established an Energy Savings Fund financed from distribution network tariffs that offers competitively allocated funding for energy efficiency projects. Other policies in these and other jurisdictions are also in place (Ministerial Council on Energy 2006).

Energy Efficiency policy efforts, however, have been criticized in a recent Inquiry Report (Productivity Commission 2005) into The Private Cost Effectiveness of Improving Energy Efficiency. This report questioned whether there were still any significant 'no-regrets' energy efficiency opportunities in Australia and, as a result, whether MEPS were privately cost effective. It recommended that agreed Stage 1 NFEE proposals should only proceed after the net social benefits of such programs had been established. This report has created considerable controversy – some observers including the Victorian State Government have questioned the limited scope of the inquiry's terms of reference because Private Cost Effectiveness is not an appropriate basis for determining policy.

In our view, one of the major weaknesses of the Productivity Commission report is its failure to recognize the limited autonomy of end-users in competitive energy markets – failures to take policy action on energy efficiency will only consolidate existing market distortions and require government intervention on the supply-side of the industry (MacGill et al 2005b). Thus, the Productivity Commission Report would seem to be part of continuing resistance to enhancing energy efficiency policy at the national level.

A Policy Framework to Support Growth in the Energy Services Sector

The overall objective for electricity industry restructuring can and should be defined as creating a context in which economic, environmental, social and technical sustainability can be achieved. This in turn implies a decision-making framework in which end-users (with the support of ESCOs) play a central role, because they are the industry participants who are best placed to make informed decisions about the nature and timing of the delivery of end-use energy services. Attributes of such a decision-making framework include:

- Coordination of decentralized decision-making via efficient spot and derivative markets in energy and ancillary services. This would be enhanced by formally extending the scope of National Electrical Market to include all end-users and distributed resource operators as direct market participants (this is presently available as an option for all contestable end-users).
- Support for decision-making by small industry participants, in the form of advice and appropriate resources, to allow them to actively and effectively participate in the market processes. Existing retailers could provide such support by evolving into entities much more like traditional ESCOs.
- A careful balance between centralized and decentralized decision-making, which devolves authority and accountability to those decision-makers best placed to make autonomous and informed decisions.
- Active engagement of end-use equipment and embedded generation manufacturers and suppliers in developing and marketing sustainable energy technologies.
- Policies that internalize important social and environmental externalities and that address the essential service aspects of electricity supply for low income and rural households.

The ESCO model (defined in the broad manner above) seems to us to be the most appropriate way to support wise-decision making by end-users and providers of distributed resources. ESCOs would act throughout the end-use sector of the electricity industry as facilitators for enhanced end-use efficiency, embedded generation and energy storage. They may specialize in particular technologies or end-use sectors. It may be appropriate to franchise ESCOs as part of a social policy strategy to work with particular classes of end-users such as low-income and/or rural households or with all residential end-users in geographical groups.

The proven spot and derivative design of the NEM wholesale electricity market, in conjunction with universal metering and advanced distribution network and retail market pricing that signaled local congestion, would provide a sound basis for the extended market model described above. Formally organized, auction-style derivative markets would augment the existing formal spot markets in energy and ancillary services.

As part of the retail contract negotiation process, large end-users already typically provide retailers with historical information on their electricity consumption to assist in the tendering process. This approach could be formalized into one in which all end-users entered into derivative contracts based on historical behavior as recorded by interval metering, planned future investments in end-use equipment, anticipated local network congestion, expected future NEM prices for spot energy and ancillary services and other relevant factors.

End-users could use contracts for difference to hedge expected future electricity consumption, supplemented by call options to hedge uncertain additional demand, such as temperature-sensitive air-conditioning use. An auction-style derivative market could be used to assign financial rights to distribution network constrained network capacity to the highest-value end-uses. This would also define the network service substitution value of distributed resources.

This approach would be a natural retail extension to the existing NEM spot and derivative wholesale market model, which includes a representation of transmission flow constraints. It would also be a natural extension to the existing auction for inter-regional settlement residues, which NEMMCO conducts on a quarterly basis.

International Approaches to Electricity Industry Restructuring

Recent North American experience has illustrated the need to jointly solve the engineering problem of maintaining availability and quality of supply with the economic problem of efficient operation of and investment in electricity industry assets including distributed resources. These issues were addressed in recent testimony before the Federal Energy Regulatory Commission on behalf of the PJM Interconnection, North America's largest electricity market. (Zibelman and Ott 2006).

In that testimony, Zibelman and Ott make the following points:

- The PJM marketplace has three components – a liquid energy market, an independent regional transmission planning process and a capacity market
- While operating efficiencies have been achieved, there are unmistakable signs of a looming problem in ensuring the new investment needed to maintain reliability in the PJM market region
- The current capacity market arrangements are not supporting the coordinated investment in generation and networks or demand response required to maintain reliability.
- The reliability value of generation and demand response resources varies by location.
- A Reliability Pricing Model (RPM), which has been developed to address this problem, has three fundamental elements – a binding four-year forward commitment for generation and demand; Locational Capacity Pricing; and a Variable Resource Requirement mechanism. Of these, the four-year commitment responds to the lead-time required for generation and network investment, the locational pricing responds to the problem of power system flow constraints and the variable resource requirement is to provide elasticity in the regulatory requirement to improve price and quantity discovery.

In comparing this proposal to the Australian experience, we can note the following:

- The Australian NEM energy and ancillary services spot markets incorporate a network model and thus internalize key locational information. This would be further enhanced by the introduction of advanced model markets at the transmission level and distribution network pricing that reflected local flow constraints (Outhred 2006).
- Derivatives based on the NEM spot market prices automatically internalize the locational values in the spot market and provide a more efficient alternative to capacity markets, particularly with respect to the untapped but broad range of distributed resource options. Introducing auction-based derivative markets that included network models could further

enhance derivative market performance and better signal the value of distributed resource options.

Glachant and Léveque (2005) have recently proposed the following priority actions for electricity industry restructuring in the European Union:

1. Ensuring better access to, and improvement of, balancing services
2. Ensuring access to competitive gas supply long term contracts
3. Improving the efficiency of the management of interconnections
4. Setting a European Market Surveillance Committee Network
5. Encouraging the negotiation of reinforced regional cooperation between TSOs
6. Seeking objective criteria for evaluating Europe's interest in grid interconnections
7. Encouraging bilateral and regional harmonization agreements between regulators
8. Developing a pan-European regulatory knowledge and training in the European Union

In comparing the EU experience to that of the Australia, we can note the following:

- The Australian NEM security-constrained energy and ancillary service spot markets provide a more efficient mechanism than a balancing market for managing short-term uncertainty.
- As in the EU, gas industry restructuring in Australia is still in its infancy
- Interconnections are modeled in the Australian NEM, allowing their losses and flow constraints to be represented directly in the market processes
- The Australian NEM already has uniform market surveillance and a single system operator independent of transmission over a geographical scope similar to that of the EU. Regulation is uniform at the transmission level and is in the process of being unified at the distribution level.

Thus in summary, the Australian approach to electricity industry restructuring appears to at least as favorable to the development of a significant energy service sector as either the North American or European approaches. It seems clear that ESCOs have yet to achieve their full potential in any of them. This highlights the need for electricity industry restructuring to focus on active and informed participation by end-users, and to develop the institutional ESCO capacity required to deliver this. The Australian experience shows how a failure to extend restructuring to end-users and to provide a complementary framework for climate change and energy efficiency can detract from the long-term sustainability of a restructured electricity industry.

Conclusions

Australia has made considerable progress with electricity industry restructuring since the early 1990s. The industry culture has changed and real electricity prices have fallen. The spot and derivative electricity market design has been effective. However problems remain, including tensions between the regulated and competitive sections of the industry, rising climate change emissions and increasing investment in network assets that are needed only to meet extreme peak demand. The role of ESCOs has been heavily curtailed.

Active engagement of end-users in decision-making and deployment of distribute resource options is the key to further progress. This could be achieved by:

- Extending the proven NEM wholesale spot and derivative market design to the retail level, supported by the roll-out of interval metering and associated communications and control technologies,
- Significantly expanding the role of ESCOs to support end-user decision-making, possibly on a franchise basis for small end-users, particularly low-income and rural households
- Implementing effective, market-compatible social and environmental policies and providing support for socially beneficial innovation by distributed resource providers.

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