

Submission to the COAG Energy Market Review

Hugh Outhred, Muriel Watt, Iain MacGill, Karel Nolles and Karl Mallon
The Australian CRC for Renewable Energy and
The University of New South Wales
Sydney NSW 2052
Email: h.outhred@unsw.edu.au
April 2002

Introduction

Although not explicitly stated in the Issues Paper, this COAG review focuses on the stationary energy sector. We hope that the equally important transport sector will be the subject of a future review.

The Issues Paper states that COAG has agreed to the following national energy policy objectives:

- encouraging efficient provision of reliable, competitively-priced energy services to Australians, underpinning wealth and job creation and improved quality of life, taking into account the needs of regional, rural and remote areas;
- encouraging responsible development of Australia's energy resources, technology and expertise, their efficient use by industries and households and their exploitation in export markets; and
- mitigating local and global environmental impacts, notably greenhouse impacts, of energy production, transformation, supply and use.

These are all worthwhile objectives. In particular, the focus on "energy services" in the first objective is welcomed. COAG's objectives also recognise the need to consistently and coherently target economic, environmental, social and technical sustainability, exploiting the synergies while avoiding the potential conflicts between these goals. They are consistent with the brief from Special Premiers' Conferences of 1990 and 1991 to the National Grid Management Council (NGMC) to design a restructured electricity industry that was both economically efficient and environmentally sound.

However in the last decade, stationary energy sector policies have focused on improving supply-side productive efficiency, which has improved dramatically but at the cost of rapidly growing climate change emissions. Also, regional communities have experienced job losses and degradations in supply reliability, with emerging concerns about future service delivery. The restructured electricity industry remains supply-side dominated, and clearly has the objective of selling electricity rather than sustainable end-use energy services.

The Issues Paper lists the following priority issues for consideration in the review:

Without limiting the conduct or scope of the review, priority issues for consideration are:

1. *Identifying any impediments to the full realisation of the benefits of energy market reform;*
2. *Identifying strategic directions for further energy market reform;*
3. *Examining regulatory approaches that effectively balance incentives for new supply investment, demand responses and benefits to consumers;*
4. *Assessing the potential for regions and small business to benefit from energy market development;*
5. *Assessing the relative efficiency and cost effectiveness of options within the energy market to reduce greenhouse gas emissions from the electricity and gas sectors, including the feasibility of a phased introduction of a national system of greenhouse emission reduction benchmarks; and*
6. *Identifying means of encouraging the wider penetration of natural gas including increased upstream gas competition, value adding processes for natural gas and potential other uses such as distributed generation, because it is an abundant, domestically available and clean energy resource.*

This list continues the supply-side policy bias. Moreover, it is surprising to see the claim that natural gas is a “clean energy resource”. Using natural gas to generate electricity creates climate change emissions, albeit significantly lower per MWH than coal in combined cycle or cogeneration plant, and may also release nitrogen oxides. Unburned natural gas has a much higher global warming potential than carbon dioxide.

To correct the supply side bias in the list of priority issues, it would not be sufficient to simply add on an objective or two about efficient energy use. Rather, the challenge of delivering sustainable end-use energy services should be addressed in a holistic way. In particular, competition is a means not an end. It is a tool to be used in the stationary energy sector in combination with industry structural design and regulation, within a coherent framework of consistent economic, environment, industry and social policies.

In the remainder of this submission, we respond to the Issues Paper and in particular, the specific questions that stakeholders have been invited to address. In doing so, we have kept in mind the need for a broader policy framework. However we note that such a coherent framework cannot be constructed by addressing these questions alone.

Our submission is based on a general view that carefully implemented industry restructuring could achieve sustainable outcomes by means of effective competition in those parts of the industry where it is feasible and efficient regulation where it is not. However this will not happen unless the industry objectives are refocused on the delivery of sustainable energy services and the important social and environmental externalities are internalised into the decision making of industry participants.

One issue of concern is that the current approach to energy industry restructuring relies on implementing competition in all circumstances. However, in practice, governments continue to seek to influence market outcomes for a range of social and political reasons. These potentially conflicting objectives must be reconciled otherwise the inconsistencies in the design of the restructured industry will remain.

General comments on the Issues Paper

The Issues Paper has sections on energy market reform (including regulation), regional areas, small business, market-based options to reduce greenhouse gas emissions, increasing the penetration of natural gas and strategic directions. These are important issues in the delivery of “reliable, competitively-priced energy services” but they are not the only ones. In particular, they do not address the over-arching issues of the institutional framework and the physical characteristics of the electricity industry.

To deliver energy services requires an energy conversion chain, in which primary energy forms are converted into end-use energy forms, using electrical energy as an intermediate energy form in the case of the electricity industry. To achieve economically efficient and environmentally sound outcomes, investment and operating decisions at all steps of the energy conversion chain must be coordinated, starting from the point of end-use. More specifically, the following questions should be answered for each end-use energy service:

- What are the available options to meet this end-use energy service, considering supply side options (such as a power station or a gas pipeline) and demand side options (such as improved end-use efficiency, fuel switching or demand-shifting) for all energy resources available at the point of use (such as electricity, gas and renewable energy)?
- What are the direct and external costs and benefits associated with each available option, and hence what is the most cost-effective option?
- Does the most cost-effective option to deliver this end-use energy service have a positive net benefit?

The decision-making processes in the stationary energy sector should be designed to allow these questions to be answered. Thus great importance should be placed on informed decision making by end-users, which in turn requires them to have adequate resources, knowledge and meaningful options.

The restructured electricity and gas industries are noticeably deficient in this regard. The end-user is regarded as the purchaser (the “consumer”) of an energy commodity (electricity, gas) rather than the key decision maker with respect to the delivery of energy services.

To date, most attention in the electricity industry restructuring process has been given to the design of wholesale electricity markets, with some attention to network regulation and retail market design. Least attention has been given to the needs of end-users, and this is reflected in the increasing nervousness of jurisdictions as they turn their attention to the implementation of “full retail competition”. Two key steps in electricity and gas restructuring should now be taken - to provide the necessary support for informed decision making by end-users and to internalise important social and environmental externalities. Careful consideration should be given to introducing a new category of industry player (perhaps called “energy service facilitator”) to assist small end-users make informed decisions. Consideration should also be given to retaining regulated distributor-retailers in regional areas where energy choices are often restricted and competition is least effective.

Responses to suggested questions for stakeholders to address

Wholesale markets

The important issue of holistic market design for the electricity industry is not adequately addressed by the questions posed in the Issues Paper.

An electricity network does not support physical bilateral trade between a particular generator and a particular end-user. Rather, the network provides a shared energy transfer platform that operates according to the laws of physics rather than according to commercial contracts. Thus a time-varying mix of end-use equipment will absorb the electrical energy injected into the network by a particular power station and a time-varying mix of power stations will provide the electrical energy absorbed by a particular item of end-use equipment. Similarly, network losses are supplied from a time-varying mix of power stations.

Because of a lack of cost-effective storage of electrical energy, power stations cannot convert primary energy forms into electrical energy unless end-user load equipment is ready to immediately convert it into end-use energy forms. Also, transmission and distribution networks must provide the paths necessary to allow the transfer of energy to occur. Likewise, end-user electrical equipment without internal energy storage cannot deliver energy services for end-users unless power stations are available to immediately produce the electrical energy they need and networks provide the necessary paths to allow the transfer to occur.

The rate of production of electrical energy by each power station, and the rate of consumption of electrical energy by each item of load equipment, is a stochastic process. The network provides a physical aggregation function subject to energy flow limits, which can be defined commercially as network-based arbitrage, and which exploits the diversity between the individual stochastic processes of electricity production or consumption. However items of network equipment are themselves subject to failure (outages) and thus the ability of the network to provide this arbitrage function is itself a stochastic process, particularly with respect to small end-users connected to distribution networks. Also, the network arbitrage function loses its effectiveness when the individual stochastic processes are strongly correlated, for example the demand for air-conditioning on a hot summer day. In that particular case, it is important to note that network flow limits also become more constraining on hot summer days.

Power station operators and end-users have a common interest in managing the risks associated with their future electrical energy flows at their points of connection to the network. In broad terms, power station operators and end-users face symmetrical risks. However, they are usually of different sizes and at different locations. Just as the physical network provides arbitrage to manage the stochastic physical energy flows in “real-time”, so could an over-arching network service provider provide commercial arbitrage to manage the risks associated with its ability to arbitrage physical energy flows in the future. Again, the ability of the network to contribute to managing future risks will depend on projected diversity and flow constraints.

Thus an ideal electricity market framework would provide trading arrangements for ancillary services, spot energy and financial instrument trading for all power station operators, end-users and network service providers. This framework would allow each network user (power station or end-user) and network service

provider to manage their physical behaviour in ancillary service and spot energy markets and their risk exposure in the financial instrument market. We are not yet able to implement an ideal electricity market of this kind, the main barriers being the absence of well-designed retail markets, reliance on asset-value based regulation of network service providers, and the immaturity of commercial ancillary service arrangements to manage availability and quality of supply.

Key steps in the transition path are to improve retail market design and network regulation. The relatively well-designed NEM wholesale electricity market, which has generators as sellers and electricity retailers as buyers, is not by itself an adequate commercial model of an electricity industry. An equally well-designed retail market that has retailers as sellers and end-users as buyers must complement it and, in time, these should be merged into one network-wide market framework in which generators were sellers, end-users were buyers and network service providers acted as arbitrage agents. In addition, end-users, particularly small ones, should have unbiased sources of informed advice to assist them to make informed decisions about their energy services.

The network role should be competitive to the extent that it is possible to do so. Where this is not possible, efficient regulation should provide incentives for network service providers to maintain the energy flow paths between generators and end-users subject to competition from distributed resource alternatives.

To what extent do existing wholesale market arrangements create impediments to the emergence of competitive and sustainable wholesale energy markets?

The electricity industry is capital intensive and lacks intermediate energy storage. It has important social and environmental externalities. To achieve efficient outcomes, the industry requires excellent coordination of operating and investment decisions. Thus “competitive and sustainable” wholesale energy markets require well functioning and coherent arrangements for ancillary services, spot energy and derivative trading, with adequate representation of electricity networks and consideration of important externalities.

The National Electricity Code defines a spot market of basically sound design with ancillary service arrangements and network representation that still need to be improved. The Code is noticeably silent about financial instrument trading. Externalities have yet to receive adequate consideration. Retail markets have not been designed to be efficient and compatible with the wholesale market design.

What can be done to improve wholesale market structures to encourage the development of more mature energy markets?

Develop a consistent market framework for ancillary service, spot energy and financial instrument trading, each with appropriate levels of network representation. Implement a compatible retail market design. Introduce taxes or tradeable instruments for important externalities.

To what extent does Australia have efficiently operating wholesale energy markets that deliver reliable, affordable and sustainable outcomes?

As previously discussed, a wholesale electricity market cannot on its own deliver “reliable, affordable and sustainable outcomes”.

The Australian NEM spot market design is basically sound and reasonably innovative, but improvements are required as previously indicated. These mainly relate to the structures that should surround and support the spot market – ancillary services, derivative markets and externalities, as well as compatible retail market design and support for informed decision making by end-users.

What further action is required, if any, to deliver more effective signals for new investment in wholesale energy markets?

The most important steps are to improve the efficiency of financial instrument trading, including adequate network representation, and to introduce taxes or tradeable instruments for important externalities.

However efficient investment requires the correct balance between supply and demand side options. This requires consistent and efficient retail markets and support for informed decision-making by end-users.

To what extent have wholesale markets delivered appropriate levels of supply reliability?

Most interruptions to supply are due to distribution network outages, over which wholesale markets have no influence. Wholesale markets are not appropriate mechanisms for managing problems of summer and/or winter needle peak demand. The needle peak problems currently being experienced in South Australia and Victoria, and emerging in New South Wales are have less to do with wholesale market design and more to do with poor implementation of industry restructuring, including inappropriate structural choices, poor design of retail markets, a lack of support for end-user decision making and poor regulatory paradigms for network services.

What could be done to strengthen the wholesale market's capacity to efficiently deliver reliable energy services? Is a regulatory solution required?

As previously discussed, wholesale markets have less influence over delivering reliable energy services than other aspects of electricity industry restructuring. It is unlikely to be efficient to invest in generation to meet uncertain additional summer peak demand that may only be present for a few hours per year if at all. Instead, more should be done to encourage wise demand side choices in delivering energy services, and demand side participation in well-designed retail markets. Regulatory oversight is needed but regulatory intervention should be a measure of last resort.

How important is diversification of ownership and control in the development of efficient and innovative energy markets?

Diversification of ownership and control is important in ensuring adequate competition in wholesale (and retail) markets. Public ownership should not necessarily be a problem, however it has proved difficult in practice for governments to reconcile ownership of electricity industry assets with a disinterested approach to market design and industry regulation. With privately owned assets, there is likely to be a trend towards concentration of ownership in the pursuit of greater profits. Such a trend would undermine competition if it were allowed to proceed too far.

Are current ownership and control arrangements preventing the full realisation of energy market reform benefits? How should this be addressed?

Current government ownership and control arrangements do appear to be interfering with the full realisation of energy market reform benefits. The highest priority for governments should be to represent the broad community interest. They should either sell their electricity industry assets or develop mechanisms that allow them to take a far more disinterested approach to their financial outcomes.

To what extent are existing transitional arrangements influencing the timely development of competitive and sustainable energy markets?

Restructuring can have multiple objectives some of which conflict with the longer term sustainability objectives. These include privatisation strategies that maximise sale values through inadequate competition, high asset valuations or inappropriate tariff structures, and "sweet-heart" deals for large energy users.

Transitional arrangements have reflected conflicting objectives of this kind, and have been prolonged through de-facto extensions, such as the NSW Electricity Tariff Equalisation Fund (EETF) or derogations. In response to financial pressures resulting from high sale prices, new owners may adopt short-term profit-maximisation strategies that under-spend in maintenance of their physical assets. Phenomena of this kind detract from the ability of the competitive industry to deliver sustainable outcomes.

How could transitional issues be more effectively managed?

Most transitional arrangements have been in place for too long to undo any damage they may have caused. The most important remaining issues are in the implementation of retail competition for small end-users (or alternative arrangements if full retail competition does not proceed). Governments should establish and abide by a clear timetable for eliminating all distorting arrangements. All transition arrangements should be tested against the broad public interest and only implemented after effective public consultation. Vesting contracts should match a plausible state that a market would have arrived in the same context.

What barriers exist to the development of innovative and sophisticated financial markets? What could be done to accelerate the development of these markets?

The nature of the electricity industry means that there are important industry-wide aspects of financial market behaviour that parallel the importance of secure system operation in spot market design and implementation. Governments should facilitate the development of derivative markets that incorporate network representation, with public dissemination of aggregate information on trading volume (by location). Retail markets should have the same structure as wholesale markets (ancillary services, spot energy and forward contracts, supported by electronic metering) so that the risk chain can be completed through to end-users. More thought should be given to the design of financial instruments that are appropriate to the electricity industry context.

Has common ownership of contestable generation and retail businesses hindered or distorted the timely development of financial markets?

Off-market arrangements, such as vesting contracts or the ETEF reduce the effectiveness and competitiveness of financial markets and can share many of the features of vertical re-integration, exacerbating supply side bias. They should be designed with great care and only used over a defined transition period.

Networks

Networks allow sources of supply to be separated from points of end-use by providing connectivity between the two. In the electricity industry, even momentary interruptions to connectivity can result in interruptions to delivery of energy services. Thus electricity networks have a crucial role to play. However it is not a monopoly. In many situations, “distributed resources” can provide local services that substitute for network services. Distributed resources can have significant advantages in social and environmental sustainability. Therefore it is important that network services should be competitive where possible, and that pro-competitive regulation should be implemented where it is not.

What incentives exist, or could be developed, to improve the effectiveness of network services provided to competitive energy markets?

The number of regions in the National Electricity Market should be increased to enhance the integration of network services into the wholesale market. Appropriate financial instruments should be implemented to better manage the risks associated with intra-regional flow constraints, and the existing instruments that support inter-regional trading should be further enhanced.

In the near term, network planning processes should be implemented independently of network service providers, with an end-use perspective that provides even-handed consideration of generation, network and demand-side options and internalises social and environmental externalities. Network service providers should be given incentives to facilitate the increased use of distributed resources rather than to resist it as at present. In this manner, investment in regulated network services would underwrite market processes (providing an insurance against market failure) rather than pre-empt them.

In the longer term, the efficiency of retail markets should be improved, and eventually, wholesale and retail markets should be combined into a single network-wide market for electricity and a similar one for gas.

How should this be pursued?

These initiatives could be implemented through modifications to the National Electricity Code, first to improve network regulation and then to improve retail market design.

Does the coexistence of market and regulated network services in the National Electricity Market promote efficient network investment and development?

It is difficult for market and regulated network services to coexist in a way that avoids distortions in investment decision-making. The main problems are that network services are regulated on an asset value basis rather than a service value basis; and that investment decisions are based on demand forecasts rather than on forward contract commitments. As discussed above, investment by regulated network service providers should underwrite market processes, not pre-empt them.

Should network pricing arrangements be refined to encourage more efficient use and development of networks?

Network pricing is a key mechanism for providing efficient incentives for generators and loads to locate where they can improve the local supply/demand balance. However it is difficult to design efficient network pricing tariffs using conventional network regulation that is based on asset values rather than network service values.

The key to resolving this problem is to design and implement efficient retail markets in ancillary services, spot energy and forward contracts, which would allow market values for network services to be determined, and network regulation to be largely replaced by oversight of the functioning of wholesale and retail markets. In time, the distinction between wholesale and retail markets should be dropped.

If so, how should this be done?

A systematic approach should be taken to designing and implementing ancillary service, spot energy and financial instrument retail markets in important load centres. Small end-users should be offered choice between standardised forward contracts that provide meaningful tradeoffs between cost and supply availability, particularly with respect to supply reliability and supply availability at times of local and regional peak demand.

Are network planning processes an impediment to efficient network development?

Network planning processes based on long-term demand forecasts usurp the role of markets in managing the future supply-demand balance at a local and regional level. Investment risks are centralised when decisions are based on forecasts, and the investment costs must then be recovered through cost-recovery tariffs. This prevents alternative supply and demand side options, which rely much more on market mechanisms, from competing efficiently with network investment options.

If so, what should be done to address current deficiencies?

Experience to date suggests that network service providers find it difficult to implement even-handed planning processes, due to the asymmetry in their risk exposure and their legal liability for availability and quality of supply. Network planning processes should be separated from network ownership, and should underwrite market processes, not pre-empt them. Ancillary service, spot and forward contracts rather than an implied “obligation to serve” should be used to manage supply availability and quality.

Retail markets

Industry-wide commercial models used for electricity and gas industries should cover in a consistent manner the full energy conversion chain from primary energy to end-use energy services. Retail markets are an essential part of an industry-wide commercial structure, although in time, they should be combined with wholesale markets to give one network-wide market. This is particularly important for electricity, which is an intermediate energy form with an extremely short life span.

Retail markets for electricity must be very sophisticated to manage issues of availability and quality of supply. This applies even to the smallest end-users, because most problems with supply availability and quality are associated with distribution networks rather than transmission networks or large-scale generation. Interval metering, which can also record key measures of supply availability and quality, should be installed at the points of connection of all generators and end-users. Retail contracts, covering ancillary services, spot energy and financial instruments should be carefully designed. Small end-users should be given support to make informed decisions regarding choice of fuel and distributed resources.

To what extent have contestable customers benefited from customer choice?

Larger contestable customers have benefited from customer choice because a large proportion of their cost of supply is determined by the cost of generation, and the efficiency of the National Electricity Market is much better than that of the regulated arrangements it replaced. However, these have been short-term benefits in direct cost terms, rather than long term benefits that take social and environmental externalities into account. Those are much harder to deliver because retailers are not directly involved in the operation of the electricity or gas industries and only respond to commercial drivers.

Smaller contestable customers have benefited less, because their costs and supply availability and quality are strongly influenced by the design and operation of their local distribution networks, which remain monopoly issues, outside the retail market. Also, they lack appropriate metering and control technology for participating in the provision of ancillary services, and may have few choices in energy supply vector or appliances.

Are there any impediments to consumers exercising effective choice?

The opportunities for end-users to reduce the cost of electricity supply through operating strategies mainly relate to the timing of consumption and to the level of availability and quality of supply. This requires modern electronic metering that not only records energy consumption by market interval, but also key measures of supply availability and quality. Such metering is particularly important for small end-users, who are most dependent on low voltage distribution networks, where there are important tradeoffs between cost and availability and quality of supply.

Investment opportunities for end-users should include choice of fuel (electricity, gas, end-use renewable energy sources), improvements to end-use energy efficiency and demand management. Greater attention should be given to the development of appropriate technology, including installation and maintenance, and to decision making support, including financing and advice.

What broader energy market benefits may be denied if effective customer choice is not introduced for all energy consumers?

Effective end-user choices, in the broad sense as defined above and not just choice of retailer, are crucial to achieving appropriate levels and kinds of investment in electricity and gas industry infrastructure, including choice of generation technologies, network augmentation and the appropriate balance between supply and demand side options to deliver economic, environmental, social and technical sustainability.

For example, before renewable energy technologies can offer real choices, they must have established delivery, installation and maintenance infrastructure, as well as display and demonstration systems and widely disseminated information.

Who might be adversely affected and how should their interests be addressed?

Inefficient retail markets disadvantage society as a whole. In addition, experience suggests that small end-users are likely to bear a greater share of the inefficiencies than larger end-users, who have better metering, better understanding and greater bargaining power.

Is effective demand side participation important for the development of efficient and sustainable energy markets?

Effective end-user participation is extremely important in the electricity industry to achieve efficient operation and investment that delivers sustainable energy services. To induce appropriate end-user behaviour, sustainability drivers must be incorporated in the market, through taxes or tradeable instruments.

What more, if anything, should be done at this stage to improve demand side participation in energy markets?

Demand side participation in energy markets is very important to improving all aspects of the sustainability of energy service delivery. The present industry structure, which emphasises energy commodities rather than end-use energy services, has led to a drive by energy retailers for increased energy sales volume, with the support of the rest of the supply industry and at the expense of end-use efficiency, cogeneration, end-use renewables and demand management services.

Efficient retail markets are an important prerequisite to durable outcomes from restructuring. Otherwise, distorted prices for “expensive” loads such as summer peak-day use of air-conditioners, will lead to poor operating and investment decisions that over-emphasise supply-side solutions and incur unnecessary long-term costs. Equally, there will be poor long-term outcomes unless externalities are taken into account in decision-making.

Also, the structure of the stationary energy sector remains biased towards the supply side, with little support being given to supporting effective end-user decision-making.

Thus, more attention should be given to internalising externalities, designing efficient retail markets (ancillary services, spot markets and forward contracts), introducing support for end-use decision-making and exploiting modern metering and control technologies.

Regulation

Regulation will remain an essential part of the restructured stationary energy sector, particularly with respect to network service providers, who will always have market power, and to incorporate externalities into decision-making processes. More needs to be done to ensure that regulation adopts an energy service perspective, and addresses economic, environmental, social and technical sustainability in a balanced manner that is compatible with a competitive industry structure.

Do the current ‘coverage’ criteria in the various regimes result in all services that should be regulated being caught and excluding those that shouldn’t?

There will always be difficulties at the boundaries between regulated and unregulated services. In particular, regulated network services sit uncomfortably between de-regulated generation and end-use.

Regulation of network-based industries should be consistent across the full scope of the network. Thus more should be done to achieve national consistency. Also, electricity and gas industries should be regulated in a consistent manner.

If not, how can the criteria be improved?

More attention should be given to the design of efficient retail markets and to the introduction of modern metering technology and decision-making support for small end-users. This would allow further de-regulation of network services, reducing the regulatory boundary problems mentioned above.

Is the current economic regulatory approach appropriate for developing a competitive energy market?

Network regulation should not be based on asset valuations and guaranteed availability and quality of supply. Instead, retail market design should be enhanced with the ultimate objective of implementing

network-industry wide markets in which all network users and network service providers participate, and which give end-users meaningful control over the delivery of their energy services.

To what extent are the current regulatory frameworks providing an appropriate balance between protecting the interests of consumers, providing appropriate returns to regulated businesses and incentives for new investment consistent with market objectives?

Regulatory efficiency is a key issue given the capital intensity and long assets lives of the electricity and gas industries. Regulation currently focuses on network service providers; however the services they provide cannot be neatly separated from services that distributed resource options could provide. Therefore it is not surprising that the present regulatory frameworks fail to achieve an appropriate balance between the interests of network service providers, distributed resource providers and consumers.

Regulation of network service providers should move towards a more market-compatible approach, based on the value of services delivered rather than the value of assets.

Is there scope for greater flexibility and innovation in regulatory approaches?

More attention should be given to designing regulatory approaches that support appropriate technical and commercial innovation through market processes. So far as possible, regulated businesses should be exposed to risks commensurate with those faced by other industry participants and their commercial interfaces to network users should be based on the services they deliver.

What opportunities exist to achieve the desired balanced outcome?

The objective of regulation should be to promote the delivery of sustainable energy services. Regulated entities, such as network service providers and franchise retailers, should be given appropriate incentives to facilitate this objective.

What scope is there for rationalisation of the current regulatory arrangements?

It would be highly desirable to achieve a nationally consistent approach to regulation, which had an end-user focus. This might imply some rationalisation; however it should not be at the expense of neglecting end-use, distribution or retail market issues.

What are the advantages and disadvantages of having a single national regulator?

The main advantage would be to facilitate national uniformity. The main disadvantages would be the scope of the task, the potential for insufficient attention to be given to distribution and retail market issues, and the potential to reduce worthwhile innovation in regulatory methodology.

Have regulatory decision-making processes been unnecessarily lengthy? If so, what were the causes of delay and how can these processes be made more timely?

The asset-valuation approach to regulation can lead to lengthy decision-making. Time delays can also be caused by attempts to value network services in the absence of efficient retail markets. These problems could be alleviated by the development of more efficient retail markets combined with the adoption of a service-value approach to regulation of network service providers.

Are the market frameworks sufficiently responsive to the concerns of participants? If not, how could they be made more responsive?

Care should be taken to ensure that the mechanism for changing national codes and retail market equivalents are adequately responsive to the concerns of participants. However it should be noted that market participants would generally prefer a market design that is biased in their favour rather than one that is competitively neutral. Therefore, objectivity must be retained in designing market frameworks.

How significant a cost is imposed by the various licensing and approvals processes?

All regulatory measures, including licensing and approvals processes should be cost-effective from a societal point of view. Therefore, they should focus on key regulatory objectives and be implemented in a straightforward manner. The annual reports of NSW Licence Compliance Advisory Board throughout its existence stressed the need to reduce the complexity and improve the focus of the NSW licence regime for electricity distributors and retailers. This has yet to be achieved.

How could licensing and approvals costs be reduced?

Licensing and approvals procedures should focus on key issues and be implemented in a nationally uniform and straightforward manner.

Regional Australia

Regional Australia, with predominantly small end-users, has probably seen few benefits from energy market reform to date. In fact, the extension of electricity and gas networks to consumers in regional Australia often relied on cross-subsidies from major urban centres.

Since restructuring commenced, regional Australia has seen a disproportionate number of job losses, a reduction in service quality in some areas and no increase in the availability of choice. In many rural communities, jobs, service quality and choice of energy service options are more important than short-term energy price reductions.

Regional Australia would have much to gain from the adoption of a sustainable energy service model for the stationary energy sector, because that would tend to shift expenditure towards local generation and demand side options and away from remote generation and network options.

To what extent has regional Australia benefited from energy market reform?

Regional Australia seems to have benefited less from energy market reform than the major urban centres.

Have benefits been universally enjoyed or have there been differences due to location or customer size?

In general, it is easier for larger generators and end-users to benefit from restructuring than small ones, and this applies as much in regional Australia as it does in major urban centres. There are a number of reasons for this – greater sophistication and resources, greater competition among retailers, and a lower fraction of supply costs attributable to the complex issues associated with distribution networks.

To what extent do the benefits achieved appear durable?

Significant benefits have yet to be delivered to rural consumers, yet alone sustained.

What are the outstanding energy issues for regional Australia?

The restructured industry has not yet delivered a very desirable objective: - to achieve appropriate utilisation of local energy resources in a manner that enhances regional economic, environmental and social sustainability. To do this would require a refocus of regulation onto end-use energy services, active end-users and community participation, with sufficient resources and support to make and implement informed decisions.

What options are available to address them in a manner that is consistent with a competitive energy market?

The most important steps would be to internalise environmental and social externalities, refocus regulation on energy services and provide appropriate technical and commercial support to allow small end-users and regional communities to make informed decisions about their energy futures. In addition, modern electronic

metering should be installed for all participants and retail market designs should either be dramatically improved or regulated distributor-retailers should be retained in regional areas.

Are there impediments to people in remote areas making rational choices between network extension or alternative sources of electricity?

Yes – a lack of appropriate pricing signals, equipment and support to make informed decisions about locally relevant solutions, including stand-alone supply systems. Also, as previously indicated, the focus should shift from energy supply options to energy service options.

If so, what options can be pursued to address them?

Distribution network planning mechanisms should be enhanced and increased support should be provided for end-user and community decision-making about local supply and demand side options. Purchasers of stand-alone supply systems should be given access to energy industry ombudsman schemes and regional maintenance facilities.

What effects will the introduction of FRC most likely have in regional Australia?

If full retail competition is implemented, it will be essential to install modern electronic meters that not only measure market interval energy but also key indicators of supply availability and quality. However FRC is unlikely to be effective in regional Australia, because a significant fraction of total costs and problems with supply availability and quality in regional areas are related to distribution networks.

Therefore the relationships that regional end-users have with their (monopoly) distributor are at least as important if not more important in determining their cost and satisfaction than their relationships with their retailers. Careful consideration should be given to retaining regulated monopoly distributor-retailers in regional Australia, charged with facilitating the delivery of sustainable energy services.

If the price effects are negative, should regional customers be protected from facing full costs of energy supply?

Rather than subsidising electricity prices, it would be far better to subsidise innovative approaches to delivering sustainable energy services using local resources.

If so, what options are available to achieve this that do not unduly distort market operation?

As previously indicated, subsidies should be directed towards delivering sustainable end-use energy services.

Have regions with access to gas experienced greater development than those without?

Areas with access to gas have both a wider range of options and a greater opportunity to implement local solutions with the potential for regional social benefits.

Are there alternatives to pipeline gas for regional Australia e.g. LNG and remote area power systems?

Unless there are significant local resources (eg hydro), stand-alone remote area power systems are more likely to be effective for households and small communities than for large communities. LNG appears to be an important option for regions that have access to LNG supply facilities.

Small business

What effects has the introduction of the competitive wholesale electricity market and network access/pricing had on small business?

The cost of electricity supply is not a major issue for most small businesses, however technological change has made small business much more dependent on electricity supply availability and quality than it used to be. This is predominantly an issue for electricity distribution, which remains a regulated activity.

Industry restructuring has had little impact on small business to date; however much will depend on how distributors are regulated in the future and whether metering is installed that can record key indicators of supply availability and quality as well as market interval energy.

To what extent is the ability to choose energy supplier(s) important to achieving positive energy market outcomes for small business?

Choice of energy retailer has little impact on the key issue of concern for small business regarding electricity – supply availability and quality. As previously indicated, supply availability and quality is primarily a matter for the distribution service provider, which remains a regulated monopoly business.

Greenhouse gas emissions

The electricity industry is responsible for about 37% of Australia's reported greenhouse gas emissions, neglecting land-use change. Moreover, there has been an upward trend in this fraction. Therefore, any meaningful attempt to reduce climate change emissions will need to target the electricity industry. Given Australia's high per capita emissions and its vulnerability to climate change, it seems only a matter of time before this problem will have to be addressed.

The most promising opportunities to reduce electricity-related emissions are via improved end-use efficiency and low emission generation technologies such as renewable energy or cogeneration using natural gas. However the energy commodity focus of electricity industry restructuring to date has resulted in less rather than more attention being given to end-use efficiency, and low emission generation has found it hard to compete with the low direct cost of coal-fired generation. Therefore, both these issues should be addressed, by adopting an energy services focus for industry restructuring and introducing emission taxes or tradable emission rights.

Will a fully competitive energy market lead to a reduction in greenhouse gas emissions?

In a competitive electricity market, outcomes depend strongly on the direct costs faced by competitors. In the more populous Australian states, these favour high emission fuels such as brown and black coal. Thus wholesale electricity markets are unlikely to deliver a reduction in greenhouse gas emissions without compatible mechanisms for correctly pricing and internalising climate change externalities.

What options are available to reduce greenhouse gas emissions within the energy market?

There are many technical options to reduce emissions from the electricity industry, such as improved end-use efficiency, renewable energy generation, cogeneration and switching from electricity to gas and renewables at the point of end-use. However these are unlikely to achieve significant penetration without sustainability drivers in the market, such as emission taxes or tradeable permits, and a structural change to focus on end-use energy services. Complementary strategies would be to disclose emission information to end-users and to implement incubator policies for emerging sustainable energy technologies.

What are their likely costs and benefits?

Most options that would reduce greenhouse gas emissions presently have greater direct costs (including information and response costs) than fossil fuel options, particularly coal-based electricity generation.

However sustainable energy options are likely to become more competitive in time and they often have positive social impacts (eg regional job creation) as well as positive environmental impacts.

Can greenhouse gas emission benchmarks be incorporated into the energy market arrangements in a compatible manner? What are the costs and benefits?

The successful introduction of the MRET legislation demonstrates that emission permit trading schemes could be readily incorporated into the electricity market. Only small changes to this legislation would be required to implement such a scheme. As with the MRET legislation, the scheme could be phased in, reducing transition impacts, providing policy stability and allowing technology providers time to respond. The penalties associated with non-compliance could be set at a multiplier of the permit price.

Natural gas

Natural gas is useful as a transition fuel in a climate change response. It has lower emissions on combustion than coal and is more suited to high conversion efficiency applications such as cogeneration or combined cycle plant. It can also be a useful substitute for electricity in some end-use applications. However it is not a “clean” fuel and should be used as a substitute for coal rather than to allow further expansion of energy consumption.

Will current market arrangements ensure that new opportunities for natural gas uptake will be created and developed? If not, what measures are needed to ensure that this occurs?

Traditional bilateral gas contracting arrangements will become less appropriate as gas is used in a wider range of applications with more variable patterns of demand. More efficient gas market designs involving spot markets and financial instruments such as that used in Victoria should be adopted nationally to encourage the development of a national gas pipeline network that can efficiently allocate gas on a national basis.

To what extent does the residential sector offer an attractive opportunity for further natural gas penetration?

Residential gas heating is facing serious competition from reverse cycle electric air-conditioning as the climate warms and with the trend to apartment living. The residential gas water heating market is also under threat, through water efficiency programs and apartment living. Therefore the gas industry needs to innovate to remain competitive in the residential sector, let alone gain market share.

Further energy market reform

What should be the characteristics of a successful energy market in, say, 2020? How will these differ from what Australia has now?

The stationary energy sector should be driven by active end-users (with appropriate support) who have a range of options to deliver end-use energy services, including improved end-use efficiency and end-use renewables, as well as electricity and gas. End-users should participate with generators (or gas producers) in compatible network-wide electricity and gas market frameworks that support ancillary service, spot energy and financial instrument trading. Market-compatible approaches should be used to incorporate important social & environmental externalities, and support should be given for innovation in sustainable energy services.

What range of benefits is such a market likely to deliver? How different are these from the benefits being delivered now?

The stationary energy sector, organised as described above, could deliver substantial improvements in economic, environmental, social and technical sustainability.

What is the appropriate role for governments in future energy market arrangements? How is this different from current or past roles?

Governments should place less emphasis on ownership of industry infrastructure and more emphasis on consistent industry restructuring that is focussed on delivering sustainable energy services.

In particular, do governments have a role in relation to innovative technologies that may promote or maximise the benefits of competitive energy markets?

Governments should support innovation in sustainable energy services and in important facilitating technologies where a degree of standardisation is desirable, such as metering, communications and control.

How might national, state/territory and local concerns be best accommodated in energy policy?

Adopting a restructuring objective that focussed on sustainable energy services would best accommodate these concerns. In particular, such an objective would favour the use of distributed resources that had positive local social and environmental impacts.

What are the key milestones that will demonstrate that Australia is proceeding appropriately to achieve a successful energy market in 2020?

- Further evolution of the National Electricity Market to accommodate end-users of all sizes, resulting in a network-wide market framework in ancillary services, spot energy and financial instrument trading.
- The implementation of a compatible network-wide market framework for natural gas
- The implementation of market-compatible taxes or tradeable permits for important social and environmental externalities.
- A shift of the focus of stationary sector restructuring from markets in energy commodities to the delivery of sustainable energy services.

Summary of key points in this submission

COAG's key policy objective for the stationary energy sector as stated in the Issues Paper is the "efficient provision of reliable, competitively-priced energy services to Australians, underpinning wealth and job creation and improved quality of life, taking into account the needs of regional, rural and remote areas". This implies a target of economic, environmental, social and technical sustainability delivered through a focus on energy services.

The key strategies for meeting COAG's objective are improved end-use efficiency, greater use of renewable energy and careful use of natural gas (for example in cogeneration applications), all of which can have positive regional impacts. However their success in a competitive industry relies on a coherent framework for industry restructuring that has an energy service focus and incorporates important social and environmental externalities. Therefore further restructuring should concentrate on delivering this framework through the following initiatives:

- The design of compatible wholesale and retail electricity and gas market frameworks that will merge over time into single network-wide market frameworks in electricity and gas for all network users and that will include ancillary services, spot energy and financial instrument trading with appropriate network representation.
- Enhanced support for end-user decision-making by the provision of adequate resources and meaningful end-use options and guidance by "energy service facilitators".
- The refocusing of network service regulation on service values rather than asset values,
- The implementation of taxes or tradable instruments for important social and environmental externalities.
- Industry policies to support innovation in end-use efficiency, renewable energy and high-efficiency natural-gas technologies.

Conclusions

COAG has acknowledged the importance of the stationary energy sector by adopting an objective of delivering economic, environmental, social and technical sustainability. However to date, the focus of electricity and gas restructuring has been too narrow to deliver this objective. Further restructuring should build on the important progress that has been made by retaining its key features but shifting its focus to end-use energy services and broadening its scope to include important social and environmental externalities.