



The 30-year electricity strategy
Discussion paper

Powering Queensland's Future

Great state. Great opportunity.



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Powering Queensland's Future

Queensland's electricity system must change.

It must become more adaptable, more resilient and more efficient to help Queenslanders avoid the unsustainable electricity price shocks we have seen in recent years.

We will need to think beyond the short-term, beyond band-aid solutions, so that we can effectively tackle the big issues. We need lasting reform so our electricity supply system can meet the needs of Queenslanders now and into the future.

To help guide this transformation, we have embarked on a journey to deliver a 30-year electricity strategy for Queensland.

This discussion paper seeks feedback on 10 proposed reforms to address immediate challenges in the electricity sector. It also sets out a series of proposed actions and principles intended to address emerging, medium and long-term challenges.

The Queensland Government is calling on industry and customers to provide feedback on these proposals, to engage in the 30-year electricity strategy process, to take responsibility and help create a better electricity supply system. If we work together, we can place the state's electricity system on a firm footing for the future and ultimately create a legacy for a more prosperous Queensland.

What could Queensland's energy future look like?

Advances in technology are fundamentally changing the way electricity is made, moved and consumed. The rate of technological change is also accelerating. While it is impossible to predict what the next great innovation will be, there are boundless possibilities.

Trials have seen electricity transmitted to devices—without wires. Imagine never having to plug in another appliance again. That new paper-thin television on the wall won't need a power point. When you park your electric vehicle in the garage each night, it will be fully charged the next morning without you having to lift a finger.

What if your home is powered independently of the grid? Maybe your roof is painted with cheap, printable, organic solar photovoltaic cells that power a high-efficiency battery in your home. Maybe a fuel cell supplied by natural gas or hydrogen provides your electricity. No matter how you get your energy, your home will have the smarts to know your preferences so that when you need power, you have it. It will also be able to monitor your appliances, identify those that are not running efficiently, and self-heal damaged circuits using nano-materials.

For Queensland's big energy users, new forms of base-load energy could power their operations be it concentrating solar thermal, geothermal or wind supported by gas. Maybe carbon capture and storage technologies will see coal-fired generators maintaining their dominant market share. Or there might be a total shift away from the current supply system. Energy intensive industry might switch to small modular nuclear reactors to power their businesses on-site, similar to those used in nuclear submarines, but with advances in technology that increase safety and reduce waste.

As our society changes, one thing remains certain, our dependence on electricity will continue to increase. Technology will play a fundamental role in this transformation and offers the potential to improve our standard of living and increase our productivity.

Overview of challenges

This paper seeks feedback on a series of reforms to address challenges in the electricity sector.

Immediate challenges



Future challenges

Future challenge 1

Facilitating the deployment of cost-effective, low-emissions generation

There are currently no readily deployable, cost-effective, low-emissions large-scale generation alternatives. Technologies such as solar thermal and geothermal energy, and carbon capture and storage, all face cost and technology challenges.

Future challenge 2

Attracting investment in generation

The market is currently oversupplied with generation capacity. Ageing assets will need to be replaced and new capacity will eventually be required. The Australian Government estimates that up to \$240 billion in investment in electricity generation, transmission and distribution and gas pipelines could be required Australia-wide by 2030.

Future challenge 3

Supporting structural change to the linear supply system

Electricity consumption patterns are changing, driving network prices higher. New technologies will continue to emerge that support customer independence from the grid, challenging the traditional network business model.

Future challenge 4

Engaging and protecting residential customers of the future

By 2042, the way in which electricity is sold and consumed is likely to be fundamentally different. The role of the consumer is changing from being largely passive and disengaged to increasingly driving the evolution of the electricity supply system.

Future challenge 5

Maximising economic growth as we transition to a better energy future

Unsustainable electricity price rises have the potential to undermine Queensland's four pillar economy of agriculture, tourism, construction and mining. Reduced investment or business closure as a result of high electricity costs would jeopardise jobs and economic growth.

Vision and objectives

What we hope to achieve

The Queensland Government has a vision for the electricity sector:

Queensland's electricity supply system will be resilient, cost-effective and customer-focused to support the economic and lifestyle aspirations of Queensland customers.

To help achieve that vision, the Queensland Government has developed several objectives to provide a common understanding of how the vision will be achieved (see Table 1).

Empowered customers with greater choice and control	The way we use electricity determines the location and type of new investment across the electricity supply chain, which impacts costs. Recent price rises, increasing retail competition and new technologies are now changing the role of the customer and their participation in the market. Customers need more options to help them respond to these pressures and to enable them to better control their own costs and the impact of their usage on system-wide costs.
A competitive market that encourages innovation	Competition prevents any one supplier from controlling the price of electricity services and better ensures the price reflects its true value. It also stimulates innovation as rival suppliers look for new products and services to attract and retain customers by better meeting their needs. Indicators of competition in electricity markets include: <ul style="list-style-type: none">- the number of alternative suppliers and their market shares- the ability of new suppliers to enter the market, creating pressure to improve offerings- customer experiences: understanding and being able to act upon options (including being willing to change suppliers) and having access to attractive products and services.
A stable regulatory and policy environment without unnecessary government intervention	Regulation is applied across the electricity supply chain to protect against or correct a range of market failures. Regulation is also used to replicate some of the beneficial attributes of competition where it is limited (e.g. in electricity networks). But we need to ensure regulation is not a barrier to market entry, competition or innovation. In addition, differences between state and federal policy, a changing regulatory landscape and government intervention in the market all contribute to increased investor uncertainty. This results in inefficient investment outcomes, the costs of which are passed onto the customer.
Equitable access to electricity including adequate protections and well-targeted and financially sustainable assistance measures	<p>'Equitable access' refers not just to the policy framework for the terms and conditions of supply but also to ensuring customers receive the support they need to overcome <i>barriers to access (or maintain access) such as financial barriers.</i></p> <p>The term 'well-targeted' recognises the importance of prioritising assistance for those who are most in need and in accordance with the level of their need.</p> <p>The term 'financially sustainable' recognises the potential for assistance measures to be very costly for the state. It also recognises that the state needs to balance electricity assistance measures with requirements for assistance and investment in other parts of society.</p>
A secure, reliable and sustainable electricity supply system	<p>'Secure' refers to the robustness of the system and its ability to withstand damage or stress.</p> <p>'Reliable' refers to the system's ability to provide sufficient power at a suitable quality to meet customer needs.</p> <p>'Sustainable' refers to the enduring capacity of the electricity system to meet the needs of customers over time, including mitigating the environmental impact of electricity use so that future generations have access to energy resources and infrastructure to meet their needs.</p>

Table 1: Objectives of change

Part 1 - The immediate challenge—1 to 5 years

Queensland's electricity system is under pressure. Electricity prices have doubled for the average consumer in the past seven years. This is a significant cost of living increase for householders struggling to pay their bills and businesses trying to remain competitive. These unsustainable price shocks are symptomatic of an electricity system that is unable to cope with the changing needs of Queensland's communities and businesses.

In May 2012, the newly elected Queensland Government recognised this and acted quickly—establishing the Interdepartmental Committee (IDC) on Electricity Sector Reform to examine all aspects of the sector that impact on the cost of electricity. The IDC found that the Queensland electricity system is facing a number of immediate challenges. These include:

- customers who are struggling with electricity costs as a result of price shocks and poorly targeted customer assistance
- a customer base that is poorly positioned to respond to changes in the market due to limited product choice and lack of understanding and engagement
- a pricing and tariff structure that has not evolved with changes to usage patterns and costs
- a lack of investment certainty for generators and retailers
- increasing costs for government in the delivery of support mechanisms.

In June 2013, the Queensland Government endorsed the IDC's high-level strategies to:

1. stop building unnecessary infrastructure and improve the efficiency of network businesses
2. maximise the benefits of competition while protecting customers
3. develop a more effective role for government.

The IDC also developed a suite of recommendations to address cost pressures and build a more competitive market while reducing risks to customers, industry and government. To achieve immediate efficiency savings, the Queensland Government has already begun implementing some of these recommendations. However, the government has determined that a number of the IDC's recommendations should be further developed through the 30-year electricity strategy. The purpose of this chapter is to engage the community and industry on these key areas of reform. Figure 1 provides background on the role of key electricity sector players. The full IDC report is at www.dews.qld.gov.au/policies-initiatives/electricity-sector-reform

Making electricity



- Power stations transform energy sources like coal, gas and renewables into electricity.
- The National Electricity Market (NEM) provides a wholesale market for the sale of electricity between generators and wholesale customers.
- The government owns generation companies Stanwell and CS Energy, regulates generation licences and makes policy.
- National bodies oversee market operation (the Australian Energy Market Operator – AEMO) and market rules (Australian Energy Market Commission – AEMC).

Moving electricity



- High voltage transmission power lines move electricity long distances from power stations to local distribution areas. Low voltage power lines then move electricity to end-users.
- The government owns three network businesses: Powerlink (transmission), Energex (distribution in SEQ) and Ergon Energy (distribution in regional Qld).
- It also makes policy and regulates licensing, reliability standards, network planning and connections.
- The Australian Energy Regulator (AER) is responsible for economic regulation (revenue recovery and pricing) for the network businesses.

Selling and consuming electricity



- Retailers buy electricity from the wholesale market and sell it to residential and commercial customers.
- The government sets retail prices for some customers, regulates licences and market behaviour, provides direct hardship assistance and owns regional retailer Ergon Energy.
- Ergon Energy is the dominant retailer outside SEQ.
- The retail market in the South East is privatised and a number of private retailers compete for customers.

Section 1 of the supporting material provides more information on how the sector works and how bills are calculated.

Figure 1: Queensland's electricity supply system

The immediate challenge—actions and proposals

The following ten proposals developed by the IDC target areas for immediate reform and require feedback from industry and the public. These proposals focus on improving the use of the networks to address cost pressures, increase competition, strengthen customer protections and better target electricity concessions to help those most in need.

Immediate challenge 1: Improve competition in retail markets

Move to price monitoring in South East Queensland's retail electricity market

Price regulation has not worked in South East Queensland. Regulators have imperfect information and may set prices too low, deterring investment, or too high to the detriment of customers. The South East Queensland retail electricity market is relatively mature and competitive. As such, the need for a regulated price-setting approach has diminished and may even have become detrimental to the further development of competition in this region.

The Queensland Government will remove regulated price-setting for the South East Queensland retail electricity market and replace it with price monitoring by 1 July 2015, subject to certain preconditions including:

- ensuring there is sufficient competition in South East Queensland to benefit customers
- implementing appropriate support mechanisms to protect customers (refer action 2)
- improving customer engagement in the market to allow consumers to reap the full benefits of increased competition and drive a more responsive sector (refer action 3)
- establishing an effective regulatory framework with clearly defined roles and responsibilities for retailers, the QCA and government
- ensuring a credible and viable methodology is in place to determine regulated retail electricity prices in regional Queensland.

Following the move to price monitoring, these additional customer protections will apply:

- All electricity retailers would be required to publish a 'standing offer' which represents what customers would be charged if they do not enter into a negotiated contract.
- The QCA would be responsible for monitoring the performance of the market and identifying any potential deterioration in the effectiveness of competition.
- The government would also retain a reserve power to reintroduce retail price regulation if the effectiveness of competition was found to have significantly declined.

This approach will minimise regulatory intervention while facilitating a competitive market, supporting opportunities for product innovation and improvements in service quality, product choice and price discounts. In the longer term, it will also increase the resilience of the market as retailers will be able to respond more flexibly to market forces.

Section 2 of the supporting material provides more information on price monitoring.

Improve retail electricity markets in regional Queensland

The Queensland Government also wants to improve competition in regional electricity markets. One barrier to this lies in the structure of subsidies paid under the Uniform Tariff Policy. The Queensland Government provides these Community Service Obligation (CSO) subsidies to Ergon Energy to overcome the much higher cost of delivering electricity to regional areas, enabling regional customers to pay an equivalent price for electricity as customers in South East Queensland. The subsidies are costly (\$620 million is budgeted for 2013–14). As other retailers cannot access this subsidy, competition remains weak in regional areas and price regulation will need to be maintained.

The Queensland Government will examine options for improving competition in regional areas, including moving towards a network-based CSO within three years, in parallel with reform of

Ergon Energy's retail business. This approach would more directly reflect the major supply cost difference for regional areas. All retailers could access the subsidised network prices and compete for regional customers. However, the government must give proper consideration to the impact of this on the cost of subsidy arrangements and the state's financial position, including that of its government-owned corporations.

Have your say

Do you agree with the proposed preconditions for the move to price monitoring? Are there any other necessary preconditions?

In addition to considering the move to a network CSO, what other measures could bring the benefits of competition to regional customers?

Immediate challenge 2: Strengthen customer protections

Customers in some other states have access to higher levels of protection than those currently in place in Queensland. The National Energy Customer Framework (NECF) has been developed by all jurisdictions in the National Electricity Market (NEM) to make it easier for retailers to operate across state boundaries and increase customer protections for those customers experiencing hardship.

The Queensland Government will implement the NECF in 2014 with modifications particular to the state, to protect Queensland customers. An industry/customer working group will also be established to examine options to further enhance the way Queensland customers are protected and engaged.

Section 3 of the supporting material provides more information on NECF.

Have your say

What issues should the Queensland Government consider when examining ways to improve customer protections?

Immediate challenge 3: Improve customer engagement

Customer confusion and a lack of engagement in the electricity market limit the ability of customers to participate effectively and obtain full benefits from the market. Engaged customers:

- understand the market and the impact of their energy use patterns
- can effectively make decisions about electricity retailers, products and consumption
- are better able to seek assistance with and manage electricity debts
- drive competition, lower prices (both for the individual and the broader system), product innovation and service level improvements.

The Queensland Government will establish a working group comprising industry and electricity customer representatives to help develop a strategy to increase levels of customer engagement with the market. This approach will create a more customer-focussed retail sector by increasing competition, lowering prices and improving products and services. The engagement strategy will commence in 2014.

Section 4 for the supporting material provides more information on customer engagement.

Have your say

What issues should the Queensland Government consider in developing a customer engagement strategy?

Immediate challenge 4: Review of electricity rebates and customer assistance

Current eligibility criteria mean that some recipients of the Electricity Rebate such as Queensland Seniors Card holders are not means-tested. Consequently some high-income households are able to access rebates. At the same time some low-income households are excluded for example Health Care Card holders who are largely unemployed and low-income families.

The structure of rebate assistance can impact its effectiveness. For example, the current flat rate of the Electricity Rebate means an eligible household with five residents receives the same value rebate as an eligible household with one resident, despite the differences in electricity costs. A range of alternative structures could be considered—including targeting the rebate to a portion of the fixed and/or variable bill components or providing assistance to meet a certain percentage of the total bill (as occurs in Victoria).

The Queensland Government will review the eligibility criteria and structure of the Electricity Rebate to better target assistance to those most in need as part of developing a holistic hardship framework. Given the state's financial position and competing funding priorities, the government must ensure any changes are both affordable and benefit those most in need.

Section 5 of the supporting material provides more information on electricity rebates.

Have your say

What issues should be taken into account in reviewing the Electricity Rebate so that it targets assistance to those most in need in a financially responsible manner?

Immediate challenge 5: Reform tariffs to address costs and provide greater customer control

Many of Queensland's electricity tariffs are out-dated. The current tariff structures do not send accurate price signals to customers about the value of using electricity at different times, or the cost of having large energy intensive appliances. This is contributing to inefficient use of the system and increased network costs. It also limits the control customers have over their usage and electricity costs.

The Queensland Government will facilitate the development of a long-term electricity tariff strategy by July 2015. The implementation of new tariffs will be supported by consumer education and engagement, and protections for vulnerable consumers.

The strategy will be aimed at encouraging more efficient use of the system and reducing the strain on the network, particularly over peak demand periods, which should help alleviate some of the existing price pressures in the system.

Section 6 of the supporting material provides more information on electricity tariffs.

Have your say

In updating tariff structures, what issues should be taken into account to send accurate price signals to customers in order to reduce cost pressures and provide greater customer control?

Immediate challenge 6: Develop a demand management and energy efficiency strategy

Peak demand occurs when very large amounts of electricity are required at one time (for example between 4 pm to 8 pm when most householders return home and switch on energy intensive appliances). According to the AEMC, capital expenditure to accommodate peak demand growth accounts for approximately 45 per cent of total network costs. However severe peak demand

periods only occur for a few hours on a few days per year. Ergon Energy estimates around six per cent of its multibillion dollar network is used less than nine hours a year. The Productivity Commission has also highlighted that asset utilisation (i.e. how much each piece of infrastructure is used) has been falling in the electricity sector.

The Queensland Government will develop a demand management and energy efficiency strategy which will include:

- working through the national reform process to implement the recommendations of the AEMC's Power of Choice review into demand-side participation
- reforming tariffs to improve price signals and energy management options (refer action 5)
- supporting a customer-driven rollout of advanced metering to enable provision of improved tariffs and other energy management products (refer action 7).

This approach is aimed at deferring the need for additional network capacity and achieving greater use of existing assets to reduce cost pressures. It will also provide customers with additional options they may use to manage their electricity use and save money.

Section 7 of the supporting material provides more information on demand.

Have your say

What are the key issues that should be taken into account in developing the Queensland demand management and energy efficiency strategy?

Immediate challenge 7: Enable improvements in metering services

Most electricity meters in Queensland are only capable of recording the total amount of electricity consumed between manual meter readings. This limited functionality reduces the potential for demand management options such as time-of-use tariffs, more frequent billing and product innovation for customers. Advanced meters with greater capability support these options but come with higher upfront costs and may raise consumer protection and privacy issues.

There are, broadly speaking, two approaches to the rollout of advanced metering technology. One is a mandated, distributor-led rollout. This approach was taken in Victoria where it was criticised as not being based on a clear economic case and not well communicated to customers.

The alternative is a customer-driven rollout, where a range of different service providers can compete to offer customers advanced metering services and associated product choices. Customers can choose to adopt the technology based on their assessment of the benefits.

Based on the Victorian experience, the Queensland Government has ruled out a mandated rollout of advanced meters in Queensland and will support the customer-driven approach.

Section 8 of the supporting material provides more information on advanced metering.

Have your say

What issues does the Queensland Government need to consider in relation to introducing advanced metering?

Immediate challenge 8: Support customer-focused reliability standards

The Queensland Government currently mandates reliability standards for the network businesses which are based on a high level of infrastructure redundancy (i.e. duplication of some elements of the system so electricity supplies will be maintained even if one element fails or is damaged). This provides a very high level of reliability but at high cost.

The Queensland Government will move towards an approach which is less prescriptive, focuses on customer outcomes and explicitly considers the trade-off between the level of reliability and

the costs. This will occur in parallel with, and will be informed by, the current work of the Australian Energy Market Commission (AEMC) to develop a framework which better reflects the value customers place on reliability.

Have your say

What issues should the Queensland Government take into account in moving away from prescriptive reliability standards?

Immediate challenge 9: Improve consultation practices for network extensions

Network extensions (for example the construction of new power lines) can be controversial for the communities through which they pass.

The current process for planning approval sees public consultation take place after a route has been identified by the relevant network business. This limits the ability of the community to have input at an early stage of the planning process.

The Queensland Government will examine how this process can be improved. The aim is to reduce community disruption without stalling investment in necessary infrastructure to meet future electricity needs.

Have your say

What should the Queensland Government take into account in developing new consultation arrangements for network extensions?

Immediate challenge 10: Improve the operation of the gas market

The development of Liquefied Natural Gas (LNG) export facilities has seen gas producers change their approach to managing gas reserves and supply arrangements as they lock-in export contracts. Local gas users, including gas-fired power generators, are finding it difficult to access gas supplies in this environment as demand from the LNG sector places increasing pressure on prices.

The Queensland Government will work through the national reform agenda to improve the operation of the gas market by:

- developing harmonised coal seam gas policies to grow gas production in a sustainable manner and develop the gas production industry's social licence to operate
- creating a gas supply hub (a trading exchange) in South West Queensland in 2014 to more readily facilitate trade in gas, including options for trading unused pipeline capacity to enhance the operation of the hub.

The preference of both government and industry is to avoid directly intervening in the market through prescriptive regulatory mechanisms such as reservation policies. This approach encourages a competitive gas market without unnecessary intervention.

Have your say

What issues should the Queensland Government take into account when examining the operation of the gas market?

Part 2 - The future challenge—6 to 30 years

The Queensland electricity supply system is entering a period of unprecedented change as economic, technological and environmental pressures reshape the way we make, move, sell and consume electricity. The proposals in Part 1 are intended to address immediate challenges in the electricity sector and place it on a firm footing for the future. However, history suggests that the future will also bring unforeseen, unpredictable challenges and changes.

One of the challenges for the Queensland Government is to develop a robust policy and regulatory framework that will remain effective over the long term. This will be critical if we are to achieve our vision for an electricity supply system that is resilient, cost-effective and customer-focused to support the economic and lifestyle aspirations of Queensland customers.

While the outlook for the reliability and security of Queensland's electricity sector remains positive overall, failure to provide a forward-looking and adaptable framework could contribute to future problems for Queensland's electricity supply system. The Californian electricity crisis (refer Box 1) provides an illustration of the dangers of inflexible market design and policy framework that fails to keep pace with changing market dynamics.

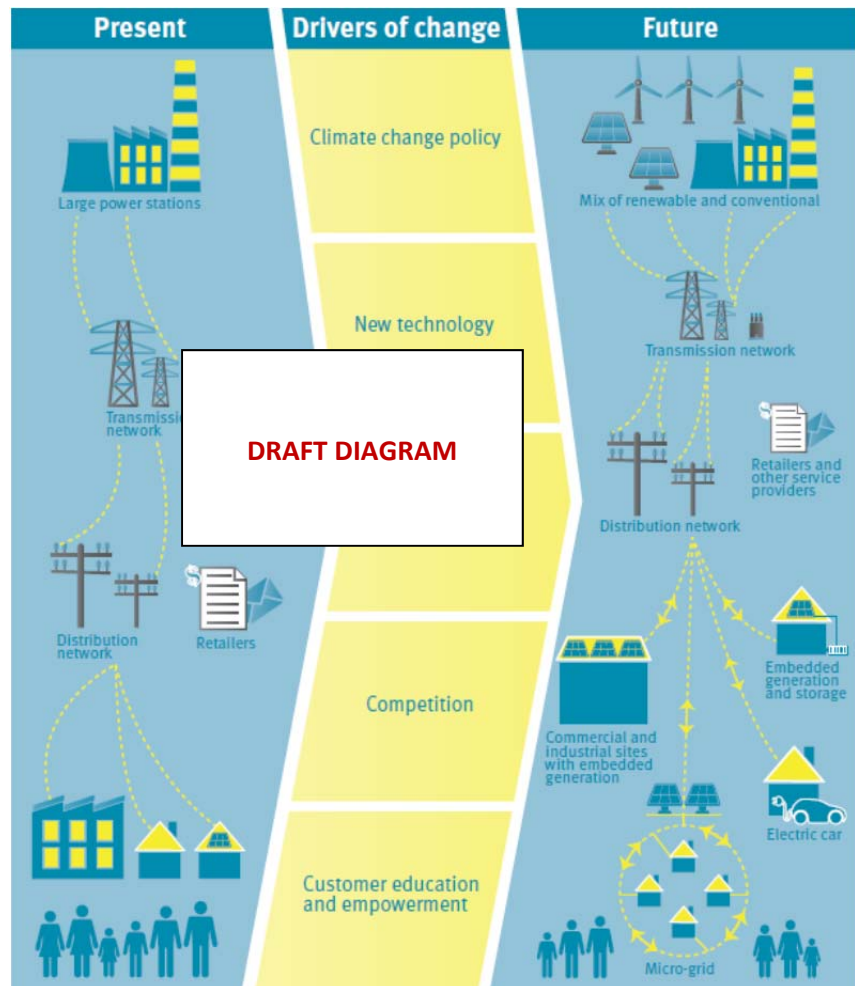


Figure 2: A possible future state for Queensland's electricity sector

This part of the discussion paper uses scenario analysis to consider a range of transformative factors and their potential impact on the Queensland electricity sector (see Figure 2 for example). It also articulates the Queensland Government's proposed approach to potential emerging challenges.

Box 1: The importance of scenario analysis—the Californian experience

California began reforming its electricity supply chain in the 1990s by creating a wholesale market and freezing retail prices. The framework wrongly assumed there would be a sufficient gap between generation capacity and demand to push prices downwards. Instead, electricity consumption grew rapidly on the back of strong economic growth while hot summers increased demand peaks. At the same time, drought conditions meant hydroelectric power stations had reduced capacity and available hydro, nuclear and gas plants were run at full capacity.

The very tight supply–demand balance, exacerbated by the increased maintenance requirements, led to rolling blackouts. These affected nearly one million households and resulted in lost productivity and slower economic growth.

Instead of falling, wholesale prices rose dramatically but the retail tariff freeze meant customers were not exposed to these prices and had no incentive to moderate their energy use. The market design provided little mechanism for retailers to manage price risks which led to a financial crisis in the retail sector. This included the collapse of the state's largest energy companies, the loss of thousands of jobs and the state taking on the role of utility provider at a cost of billions of dollars, borne by the taxpayer.

Scenario analysis—exploring possible futures for our electricity system

The purpose of using scenarios is to describe possibilities, rather than predict the likelihood of any particular chain of events coming to pass. Three scenarios have been created to explore the *how* and *why* of events in the electricity system—as shown in Figure 3.

Section 9 of the supporting material provides more detail on the three scenarios.

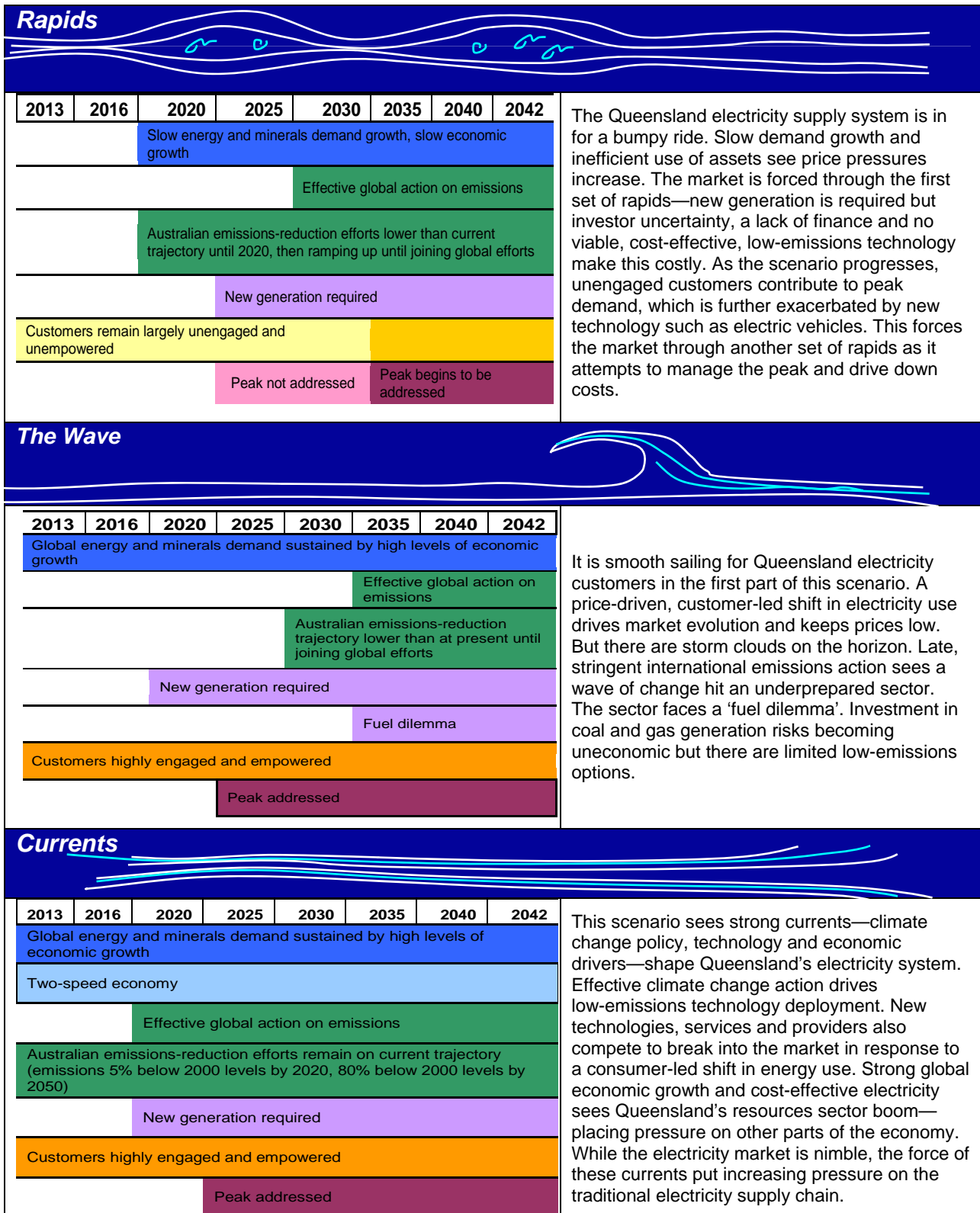


Figure 3: Future scenarios for Queensland's electricity system

Developing an enduring framework for the electricity system

The scenario analysis shows just how much uncertainty there is for the state's electricity supply system in the medium to long term. It also identifies some key unresolved and emerging issues. The themes emerging from the scenario analysis show that each element of the supply chain is likely to face significant challenges over the next 30 years. These include:

Making electricity



Shifts in Queensland's generation mix

- Future challenge 1: Facilitating the deployment of cost-effective, low-emissions generation
- Future challenge 2: Attracting investment in generation

Moving electricity



Disruption to the traditional network business model

- Future challenge 3: Supporting structural change to the electricity supply system

Selling and consuming electricity



The social and economic impacts of a changing system

- Future challenge 4: Engaging and protecting residential customers of the future
- Future challenge 5: Maximising economic growth as we transition to a better energy future

To meet these challenges, the Queensland Government is seeking feedback on a number of draft policy principles and initiatives to guide electricity policy development.



Making electricity: Shifts in Queensland's generation mix

In the coming three decades, government and industry anticipate a shift in generation to a lower-emissions and potentially more diversified generation mix. However, the timing and nature of that change remains unclear. Modelling undertaken by CSIRO, as shown in Figure 4, indicates that the likely generation mix, wholesale prices and emissions by 2050 are highly dependent on a number of key policy, investment and technology developments in the medium term.

Varying these assumptions leads to a broad range of potential generation fuel mixes, emissions outcomes and wholesale electricity costs. This analysis indicates the lowest-cost and most effective emissions reduction outcomes are achieved where nuclear power is permitted.

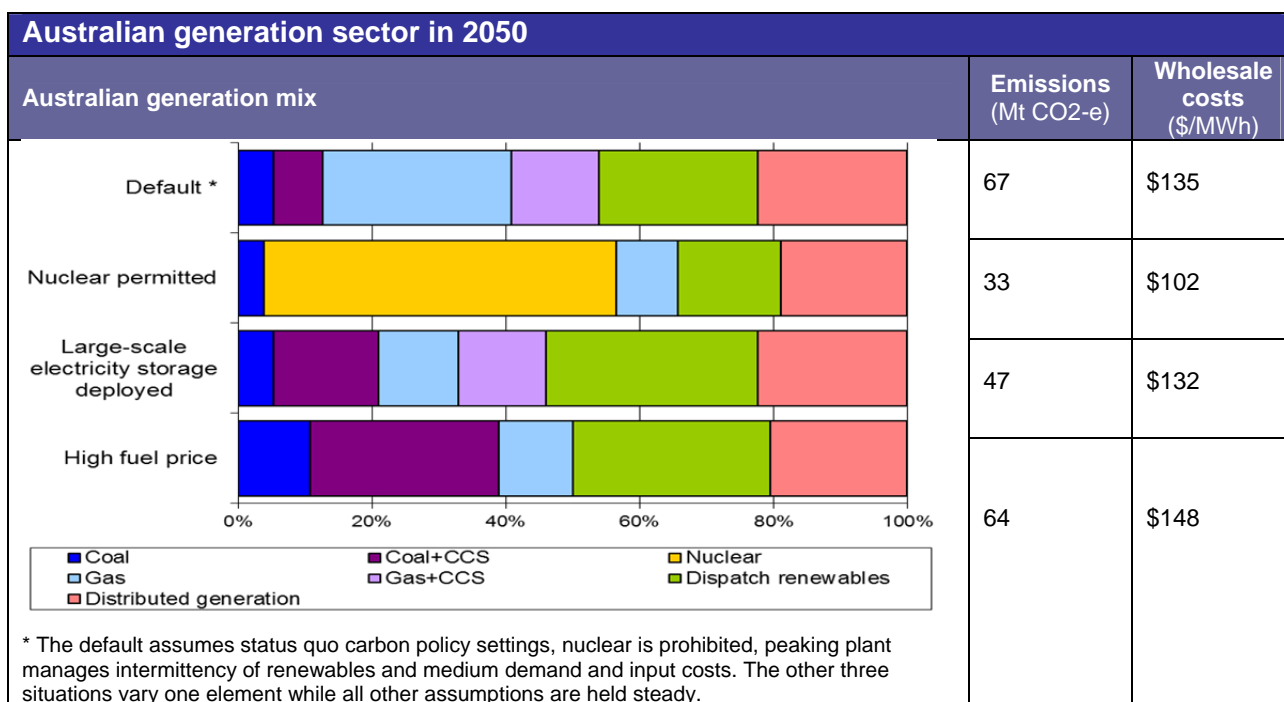


Figure 4: CSIRO modeling of future generation outcomes (source: www.efuture.csiro.au, accessed 21 May 2013)



Future challenge 1: Facilitating the deployment of cost-effective, low-emissions generation

What the scenarios tell us

Technology challenges

There are currently no readily deployable, cost-effective, low-emissions large-scale generation alternatives. Technologies such as solar thermal, geothermal and carbon capture and storage (CCS) all face cost and technology challenges and there is a risk that sustainable alternatives will not be developed in time to meet emissions reduction goals.

Outlook for fossil fuels

In the medium term it is likely that coal will remain an important part of the mix in Queensland as many of the state's coal-fired generators are relatively new. There will however be a gradual retirement of older plants replaced with lower emission alternatives.

While gas is considered the major transition fuel in moving to a low carbon economy, the window for gas-fired generation as a viable technology may be narrow, depending on fuel costs and the emissions trajectories required to reduce the impacts of climate change. If a rapid transition occurs, fossil-fuelled generation assets may become significantly impaired or stranded, resulting in financial loss for the owners and potential disruption to the market.

Fuel security for Queensland in the long term is unlikely to be a major issue as the state has large reserves of coal and gas. However, fuel market dynamics can change quickly and can impact the financial feasibility of new generation. For example, the US shale gas boom appears set to dramatically improve the US's fuel security and may lead to it becoming an exporter, rather than an importer of gas.

Market challenges

The resilience of the electricity system may be tested by a lack of fuel diversity or a framework which does not facilitate greater diversity. For example, there are currently regulatory prohibitions on some options (for example nuclear) and inadequate regulatory settings which are impeding the development of others (for example wind farm policy and regulatory settings to support CCS).

The cost of generation will also increase. The rate at which it does will depend on the cost of carbon, renewable and other environmental schemes; and the timing and type of technologies that replace the traditionally lower cost generation options of coal and gas.

Queensland Government response

- The Australian Government has assumed the policy lead for transitioning Australia to a low carbon economy. The Queensland Government will not duplicate these programs.
- The nature and timing of future investment in generation should be determined by the market. The Queensland Government will not attempt to 'pick winners' by creating incentives for specific technology types.
- The Queensland Government will remove regulatory barriers to generation technologies (such as nuclear power—refer Box 2); and provide regulatory frameworks which encourage the emergence of new technologies (such as CCS, geothermal and other low-emissions technologies). These actions will be subject to broad public consultation and undertaken where the benefits outweigh the risks and/or costs.
- The Queensland Government will establish the *Electricity Outlook Expert Panel* with membership from government, industry and academia, to consider, amongst a range of other roles, how best to make Queensland an attractive place for investment in generation infrastructure (refer Box 3).
- The Queensland Government will continue to monitor the gas market and implement policies and regulations that support a competitive and effective local and international gas market.

Box 2: Considering nuclear energy as part of Queensland's future generation mix

According to the International Energy Agency's World Energy Outlook 2012, nuclear power remains an important and proven technology choice to manage the impact of electricity price rises and meet climate change targets. Nuclear technology also continues to develop with improvements in the efficiency and safety of existing technology. The development of small modular reactors provides the potential for nuclear power to become competitive in different markets for example where smaller additions of capacity are required. Research also continues into alternative materials and processes such as thorium and fusion reactors.

Australia does not include nuclear power as part of the range of technology options for generation and it is prohibited by both state and federal government legislation. In considering a 30-year electricity strategy it is important all avenues are explored. If nuclear power is to be considered as part of the future generation mix, it may take up to 10 years before commissioning could occur. For that reason, Queensland needs to start the debate now. Matters to be considered include:

- potential cost and emissions reduction benefits
- community, safety and environmental concerns (including disposal of waste)
- required regulatory frameworks
- processes for site selection
- expertise required to support the emergence of a nuclear industry
- capital market challenges and the potential risk allocation between plant owners and the state.

The Queensland Government remains technology agnostic, with no preference for nuclear power over other technology options. Notwithstanding, it is willing to commence a debate on the potential merits of nuclear as an additional option for the future generation mix in Queensland.

Box 3: Creating the Electricity Outlook Expert Panel

In developing a 30-year strategy, Queensland has a unique opportunity to leverage the knowledge, experience and foresight of industry, academia and consumers.

The Queensland Government is proposing to establish the Electricity Outlook Expert Panel which would consider:

- the impacts of climate variability policy settings on the Queensland and national market
- emerging technologies and their likely application in Queensland (including how to exploit any natural advantages the state may have)
- the potential for changing business and regulatory models across the electricity supply chain
- the potential for facilitating or sponsoring targeted research and development efforts to Queensland's best advantage
- the changing role of the customer.

The aim of the Expert Panel is to create a forum for the regular exchange of ideas and critical examination of emerging issues, to ensure that Queensland's long-term planning remains focussed on the horizon. This will allow Queensland to flexibly adapt to the market's changing needs.

Have your say

Given the primary policy role of the Australian Government in driving the shift to a low carbon economy, what role should the Queensland Government play to support the development of new and emerging generation technologies in Queensland?

What regulatory barriers or constraints need to be addressed to encourage an optimal generation mix in Queensland?

In what circumstances would you support the use of nuclear power in Queensland and how should the potential risks be managed?

Do you support the idea of the Electricity Outlook Expert Panel? Who should be involved and what should its role and responsibility be?



Future challenge 2: Attracting investment in generation

What the scenarios tell us

The market is currently oversupplied with generation capacity. However, ageing assets will need to be replaced and new capacity will eventually be required. Significant private sector funding is required to meet these requirements. The Australian Government estimates that up to \$240 billion in investment in electricity generation, transmission and distribution and gas pipelines could be required Australia-wide by 2030.

The market currently faces a number of challenges making investment more difficult or costly:

- Global capital markets have been constrained since the global financial crisis.
- Policy uncertainty exists in relation to climate change.
- Electricity demand has become progressively more difficult to predict.
- Securing cost-effective fuel supply for fossil fuel based projects is becoming more difficult and costly (particularly gas).
- Technology risk may make it difficult for some projects to be financed. Lower-risk technologies may be the only projects that will be funded, stalling emissions-reduction efforts.

Queensland Government response

- The Queensland Government will not invest in new generation as long as the market continues to deliver sufficient capacity to provide reliable electricity supplies. This statement

should allow the market to operate commercially and with confidence. The test for market failure will be set high, requiring strong evidence of a clear absence of private sector investment in response to an emerging capacity shortfall and price signals.

- In the event that the market was not responding to forecasts and price signals that additional capacity was required, government intervention would not necessarily be through direct investment in new capacity. Rather, it would be determined by the market dynamics and circumstances at the time, including consideration of the factors contributing to the market failure.
- The Queensland Government is also examining the potential costs, risks and benefits of selling the government-owned generation businesses, Stanwell and CS Energy. This was recommended by the Commission of Audit to improve both the state's financial position and the competitive operation of the generation market. However, the government has reiterated that no sale will proceed without a mandate from the Queensland people.

Have your say

Do you support the Queensland Government's proposed approach of non-investment in the market in the absence of clear market failure? In what circumstances, if any, should the government be required to provide market support? What form should this take?

What issues should the government consider in relation to its future ownership versus the sale of generation assets?



Moving electricity: disruption to the traditional network business model

Future challenge 3: Supporting structural change to the linear supply system

What the scenarios tell us

Electricity consumption patterns are changing (with a decline in overall demand but with sustained peaks)—driving network prices higher as fixed costs are spread over lower overall volumes of electricity. Figure 5 shows us what the grid of the future might look like.

New technologies that support customer independence from the grid (such as embedded generation and customer-level storage) will continue to emerge, challenging the traditional network business model. The network may become a back-up or secondary supply option or may be used by these customers to sell surplus power.

New entrants (such as demand aggregators and micro-grid managers) will seek to enter the market to help consumers manage their electricity requirements. These may assist in offsetting the need for extra network investment but may also add to competitive pressure on the traditional supply chain as the main means by which customers can meet their electricity needs.

Other technologies such as electric vehicles may place increasing demands on the networks, particularly if recharged during peak times. They will need to be accommodated in a way that increases the efficiency of the network. New generation

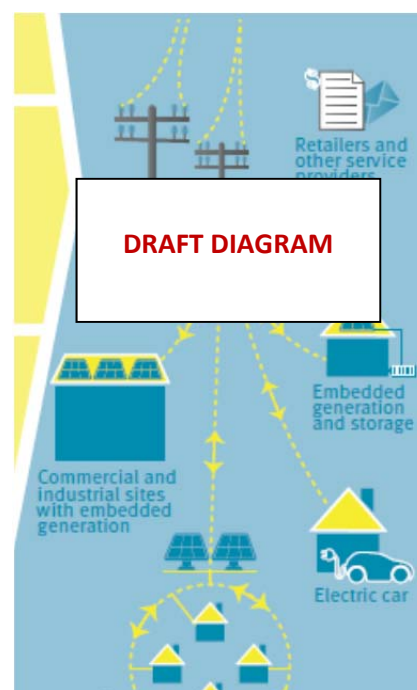


Figure 5. The grid of the future

technologies will also place different demands on the networks due to their intermittent nature or voltage requirements—for example rooftop solar photovoltaic (PV) and wind power.

All of these changes mean traditional network assets may become significantly impaired or even stranded if usage fundamentally declines and costs cannot be recovered by network owners. Investment in new assets may be constrained if the risk of recovering the capital and operating costs becomes uncertain.

As the electricity supply system changes, the requirements of the workforce that construct and maintain it will also change. Government and the state's education, training and research sector will need to work closely together to ensure the skills exist to solve the complex and emerging problems and challenges facing the industry.

Queensland Government response

- The Queensland Government accepts that the traditional business model and regulatory framework for networks are under threat. Reform will be required, with collaboration across NEM jurisdictions in recognition of the national economic regulatory framework.
- The Queensland Government proposes to develop and lead a new work stream at the national level that will examine how fundamental changes in the structure of the linear supply chain should be managed throughout the NEM.
- Principles to support the future regulatory framework and market design include:
 - putting the long-term interests of customers first
 - maximising the ability of competition to drive innovation and service improvements
 - apportioning the costs of delivering electricity accurately and fairly to provide clear price signals for consumption and product innovation as the market evolves
 - providing customers with a voice in relation to the balance between services and cost
 - providing operators a fair return to support timely investment that meets customer needs
 - being sufficiently flexible to address changes in usage patterns, operating environments and business models.
- To support this action, the Minister for Energy and Water Supply will host an electricity and water forum in 2014 where leading thinkers from across the industry and academia can examine and share knowledge on critical technological developments. The forum will also consider the nexus between water and electricity supply chains, the challenges they face and the relevant elements of the 30-year water and electricity strategies.
- In addition, the Electricity Outlook Expert Panel proposed in response to future challenge 1 will:
 - consider potential developments that may disrupt existing business models and/or the operation of the linear supply chain
 - develop linkages with the Queensland Department of Science, Information Technology, Innovation and the Arts and relevant Australian Government departments to examine new and innovative ways to encourage public and private funding of energy research and development in Queensland
 - consider skilling and education requirements to support the growth of the future electricity supply system in Queensland.
- As owner of Energex and Ergon Energy, the Queensland Government will support the network businesses in continuing to invest in research and development which supports their core business.

Have your say

What issues should be taken into account when considering how structural change should be managed throughout the NEM?

Are there any other roles for government in relation to the development/uptake of new electricity products or service models?

Given their commercial imperative, what role should the Queensland distribution businesses play in supporting research and development that supports their core business?



Selling and consuming electricity: the social and economic impacts of a changing system

Future challenge 4: Engaging and protecting residential customers of the future

What the scenarios tell us

Competition and technological advancements will provide households with increasing product choice and supply options. This means:

- customers will have increasing access to self-supply options (for example embedded generation) that may require upfront costs with benefits flowing over the longer-term
- product offerings may extend beyond traditional electricity supply options, and include the bundling of new product choices (for example electric vehicle providers may bundle vehicle and electricity supply or management services)
- with technological improvements and product differentiation, customers will have greater ability to tailor their supply options and/or consumption to best meet their financial and lifestyle needs.

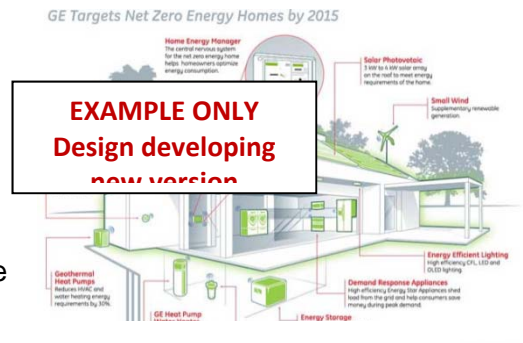


Figure 6. Possible House of the future (example only – design preparing new version)

Figure 6 provides an example of a possible house of the future.

The challenge of complexity

With this choice will come complexity. This means households will need to develop a greater understanding and a closer interaction in the electricity market. Customers who do not engage with the market (due to financial literacy, time or capacity constraints) are likely to be disadvantaged, using products that are not suitable to their needs.

Equity challenges

Bundling of products or changing product offerings may increase the total cost of electricity for households, increasing the risk of financial difficulties. The market may focus on the most profitable offerings, leaving low-consumption or low-income customers with limited product choice. Equity issues may emerge as customers who can afford to take advantage of technological advancements to better control their usage and costs leave others behind. Subsidy arrangements may no longer meet the changing market, providing support to those who do not need it but leaving the most disadvantaged at risk.

Queensland Government response

- Building on its immediate reform measures, the Queensland Government will support ongoing customer engagement and education programs to assist residential customers as the market evolves.
- The Queensland Government will monitor the impact of usage patterns, new business models and technological advancements on the different customer classes and sizes to ensure policy and regulatory support arrangements for households remain appropriate.
- The Queensland Government will examine all subsidy arrangements to ensure that support mechanisms remain transparent, equitable and financially sustainable from a state perspective (refer Box 4).

- The Queensland Government will support establishing a national energy consumer advocacy group and will also examine other ways to ensure Queensland customers are adequately represented in policy and regulatory debates.

Box 4: The challenge of subsidising the regions

Queensland has a Uniform Tariff Policy which means that customers in regional Queensland pay an equivalent price for electricity as customers in South East Queensland. This policy is supported by a significant subsidy (the CSO) paid to Ergon Energy's retail business. For 2013–14, the cost of the subsidy is budgeted at \$620 million and is projected to be more than \$3 billion over the next five years.

As growth in the regions continues in the coming decades, the future liability is forecast to escalate to potentially unsustainable levels. For this reason, the Queensland Commission of Audit has called on the government to review these arrangements. The government has agreed to review the Uniform Tariff Policy arrangements and to consider barriers to growth in retail competition in regional Queensland.

Have your say

Will new types of support be needed for different customer groups or locations to respond to changes in the future? If so, what will they be?

What new obligations, rights or protections will need to be put in place for customers as the market evolves?



Future challenge 5: Maximising economic growth as we transition to a better energy future

What the scenarios tell us

Electricity is a major cost input for many Queensland businesses, with small cost increases potentially impacting their ongoing viability. Queensland has a concentration of a small number of very large industrial users (with aluminium and zinc smelters consuming more than 15 per cent of the state's electricity). In addition, trade-exposed and/or highly competitive industries (such as aluminium and agriculture) may have limited ability to modify their consumption or to pass on unsustainable electricity price increases to customers.

Challenges for commercial and industrial customers

Unsustainable electricity price rises have the potential to undermine Queensland's four pillar economy of agriculture, tourism, construction and mining. Reduced investment or the closure of businesses as a result of high electricity costs would jeopardise jobs and economic growth.

Challenges for the electricity supply chain

The sudden loss of a major industrial customer or group of customers (such as smelters) could have significant consequences along the electricity supply chain, as the system seeks to adjust to a reduced load profile and revenue stream. It may mean loss of business for some generators and networks. It may worsen asset utilisation and increase cost pressures for remaining users. There is a risk that electricity pricing policy is used to create incentives for industry, rather than separate and transparent assistance schemes. This would disrupt price signals and potentially create cross-subsidisation between customers and perverse outcomes across the broader electricity sector. Mining and resource development means that significant economic and electricity demand growth may occur in regional areas, leading to significant infrastructure requirements (refer Box 5).

Queensland Government response

- The Queensland Government supports the goal of providing efficient electricity supply as a key component of economic growth. This is consistent with other key Queensland

Government strategic platforms. For example, a focus of the Queensland Government's 30-year agricultural strategy is to help minimise the costs of production while ensuring reliable access to cost-effective inputs such as electricity and water to increase the viability of the sector.

- The Queensland Government is committed to providing an environment which supports cost effective electricity supply by:
 - supporting the efficient delivery of government electricity services
 - providing a policy and regulatory framework for electricity supply in Queensland which is designed to minimise regulatory burden and supports competitive markets
 - where government provides support to the sector it is provided in a manner which is targeted, transparent and minimises market distortions.
- The Queensland Government will examine the impact of electricity costs and supply reliability on economic growth and competitiveness. This work will help government better understand the role of electricity in supporting Queensland's economic growth and will help inform the development of a flexible policy framework that delivers least-cost electricity.
- The Queensland Government will continue to monitor the economic growth potential of emerging economic zones (such as the north west province) to ensure adequate investment exists to support economic development within the state.
- The Queensland Government's approach supports market-based principles for determining the level and location for any new investment.

Box 5: Facilitating growth in the regions

Queensland is a resource-rich state that has benefited from strong economic development in the regions. A number of regions are likely to undergo significant growth as their natural resources are exploited. For example, a report by the Mount Isa to Townsville Economic Development Zone indicates that growth could significantly expand and provide a host of benefits to North West Queensland over the next 40 years. Critical to the growth of these regions is the development of timely and cost-effective infrastructure.

Have your say

What role does electricity play in relation to the varying sectors of the state's economy and how can government best support the broader economic development of the state?

What issues should the Queensland Government specifically consider as part of its examination of the impact of electricity costs and supply reliability on economic growth and competitiveness?

Responding to unforeseen shifts

This paper has explored how some emerging challenges may shape the electricity supply system in the future. However, the biggest changes and paradigm shifts can be triggered by undirected and unforeseen events. The term 'black swan' is often used to refer to high impact events that were not predicted—but in hindsight seemingly should have been. The rise of the internet and the global financial crisis are examples.

The Queensland Government has proposed a range of measures to address emerging challenges in the electricity sector, guided by its overall objectives for the sector. This framework is intended to capitalise on the state's strengths and manage risks to the electricity supply chain and customers, regardless of what the future holds.

Have your say

Will these measures be sufficiently resilient and adaptable regardless of any unforeseen challenges or shifts that may emerge over the next 30 years?

Next steps

Achieving the objectives

This discussion paper has set out 10 actions for short to medium term reform along with a series of proposed policy principles and initiatives to address future challenges. These are intended to achieve the objectives set out earlier in this paper so that we can realise a resilient, cost-effective and customer-focused electricity supply system that supports the economic and lifestyle aspirations of Queensland customers.

We need your input and active engagement

The publication of this discussion paper heralds the beginning of a consultation process that will help us finalise Queensland's first 30-year electricity strategy. We are seeking feedback from participants across the supply chain and from customers of all sizes and types on the proposed actions and policy principles set out in this discussion paper.

Electricity sector reform is a shared responsibility

The Queensland Government cannot create a long-term vision for the sector without the input and shared responsibility of key stakeholders. The responsibility for the effective operation of our electricity supply system does not reside with just one party. The final 30-year electricity strategy will define the role of customers, market and government in achieving our vision.

Getting to the final strategy

As Figure 7 indicates, this discussion paper is the second stage in the development of the 30-year electricity strategy. Stage 1 involved the release of a directions paper in December 2012, which signalled the government's approach to the reform agenda. A total of 78 submissions were received on the directions paper. Feedback received has informed the development of this discussion paper. Submissions to the directions paper can be accessed at www.dews.qld.gov.au/policies-initiatives/electricity-sector-reform/directions-paper/submissions.

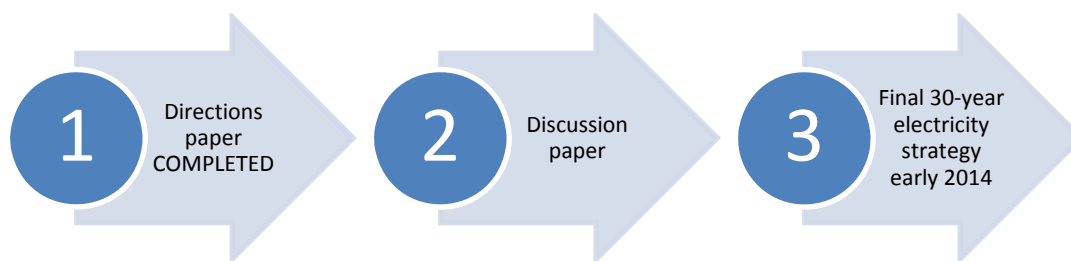


Figure 7: The stages for developing Queensland's 30-year electricity strategy

The final strategy will be published in 2014. It will include an implementation plan for short to medium term actions. It will also provide for ongoing monitoring of the evolution of the electricity market and the forces which are driving change and creating pressures and challenges. This will assist in measuring the effectiveness of the strategy in supporting our vision for the electricity sector and the future state of the Queensland electricity supply chain.

Feedback should be submitted by X October 2013

Mail: The 30-year electricity strategy
Department of Energy and Water Supply
PO Box 15456
City East Qld 4002

Email: electricitystrategy@dews.qld.gov.au

Web: dews.qld.gov.au

Please indicate whether you would prefer any elements of your feedback to remain confidential. Submissions not marked as confidential may be published in full or quoted in public documents. For more information, call the Department of Energy and Water Supply on 13 43 87.

Summary of consultation questions

The questions throughout the discussion paper are intended to guide rather than limit feedback. The Queensland Government is interested in any and all input on the electricity supply system now and into the future.

The immediate challenges: Have your say

Immediate challenge 1: Improve competition in retail markets

Do you agree with the proposed preconditions for the move to price monitoring? Are there any other necessary preconditions?

In addition to considering the move to a network CSO, what other measures could bring the benefits of competition to regional customers?

Immediate challenge 2: Strengthen customer protections

What issues should the Queensland Government consider when examining ways to improve customer protections?

Immediate challenge 3: Improve customer engagement

What issues should the Queensland Government consider in developing a customer engagement strategy?

Immediate challenge 4: Review of electricity rebates and customer assistance

What issues should be taken into account in reviewing the Electricity Rebate so that it targets assistance to those most in need in a financially responsible manner?

Immediate challenge 5: Reform tariffs to address costs and provide greater customer control

In updating tariff structures, what issues should be taken into account to send accurate price signals to customers in order to reduce cost pressures and provide greater customer control?

Immediate challenge 6: Develop a demand management and energy efficiency strategy

What are the key issues that should be taken into account in developing the Queensland demand management and energy efficiency strategy?

Immediate challenge 7: Enable improvements in metering services

What issues does the Queensland Government need to consider in relation to introducing advanced metering?

Immediate challenge 8: Support customer-focussed reliability standards

What issues should the Queensland Government take into account in moving away from prescriptive reliability standards?

Immediate challenge 9: Improve consultation practices for network extensions

What should the Queensland Government take into account in developing new consultation arrangements for network extensions?

Immediate challenge 10: Improve the operation of the gas market

What issues should the Queensland Government take into account when examining the operation of the gas market?

The future challenges: Have your say

Future challenge 1: Facilitating the deployment of cost-effective, low-emissions generation

Given the primary policy role of the Australian Government in driving the shift to a low-carbon economy, what role should the Queensland Government play to support the development of new and emerging generation technologies in Queensland?

What regulatory barriers or constraints need to be addressed to encourage an optimal generation mix in Queensland?

In what circumstances would you support the use of nuclear power in Queensland and how should the potential risks be managed?

Do you support the idea of the Electricity Outlook Expert Panel? Who should be involved and what should its role and responsibility be?

Future challenge 2: Attracting investment in generation

Do you support the Queensland Government's proposed approach of non-investment in the market in the absence of clear market failure? In what circumstances, if any, should the government be required to provide market support? What form should this take?

What issues should the government consider in relation to its future ownership versus sale of generation assets?

Future challenge 3: Supporting structural change to the linear supply system

What issues should be taken into account when considering how structural change should be managed throughout the NEM?

Are there any other roles for government in relation to the development/uptake of new electricity products or service models?

Given their commercial imperative, what role should the Queensland distribution businesses play in supporting research and development that supports their core business?

Future challenge 4: Engaging and protecting residential customers of the future

Will new types of support be needed for different customer groups or locations to respond to changes in the future? If so, what will they be?

What new obligations, rights or protections will need to be put in place for customers as the market evolves?

Future challenge 5: Maximising economic growth as we transition to a better energy future

What role does electricity play in relation to the varying sectors of the state's economy and how can government best support the broader economic development of the state?

What issues should the Queensland Government specifically consider as part of its examination of the impact of electricity costs and supply reliability on economic growth and competitiveness?

Responding to unforeseen shifts

Will these measures be sufficiently resilient and adaptable regardless of any unforeseen challenges or shifts that may emerge over the next 30 years?