westernpower

SUBMISSION TO THE STRATEGIC ENERGY INITIATIVE'S ISSUES PAPER

26 FEBRUARY 2010

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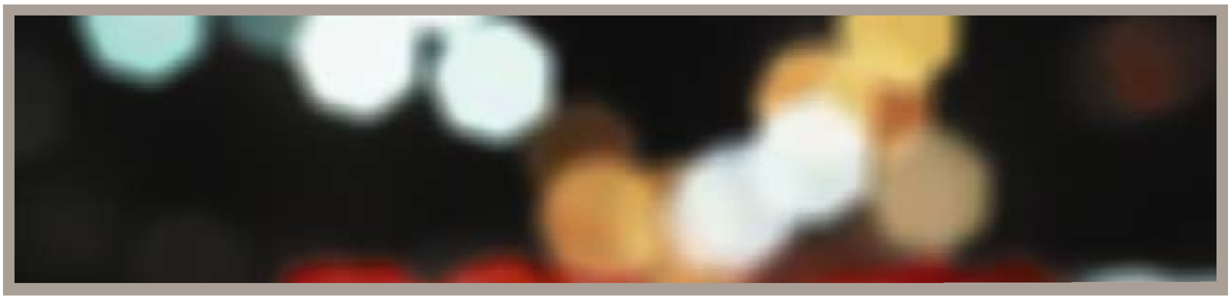
1.0 INTRODUCTION



Western Power enthusiastically welcomes the State Government's intention to develop the *Energy2030: Strategic Energy Initiative* for Western Australia and takes this opportunity to make our submission on the Issues Paper released on 31 December 2009.

With a clear and shared understanding of our State's energy future over the coming two decades, Western Power is optimistic of a rewarding and sustainable energy future for our community. With the right frameworks, policies and systems in place, Western Australia has the ability, to create a truly world class energy sector with improved economic, social and environmental outcomes.

Society, the economy and the environment are constantly changing and the rate at which these changes are occurring is increasing rapidly. This state of flux renders the task of making predictions about futures fraught with difficulty, particularly when looking decades ahead. Forecasts made twenty years ago about the potential of information technology provide a good example of just how unpredictable the future can be. Because of this, Western Power believes in planning to accommodate the fluid and indeterminate nature of the energy sector of the future.

Western Power's long term strategic focus is on being an energy solutions provider for the community including, but not necessarily limited to, managing a network of "towers, poles and wires". We seek to operate and manage a dynamic electricity network in an increasingly dynamic environment with the capacity to adjust to whatever future needs the community demands of it. We look forward to a *Strategic Energy Initiative* that provides well considered and much needed direction for the industry while allowing the adaptability required to respond to future challenges.

Western Power also looks forward to the *Strategic Energy Initiative* providing the Government's clear policy direction creating the opportunity for change. We welcome and encourage mandates that can operate in conjunction with our economic responsibilities under the *Electricity Networks Access Code 2004*. We also encourage changes to the code that will allow us to deliver on policies designated by laws established as a consequence of the Government's *Strategic Energy Initiative.*

A tremendous amount of work in reviewing existing markets, policies and frameworks has recently been undertaken with the support of a wide range of market participants including Western Power which should assist the *Energy2030* development process. This includes the extensive and highly comprehensive "esaa WA Energy Market Study" conducted by the Energy Supply Association of Australia (esaa) and the Australian Energy Markets Commission's (AEMC) "Review of Energy Market Frameworks in Light of Climate Change Policies" report sponsored by the Ministerial Council on Energy (MCE). Western Power trusts that the findings of these reviews will be taken into consideration in the development of the *Strategic Energy Initiative (SEI)*.

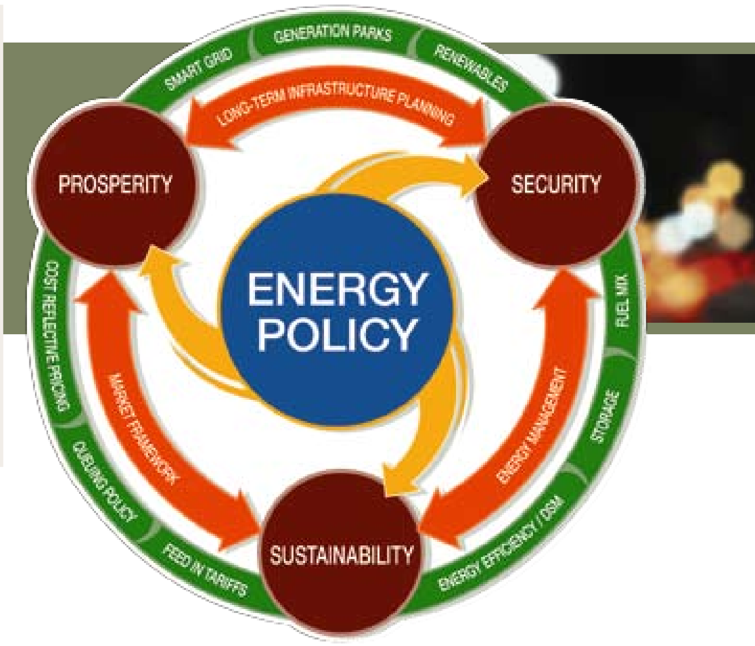
2.0 WESTERN POWER'S VISION OF WESTERN AUSTRALIA'S ENERGY FUTURE – A SHORT SUMMARY

Western Power's vision of our long term energy future (consistent with the Strategic Energy Initiative's 2030 timeline) contains the following elements:

- Energy markets will be mature, open and self supporting.
- Energy prices paid by consumers will reflect the true cost of production and are kept economically efficient by strong competition amongst primary energy producers and electricity retailers and generators, and by appropriate regulation of our monopoly transmission and distribution networks.
- In our increasingly carbon constrained future, low and zero emissions technologies will contribute a growing proportion of our total electricity generation. Dispatchable renewable energy sources such as wave, geothermal and biomass will feature strongly. Viable energy storage solutions will be in operation. And the intermittency issues associated with wind and solar power plants will have been resolved so that they too will become net dispatchable generators.
- In addition to market forces playing their part, long term planning for electricity generation and network infrastructure development will be facilitated cooperatively across government to ensure the optimum sustainable result without stranding existing and future assets.
- And most importantly of all, generators, retailers and consumers will be connected via a *Smart Grid* - an enhanced network where the application of information and communications technology improves the efficiency and effectiveness of the transmission, distribution and usage of electricity. In the *Smart Grid* the network will change from a "one-way street" to a "highway" where both information and electricity flow both ways. Key *Smart Grid* applications include:
    - Smart metering - the key enabler for providing information to customers and to the network.
    - Near real-time data presentation allowing customers to make choices on the way they use energy.
    - Managing how renewable, intermittent generation, such as solar, and other distributed generation is dispatched to support the grid and maintain power quality.
    - Power outages can be detected and located immediately they occur and a self-healing capacity is enhanced leading to a more robust and reliable network.
    - Small or medium energy storage systems can be used to overcome intermittency issues around distributed generation.
    - Power quality is improved through use of sophisticated sensing and control systems.
    - Maintenance is based on data from sensors embedded in the system, addressing many problems before they happen, so improving the reliability, security and efficiency of the distribution grid.
    - Distribution and transmission automation through integrated control systems.
    - The realisation of the full potential benefits of electric vehicles as a form of distributed, dispatchable energy storage for grid support and peak lopping.

This will be achieved through advancements in our energy pricing policies (see 4.2), major investments in smart metering, greater automation of our network and improved community education and awareness.

3.0 REALISING THE VISION



In order to achieve this vision, Western Power believes strongly in supporting the development of Western Australia by providing energy solutions to enable **prosperity**, **security** and **sustainability** for the community within the South West Interconnected System (SWIS).

Western Power is working hard to achieve this vision so we can deliver:

- A **social** dividend to the community by ensuring a secure and reliable supply of electricity to homes, businesses and public institutions. We do this by improving the condition and safety of our aging network while addressing community concerns about the construction of new infrastructure - consistent with the *SEI's* strategic goals for **secure and reliable energy**;
- An **environmental** dividend by playing our part in facilitating a power system that enables a reduction in greenhouse gas emissions from electricity generation, transmission and distribution – consistent with the SEI's **cleaner energy** strategic goal; and

An **economic** dividend by extracting the best possible long term value from the SWIS, controlling costs in order to constrain upward pressure on electricity prices while supporting the required performance outcomes for our customers consistent with the SEI's **competitive energy** strategic goal.

Central to this economic objective is a clear understanding of the drivers of investment in network infrastructure within the SWIS. The network is built to accommodate the peak demand for electricity at any one time even though the duration of these peaks in demand are relatively brief. Because of this, we as a community spend a great deal of money building a network that is only infrequently used at its full capacity as can be seen from the graph below which charts the percentage of time that the system is operating at certain demand levels.

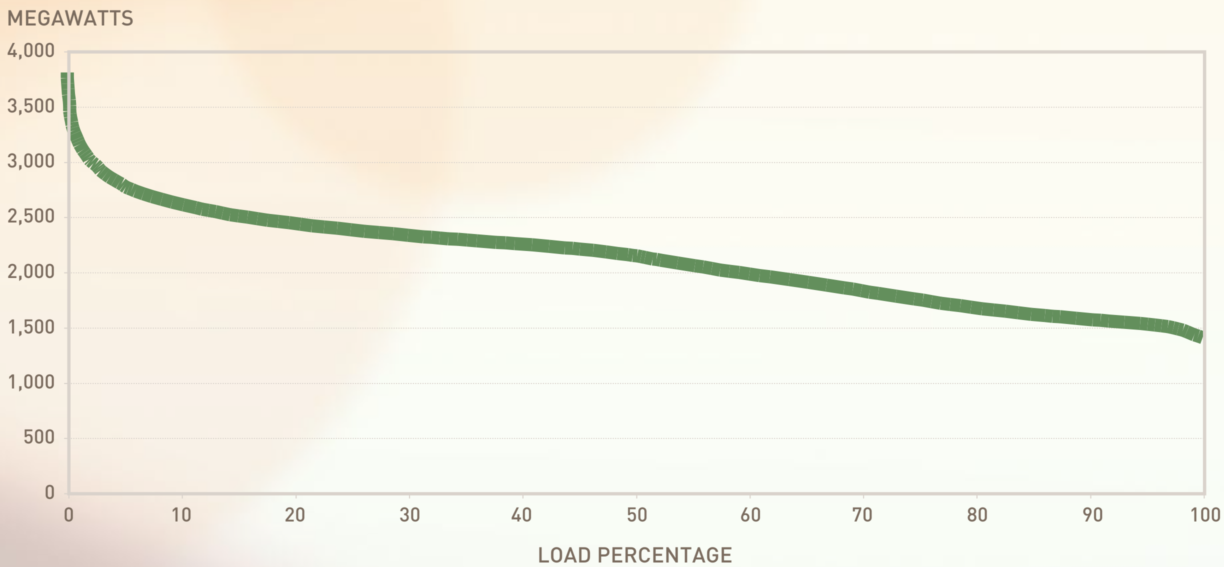
During the whole of 2009, the top 15% of demand (loads between 3,230 MW and 3,800 MW) occurred less than 1% of the time (a total of less than 3 days). In other words the system operated at 85% of its capacity or below for more than 362 days of the year.

Initiatives that reduce peak demand are required if Western Power is to meet its reliability commitments and reduce investment in network infrastructure. These same initiatives can also reduce the need for peaking plant, saving on generation investment as well.

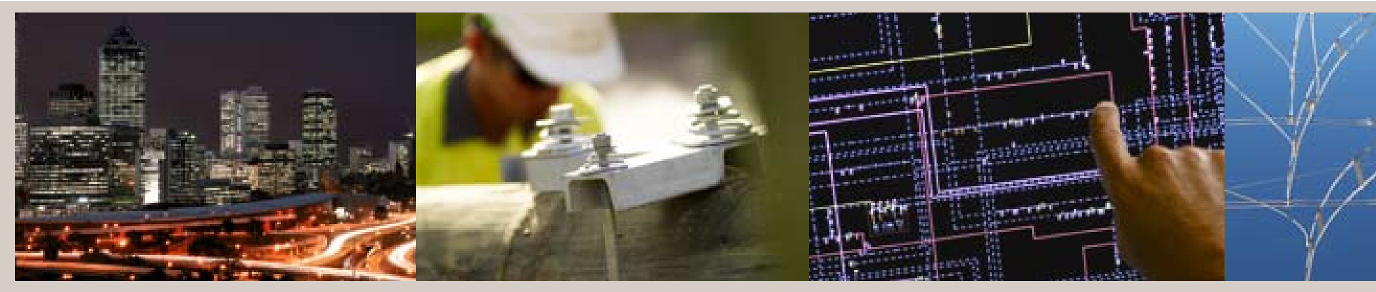
Western Australia's peak demand occurs in summer and is driven by air conditioners. Initiatives that can reduce demand at this time will be particularly beneficial. Use of storage, *Smart Grid* technology, customer incentive schemes and ongoing awareness campaigns are some of the ways this can be achieved. Benefits will be even greater if coordinated with improved energy efficiency in buildings and other non-electricity initiatives.

In order to achieve these goals, Western Power has developed a number of interrelated and interdependent reforms and principles which we believe will bring about the realisation of our energy future as expressed above. These reforms and principles are expressed and summarised in the following seven **Strategic Directions** (listed in no particular order).

2009 SYSTEM LOAD DURATION CURVE



4.0 STRATEGIC DIRECTIONS



4.1 IMPROVING ENERGY EFFICIENCY AND ENERGY CONSERVATION

To enjoy the benefits generated by maximising the use of existing electricity infrastructure and delaying new investments, and for the reduction in environmental harm, **Western Power strongly supports initiatives aimed at reducing the consumption of energy** (during peak periods of demand and in total) **through improved energy efficiency and energy conservation.**

Improvements to the way we provide secure, reliable, competitive and cleaner energy often focus on supply side issues such as generation and network infrastructure development. Improving energy efficiency is an important demand side initiative that can not only reduce demand for more, expensive generation and network assets, but also improve the productivity and sustainability of the economy. As a result governments and consumers are increasingly turning their attention to improving the way energy is used through household energy efficiency schemes (e.g. home insulation) and through regulation to improve appliance and building efficiency standards.

This focus on energy conservation and efficiency provides the best, least cost, and most readily available means of managing the sustainable delivery of electricity to the community particularly in the short to medium term while new and less emissions intensive forms of energy production are fully developed and commissioned.

Western Power fully supports any and all means to improve energy efficiency. Reducing the overall demand for electricity ensures the maximum lifespan of existing transmission and distribution assets which helps to control costs and slows the rate of increase in the price of electricity for consumers. Similarly, the efficient use of the network as it stands is boosted by shifts in the patterns of electricity use which level the daily and seasonal demand profiles - for example, shifting load from afternoon demand peaks to nightly demand troughs. In this way energy efficiency is closely related to the need for variable, cost reflective pricing (see 4.2.1 below) and encouraging the use of electric vehicles (see 4.4 below).

Under current regulatory arrangements, however, there is little financial incentive for Western Power to proffer energy conservation and efficiency alternatives over further infrastructure developments. We would, however, welcome changes to these arrangements that would provide stronger encouragement for this in the future. This includes more extensive behavioural change programs aimed at reducing both overall and peak period energy consumption through active interaction with *Smart Grid* technology thereby stimulating a demand side response. It is worth noting that incentives to reduce overall consumption do not necessarily reduce peak demand and therefore specific incentives to reduce peak demand are necessary. In the meantime, Western Power will continue to commit significant resources to school and public education programs to increase awareness of these important issues so that the community as a whole can enjoy the environmental, social and economic benefits derived from improved energy efficiency and conservation.

4.2 ADOPTING AN ELECTRICITY PRICING POLICY FOR WA

For the long term sustainability of the energy sector in Western Australia, **Western Power strongly supports establishing a clear, market based Electricity Pricing Policy** as an essential precursor and driver for a wide range of desirable social, economic and environmental outcomes in the energy sector.

Western Australia's Electricity Pricing Policy should include the following essential elements:

4.2.1 Cost reflective pricing

The current system where electricity prices are set or have been constrained by previous governments at levels below the cost of supply is unsustainable and places enormous constraints on the Western Australian energy sector. The current Government's support for movement towards cost reflective pricing is a positive development in creating a more sustainable energy sector. Western Power also supports retail electricity prices being set by an independent body such as the Economic Regulatory Authority (ERA) as recently recommended by the Economic Audit Committee Report or the Australian Energy Regulator.

Cost reflective pricing:

- Encourages competition in the generation sector driving down prices.
- Encourages competition in the retail sector paving the way for Full Retail Contestability and driving down electricity prices for consumers.
- Establishes a strong price signal to encourage households, businesses and industries to reduce energy consumption and therefore optimises the economic return from the network.
- Saves on network augmentation costs and contains network growth to within sustainable levels.
- Stimulates investment in renewable technologies which are more expensive than conventional technologies at present.

Vulnerable members of the community can continue to be protected from the true cost of electricity by being the beneficiaries of direct government compensation designed to shield them from the added impost that cost reflective pricing will bring. This system is likely to be cheaper, more transparent and more economically efficient than the current system of government-subsidised energy generation. The current system obscures the true cost of electricity from the consumer and offers a weaker price signal to encourage consumers to reduce demand. Making the true cost of energy (particularly during periods of peak demand) apparent to consumers has a greater chance of leading to a reduction in energy use (particularly desirable during peak demand periods) beyond that offered by the current system. This reduces the cost to the community of building more generation, transmission and distribution assets, restraining upward pressure on prices.

4.2.2 Variable pricing

Energy usage within the SWIS is highly variable throughout the day with high day time peaks in usage followed by deep troughs in night time demand. This has resulted in generation, transmission and distribution infrastructure that is built to accommodate high demand periods while operating below capacity much of the time. Beneficial market mechanisms such as variable pricing assist in spreading demand more evenly throughout the day. This is highly advantageous in terms of improving the efficiency of the SWIS and deferring the need for network augmentation thereby controlling costs and reducing upward pressure on electricity prices. It also helps to defer the need for new generation assets to be built. The introduction of variable pricing requires the widespread installation of smarter technology such as Advanced Metering Infrastructure (AMI), currently in use in some parts of the network. Variable pricing mechanisms used in other electricity networks include:

- **Time of use pricing** – where electricity prices are set at higher levels for blocks of time covering the daily and seasonal peaks, and lower levels during troughs. Time of use pricing alone, however, runs the risk of shifting the problem of steep spikes in demand to a time later in the day when prices fall.
- **Critical peak pricing** – a scheme involving pre-advertised very high prices under extreme circumstances such as a forecast exceptionally hot day. This reduces demand to within system capacity, potentially avoiding blackouts and the need for costly power system augmentation to cater only for extreme events.

- **Real time pricing** – is a much more attractive and advanced form of time of use pricing where prices are set in real time based on supply and demand pressures at that time rather than simply in blocks of time.
- **Tiered pricing** – a sliding scale of prices that charge more per unit electricity consumed the more total energy used. This mechanism allows low and moderate users of electricity to keep their bills to within affordable limits while charging those, probably high income households who consume vast amounts of energy, more per unit of electricity in a similar way to the pricing of water.

The SWIS is already a complex system and adding further complexity should be avoided. Therefore any variable pricing system introduced needs to be simple for all parties involved including the network operator, electricity retailer and customer. Western Power recommends the introduction of a combination of real time pricing (to provide the necessary economic drivers) and tiered pricing (to lessen the social impact on those with the least capacity to pay).

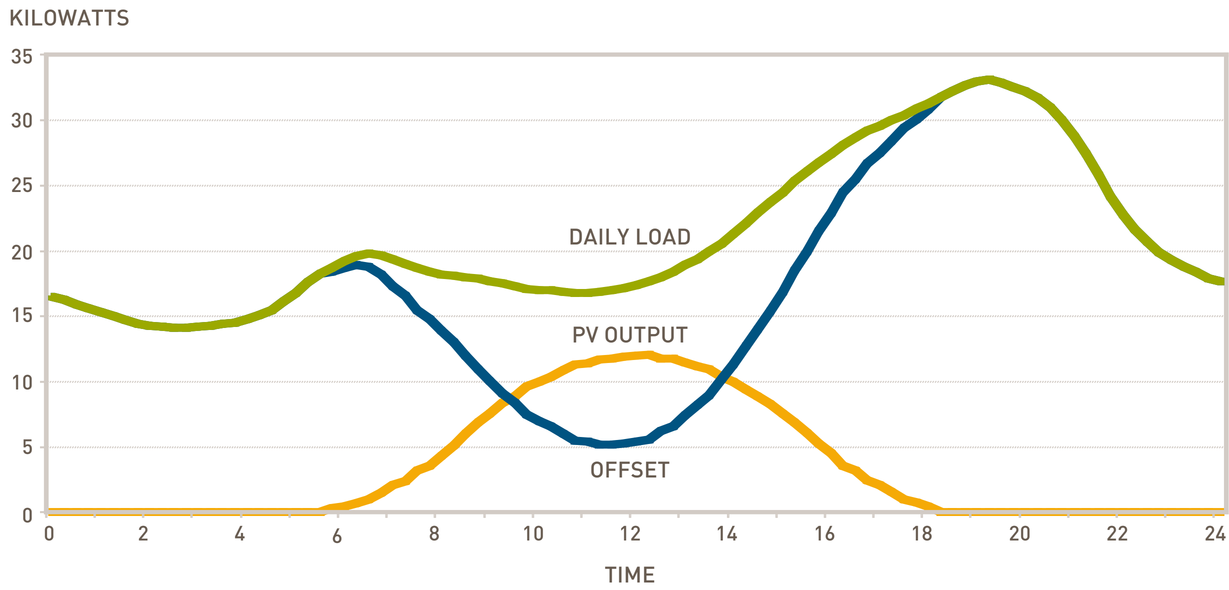
Variable pricing mechanisms may also enhance potential opportunities for Vehicle to Grid (V2G) energy transfer as will develop with the introduction of electric vehicles (see 4.5 below).

4.2.3 Net feed in tariffs

In general, Western Power supports Net Feed In Tariffs (which pay households a premium for their self generated electricity from renewable systems) as a means of encouraging the increased generation of cleaner energy and more energy efficient behaviour at a residential level. A feed in tariff adds long term certainty which helps the householder make the decision to invest in a renewable energy system. The widespread uptake of distributed generation, however, needs to take into account the impact this will have on the management of the electricity system as a whole (see 4.6 below).

Working together, a *Smart Grid* with variable, cost reflective pricing and net feed in tariffs for distributed generation have the ability to significantly flatten the demand profile, in turn appreciably reducing the need for major network augmentations. This offers substantial cost savings and maintains growth in the cost of electricity delivery within more sustainable limits. It must be recognised, however, that there is a loss of solar output in the late afternoon before the system load has significantly decreased (the graph below demonstrates this effect for a sample of Perth metropolitan homes with photo-voltaic systems fitted). This may cause system demand to increase to a level where commitment of more plant is needed late in the day. A *Smart Grid* would help alleviate this problem by gathering data to facilitate shifting load, applying demand side response and energy efficiency.

AVERAGE DAILY LOAD FOR 30 SITES



4.3 CONSIDERING THE TRANSITION TO A CONSTRAINED ACCESS NETWORK

Western Power sees merit in a well planned, systematic and long term transition from the current unconstrained network access model to a constrained network access model in order to optimise the economic return from investment in the transmission and distribution network (and generation assets).

Unlike the situation in the National Energy Market (NEM), access to the SWIS is provided to most generators on an **unconstrained** basis (NB: a few generators are currently provided access on only a constrained basis). This means that network access is offered for the full operating capacity of the generator irrespective of power system conditions. If the access offer is accepted, the generator then has the right and ability to input energy into the system up to that capacity with the knowledge that the network will be able to accommodate it. This method provides simplicity and certainty for the generator. It is also simpler for the system manager who can operate without the need for a mechanism to curtail certain generators once the system reaches capacity. It should be noted that a few generators have not accepted the cost of upgrades to provide unconstrained network access and in these cases automatic runback of the generator output occurs if network conditions require it.

Providing unconstrained access also requires the operation of a complex queuing mechanism for new generators (known in the case of the SWIS as Western Power's Application and Queuing Policy - AQP) since there are usually more interested generators wishing to dispatch energy into the SWIS than demand and network capacity allows for. Most significantly, an unconstrained access model can also result in over investment in the network because, even though the system is built to accommodate full generating capacity, not all generators are always operating to this level.

Shifting to a system like the NEM's where access is provided on a **constrained** basis would encourage more efficient use of the network by reducing the need for network augmentations and reinforcements and thereby maximising the economic return from the existing network. It would also significantly simplify the queuing process which would relieve more internal resources to evaluate the proposed connection and perform suitable studies. Under a constrained model, generators calculate and assume the risk of gaining unconstrained access to the network upon completion of their plant rather than being guaranteed of it. A constrained access model may require more generation investment than an unconstrained model to ensure demand is met even if some generation is constrained. However, the arrangement has the potential to deliver more efficient levels of expenditure in network and generation combined.

Transitioning to a constrained access model will also significantly reduce the long lead times entrenched in the current method of obtaining access to the SWIS which can cause delays in the progress of conventional and renewable power generation technologies thus impeding development.

However, we must be mindful that under a constrained model, a mechanism is required to resolve dispatch in constraints as well as the allocation of capacity to generators. The development of network constraint equations is a highly significant undertaking, with some previous estimates indicating many years of development as well as dedicated staff required for ongoing maintenance. There could also be a significant increase in the complexity of the reserve capacity mechanism for generators sitting behind a constraint. This issue

would also need to be resolved prior to any transition and represents a significant undertaking. A significant extra benefit of this work is that it will give a clear indication of the limitations of the network under all loading conditions. This will provide a better understanding of the state of the network to help direct planning efforts as well as assisting System Management. It will also provide benefit when responding to customer connection enquiries as we will have an indication of the capacity of the network at all points for generation and load, although describing this capacity will be more complex as it will depend on generation dispatch, system load and network topology.

We also need to consider that the small, isolated and "skinny" nature of the SWIS will make it less likely for a constrained access approach to deliver the full benefits that are possible in the NEM. A constrained access network will also fundamentally change the nature of the Western Australian Wholesale Electricity Market (WEM) where electricity will be probably need to be traded via a pool with five minute bidding rather than our current predominantly bilateral contract market

There is a further issue that would need to be considered and that is recognising the impact on the financial viability of existing generators. To be effective, constrained access may need to apply to all generators, both existing and those yet to be commissioned. This fundamental change will benefit some generators and adversely affect others. Therefore the impact on the financial viability of generators would need to be considered carefully.

While the shift from an unconstrained to a constrained access model presents challenges to administrators and system managers, and represents a major undertaking of the whole system, the long term benefits enjoyed have the potential to outweigh the short to medium term problems and costs. Accordingly Western Power supports a more thorough review of this potential transition, and any required changes to the Access Code, as a prudent investment in long term network sustainability.

4.4 BUILDING A FRAMEWORK FOR "GENERATION PARK" PLANNING

Western Power supports the creation of a framework for **whole of government planning to build significant new electricity generation assets in strategic locations** of greatest advantage to the long term needs of the WA economy.

Generation Parks are envisaged to be areas of land identified and preapproved for the location of SWIS connected, electricity generation assets in areas of natural advantage. They would offer savings achieved through economies of scale and provide a degree of certainty for potential generators around the following key issues:

- Appropriate ownership of the land.
- Appropriate zoning, planning and environmental approvals.
- Heritage and native title clearances.
- Appropriate community and stakeholder engagement.
- Available water resources.
- Road and other available transport links.
- Telecommunication links.
- Pre-determined availability of solar, wind and potentially geothermal energy resources.
- Access to the SWIS to a specified level of generating capacity and for an easier to estimate cost.

A Generation Park is not envisioned to be a "field of dreams" where all of the above is delivered in advance and in full prior to inviting generators to take up opportunities. That high risk approach would be unwise. Rather, planning for Generation Parks would be a process whereby some preliminary work is carried out, expressions of interest are sought and the Park's further planning then occurs in parallel with the firming up of proponents in a timely manner upon the achievement of

certain milestones. There is likely to be a need for some structure around this process whereby progression through a number of sequential steps is dependent upon confirmation of key milestones by both the government agencies and the proposed proponent. In this way Generation Parks become a tool for providing the market with more detailed information about the nature of the existing network to inform their investment decisions.

The concept is designed to overcome the paradox of our current system where prospective generators are required to provide details of where they intend to locate their generation assets along with a range of other technical information for Western Power's assessment. However, these proponents at times first want to learn from Western Power where the SWIS could best accommodate extra generation in order to reduce their connection costs and thereby improve or achieve economic viability for their project (acknowledging that many new generation projects are located alongside the fuel source in order to reduce transport costs). Until proponents know the proposed location of their plant they often are not in a position to be able to provide technical project details. Along with other uncertainties (e.g. planning and environmental approvals), this circularity can add risk to a level that prevents a project from developing, especially for newer technologies such as solar thermal and geothermal.

The development of Generation Parks is envisaged as a top down approach whereby at the highest level all possible sites are considered and are then discounted by a process of elimination until only those that are feasible remain for more detailed analysis. Western Power believes that the Generation Park concept needs a lead agent to guide and facilitate the process with a dedicated resource for doing so. This might be provided by the Office of Energy (or perhaps the Department of Planning) heading a taskforce of relevant agencies.

Generation Parks could also greatly assist with an increase in the development of more renewable energy generation and could accommodate the co-location of "dancing partners" to reduce intermittency problems often associated with renewables (e.g. gas [assuming its availability] or bioenergy fired power stations co-locating with wind farms to provide a net dispatchable output) (see 4.6).

Another advantage that Generation Parks might offer is a fairer and more transparent system of apportioning the costs of major transmission infrastructure. Currently, where spare capacity exists, new generators can connect to the SWIS relatively cheaply. Then at some point when capacity is exceeded the next generator that requires connection needs to carry a significant proportion of the cost of transmission reinforcement even though its output might be comparable to those who came before it. A more coordinated, holistic planning approach such as that potentially available under a Generation Park model would allow a mechanism to share these reinforcement costs amongst all users more equitably.

By improving the way we as a State plan for the development of electricity generation assets, Western Power believes there are significant economic, social and environmental benefits for the community. Generation Park planning is one such way to achieve this goal and allow a framework for a degree of centralised planning for greater efficiency.

4.5 PREPARING FOR THE TRANSITION TO ELECTRIC VEHICLES

In recognition of what is seen by some as the inevitable transition from internal combustion vehicles (ICVs) to electric vehicles (EVs), **Western Power supports the market and infrastructure adjustments required to maximise the advantages** (such as in load profile management and the provision of ancillary services) **while minimising the potential disadvantages** (such as increased peak demand) **of EVs.**

Although it's not certain when, EVs are coming! With the market demonstrating its enthusiasm for Hybrid Electric Vehicles (HEVs) such as the Toyota Prius, many major car manufacturers are on the verge of releasing mass production Plug-in Hybrid Electric Vehicles (PHEVs) and even full Battery Electric Vehicles (BEVs) (e.g. Mitsubishi's i-MiEV planned for release in 2010). While a handful of EVs owned by local enthusiasts are operating already, their effect on the SWIS is insignificant. With an expected influx of manufacturers' PHEVs and BEVs, however, the potential effects on the SWIS range from highly advantageous to disastrous depending on how this transition is managed and our collective understanding of the necessity to do so.

In a worst case scenario, where EVs become very popular and no changes are made to our management of the SWIS or to electricity market frameworks, large numbers of EVs would have very serious and costly consequences for the system as a whole. Research from a variety of sources, including the Curtin University Sustainability Policy Institute working in collaboration with Western Power, suggests that large numbers of EVs charging at the same time of day under the current tariff framework would add significant loads to the daily peak demand period to the extent that they may cripple the entire system. This could result in either system failure when demand exceeds capacity or require significant new levels of investment in peaking generation and network augmentation to increase capacity.

With the right market reforms, however, an influx of EVs could provide a number of highly desirable improvements to the SWIS. With a network of interconnected EVs plugged into a *Smart Grid* (incorporating mechanisms to optimise consumer behaviour such as variable pricing - see 4.2), EVs can potentially offer the following highly attractive services once they reach an aggregate fleet of significant size:

System balancing and ancillary services.

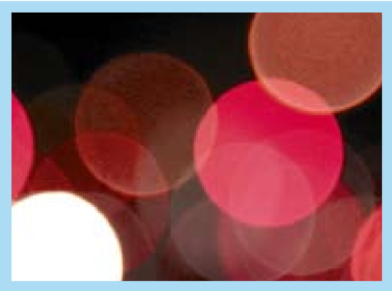
- Overnight recharging adding load to the low demand period that coincides with high wind energy supply and therefore effectively allow for "wind powered vehicles".
- Lower overall greenhouse gas emissions and other air borne pollutants.
- Provide a long sought after and highly valued energy storage solution for greater System Management efficiency.

Innovative enterprises are already in motion overseas and in Australia offering services to future EV

drivers such as car leasing (to guard drivers against the initial high cost of purchasing an EV), battery recharging and swapping stations, and in turn (through the aggregation of large numbers of EVs) offering services back to system operators such as balancing and storage.

Under such rapid changes it is not hard to imagine a not too distant future where drivers will acquire the services of a car in a fashion similar to the way most people acquire mobile phone services today – through the purchase of a plan delivered through a physical device that you do not necessarily own but for which you pay a monthly fee. In return the service provider ensures the functionality of the EV to the customer by ensuring it's always charged and simultaneously sells aggregated services to the grid system operator at a rate cheaper than can be met by more traditional infrastructure investment.

By ensuring our market frameworks and *Smart Grid* policies are attuned, Western Power anticipates a bright future for a relatively rapid transition from ICVs to EVs where the significant benefits are realised and the pitfalls are averted.



4.6 DEVELOPING DISTRIBUTED GENERATION ACROSS THE SWIS

In recognition of the potential advantages provided, **Western Power supports the growth in distributed electricity generation** (such as rooftop solar PV systems) **throughout the SWIS** in a manner which improves the overall efficient management of the SWIS.

The community is increasingly aware of environmental issues such as climate change. Together with the rising cost of electricity, this trend is resulting in an increase in the number of households, businesses and schools installing their own electricity generating systems. This uptake is further encouraged by the falling cost of the systems involved and related government schemes and subsidies. These systems include micro-wind turbines but most commonly they are in the form of rooftop photo-voltaic (PV) panels.

The electricity system benefits provided by distributed PV include:

- Offsetting conventional generation during daylight hours.
- Providing capacity in the SWIS and at 'Edge of SWIS' locations.
- Deferring network augmentation.
- Reducing overall line losses.

PVs can also be used to influence power quality and reliability, reduce losses particularly on long rural feeders and avoid the direct and indirect cost of fuel. Because of these potential advantages (on top of the environmental benefits derived from a reduction in greenhouse gas emissions from more traditional, fossil-fuelled generation), Western Power supports the installation of distributed generation systems throughout the network and mechanisms that encourage it including a Net Feed In Tariff (see 4.1).

Western Power is, however, mindful of the potentially negative impacts that high levels of distributed generation may have on the management of the system and therefore also supports further studies and research to better understand what these impacts might be, at what levels of distributed generation uptake they may start to be a problem and what can be done to mitigate these effects. The evolving *Smart Grid* will play a major role in mitigating these effects.

A concern with high levels of penetration of PVs stems from the difference between the daily load profile and the PV production pattern as dusk approaches. This difference may result in a large short term generator capacity shortfalls causing the system operator to have to start large amounts of conventional generation to cover the shortfall. Storage capacity such as that potentially available from electric vehicles may overcome this problem (see 4.5), but careful management of the available storage would be required to ensure that the driving public is not negatively affected.

The ability to gather more data on customer behaviour and generation patterns (such as is occurring through Western Power's participation in the Perth Solar City program) allows for the mitigation of some of the potentially negative effects of distributed generation. Demand side response and load profile changes tied to generation availability is an example and can be available through *Smart Grid* technology as a systems approach (e.g. better visibility, control and protection systems). The performance requirements of PV and wind systems also need to be considered including fault ride through and voltage control if the sum total of the energy provided by these systems is to become a significant portion of the overall generation capacity of the SWIS.

Opportunities also exist to embed mid size renewable generation plants (at around the 30 – 40 MW size) at strategically chosen locations throughout the existing network with minimal necessary network augmentation. This will maximise the efficient utilisation of existing infrastructure. These opportunities are currently under investigation and it is hoped this will be an ongoing initiative.

4.7 OVERCOMING THE CHALLENGES OF INTERMITTENT GENERATION

While strongly supportive of the overall increase in grid connected renewable energy generation, **Western Power seeks cooperative solutions to the system security challenges presented by increasing levels of electricity generated from intermittent sources.**

With consumers and governments increasingly taking action to reduce greenhouse gas emissions, growth in renewable energy generation is inevitable. Western Power is strongly supportive of these alternative energy solutions. The renewable nature of some energy sources does not in itself present any problems for a network operator such as Western Power. Intermittent energy does, however, present significant challenges for the management of the SWIS particularly because it is relatively small with no natural storage support such as hydro.

When the energy produced from an electricity generator is connected to the grid but varies in output from moment to moment or throughout a daily or seasonal cycle (due to fluctuations in the availability of the energy source), it must be supported with back up generation capacity to compensate for periods of low output. If the back up weren't provided, consumers of the energy produced would be subject to unacceptable fluctuations of supply. This costly duplication of generation capacity adds considerably to the total system cost and hence the charges eventually paid by the consumer.

For this reason it is the intermittency rather than the renewable nature of some forms of energy production that causes problems for system security and reliability. Non-intermittent or continuously available (and therefore dispatchable) forms of renewable energy (e.g. biomass and potentially geothermal energy) provide encouraging technological options for expanded renewable energy production.

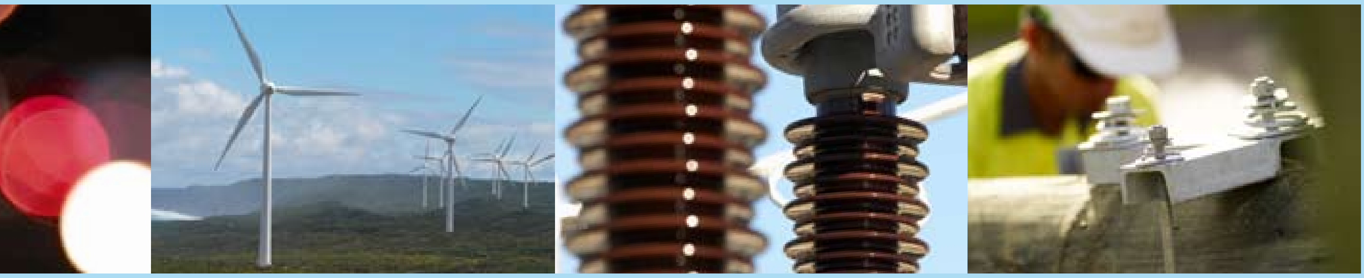
We must resolve the problems associated with the intermittency of certain forms of grid connected renewable energy generation (e.g. wind and solar power) if these technologies are to increase their market share without adversely affecting security and reliability in the SWIS. This might include a mechanism to ensure suitable cost signals are transferred to intermittent generators to encourage solutions to intermittency issues and to encourage more "power system friendly" renewables.

Other potential options for resolving intermittency include:

- Smart Grid developments – load management fast data analysis, smart meters, retail products etc.
- Energy storage systems – water, gas, air, batteries (see 4.5) etc.
- Increasing the diversity of energy supply methods.
- Pricing signals.

The recent extensive work by the esaa and the AEMC referred to in the Introduction (see 1.0 above) is highly relevant to this area of concern. In addition, Western Power supports any further research aimed at clarifying the hidden costs of resolving intermittency such as load following, "two shifting" and the inefficiency of operating generation plant below optimum capacity which would enable more informed planning decisions.

5.0 RESPONSES TO SPECIFIC WESTERN POWER RELATED QUESTIONS AND ISSUES RAISED IN THE SEI ISSUES PAPER



5.1 SECURE ENERGY

5.1.1 Upstream production and the bulk transportation of energy

5.1.1.1 What changes (if any) are required to current policies to facilitate the development of energy resources and facilities including the structure and design of downstream energy markets (especially gas and electricity)

Possible issues with current policies include:

- There is a lack of supply chain coordination from fuel (including renewable resources) for generators to customer load and consumption patterns. This requires holistic policy and technology thinking rather than the current system where individual enterprises make choices based on their best outcomes which collectively don't always amount to the best overall outcome. This issue is, however, difficult to overcome without more centralised planning and control which is not favoured by the current, more market based approach.

- In the short term, the SWIS needs a significant electricity storage mechanism to cater for the increasing intermittency of renewable generation sources such as wind farms (see 4.7). Without it, the next major wind farm will put the SWIS into a situation where either significant wind farm curtailment will take place or cycling of Verve Energy plant will become a regular occurrence, or both. This need is closely linked with the advent of more electric vehicles (see 4.5) and an electricity pricing policy (see 4.2).

- With a potential future move to operating a more constrained network access model, changes to the Technical Rules and the Wholesale Electricity Market Rules will be necessary (see 4.3).

5.1.1.2 How can regulatory systems affecting investment in and protection of energy infrastructure be improved to ensure the availability of energy for downstream markets?

The current market rules expose conventional generators to continuous load variations not envisaged at the time of design. The need for conventional generators to load follow is expected to grow substantially as intermittent generator penetration increases. Cycling of conventional generators will increase which will lower the capacity factor. Across portfolios the load variations will add to the duty cycle of individual generators. Longer term impacts of cycling and load variations will lower generator reliability and increase maintenance. Investment in future capacity will become less attractive.

For large scale transmission connected renewable projects, the per unit infrastructure costs may increase significantly as a result of increased investment needed to meet the lower percentage of times when renewable output is maximum. For smaller scale distribution connected renewable projects the connection and distribution infrastructure will need to be solid enough to cope with intermittency and times when the renewable power output is low whilst load demand is high. Voltage and load management will need to be capable of following potentially rapid changes imposed by intermittency. Also management of bidirectional flows of power may become a necessary design change in the distribution infrastructure.

Regulatory mechanisms will need to focus across both high level power system management (the major focus at the moment) and the lower levels of power system management (e.g. *Smart Grid*, V2G, load management). Leaving management of the lower level network elements out of the regulatory mechanisms may not deliver the management infrastructure required to enable high levels of renewable energy uptake in the SWIS.

5.1.1.3 Western Australia's economy has traditionally been dependent on imported oil, natural gas from the north-west and coal from the south-west to meet its primary energy needs. What are the feasible alternative sources of primary energy? What are the barriers to their development and how can these barriers be overcome? Examples include commercial scale renewable energy (e.g. biomass, solar, wind, wave, geothermal, hydro etc).

Mature renewable technologies like wind and solar PV are already providing feasible primary energy sources for customers in the SWIS. With regulatory changes such as the Australian Government's expanded renewable energy target and a potential emissions trading scheme, these technologies are best placed to take advantage of the improved market conditions these mechanisms will offer renewable energy generators. For an islanded system like the SWIS, however, there is a limit to the proportion that this form of intermittent generation can be accommodated without serious deleterious consequences to system security and reliability. In this sense the barrier to further penetration of these technologies is their intermittency. This is discussed further in 4.7 above.

5.1.1.4 Biomass fired electricity generation offers potential as a mature, dispatchable form of renewable energy which seems limited only by its economics as a function of the value of Renewable Energy Certificates (RECs) and the cost and availability of a reliable fuel supply.

Evolving technologies such as solar thermal, geothermal, wind and wave power present significant opportunities for potentially dispatchable renewable energy over the next decade and beyond. With increased investment in research and development and an improved understanding of the nature and availability of the energy resource, and the favouring of low carbon alternatives through market mechanism, these technologies should increase their market share over the years ahead.

The SWIS's unconstrained access model which requires Western Power to operate a complex and time consuming network Access and Queuing Policy (AQP), constitutes a significant barrier to new generation market entrants. This is particularly so for newer technologies likely to already be burdened with higher risks. This issue and its potential solution are discussed in more detail in 4.3 above.

Finally, the lack of a clearly defined and legislatively supported energy policy or vision for Western Australia up to the current point in time has been a significant impediment to the development of some alternative solutions to our energy future. Major capital investments by private corporations (e.g. in generation plant) are more likely if proponents feel confident in the long term direction and stability of the energy industry. The completion of this SEI process therefore offers an affirmative step in the reduction of this barrier.

5.1.2 Downstream infrastructure and markets

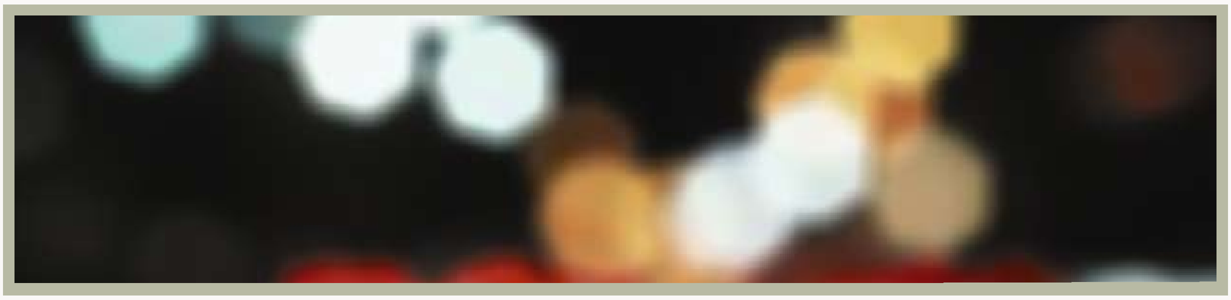
This includes electricity generation, transmission and distribution and energy use.

5.1.2.1 What are the current Commonwealth and State regulatory impediments to investment in downstream energy infrastructure?

Our current regulated environment has a strong economic focus as per the mandated principles for its creation (economically efficient, to create downward pressure on prices). However, Western Power needs to be able to make investment decisions through a range of filters that may occasionally be in tension with economic efficiency. For example the ability to make 'speculative investments' that are recognised in our asset base for trials or pilots in order to collect the data required to undertake full cost benefit analyses on non-network or green energy solutions is limited under the current Access Code regime.

5.1.2.2 What are the current impediments to the development of alternative energy and low emission technologies? These include:

- Commercial scale renewable power plants (e.g. wind, geothermal). In addition to those issues outlined in 5.1.1.4 above, a more constructive and supportive planning framework for energy generation precincts would overcome significant barriers to establishing new commercial scale renewable power plants. This idea is explored in more detail in 4.4 above. There maybe some scope for the introduction of medium scale size generation e.g. less than 10 MW through proactive analysis on the existing networks
- Small scale distributed energy (e.g. photovoltaic cells, microwind etc). See 4.2.3 and 4.6 above.



- Energy storage technologies (e.g. pumped storage, large scale gas storage). The most visible form of storage currently is the introduction of electric vehicles which offer a tremendous opportunity for system wide, dispersed energy storage and ancillary services as described in more detail in 4.5 above. Other forms of storage such as batteries, ice and chilled water creation are currently not cost effective. Some form of incentive may help in establishing research opportunities and enable cost effective applications of these technologies. This will assist in alleviating some of the issue with intermittent generation as discussed in 4.7

5.1.2.3 What are the current problems with the energy supply systems serving industry and communities in the north west, mid west and remote communities? What options should be considered to ensure that any expansion of existing energy supply systems serves the interests of all businesses and members of our community?

Western Power is currently in detailed planning for the reinforcement of the existing 132 kV transmission line to Geraldton in the Mid West. This planning is considering a number of options in an effort to decide the most economically effective and efficient alternative for all electricity consumers in the area. Western Power is concurrently applying to *Infrastructure Australia* for Commonwealth funding to build a 330 kV line to Geraldton in partnership with the State Government and private industry as a long term solution to enhance a number of "nation building" initiatives in the region. If successful, this will help to provide a sound, long term solution for the region which short term economic decisions do not necessarily allow.

5.2 RELIABLE ENERGY

5.2.1 What is the level of reliability that customers expect and what are they prepared to pay for increased reliability? Will customers be prepared to trade off a lower level of reliability with a decreased cost or vice versa?

VENcorp (Victorian Energy Networks Corporation) as the Victorian energy regulator, provides its network service providers with a periodic, comprehensive study and report into the 'value of lost load' - essentially the value customers place on reliability or what they would be willing to pay for this. The network service provider is able to compare the cost of the solution to the cost customers would be willing to pay for reliability to see if the investment is required. This encourages economically efficient investment in the network as the network service provider will only invest what customers would be willing to pay for. A similar system could be established here in Western Australia through the ERA if it was considered worthwhile.

5.2.2 How can the State ensure that its energy supply systems have adequate backup or redundancy (e.g. electricity reserve margin, electricity network capacity) to meet end-user expectations, while also ensuring that the price of energy remains competitive?

A risk emerging in terms of SWIS reliability is the treatment of renewable generator sources and "curtailable" load in the wholesale market's reserve capacity mechanism. Currently the capacity credit given to a renewable generator source such as a wind farm is the average output over the whole year. This capacity credit is used when determining the opportunity for new generation investment in the SWIS. While the capacity credit provides a commercial incentive for proponents due to intermittency, it does not always provide reliable capacity when electrical demand

is highest. As renewables become an increasing percentage of the generator capacity in the SWIS the risk grows and a better statistically based assessment of the capacity is indicated. The Independent Market Operator's Renewable Energy Work Group is examining the issue of capacity allocation for renewable energy and may correct some of the emerging risks to capacity.

A similar lack of confidence exists about the reliability of capacity for curtailable loads for which there is little operational experience and which are considered largely unproven at this stage. This concern may lessen once wider experience with the dispatch of curtailable load capacity is gained.

5.2.3 What feasible solutions can customers employ to mitigate energy supply disruptions (e.g. micro-generators, uninterruptible power supplies)?

Embedded generation can be used as backup emergency generation if the fuel source is available. Solutions of this nature with storage and other non traditional network solutions used in a hybrid approach need to be explored and may provide a solution to distributed generation issues in general through Smart Grid technologies. Uninterruptible power supplies can assist where quality is critical to a customer's business, for example through energy storage devices.

5.2.4 Is it possible to enlist or adjust end-user responses to mitigate demand or substitute with alternative fuels in response to emergency events? What are the limits on this kind of response?

Western Power's Nedlands trial in curbing demand through the control of air conditioners has demonstrated that a positive reduction was achieved in peak demand without any noticeable discomfort to consumers having received no complaints during the three trials conducted. This trial demonstrates that it is possible to enlist end-user responses to limit demand. This kind of demand management has also been used successfully internationally e.g. California.

5.2.5 What options are feasible to manage the rapid fluctuations in supply from intermittent generation sources (e.g. wind and solar) and how can the input from these generators better match demand characteristics?

See 4.5 and 4.7 above.

5.2.6 What options are available to improve the reliability of power supplies to remote and 'edge of grid' industries and communities?

Remote communities at the edge of the SWIS are ideal locations to trial renewable energy solutions to offset the cost of diesel back up and long transmission lines to small loads.

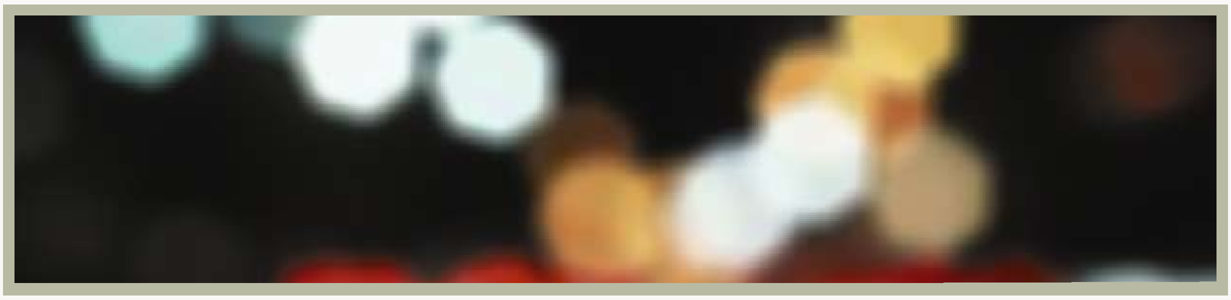
5.3 COMPETITIVE ENERGY

5.3.1 General

5.3.1.1 What are the major impediments to increasing competition in … downstream (e.g. electricity) energy markets in Western Australia?

The lack of a clear and strategic energy pricing policy which, among other things, allows for Cost Reflective Pricing has been a significant impediment to increased competition in the electricity market – see 4.2 above. Competition amongst generators is also hampered by the necessity for Western Power's AQP – see 4.3 above. Other impediments include:

- The small size of the (SWIS) market
- High levels of complexity
- Lack of real competition
- Long (40+ years) life of the assets involved
- Technology



- Lack of interconnection (i.e. a "skinny" network)
- Limited fuel sources which in some forms are almost at monopoly status.

5.3.1.2 How can energy markets be better integrated (especially gas and electricity) to deliver more efficient and competitive market outcomes with improved reliability?

Western Power supports ongoing work in this area as is being conducted by the Oates Review's Market Rules Working Group including:

- Better alignment between gas market and electricity market clearance and scheduling times.
- Closer to real time negotiation of positions in both markets.
- Better visibility of constraints and potential congestion points across both markets as they emerge.
- More reliable forecasts for electricity demand and wind farm and other renewable generator outputs.
- Greater visibility of contractual and commercial positions being adopted by players in both markets.

5.3.1.3 How should the role of government change in response to the development of a market driven energy sector?

Under a more market driven energy sector than Western Australia has at present, the Government's role would be likely to turn more to ensuring the socially and economically disadvantaged are not further impoverished by the changes that occur to the cost of their energy through responsible social equity programs (see 4.2.1 and 4.2.2 above). The Government should continue to regulate monopoly providers of infrastructure and continue to refine and monitor policy development and implementation against stated aims and key performance indicators.

5.3.1.4 What are the implications for government policy of unintended social and environmental impacts of facilitating a market driven environment for energy?

The strong economic focus of our current regulated environment can limit Western Power's ability to offer more community friendly infrastructure solutions. This is a particular problem in developed, urban areas. Increasing community opposition to large scale transmission and distribution infrastructure projects presents a considerable strain on Western Power's resources and inhibits the smooth development of projects. Western Power supports a position whereby provision is allowed under the 'New Facilities Investment Test' provisions of the *Electricity Networks Access Code 2004* for the mitigation of the visual impact of infrastructure such as substations which would allow the local community's needs to be accommodated much more readily.

(See 5.3.1.3 for discussion on managing social disadvantage impacts).

5.3.2 Energy price regulation

5.3.2.1 The State Government has maintained control of both gas and electricity retail tariffs. Is it appropriate for this to continue?

See 4.2 above.

5.3.2.2 If gas and retail price regulation is required in the future, what is the appropriate process that can be put into place to ensure that consumers are protected and that suppliers are able to earn a commercial return?

See 4.2.1 above.

5.3.2.3 What is the appropriate way to provide assistance to remote or socially disadvantaged groups in our community (e.g. uniform tariffs, rebates, concessions, flat rate tariffs etc.)? How should they be funded?

Vulnerable members of the community can be protected from the true cost of electricity by being the beneficiaries of direct government compensation designed to shield them from the added impost that cost reflective pricing will bring (see 4.2.1 above).

The introduction of tiered pricing is another way to lessen the social impact on those with the least capacity to pay. This involves a sliding scale of prices that charge more per unit electricity consumed the more total energy used. This mechanism allows low and moderate users of electricity to keep their bills to within affordable limits while charging those, probably high income households who consume vast amounts of energy, more per unit of electricity in a similar way to the pricing of water (see 4.2.2 above).

5.3.2.4 How can we maximise the benefits of introducing cost reflective energy tariffs, especially in terms of promoting energy conservation; reducing peak demand; and promoting better utilisation of energy infrastructure?

We can maximise the benefits of cost reflective tariffs by combining them with a variable pricing regime within a *Smart Grid* development context (see 4.2).

5.3.3 Electricity

5.3.3.1 What specific reforms could be made to the Wholesale Electricity Market to improve the efficiency of the market (e.g. promote transparency, liquidity, risk management tools)?

See 4.3 above.

5.4 CLEANER ENERGY

5.4.1 What are the technical, regulatory and market barriers to the introduction of renewable energy projects in Western Australia?

See 5.1.2.2 above.

5.4.2 How can these barriers be overcome while ensuring that all generation projects are treated equally within market and regulatory frameworks?

See 5.1.2.2 above.

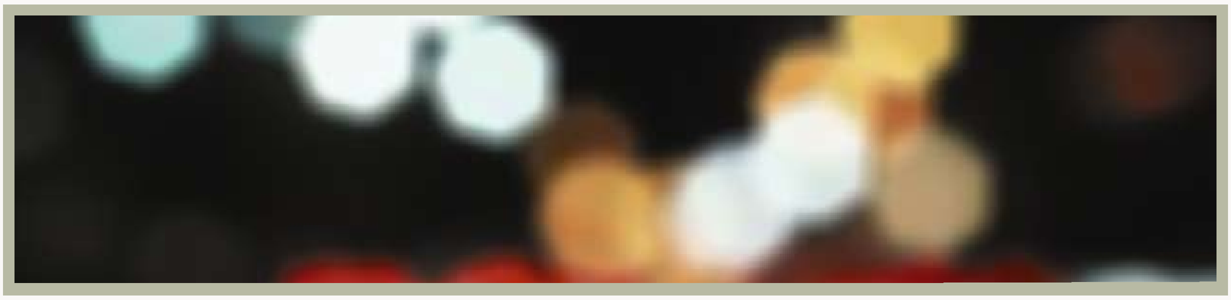
5.4.3 How can government best facilitate the development of electricity markets that efficiently apportion the costs and benefits of the introduction of renewable energy to various market participants?

One important issue (as outlined in 4.7 above) regarding the system's ability to accommodate further expansion in wind powered electricity generation is the cost of balancing for this intermittent form of energy.

Currently this cost is borne by Verve Energy rather than the wind generator. A fairer system which would encourage wind generators to develop innovative ways to resolve their intermittency issues would be for them to bear the balancing costs themselves. In this way the proliferation of more wind powered energy into the system would not present a threat to system security and reliability. It's also important to clearly understand the real costs of intermittency. These are currently hidden in both the Western Australian and national markets. They include the costs of load following, lower plant efficiency and shortened plant lives (see 4.7).

5.4.4 What are the technical, regulatory and market barriers for the introduction of distributed generation technology?

See 4.6 above.



5.4.5 How can the State Government ensure adequate investment by electricity distributors in 'smart grid' technology?

Western Power is currently participating in the Australian Government's Solar Cities Program which is trialling a number of *Smart Grid* technologies and systems in Perth's eastern suburbs. This program will provide the experience and evidence to support a more widespread introduction of *Smart Grid* technologies across the SWIS which Western Power will endeavour to achieve regulator approval for in years ahead (see 2.0 and 5.4.7).

The trials are designed to test some of the key objectives of smart networks which are:

a. Change the relationship with customers, transforming their role from uninformed and non-participative to informed, active and involved, stimulating demand side responses;

b. Accommodate connection of widely distributed, renewable energy sources across the network and in particular at customer premises, providing an 'energy clearing house' function;

c. Facilitate market interactions, providing customers access to products and services with choice, based on price and environmental concerns;

d. Accommodate new energy storage technologies, enabling customers to choose the source of their energy and optimise the efficiency of their use of energy; and

e. Continue to improve the performance of the network by:

   - using greatly enhanced data gathering capabilities;
   - detecting and responding to problems automatically;
   - strengthening interconnections; and
   - optimising replacement investment.

Delivery of those objectives involves a merging of the existing electricity network infrastructure - upgraded with sensing, monitoring and management devices - with a secure, robust, and reliable communications infrastructure, supported by relevant information technologies, resulting in two-way exchanges of energy and information.

The State Government can support this program by:

- Integrating the *Smart Grid* into future energy policies.
- Supporting funding for an expanded trial and/or roll out.
- Linking to a national approach.
- Promoting WA as a useful laboratory as the SWIS is a small isolated network

Delivery of these objectives will also contribute significantly to the Federal Government's objectives of reducing greenhouse gas emissions and enhancing energy security.

5.4.6 What are the benefits and costs associated with installing advanced metering in customer premises?

In 2008 NERA Economic Consulting completed a cost benefit analysis of smart metering, by State, for the Ministerial Council on Energy (MCE). The analysis showed that the benefits associated with a national rollout of smart metering have been estimated to be between $4.5B and $6.7B in Net Present Value (NPV) terms over the 20 year period of the analysis.

The majority of benefits result from:

BENEFIT CATEGORY	NPV BENEFIT
Avoided meter costs associated with not having to replace existing meter stock	$1.7 billion - $2.6 billion
Business efficiencies which include avoided cost of routine manual meter reading, avoided cost of special meter reads, avoided manual connections/ disconnections, reduction in calls to fault and emergency lines, avoided costs of customer complaints about quality of supply	$2.1 billion – 2.9 billion
Demand response which reduces time of use and overall demand, deferring peak augmentation, deferral of peak generating capacity and reductions in the level of unserved energy, generation operating costs and carbon emissions.	$250 million - $738 million
Including interface to Home Area Network (HAN)	$169 million - $925 million
Total demand response benefits:	$419 million – $1.66 billion
TOTAL	**$4.5 billion - $6.7 billion**

Smart Grid costs and benefits: Western Australia

The NERA assessment concluded that the net benefits of smart metering are not unequivocally positive for all jurisdictions. An assessment of the specific Western Australian benefits notes:

- The need to replace 300,000 non-compliant meters (one third of the total stock) will accelerate benefits realisation.
- A rollout of smart metering by the distributor is justified on avoided meter costs and business efficiencies. Net benefits range from $93 million - $553 million.

The NERA assessment concluded that "the net benefit for WA … is expected to be positive and is likely to remain robust in response to (any) changes in assumptions". The report also notes that "substantial distribution business efficiencies have been estimated for WA."

The key benefit of undertaking a trial is the ability to test the assumptions behind the projected benefits of a *Smart Grid* deployment, prior to any significant investment. The scale of the trial is not so large as to cause disruption to the network or expose the business to significant cost and is considered to be sufficiently scalable to derive reliable conclusions about projected benefits on a broader scale while being sizeable enough to test the full range of functionality. A trial enables the development of a reliable, robust business case for any further investments in the next regulatory period (AA3).

The breakdown of benefits and costs is as follows (million dollars):

WA	SMART METER COSTS	AVOIDED METER COSTS	BUSINESS EFFICIENCIES	DEMAND RESPONSE	NET POSITION
Minimum net benefit	(532)	297	299	28	93
Maximum net benefit	(336)	394	411	84	553

Other benefits of undertaking a trial in WA include:

- The opportunity to work with the retailer (Synergy) to test the benefits of customer applications (in home displays, new tariffs which potentially lower bills, load control) to understand how benefits are realised and the potential for pass through of savings to customers. This is particularly important in light of recent and proposed tariff increases.

- The provision of a *Smart Grid* infrastructure will enable improvements in services to customers especially the connection of distributed generation (e.g. photovoltaic) at the customer's premises, and better management of the loads generated by distributed generation.

- The opportunity to include the *Smart Grid* trial within the scope of the Perth Solar City program enables an injection of $2M of Commonwealth funding to be allocated to offset the costs of the trial.

- The Solar City program will focus on consumers in the eastern region of Perth (300,000 households) which is known to have a wide cross section of socio-economic groups. The implications of smart metering for vulnerable customers, in particular take up of new tariff offerings and in home displays, will be better understood.

5.4.7 How can the State Government facilitate the deployment of advanced metering for energy customers and maximise the benefits?

Further to comments made in 5.4.5 above, the State Government can facilitate advanced metering through a comprehensive electricity pricing policy that allows cost reflective and variable pricing (see 4.2 above) and encourages energy efficiency, demand side response through improved data capture and incentive to enable research and development I these areas as well as low cost storage and facilitate other initiative s such as the uptake of electric vehicles (see 4.5).

5.4.8 Does the State Government need to put in place programs to encourage end-use efficiency?

Western Power believes strongly in the need for the Government to invest in energy efficiency and energy conservation programs either through the Office of Energy or Western Power if we were given the specific policy and regulatory mandate to do so (see 4.1 above). Encouragement needs to be provided to enable customers to transform their role from uninformed and non-participative to informed, active and involved, stimulating demand-side response and in addition the market needs to provide customers access to products and services with choice, based on price and environmental concerns. Smart Grid technology facilitates this interaction.

5.4.9 What incentive programs for renewable energy and energy efficiency should the State Government consider?

Incentive programmes should encourage the following:

- More diversity in technology – i.e. not only wind farms and PVs

- Minimising common mode effects (e.g. a 45 degree day stops all PV production and a high pressure over WA stops all wind energy production).

- Encourage non-intermittent sources of renewable energy (see 4.7).

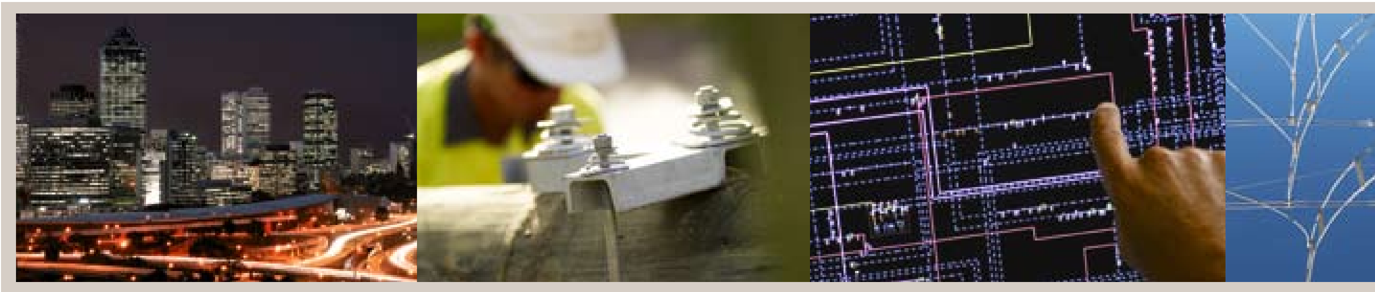
- Foster storage technology in conjunction with intermittent generation.

5.4.10 What role should the State Government have in facilitating cleaner energy projects?

Acknowledging assistance already provided (to wave and geothermal technologies for example), the Government could consider further funding and/or other assistance programs to facilitate research and development for immature renewable energy technologies in a Western Australian context.

The Government could also support the transition to a constrained access model (as described in 4.3 above) which, notwithstanding the risks involved, is more likely to facilitate the most efficient generators in an economy operating after the introduction of the expanded Renewable Energy Target and an Emissions Trading Scheme when cleaner generators will become more competitive in the market.

6.0 SUMMARY AND CONCLUSION



The long term provision of secure, reliable, competitively priced and cleaner energy for all Western Australians is one of the great challenges facing our State. With the challenge, however, comes enormous opportunity particularly with the rich resources available in Western Australia.

Our energy future is inextricably linked with the issue of climate change, described by leading economist Professor Ross Garnaut as a "diabolical policy problem". A low carbon future seems an inevitable means of addressing this problem. Therefore it is critical that we prepare systematically to achieve a sustainable energy future.

For our economy to prosper, for our environment to be protected and repaired, and for our way of life (dependent on safe, reliable and affordable energy) to be maintained, getting our energy future right is essential.

The *Strategic Energy Initiative* offers a tremendous opportunity for Western Australia to collaboratively indentify the potential challenges ahead - both general and specific – and propose solutions in order to help the Wholesale Electricity Market and the energy sector generally to develop and mature.

As the operator of the State's largest interconnecting energy system, Western Power values the opportunity to contribute to the *Strategic Energy Initiative* process and looks forward to meeting the issues we collectively confront with innovative solutions.

In this submission we have sought to describe what Western Power sees as the critical strategic directions of, principally, the electricity industry leading up to 2030 which will allow the development of a fully integrated smart network more closely involving customers and their needs:

- Improving energy efficiency and conservation.
- Adopting an electricity pricing policy for Western Australia.
- Transitioning to a constrained access network.
- Building a framework for "Generation Park" planning.
- Preparing for the transition to electric vehicles.
- Developing distributed generation across the SWIS.
- Overcoming the challenges of intermittent generation.

To facilitate the achievement of these directions, we see the SWIS evolving from a passive conductor of electricity from remote generator to centralised consumer, to a much more sophisticated *Smart Grid* allowing bidirectional flows of energy, highly informed and empowered consumers savvy in controlling their energy requirements and innovative ways of maximising the value of investments in energy infrastructure.

Western Power looks forward to the results of this initial round of consultation in the development of the *Strategic Energy Initiative* and actively participating in further involvement opportunities.