Australian PV Association

www.apva.org.au

APVA Response to the Draft Energy White Paper, Dec 2011

March 2012

Summary of key points

The Government's Draft Energy White Paper (EWP) is a timely update of Australia's energy resources, usage, markets and policy. This submission focuses on the issues most relevant to PV and the APVA appreciates the opportunity to update the Government's data on PV pricing, installed capacity and potential in Australia.

APVA especially notes the following key points:

- APVA is surprised and disappointed to see that PV is not included in the EWP as one of the key renewable energy technologies most likely to contribute significantly to Australia's electricity supply in the future.
- Distributed PV appears to be assessed only as part of a bundled SRES technology band, and as a result,
    - The future rate of uptake of PV is significantly underestimated
    - Uptake of distributed small- and medium-scale PV is apparently assumed to halt without support from the SRES, despite grid parity having already been reached
    - Proposed market and regulatory changes focus on addressing barriers to distributed energy within existing market structures and fail to capture the opportunities provided by creation of new distributed energy markets.
- No mention is made of larger scale PV, despite the favourable costs of PV compared to current costs of solar thermal and geothermal technologies. The EWP has failed to recognise the progress made in utility-scale PV installations in recent years, in particular:
    - Utility-scale PV installations are consistently proven to produce the lowest cost of electricity within the demonstrated solar technologies
    - Utility-scale PV has reached a cost point where it could reasonably be expected to make up a significant portion of the Renewable Energy Target.
- No mention is made of the significant potential for PV to displace diesel in off-grid electricity markets, nor of the benefits this would bring for energy security, reduced government cross-subsidies, reduced environmental impacts and reduced costs of remote power supplies.
- The APVA strongly recommends the inclusion of PV as a separately identified technology in the final version of the EWP, with projected uptake levels of around 9 GW by 2020, in line local analyses and international projections.
- The EWP seeks to prevent the introduction of new State-based complementary measures. The energy playing field is far from level and markets alone will not be sufficient to elicit the major infrastructure and institutional changes necessary for a transition to a clean energy future. Support for new technologies, from R&D through early stage deployment will remain important, while all Governments must be free to encourage the development of new industries and jobs in their jurisdictions.

Section 2: Australia's energy resources

The APVA notes that the new COAG Standing Council on Energy and Resources is responsible for ensuring the safe, prudent and competitive development of the nation's mineral and energy resources and markets to optimise long-term economic, social and environmental benefits to the community.

We note the current electricity market is focussed on central power generation and supply and is therefore restricted in its ability to take advantage of the lower cost distributed energy options now available, which also have significant social and environmental benefits. Australian consumers are being asked to pay increasing electricity prices to reinforce an out-dated and high-cost central generation model of delivery. Distributed options are given lip service only, with large opportunities for cost effective energy efficiency and demand management being ignored across the country and with competition apparently non-existent, as evidenced by the zero buy-back rates on offer from several retailers for solar generated power, which is on-sold at peak rates.

The APVA is of the view that a new regulatory framework for distributed energy is urgently needed.

- Increasing uptake of PV, as well as other forms of distributed generation and energy efficiency, have the potential to significantly reduce per customer electricity sales, which will have a significant impact on current retailer and network operator business models, and upstream on the wholesale energy market
- New regulatory frameworks will need to be developed to cater for the new markets in distributed energy services
- The EWP acknowledges the need for more effective demand side responses, but views this as a need for improved productivity, information and choice for end-use customers, not as the need for a new market which would allow distributed energy benefits to be traded, perhaps separately from existing markets. The latter would facilitate the establishment of new energy service companies, would empower customers to trade on their own energy investments and would break the trend to increasing consolidation of the electricity retail sector.
- New market structures should encompass incentives for the grid services PV inverters can provide, including reactive power and voltage support, whilst also creating opportunities for associated storage and load control.

Section 3: Future energy trends, priorities and challenges

Absence of PV in the EWP

APVA is surprised and disappointed to see that PV is not included in the discussion as one of the key renewable energy technologies most likely to contribute significantly to electricity supply in the future. With PV LCOE costs now lower than retail electricity prices in many areas, it is even more surprising to see that the EWP and the referenced modelling show PV (which is presumably incorporated under the generic SRES category) gradually declining after the end of the RET.

In addition, no mention is made of larger scale PV, despite the aims of the solar flagship program, the current State Government calls for larger systems and the favourable costs of PV compared to current costs of solar thermal and geothermal technologies. This is demonstrated by the current

construction of Australia's first utility-scale PV project, a 10MW AC installation near Geraldton, Western Australia.

There is already over 1.5 GW of PV installed in Australia, as shown in Figure 1 below:

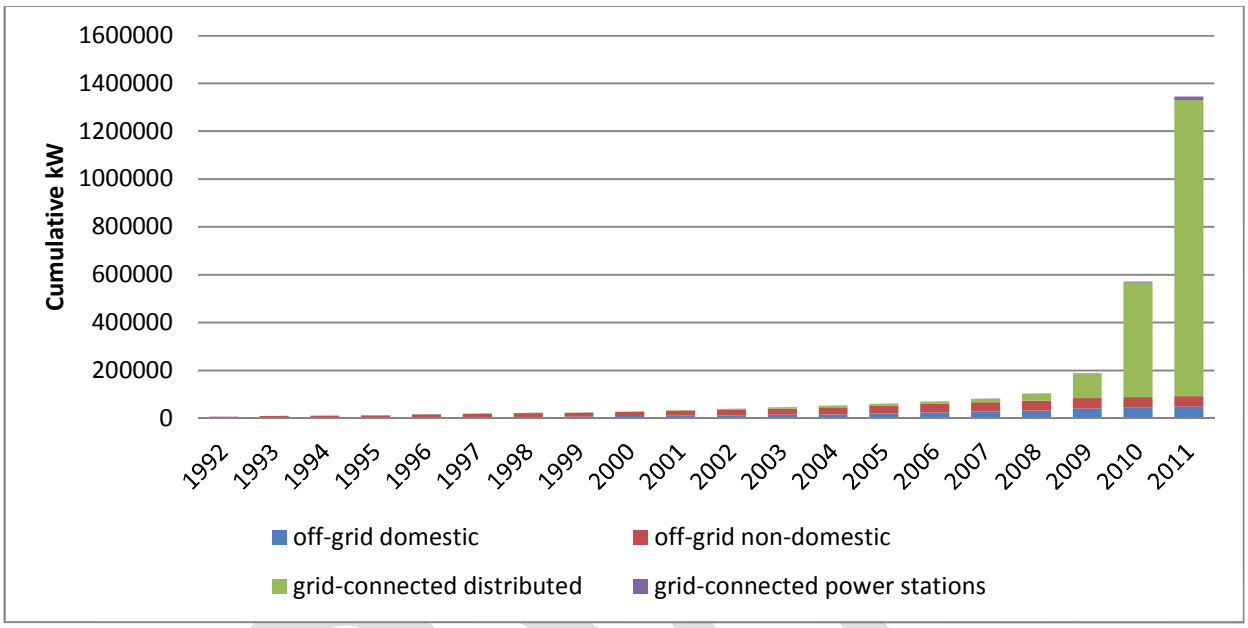

Figure 1: Cumulative PV installations in Australia[1]

Figure 2 shows the PV module price trend over the same period.

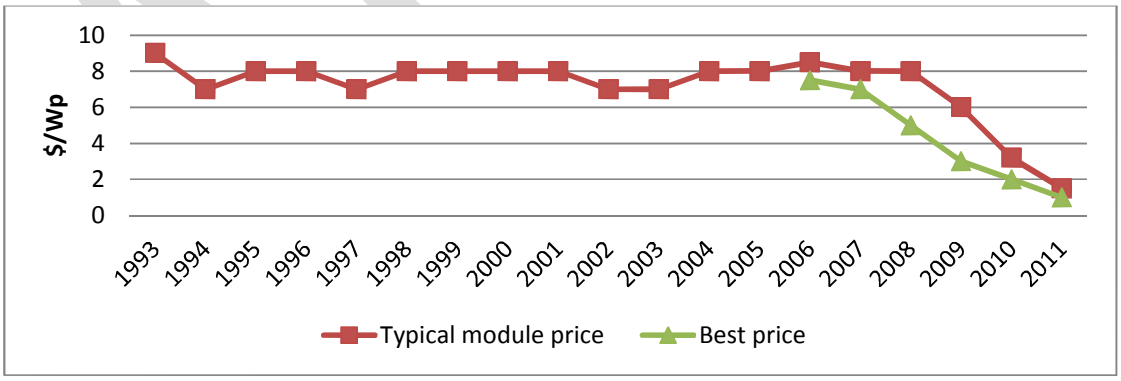

Figure 2: Australian PV module prices[2]

The following graphs show projected costs of PV electricity, without any REC or Feed-in Tariff subsidies, for large-scale, commercial and residential PV systems plotted against projected prices of displaced electricity and the Net Present Value of those electricity prices. It can be seen that parity with the NPV of wholesale electricity prices under the high price projection will begin to be reached for

[1] APVA, various years, PV in Australia. **PV in Australia 2011** is in press.
[2] APVA, various years, PV in Australia. **PV in Australia 2011** is in press

central generating PV systems from 2018 and with current prices from 2022. For commercial and residential systems, parity has already been reached.

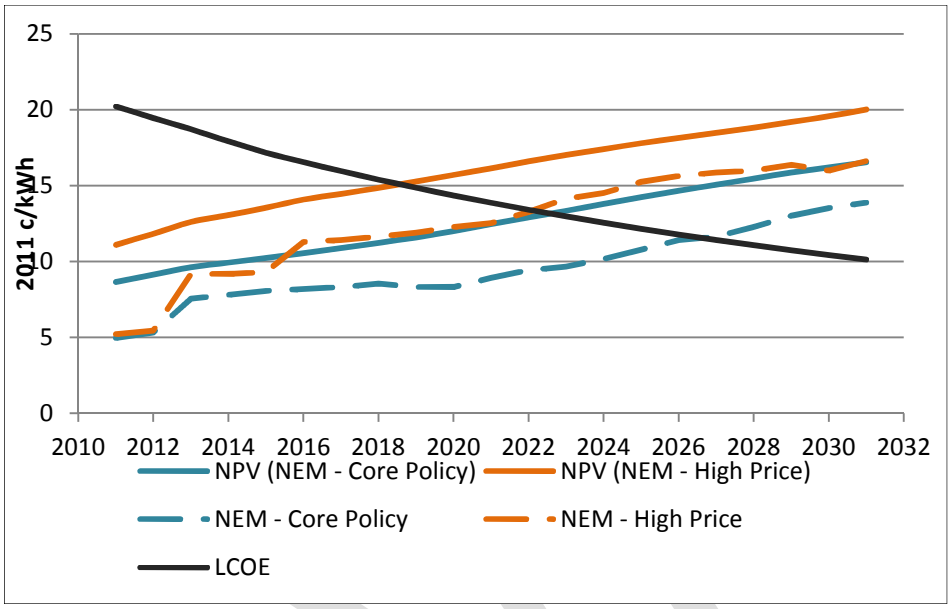

Figure 3: LCOE projections for large-scale PV systems and the NPV of offset wholesale electricity price projections – excludes LGCs (Core Policy = 5 per cent cut on 2000 levels by 2020 and an 80 per cent cut by 2050; High Price = 25 per cent cut on 2000 levels by 2020 and an 80 per cent cut by 2050)[3]

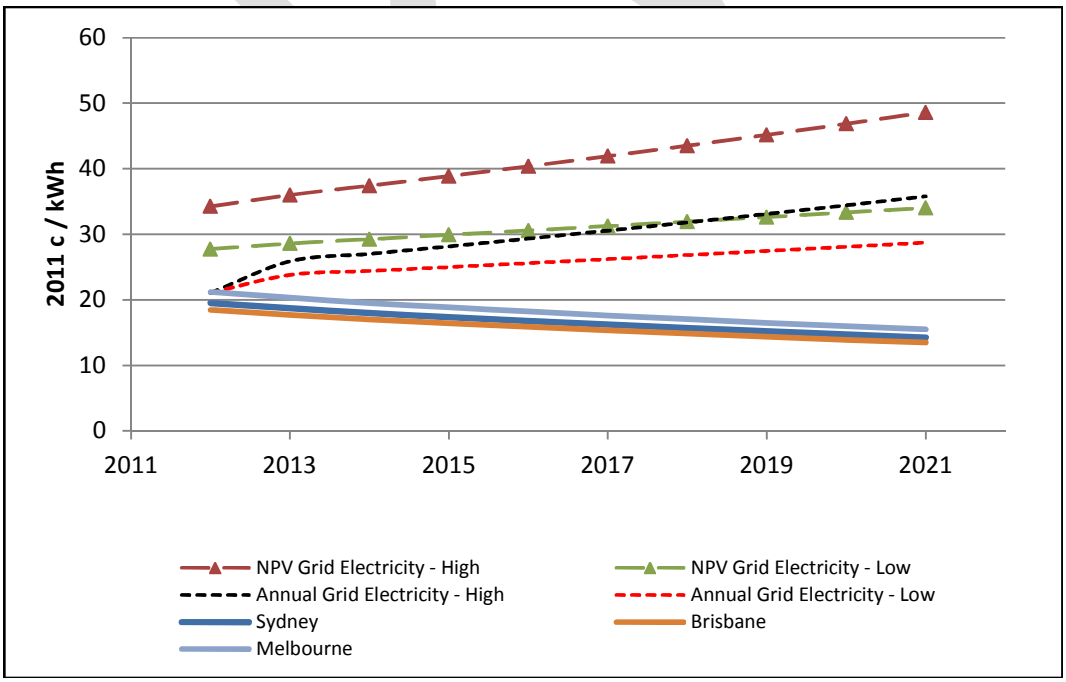

Figure 4: LCOE projections for commercial PV systems vs high-low grid electricity price projections - excludes Solar Credits[4]

[3] *APVA, 2011,* ***Modelling of Large-Scale PV Systems in Australia, 2011***

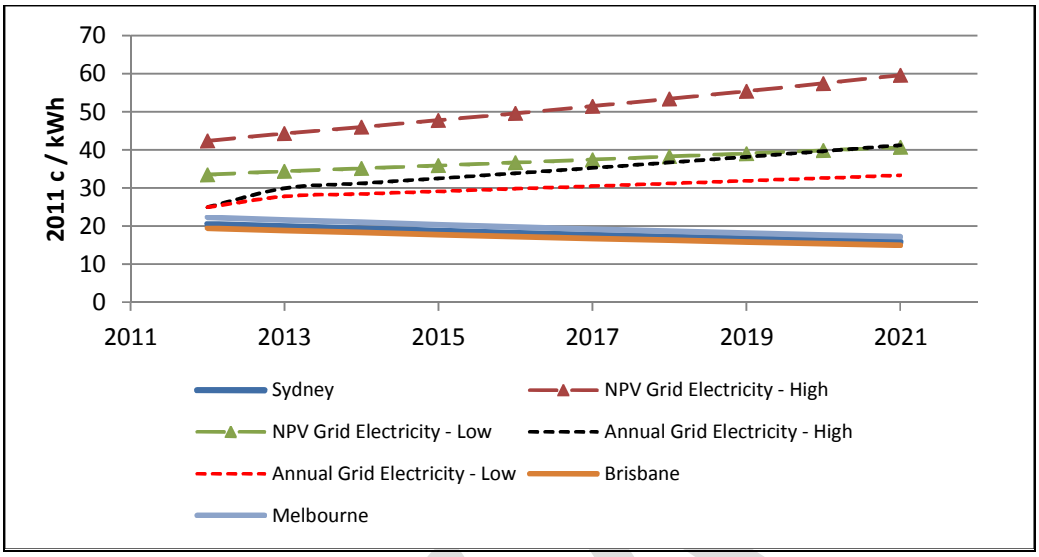

Figure 5: LCOE projections for residential PV systems vs high-low grid electricity price projections – excludes Solar Credits[5]

Global PV module and LCOE projections from Clean Edge[6] shown in Figure 6 indicate similar trends.

Total Installed PV System Prices and Costs of Electricity (Global Average)

Year	System Price ($/W)	LCOE Range (cents/kWh)
2007	$7.20	28 - 47
2008	$7.00	27 - 45
2009	$5.12	20 - 34
2010	$4.55	18 - 30
2011	$3.47	14 - 23
2012*	$2.69	11 - 19
2013*	$2.43	10 - 17
2014*	$2.19	9 - 15
2015*	$2.02	8 - 14
2016*	$1.87	7 - 14
2017*	$1.73	7 - 13
2018*	$1.60	6 - 12
2019*	$1.48	6 - 11
2020*	$1.37	6 - 10
2021*	$1.28	5 - 10

*Source: Clean Edge, Inc., 2012. 2007 through 2011 are actual figures and *2012 through 2021 are estimates. Figures calculated using Clean Edge cost projections and the NREL Levelized Cost of Energy (LCOE) Calculator. ASSUMPTIONS: Discount rate: 6%; Capacity factor: 16-26%; O&M cost: $6-$26/kW.*

Figure 6: Global average historical and projected PV module and LCOE trends

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[4] *APVA, 2011,* ***Modelling of PV & Electricity prices in the Australian Commercial Sector, 2011, updated 2012***

[5] *APVA, 2011,* ***Modelling of PV & Electricity prices in the Australian Residential Sector, 2011, updated 2012***

[6] Clean Edge, 2012, *Clean Energy Trends 2012*, Clean Edge, The Clean Tech Market Authority, March 2012.

In line with these projections, while taking account of reduced government support via Solar Credits and Feed-in Tariffs, we project a growth rate of 15% per year from 2014 and, adding in an anticipated 400 MW of PV installed under Solar Flagships Stage 1 and Stage 2, a cumulative installed PV capacity in Australia of 9 GW by 2020, as shown in Figure 7.

The APVA strongly recommends the inclusion of PV as a separately identified technology in the final version of the EWP, with projected uptake levels in line with the projections shown here, which are supported by international and local analyses.

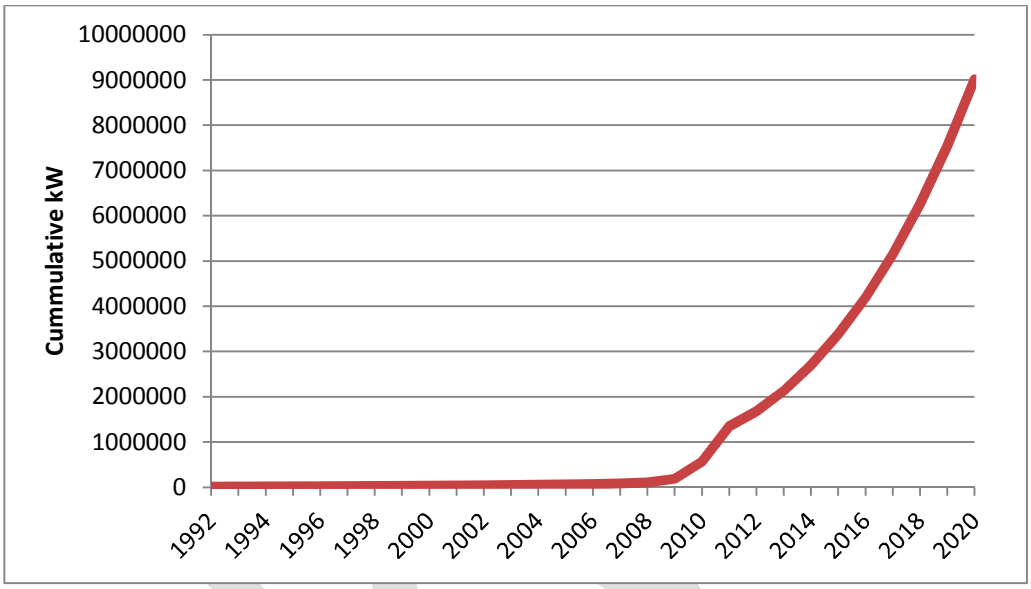

Figure 7: Past and Projected Installed PV Capacity in Australia

Growth rates and networks

We note that the EWP does not deal with the current decline in residential sector electricity use, its causes or its impacts. Rather, the report focuses on continued demand growth, especially peak demand. The now noticeable decline in residential electricity use can be attributed to the GFC and cooler summers, but it is also likely to be linked to increasing electricity prices, the uptake of PV, solar water heaters, energy efficient appliances and energy efficient homes.[7] The latter is a trend that will continue, with many householders and housing developers now seeking 'net zero energy' homes, with passive solar design negating the need for air conditioners, and a range of distributed energy options, as these become increasingly affordable. Significant new investment in networks may result in stranded assets in future, with a need to increase electricity prices even further to cover costs.

Many of the rural grid extensions undertaken in the 1970's and 1980's were heavily cross subsidised. Their upgrade now will be even more expensive and, with real options now available, consideration should begin to be given to the creation of semi-autonomous regions, linked by relatively small connectors, or to totally self-contained power supplies for outlying portions of the grid. This would significantly reduce the overall infrastructure costs, while providing supply which is more resilient at times of bushfires, cyclones, floods or other emergencies impacting networks.

[7] AEMO, 2011, Electricity Statement of Opportunities, for the National Electricity Market, 2 March 2012.

Reduced local demand as householders seek self-sufficiency will significantly impact the current electricity retail model. The need for a new Distributed Energy Market to cater for this change has already been mentioned.

Section 4: Australia's energy security

We note several key aims in the EWP:

- "Developing new generation and end-use technologies to improve performance (including environmental outcomes), diversify the energy system and reduce critical dependencies "
- "Central to the delivery of this framework and energy security outcomes is the provision of stable Policy"
- "An important part of creating a more resilient Australia is creating more resilient critical infrastructure"

Australia has a high reliance on diesel for off-grid power supplies, including for many mining sector installations. With rising oil prices and reduced local production levels, emphasis needs to be placed on substitution of diesel fuel by cost-effective renewable energy options. PV is cost-effective for most off-grid diesel power supplies on a life-cycle cost basis (~20 years). However, many companies use very short investment horizons, so that it becomes more difficult to justify PV installation. In addition, the capital cost of PV must be depreciated over its lifetime, but diesel fuel use can be written off in the current tax year. An accelerated depreciation rate for diesel replacement by renewables would be an effective means of speeding up the transition. We note also the fuel excise benefits available for diesel used in electricity generation, which has slowed the transition to alternatives. These issues are relevant also to the discussions in Section 6.

In addition, power supplies in many regional areas are heavily subsidised (the Northern Territory Government alone currently spends over $60 million on Community Service Obligation power supply cross-subsidies[8] and estimates $100 million per year will be needed by 2014). Most of these supplies are diesel based. PV is already a cost effective option which will significantly reduce future fuel imports and cross subsidies, as well as reduce environmental impacts of fuel distribution and use.

The PV sector welcomes the Government's call for stable policy settings. Policies impacting PV have changed on a regular, and often unscheduled, basis over the past decade, making it very difficult for robust long-term industry development. Hence, although PV installations have increased, the industry is fragmented and has not established the strong underlying infrastructure necessary for the future.

Diversification of energy supply is a critical component of a resilient energy system. With its high reliance on fossil fuels and on central generation and distribution, the Australian electricity sector has been made highly vulnerable to carbon prices, network costs and network reliability issues. Implementation of a carbon pricing system is beginning the transition from fossil fuel dominance, but network costs are now driving price rises, whilst increased extreme weather events, such as bushfires, cyclones and floods, have made distribution infrastructure vulnerable. A transition to decentralised, renewable energy based, local electricity nodes, or mini-grid system, would improve electricity system resilience and would certainly be cheaper than undergrounding distribution networks across Australia.

The APVA notes that the opportunities presented by low-cost PV in these and other aspects of energy security have not been explored in the EWP.

[8] NT Government Budget Papers, Community Service Obligations, Budget Paper 3 (http://www.budget.nt.gov.au/papers/bp3/community_service_obligations.pdf).

Section 5: Developing Australia's energy resources

The APVA notes that the EWP recognises the large renewable energy resource base in Australia, but would add "market barriers" to the commercial and technical barriers cited.

We are pleased to see that mapping Australia's renewable energy resource base is mentioned as a priority.

Under "working with communities", we note that there is a high level of community support for solar technologies in Australia, but that it is often difficult for interested communities to develop projects for their region. Assistance for communities wishing to develop their local renewable energy resources would be a very useful Government activity now that PV and other renewables are becoming cost-effective at a local level.

Section 6: Australia's energy markets and improving Australia's productivity

The APVA notes the EWP's reference to "imminent prospects for large-scale change" and "the need to review market frameworks", that "energy markets should operate in the long term interests of consumers" and the recognition of grid interconnect issues arising for distributed generation. The APVA commends the EWP on:

- recognising that policy and regulatory frameworks are required that can:
    - efficiently interface with other key markets and mechanisms
    - smoothly integrate rapidly evolving technologies and robustly adapt to changing dynamics
    - more efficiently balance supply and demand and provide consumers with better information and an increased range of options to manage their energy needs

Despite this apparent awareness, however, the treatment of demand side options seems inconsistent throughout the report, sometimes including distributed generation and sometimes not. There seems to be a general assumption that significant levels of DG and energy efficiency are 'things of the future', rather than options already being adopted. This means that the EWP focuses almost exclusively on measures required to drive initial uptake rather than on what might be needed to address the consequences of this uptake, and so enable orderly and appropriate responses to maximise the associated benefits. This is a major short-coming in a report with a timeframe out to 2030.

The EWP professes to support a market-based approach to energy sector transformation, yet the critical need for new energy market structures is not addressed. With the levelised cost of PV electricity now at or below retail electricity costs in many areas, and continuing to decrease, an increasing number of households and businesses will install PV, with or without government subsidies. This increase in distributed PV will decrease electricity demand, adding to the decreases already evident according to the latest AEMO Electricity Statement of Opportunities, which showed electricity demand 5% lower than forecast for 2011/12, having decreased in absolute terms every year since 2008/09.[7]

The increased uptake of PV and other distributed energy services is likely to continue over time, driven by a variety of technologies in addition to PV, such as cogeneration, electric vehicles, fuel cells and various storage technologies. Similarly, energy efficiency technologies, including solar water heaters, are already reducing electricity use and have significant potential for much greater reductions. These modular, rapidly deployed and low emissions options have the potential to reduce costs and increase reliability of future electricity supply for customers in an environment of approaching generation capacity constraints, network constraints and future environment policy uncertainties.

In aggregate, these distributed energy options have the potential to significantly reduce electricity consumption, especially per customer, putting increasing pressure on utilities' traditional revenue and business models. Thus, it is likely that new business models will need to be developed to cater for a new market in distributed energy services, rather than just electricity sales.

New regulatory arrangements will need to be put into place as soon as possible to cater for this new market. Such a market would facilitate new business models for both networks operators and retailers, providing appropriate incentives for grid support functions, distributed generation and demand reduction.

This lack of understanding of the uptake potential of PV is most likely because the installed costs and resultant levelised cost of electricity (LCOE) of PV have been significantly overstated in the EWP. A number of different sources have been used for the cost of PV – all of which are either written by or commissioned by government – creating a rather circular process reliant on inaccurate data.

On page 40 of the EWP, the Treasury report *Strong Growth, Low Pollution* is cited to apparently support a sole focus on solar thermal, with small-scale PV generation no longer contributing once the systems installed under the Small Scale Renewable Energy Scheme (SRES) wind down.[9] Medium and large-scale PV do not appear to be included anywhere.

The EWP acknowledges the gradual consolidation of the electricity retail markets and the dominance of several key players. For PV, this issue is exacerbated by significant PV investments by these dominant retailers, which provides even greater market power and has the potential to reduce competition in future.

The EWP acknowledges the need for more effective demand side responses, but views this as a need for improved productivity, information and choice for end-use customers, not as the need for a new market which would allow distributed energy benefits to be traded, perhaps separately from existing markets. The latter would facilitate the establishment of new energy service companies, would empower customers to trade on their own energy investments and would break the trend to increasing consolidation of the electricity retail sector.

The APVA supports the Government's Clean Energy Future package, and the inclusion of the Energy Security Fund. We disagree, however, with the decision to use the funds for general household support and not for targeted measures to reduce future exposure to energy price rises. The Government's approach will perpetuate the need for household support and do little to develop new efficient energy infrastructure for the long term. Justifying this approach on the basis of allowing market signals to be preserved naively assumes low income householders can access the information and choice available, and have the ability to make significant energy use changes.

The APVA supports the moves to develop standardised grid connection protocols, minimum energy performance standards and building disclosure requirements. It also commends the Government on its Smart Grid - Smart City and Solar Cities' trials. The APVA would encourage the Government to make findings from these trials publicly available so that monitored data and other information can immediately be used for the further development of the renewable and distributed energy sector.

Complementary Measures

The Government wishes to abolish all complementary measures, on the basis that competitive markets and a carbon price are sufficient to facilitate the major changes required in the Australian energy sector over coming decades. Given the many decades of strong government support for the establishment of Australia's centralised, fossil fuel dominated energy sector, its extensive infrastructure

[9] Treasury, 2011, *Strong Growth, Low Pollution: Modelling a carbon price*, Treasury, Commonwealth of Australia.

and strong institutional arrangements, it is naïve to assume that major change will occur merely through competition, especially as the primary incentive in the current system is energy sales. Incumbents are already mounting strong campaigns against the introduction of wind and solar installations, making it very costly and difficult for customers to install co-generation systems and have publicly acknowledged their reluctance to reduce peak demand, because of the impact on their revenue. The playing field is far from level. It is clear that other interventions will be necessary in the short to medium term to bring new technologies and business models into the market, at least until they are established and accepted.

Internationally, the need is well recognised for measures complementary to a carbon price. Comprehensive analysis reveals that in order to reduce the *total* longer-term cost of agreed-upon emissions trajectories (rather than the short-term static cost), higher-cost abatement measures need early-stage support. The increased deployment that results from early stage-support lowers the price of technology deployment (due to learning-curve effects), which lowers the long-term cost of abatement whilst avoiding the lock-in of technologies whose abatement cost starts out low but becomes increasingly expensive when reducing emissions to zero becomes necessary, such as the case may be for carbon-capture and storage from gas turbines[10].

In addition, the EWP makes it clear that over 60% of abatement to 2020 is likely to come from international sources. This means that local options will not be provided with all the benefits of the carbon price so that complementary measures will continue to be required if Australia is to establish the infrastructure, installation base and expertise necessary for new technologies to take over from the incumbents. It would definitely be in the interests of the States to seek to encourage new industries, training and jobs and, in the longer term, this will benefit Australia as a whole. It is inappropriate for the Australian Government to seek to prevent such State-based investment.

Section 7: The clean energy transformation

The EWP rightly acknowledges Australia's significant capability in PV research and development, and the advantages this is already providing in technology transfer, education and implementation world-wide, as well as in Australia. Robust local markets for PV, with the added learning this provides, will enhance these capabilities and place Australia in a world-leading position to assist the rest of the world in their transition to a clean energy future. Policy support has been focussed on the residential PV market to date. The APVA believes that the focus should now be broadened to include the medium and large-scale PV markets. These markets can more actively be developed to assist with peak load management and grid support and can better drive the economies of scale needed to take PV costs to the next level. The engineering and other expertise required for this broader implementation will be keenly valued in the Asia-Pacific region in coming years.

Page 210 of the EWP states "The most recent LCOE projections commissioned by the Department of Resources, Energy and Tourism for a range of electricity generation technologies in 2030 are shown in Figure 7.1". It is not clear whether this is what is actually presented, since both axes on the graph refer to CO_2 costs. The reference is to the EPRI report *Australian electricity generation technology costs: reference case 2010*[11], which had very high LCOE values. Whatever the EPRI figures, this graph is misleading and will need to be revised for the final report.

[10] Cédric Philibert, 2011, "Interactions of Policies for Renewable Energy and Climate", International Energy Agency, Working Paper.

[11] EPRI, 2010, *Australian electricity generation technology costs: reference case 2010*, by the Electric Power Research Institute for the Department of Resources, Energy and Tourism.

The current Australian LCOE for flat plate PV is already between $150 and $250/MWh, and is projected to be around $100/MWh by 2030, without any government subsidies, as previously indicated. The revised Figure 7.1 in the final EWP should also refer specifically to large-scale centralised PV. A separate graph is needed to asses distributed energy options, since these compete with retail, not wholesale electricity prices. Retail electricity rates are much higher and likely to increase at a faster rate than wholesale electricity prices (due to relatively larger growth rates in forecasted transmission and distribution costs).

The outdated view of PV LCOE in the EWP is reflected in one of Chapter 7's Key actions: "work with other jurisdictions to harmonise state and territory–based micro-distributed generation feed-in-tariff schemes with the agreed Council of Australian Government's principles for complementarity of climate change mitigation measures and ensure that the schemes do not impose an unjustifiable burden on electricity consumers either through cross-subsidy mechanisms or their impact on the Small-scale Renewable Energy Scheme". Most FiT schemes have already finished or are soon due to, PV electricity costs are lower than prevailing tariffs in many areas and the debate has moved on to how the benefits of lower cost on-site generation should be disbursed and how much PV systems should be paid for electricity exported to the network.

With the advent of commercially available electric vehicles and the associated significant progress made in reducing the cost of batteries, it is highly likely that over the next 5 years batteries will be integrated with PV, thereby resulting in even larger PV systems, where excess electricity can be stored onsite for use during peak demand periods. It is also possible that batteries may be deployed without PV systems and simply used to flatten an end user's load curve. The ability to export electricity at will raises even more interesting possibilities.

Thus, the EWP ignores PV as a major new technology and significantly underestimates its likely rate of uptake. Small-scale PV is wrapped into SRES markets, which disappear when the RET finishes, while PV on the large scale has not been addressed at all. The APVA therefore supports the suggested publication of regular Energy Technology Reviews. We especially consider that recent reports have not captured the rapid advances which have been made in technologies such as PV.

The APVA commends the EWP for its recognition of the difficulties faced in commercialising new technologies. It considers that clear distinctions need to be made between Government actions to develop low emission energy markets and those aimed at development of new technologies and industries, whilst recognising that incentives for both should be consistent. Separation of policy goals can overcome the perceived issues arising between energy market mechanisms and complementary policies.

The APVA welcomes the recommendations concerning stable and long term policy settings. Development of new industries and the infrastructure required to service them require significant investment. Long term policy certainty is key to attracting private sector interest in Australia's renewable energy sector. The RET has provided an important level of market certainty, and the APVA urges the Government to provide a strong statement of commitment to its 2030 goals prior to and during the 2012 review process, in order to prevent the market from stalling.

Section 8: Cross cutting policy issues

APVA welcomes the EWP acknowledgment of energy sustainability as the key underlying driver for change. Increased use of renewable energy in Australia will provide lower cost energy in the long term, will provide energy services with a much lower environmental impact, on a range of measures, and will provide new industry development and employment opportunities across the country, both in cities and in regional and remote areas.

Energy and environmental goals are much easier to align for renewable energy than they have been for fossil fuels. PV requires no water for its operation, has no air emissions or noise and can deployed in even the most pristine and protected areas. Even on a large scale, PV can co-exist with grazing or other agricultural activities, with at a smaller scale it can be incorporated into existing structures.

The PV sector has worked hard over the past decade to build up its skills base and is now offering our training as well as our expertise on the international market. As PV uptake increases, the skills base will also need to keep pace, especially as penetration levels rise and as new products and markets evolve. The APVA welcomes the Government's commitment to education and will continue to work closely with governments and the education sector to provide up-to-date PV specific educational materials and services. PV is a key energy technology in remote areas and hence there has already been a focus on PV training for indigenous communities. Now that PV is significantly less costly than it has been, extended training for indigenous communities should be undertaken as PV can be a key component to sustainable housing and health provision.

Section 9: International engagement and energy analysis

International institutions

The APVA commends the Government on its commitment to maintaining international linkages. The APVA manages Australia's commitments to the IEA PV Power Systems Programme (IEA-PVPS) and considers that the international research collaborations that have been made possible through this program have contributed significantly to the development of the PV sector in Australia. At the same time, the Program has allowed Australian technology and expertise to be internationally recognised.

Over the 19 years the IEA-PVPS has operated, the focus has moved from technical through cost and now to implementation and regulatory issues. Collaborative work on many of these areas has ensured consistent global standards, rapid transfer of technical knowledge and experience and now the ability to share policy outcomes and experiences with different market structures, and business and financing models. This work, and the international networks it establishes, facilitates understanding of international energy policies, programs and directions and allows Australian access to international technology innovation, as well as international access to Australian innovation.

R&D and Capacity Building

Australia must continue its focus on PV R&D, as well as on knowledge and capacity building. This is crucial to the improvement of PV technologies and applications as they move into the mainstream energy sector. The APVA welcomes ongoing and enhanced support of both PV devise and system R&D and on PV education and training at school, TAFE, university and professional levels. This is increasingly necessary to assist with safe and reliable PV system design and installation. Australia has a world-leading reputation in PV R&D and education and Australian PV expertise is one our key export services.

Energy Metrics

Included in the IEA-PVPS work is regular updating of PV statistics. Hence the APVA is also pleased to see the EWP acknowledge the need for improved energy metrics via energy research, analysis and forecasting. This is a key element of the APVA's work.

The APVA is disappointed that the comprehensive data on PV in Australia which is collected by the APVA as part of the Government's IEA commitments was not accessed for the Draft EWP, leading to PV being ignored as a key new energy technology in the draft EWP. We look forward to working with the Government on updating its dataset for the final report.

Attachment A: Background on the APVA

The APVA is an association of companies, government agencies, individuals, universities and research institutions with an interest in solar photovoltaic electricity. In addition to Australian activities, we provide the structure through which Australia participates in an International Energy Agency (IEA) programme called PVPS (Photovoltaic Power Systems), which in turn is made up of a number of activities concerning PV performance and implementation. Further information is available from www.apva.org.au.

APVA Objective

The objective of the Australian PV Association is to encourage participation of Australian organisations in PV technology and industry development, policy analysis, standards and accreditation, advocacy and collaborative research and development projects concerning photovoltaic solar electricity.

APVA membership provides:

Information

- Up to date information on new PV developments around the world (research, product development, policy, marketing strategies) as well as issues arising
- Access to PV sites and PV data from around the world
- International experiences with strategies, standards, technologies and policies
- Australian PV data and information
- Standards impacting on PV applications

Networking

- Access to international PV networks (PV industry, government, researchers) which can be invaluable in business, research or policy development or information exchange generally
- Opportunity to participate in international projects, with associated shared knowledge and understanding
- Opportunity to meet regularly and discuss specific issues which are of international, as well as local interest. This provides opportunities for joint work, reduces duplication of effort and keeps everyone up to date on current issues.

Marketing Australian Products and Expertise

- Opportunities for Australian input (and hence influence on) PV guidelines and standards development. This ensures both that Australian products are not excluded from international markets and that Australian product developers are aware of likely international guidelines.
- Using the information and networks detailed above to promote Australian products and expertise.
- Working with international network partners to further develop products and services.
- Using the network to enter into new markets and open new business opportunities in Australia.

The International Energy Agency PV Power Systems Programme (IEA PVPS)

One principal activity of the APVA is to manage Australian participation in the PVPS Programme. This work is arranged by Tasks, each with its own commitments of time and resources. Support is provided by the Australian Solar Institute. At present Australia participates in:

Task 1: PV Information Exchange and Dissemination

Task 11: PV Hybrid Systems within Mini-grids

Task 14: High Penetration of PV in (Smart) Electricity Grids

and maintains an interest in:

Task 8: Very Large-Scale PV Systems

Task 9: PV in Developing Regions

Task 12: Environmental Health & Safety for PV Systems

Task 13: PV System Performance

For further information on the Australian PV Association visit: **www.apva.org.au**

For further information on the IEA PVPS Programme visit **www.iea-pvps.org.**