States of Jersey
States Assembly

États de Jersey
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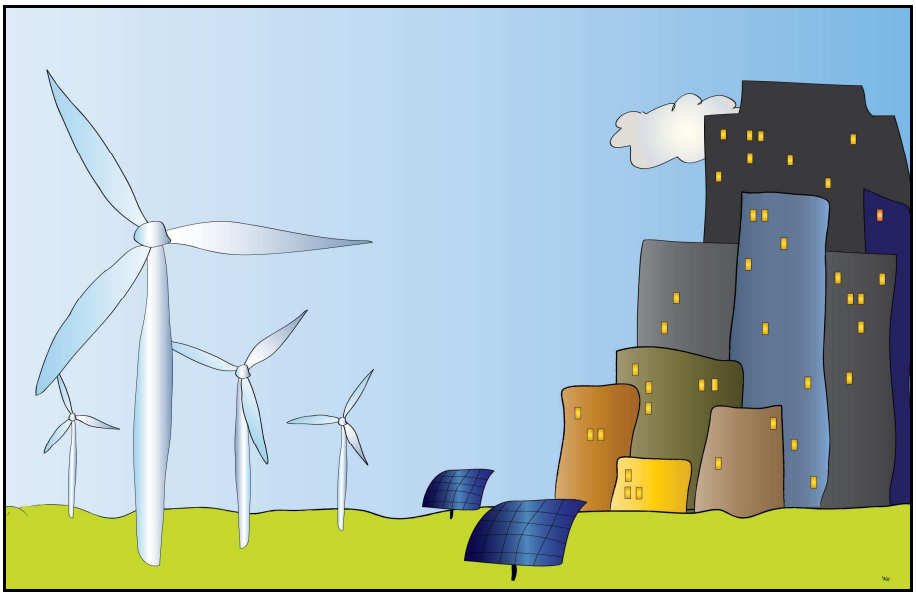
Environment Scrutiny Panel

Energy Policy



Presented to the States on 14th November 2013

S.R.12/2013

Front cover illustration: ‘Green Energy’, Kiril Havezov

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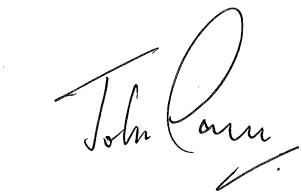
Chairman's Foreword

Members of the Environment Scrutiny Panel welcomed the opportunity to review the draft energy policy for the Island, which potentially will benefit the next generation of Jersey men and women. We were both excited and daunted by the importance and scope of the work required, and set ourselves the objective of trying to offer an insight for States Members and our community into this huge subject.

The Minister's draft policy came to us as an environmental policy. At the end of the review, after six months' work including many in-depth public hearings with key stakeholders, we see it as a whole Island policy spanning our economy and potentially affecting all our lives. The policy illustrates the very principal of sustainability, something many people argue has so far eluded our community.

We have produced a report which we hope will add significantly to the debate ahead. The Panel believes the draft policy should be commended wholeheartedly; our only reservations cover the need for implementation plans. We have highlighted major opportunities for renewable energy and initiatives which potentially could benefit our economy and enhance the Island's international reputation. We hope that collectively the Island will find a way of achieving the mutual cooperation between public and private sectors of our economy that will be required to take the policy forward successfully into implementation.

We very much hope that Members will read the report and share our views, and are indebted to our adviser, Mr. Roger Levett, for guiding the Panel on its journey into the expert world of energy science and policy.



Deputy John Young
Chairman, Environment Scrutiny Panel

1. Background

The Environment Panel launched this review of the Minister for Planning and Environment's draft energy policy, 'Pathway 2050: An Energy Plan for Jersey' publicly in May 2013, following a consultation by the Department of the Environment. The Panel's review assessed whether the Minister's draft plan offers a suitable framework to meet the long term energy requirements of the Island in a secure, affordable and sustainable way. Specific areas of interest included:

- The institutional and regulatory framework
- Plans for energy savings in the domestic and commercial sectors
- The prospects for large scale renewable energy sources
- Transport energy use

Other topics covered included energy security, particularly whether Jersey can rely on importing nuclear-sourced electricity from France in the longer term, or if it should be taking active steps towards harnessing energy from renewable resources using technologies such as offshore wind and marine turbines. The potential need for regulation of energy supplies, improved building standards to reduce energy demand, and opportunities for innovative measures such as encouraging the uptake of electric vehicles in Jersey were also included.

During its review the Panel heard from many witnesses, holding a total of 15 public hearings with energy providers, energy experts, representatives of industry, pressure groups and Ministers.

The draft policy, supporting documents and summary of responses to the department's consultation can still be accessed for reference on the States website at:
http://www.gov.je/Government/Consultations/Pages/EnergyPolicyConsult.aspx

Submissions, hearing transcripts and podcasts from the Scrutiny Panel's review can be found on the Scrutiny website at:
http://www.scrutiny.gov.je/Pages/Review.aspx?reviewid=186

Panel Adviser

Throughout its review the Panel has been grateful for the expert advice and guidance provided by Mr. Roger Levett, of Levett-Therivel Sustainability Consultants. Mr. Levett was commissioned to carry out a similar task for the previous Environment Scrutiny Panel in 2011, which was postponed when the draft policy was taken back for revision.

Reports

The Panel's report summarises key questions and lists the Panel's findings and recommendations; the adviser's report covers these issues in more detail and is attached in full as an appendix. The adviser's report to the Panel does not necessarily reflect the Panel's views. Neither report attempts a comprehensive investigation of all aspects of the draft policy; areas prioritised for the review are indicated in the Panel's terms of reference (see Section 2).

2. Terms of Reference

Environment Scrutiny Panel

Pathway 2050: An Energy Plan for Jersey

This review will examine the proposed policy of the Minister for Planning and Environment to provide for the Island's energy needs for the period up to 2050, presented in the consultation document entitled 'Pathway 2050: An Energy Plan for Jersey' published in October 2012.

The review will consider how the draft Policy addresses the future energy needs of the Island, together with its environmental, economic and social implications, and assess its suitability as a framework to meet the long term energy requirements of the Island in a secure, affordable and sustainable way.

The review will consider any significant issues within this scope which emerge from study of the draft Policy and stakeholder responses to it. However it is intended to concentrate on the adequacy and effectiveness of the actions proposed in the draft Policy to achieve its stated objectives. Specific attention will be paid to:

1. The institutional and regulatory framework, including the role and activities of the proposed new energy partnership and the future of existing energy bodies;
2. The adequacy of the proposed means to deliver the planned energy savings in the domestic and commercial sectors;
3. The prospects for large scale renewable energy sources and how Jersey should exploit them;
4. The roles of technology, logistics, behaviour and attitudes in transport energy use, and the interdependence of transport with other policy areas including spatial planning and economy.

The Panel will report its findings to the States.

3. Panel membership

The Environment Panel is constituted as follows:

Deputy John Young of St. Brelade (Chairman)

Deputy Steve Luce of St. Martin (Vice Chairman)

Connétable Phil Rondel of St. John (Member)

Officer support: M. Orbell

4. Key Issues

4.1. Reducing carbon emissions

The primary aim of the draft policy is to substantially reduce carbon emissions from energy use. Latest surveys suggest that there is now 97% agreement among scientists that human activity producing carbon emissions is having a major impact on the global climate. The first instalment of the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), the 'Summary for Policymakers' was published on 27th September 2013. It reaffirmed the need for action to reduce carbon emissions, finding that there was unequivocal evidence of warming in the climate system and that concerted action will be needed to limit the extent of climate change.

'Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Limiting climate change will require ***substantial and sustained reductions*** *of greenhouse gas emissions.'*

(Thomas Stocker, Co-Chair of IPCC Working Group I.)

The policy target for an 80% reduction in Jersey's carbon emissions between 1990 and 2050 is consistent with both UK and EU policy. The Panel considers that given the level of international agreement, scientific consensus and the extent of evidence on climate change the policy is right to reject 'climate denial' arguments.

4.2. Kyoto Treaty obligations

Jersey is a signatory to the Kyoto agreement through the UK, and so is not strictly obliged to adopt the same reduction target. However, when the agreement was extended to Jersey it was required that the Island would *'introduce, where possible, and having taken into account local circumstances, policies in line with the objectives of the UK Climate Change Programme'*. Other reasons for the Island to comply include:

- **Moral responsibility:** climate change is seen as potentially one of the greatest challenges to humanity, requiring a united response from all nations
- **Political solidarity:** matching the emissions targets of the UK and EU would demonstrate the Island's commitment to co-operation with its closest and most important neighbours
- **Access to economic opportunities:** UK and EU subsidies for low carbon energy and support for green technologies could potentially benefit Jersey, either directly (through co-operation or joint investment) or indirectly, through the creation of new energy-related business
- **Reputation:** energy policies which aim to reduce carbon emissions have become a mark of responsible governance

- **Increased resilience:** the majority of Jersey's energy demands have been met in recent years by importing largely nuclear-sourced electricity from France. While this has been attractively priced and low-carbon, given the current state of economic uncertainty in parts of Europe and elsewhere a broader mix of energy sources could offer the Island greater energy security.

Jersey has the potential to do more with its energy policy than some other jurisdictions because of its unique advantages. As a relatively prosperous community with a high level of energy consumption, there is a greater opportunity for significant reductions, with measures to prevent hardship. The Island's sound financial footing also puts it in a good position to raise funding for energy initiatives, while the absence of heavy industry means that there is no structural dependence on fossil fuels to maintain production, which would make it harder to lower emissions.

One consequence of the Island's dependence on imported manufactured goods is that the emissions caused by goods used in Jersey are generated elsewhere. Standard carbon accounting methods tend to ignore this issue, but the Island's total carbon 'footprint' would probably be significantly greater than is currently reported if an appropriate allowance was made for the impact of manufactured goods imported to the Island.

Findings

1. ***The 80% carbon reduction target in the draft Plan is justified by climate science and consistent with many other jurisdictions***
2. ***Jersey has a responsibility to contribute to global efforts to combat climate change. Doing so will improve resilience to uncertain energy futures, and could potentially enable the Island to benefit from UK and European carbon reduction commitments***

4.3. Energy efficiency measures in housing and other buildings

The draft Plan calls for an 82% reduction in emissions from housing from 1990 to 2050. Most of these savings are expected to be delivered through further development of the existing Eco-Active Energy Efficiency Service, in particular extending this into the 'able to pay' sector. The policy also proposed introducing stricter 'carbon-neutral' standards for new homes through enhanced Building Bye Laws.

Energy Efficiency Service

The Eco-Active Energy Efficiency Service has been successful since its inception in 2009 in helping many householders on lower incomes to insulate their homes to improve energy and thermal efficiency. However, as yet it has no experience in the 'able to pay' sector, even though this is crucial to the successful delivery of the policy aims. Evidence from previous initiatives in the UK indicates that motivating people who can afford to make improvements to the energy efficiency

of their homes is not easy, because the potential cost savings have often not been perceived as significant enough to justify the effort of planning and installing improvements.

Given the substantial sums in grant aid that have been applied so far under the Energy Efficiency Scheme (approximately £2.7m in direct grants for domestic and community buildings from 2009 to 2012), the Panel believes that it is important to take stock of how well this has been administered and consider future objectives very carefully before launching new initiatives. A cautious approach is therefore recommended. An audit of the scheme to date could provide useful information on whether the sources of funding are adequate and appropriate and how effectively the aid has been targeted. Extension into the 'able to pay' sector needs to take full account of the lessons that can be learned from experience in the UK and elsewhere, and proceed incrementally, preferably with piloting to test what works best in a Jersey context before significant changes are put in place.

'Carbon neutral' buildings

Compared with some other jurisdictions, Jersey's construction industry is relatively inexperienced in using the latest technologies for improving energy efficiency. While progress is being made, any attempt to change building standards to a strict 'carbon neutral' model in a short timescale would significantly increase the cost of new homes. The consultation process identified this as a problem and the Minister has now proposed amending the draft policy to reflect low carbon targets in the first instance, rather than aiming for carbon neutrality. The Panel considers that draconian measures should not be needed, but sustainable progress will require rising standards informed by consultation with industry to determine what can be delivered within realistic timeframes, together with sufficient flexibility to ensure that the benefits of fast-moving technology are not missed or excluded due to overly prescriptive bye laws.

Energy industry witnesses questioned during the review tended to advocate approaches to building regulations that would be advantageous to their own fuel. The Panel considers that rather than emphasising the benefits of one fuel over another, the primary focus of any new building bye laws should be on minimising the need for externally supplied energy, whatever the source.

Findings

3. ***Extending Eco-Active Energy Efficiency Service activities into the 'able to pay' sector should improve energy efficiency standards in existing buildings, but a careful approach will be needed to ensure that new initiatives are effectively targeted and provide value for money***
4. ***High profile public education/awareness-raising/motivational campaigns may assist in promoting energy saving behaviour***

5. ***More direct interventions are also likely to be needed to achieve the savings targeted in the policy. These could include direct grants or subsidies, 'smart tariffs' to reward energy saving, or other measures***
6. ***Continuing help for vulnerable households will still be needed. Care will be needed to protect the less well-off from the side-effects of energy policies, if these involve changes to existing tariff structures to discourage excessive energy consumption***
7. ***To meet the needs of the draft Plan, Jersey businesses will need to supply and install more energy efficient and renewable energy technologies. This should be encouraged through training opportunities and by accreditation of suppliers and installers***
8. ***Demanding standards for energy efficiency in new construction will be needed to drive improvements and raise expectations in the industry. However, a requirement for carbon neutrality is unrealistic in the short term***
9. ***New building bye laws should be framed in consultation with industry to ensure that objectives are realistic and sustainable. A flexible and pro-active approach to regulation will be needed to ensure that the Island's construction industry can employ new and innovative technological solutions without undue restriction***

4.4. Transport

The Plan sets a target for a 78% reduction in transport carbon emissions, through an anticipated 90% switch to Ultra Low Emission Vehicles (ULEVs) by 2050. This relies on the expectation that technical and market trends outside Jersey will make ULEVs attractive to buyers in the Island.

Improvements driven by EU legislation have greatly increased the efficiency and emissions performance of 'traditionally' powered cars and commercial vehicles, but the real opportunity may lie in Jersey's potential to encourage the adoption of electric cars.

Electric vehicles

Jersey's short distances and low Island-wide speed limits, together with relatively low cost and low carbon electricity offer ideal conditions for the take-up of electric vehicles. However, as in many jurisdictions uptake so far is extremely low. Possible reasons include the much higher purchase cost of electric vehicles compared with conventionally fuelled alternatives in Jersey. The cost of new electric cars is heavily subsidised in a number of jurisdictions (the UK has offered a government grant of up to £5,000 for qualifying vehicles since 2011 and other countries have similar schemes), but with starting prices frequently being £10,000 or more above the cost of petrol equivalents this is still a barrier. There is also likely to be concern amongst potential purchasers about investing in unfamiliar technology, and some might still feel more comfortable having a conventionally fuelled vehicle for off-Island travel.

Slow sales of electric vehicles elsewhere could provide a real opportunity for Jersey to assume a leading rôle in this field. A States-backed initiative to boost take-up, perhaps setting an example by changing a significant proportion of the existing departmental fleet to electric power, supported by financial and/or other incentives to encourage large scale adoption by the public could potentially open the door to a major manufacturer using the Island as a test-bed for further development and marketing purposes. Support packages could be negotiated with the manufacturer(s), while the States could also consider tax concessions or other incentives to give targeted encouragement.

Some leading manufacturers are only now beginning to advertise electric cars alongside their conventional ranges, while others already have a selection of pure electric and hybrid designs available. If Jersey is to seize this opportunity the window may only exist for a short time, before sales in bigger markets begin to grow in importance. To give an idea of scale, 'alternatively-fuelled vehicles' (AFVs) accounted for just 1.4% of all new UK registrations in August 2013, or 926 out of a total of 65,937 registrations, although the figure for AFVs was up by over 41% from the year before.[1]

A major shift to electric vehicles would potentially benefit Jersey not just through reputation, as an innovative and responsible jurisdiction, but also environmentally, through reducing transport emissions in a much shorter timescale. Road transport generates over one third of the Island's total carbon emissions, and is also the key contributor to air pollution, with nitrogen dioxide (NO_2) and particulates (PM_{10}) from road transport presenting the greatest challenge in terms of improving air quality for residents. Outdoor air quality in Jersey is generally good, but there are known 'hot-spots' where pollutants from vehicles are a health concern at times, and with increasing large-scale development in areas such as the Waterfront there is a possibility that problems may spread. Road transport also accounts for over one fifth of final energy consumption in Jersey, so this sector could present a significant opportunity for efficiency gains as well.

To bring about significant modal shift to electric vehicles the Panel considers that a specific 'champion' would be needed, either an individual or a body committed to bringing potential stakeholders together. This would require active co-operation between TTS, Economic Development, the Chamber of Commerce, one or more major vehicle manufacturers, and other public and private interests.

A package of incentives or concessions together with some investment in infrastructure would be required to overcome public concerns about the high initial cost of electric vehicles, reassure potential owners about their reliability, and ensure the availability of convenient charging points in strategic locations. To be beneficial for carbon as well for air quality, the development would need

to be balanced by an expansion in renewable electricity. A widespread uptake of electric vehicles would only reduce carbon emissions overall if they were charged using electricity from low carbon sources. With the right technology electric vehicles could help to facilitate the growth of renewable energy supplies in Jersey if their batteries were charged at times when supply exceeded demand, and used to feed power back into the grid when demand outstripped supply.

Findings

10. By virtue of its size Jersey has an opportunity to make a major shift to electric vehicles. The Island could potentially position itself as an example for other jurisdictions to follow if action was taken soon

11. For this to be successful it would require dedicated support from an individual or group prepared to champion the change campaign and co-ordinate the efforts of relevant stakeholders, together with States support

4.5. Utility scale renewables

Work to identify the potential for large scale renewables in Jersey has been in progress since 2008, firstly by the Tidal Power Group, later renamed the Tidal Power Commission and since 2011 the Renewable Energy Commission. As the earlier names indicate, much of the Commission's effort has been directed towards investigating possibilities for marine tidal power.

There was a marked difference of opinion between witnesses in respect of renewable energy options. Some felt that the combination of our wind and tidal resources, proximity to the European market and global demand for renewable power could offer a big economic opportunity for the Island, concluding that Jersey should take positive steps to secure this. Others pointed out that tidal power was still in its infancy, offshore wind had disadvantages, and that neither was yet near to achieving 'grid parity' (where the cost of renewable energy matches the current price of imported electricity).

Differences between these two positions reflect uncertainty over the amount of the renewable resource that can practicably and economically be harvested. This depends partly on how technology develops, but also on the price power can be sold for. Market supply and demand in Europe, the cost of connection to wider electricity markets, subsidy and support mechanisms in the UK and EU and Jersey's potential eligibility to benefit from them are all important factors that could affect the viability of our renewable resources. However, there is no doubt that Jersey has scope to exploit various renewable energy sources including tidal power, offshore wind, bio- and combustible wastes. A brief explanation of the potential for each of these follows. (This is based on information from various sources, which is subject to large uncertainties, and should be taken as a

[1] Statistics from Society of Motor Manufacturers and Traders (SMMT) website: www.smmt.co.uk

rough indication of potential which would need to be verified by more detailed study. All estimates of potential generating capacity are averaged over a year; renewable resources such as tidal and offshore wind are intermittent.)

- **Tidal power** has been the subject of some detailed investigation, including offshore survey work in local waters to assess their potential. From information shared with the Panel[2] (not presently in the public domain) it appears that there is an exploitable resource, but estimates as to its size are subject to large variables. Despite the Island's considerable tidal range, there are limited locations where tidal currents run sufficiently fast for long enough to harvest the energy effectively with undersea turbines. Different calculations suggest that there could be enough potential to produce anything from about 9% up to 50% of the Island's current electricity consumption. Until more work is done, given the scale of the resource and the experimental state of most marine turbine technology it seems unlikely that this resource will be capable of being successfully exploited on a large scale for many years to come; nor would it be sufficient to support a major new energy export industry, unless technology and/or demand were to develop much more rapidly than now seems probable. However, depending on future demand there is a possibility that more sea areas around Jersey could become viable sources of tidal power.

- **Offshore wind** technology is much more mature than the Island's other major renewable alternative of tidal power, but has not so far been the subject of any detailed investigation on behalf of the States. The Panel was informed that from their own research, Jersey Electricity believe that there is sufficient wind resource available locally to generate up to about 6 times the Island's current total electricity consumption. Potentially this could provide a significant amount of energy for export, although the scale of offshore installations needed to harness this energy and the investment needed to construct them would be significant, at some £2-3bn for around 1GW of capacity, and therefore reliant on external and private investment. However, assuming Jersey Electricity's estimates to be accurate a project to produce the majority of Jersey's electricity from offshore wind within the next two decades would be technically feasible and could lead to a material source of new income as well as local employment opportunities. The Panel has not seen their research, but its adviser considers the figures discussed to be broadly credible and in line with other developments elsewhere. By way of comparison, construction work on the London Array (currently the largest operational offshore wind farm in the world) started in 2009, and its first phase was officially opened in July 2013. This is capable of generating a total of 630MW from 175 wind turbines, which is sufficient energy to power half a million UK homes and reduce CO_2 emissions by over

[2] *Tidal Stream Energy Feasibility Study for the States of Jersey* (report commissioned from IT Power by the Environment Department in 2010)

900,000 tonnes per year. The Panel's adviser has calculated that assuming comparable conditions to recent UK offshore windfarms, Jersey's existing annual electricity demand could be met (on average) by some 64 wind turbines of the same 3.6MW capacity; such an array could cover a sea area of approximately 9 square miles, with turbines typically being installed about 750 metres apart to give optimum performance.

- **Energy from waste** is exploited through the EfW plant at La Collette, which is capable of generating in excess of 10MW of electricity when operating at full capacity. The Panel was informed by Transport and Technical Services that a significant amount of heat energy produced during power generation is wasted as residual heat, because seawater circulated through the machinery in the plant to cool it is simply pumped back into the sea after it has heated up. Scandinavian countries frequently use the hot water from energy from waste plants in community district heating schemes, which raises their overall energy efficiency to about 70% (from approximately 40%). The opportunity for a heat distribution network to use this wasted energy was considered at the design stage of the EfW plant. However, it was recognised that the economics of providing district heating in a mild climate location such as Jersey are very different to those of a cold Scandinavian country, and would have involved high capital costs for limited returns. For this reason the idea of a heat grid was not taken further, and the design of the plant was optimised for efficient electricity generation. This means that heat is released in the form of cooling water at low temperature (only about 30-40^{o}C) which is difficult to exploit cost-effectively. TTS are considering a study of what additional resources can be utilised and whether better use can be made of waste heat energy from the EfW plant in future. It is believed that a certain amount of process heat could be used in other ways without unduly impacting on the electrical generation capacity of the plant, but further investigation will be needed.

- **Micro-renewables** could include individual installations by home-owners as well as larger facilities in commercial buildings or new developments. These could incorporate a range of technologies such as small wind turbines, solar photovoltaic panels (PV), solar water heating, hydro-electric power, heat pumps and biomass. All of these together have the potential to usefully reduce consumption of power from the grid and thus Jersey's dependence on imported energy, even if individual savings are relatively small and will not necessarily coincide with times of high grid demand. Jersey's record of sunshine hours makes the potential for photovoltaic or solar water installations on a larger scale particularly interesting. The Plan's approach to micro renewables is essentially to offer advice and information to raise householders' awareness and encourage the take-up of new technology. When questioned the Minister for Planning and Environment argued against offering incentives to encourage people to install micro renewables, because he considered that they should be sufficiently

persuaded by the ethical case for a transformation of behaviour. The Panel's view is that this is unrealistic; according to its adviser, evidence from past energy saving schemes in the UK strongly suggests that in the absence of more concrete support measures, encouragement alone makes little difference to consumer behaviour.

- **Anaerobic digestion** would require the collection of suitable input materials, potentially including animal slurries, farm wastes, restaurant and food industry wastes, kitchen and garden wastes, with provision for separation and storage. Digesters could provide biogas for use in on-site electricity generation and heating, or sale for off-site use. Commercial opportunities could include the sale of gas, electricity, heat, digestate and solid fibrous residues. While the likely generating capacity would be relatively small compared with other renewables, the advantage of putting existing wastes to better use potentially makes this an attractive idea. However, given the limited extent of agricultural land available locally, some safeguards might need to be considered to prevent crops being grown specifically for anaerobic digestion purposes to the detriment of food production, which has been recognised as a potential problem in some other jurisdictions.

- **Shale gas** was a subject of speculation for some witnesses, not only in respect of its increasing availability on world markets and the impact this might have, but also the possibility that deposits might be found in or around the Island. Increasing exploitation of shale gas around the world could have a significant effect on gas and other energy prices and lead to changes in market behaviour. This might be an advantage to consumers, but there would be negative consequences in terms of carbon emissions from any increased burning of fossil fuels. In the absence of any evidence that local reserves of shale gas exist, or whether they could be exploited without causing unacceptable harm to the environment, in the Panel's view the policy is right not to make any assumptions about shale gas as a local source of energy.

Estimated potential contribution of renewables compared with Jersey's current electricity consumption (averaged over a year):

Source	Potential (shown as % of current consumption)[3]
Offshore wind	**100 – 600**
Tidal power	**9 – 50**
Energy from waste	**5.5[4] – 22[5]**
Large scale photovoltaics	**5 – 10**
Anaerobic digestion	**0.8 – 1.3**

[3] For further information see the Panel adviser's report pp.10-14
[4] Based on electricity generation at around the current levels of EfW plant operation
[5] Based on EfW plant operating at full capacity for 80% of the year, assuming successful recovery of a significant amount of heat energy from cooling water

Findings

12. The most promising potential source of renewable energy for Jersey is offshore wind, because of the scale of the resource and the availability of tried and tested technology

13. The lowest estimate of potential for offshore wind is considerably greater than that for all other renewables combined, including tidal power

14. Possibilities for exploiting offshore wind resources through licensing arrangements or commercial partnerships should include consideration of partnerships with other Channel Islands, France and/or other European neighbours. The EU currently has a need for more capacity to enable it to meet its 2020 targets, although opportunities may vary as technology and targets evolve

15. Jersey should position itself as a 'fast follower' of tidal power technology, and be prepared to exploit tidal power as and when it becomes technically feasible and economically viable

16. Electricity generation at the Energy from Waste plant at La Collette provides a useful resource, but the efficiency of the operation could be enhanced by exploring the potential to harness waste heat energy from cooling water

17. Farms and other organisations should be encouraged to investigate anaerobic digestion facilities; while this would be expected to contribute only a modest amount of energy, it could generate extra income for owners while enabling productive use of wastes which would otherwise have to be disposed of elsewhere

18. Positive measures such as grants, loans or the use of 'buy back' or similar tariffs would encourage the uptake of micro renewable technologies and reduce demand on the central electricity grid

4.6. Public sector energy use and emissions

Jersey's public sector is a major local consumer of energy in its own buildings and transport. Witnesses to the review stressed the importance of the States leading by example. In this context the initial savings target in the plan for a 10% reduction in States energy usage is not very ambitious; evidence was presented indicating that some organisations coming new to energy management had achieved much higher savings in a short period.

An increase to target a 15% reduction in States energy use by 2020 through departmental action plans is seen as more appropriate, but even this should be regarded as a minimum. Suggested actions to help achieve this include installing solar water heating and photovoltaic panels on public buildings, and procurement of electric vehicles when replacing the existing mostly fossil-fuelled public sector fleet.

The Panel considers that co-ordination of over-arching measures to improve overall public sector energy efficiency could be enhanced if a States-wide 'champion' was nominated to take responsibility for this. Although individual departments should be encouraged to continue initiatives

appropriate to their own activities under the 'Eco-Active' banner, there is also a need for the States to be seen to be working together on such an important issue.

Findings

19. ***A corporate commitment to equip States-owned properties with energy-efficient technologies such as photovoltaic panels and solar water heating would reduce States energy bills, boost energy-related technology business activity by providing increased employment and training opportunities for suppliers and installers, and set a good example for private sector developers***
20. ***A States 'champion' for energy management should be nominated with overall responsibility for co-ordinating key initiatives across all departments***
21. ***A switch to electric vehicles within the States fleet would provide an example for increased modal shift within Island transport generally and should also help to raise manufacturer interest in a Jersey-based electric transport initiative***

5. The Energy Partnership

The plan proposes the creation of a multisectoral 'energy partnership' to act as a coordinating body. It was argued by some witnesses that the lack of a coherent, coordinated approach across different States departments was an inherent weakness in Jersey. However, the Island has major opportunities for environmental, social and economic benefits if action can be effectively coordinated through a cross-Government structure involving all relevant departments, working in partnership with private and third sector organisations.

The proposals for an energy partnership in the plan are vague, and do not clearly establish the need or rôle for any one body. The Panel sees a need for co-operation at several different levels:

- the States need strong and co-ordinated internal energy management, to ensure that government meets or exceeds the standards it is setting for others, and takes an integrated approach to energy matters across all departments
- a need for interaction with private and third sector organisations, working pro-actively with stakeholders to achieve the aims of the energy plan and their customers to inform and encourage behavioural change
- an over-arching need for active co-operation, potentially joint investments and other actions, with other Channel Islands, France, the UK and/or the European Union

From evidence presented to the Panel it does not believe that current links and institutional arrangements are strong enough to achieve these aims. While a single partnership may not be the best way to undertake all aspects of this work, individual bodies such as the Renewable Energy Commission and Jersey Energy Trust cannot offer the coherent approach needed; some existing groups do not appear to meet very frequently, or have strong enough links to Ministers or departments to drive through change. The energy partnership needs to provide oversight, guidance and decision-making ability to deliver on the policy imperatives through close co-operation and involvement with key stakeholders in their fields.

Findings

22. The structure of the proposed Energy Partnership is vague and ill-defined but will be fundamental to achieving the aims of the draft Plan

23. Existing advisory groups do not provide the best starting point for the Energy Partnership

24. The Energy Partnership will need to provide a robust framework for delivery, political accountability and oversight of the policy

6. Regulation

The Panel heard from several witnesses that Jersey has managed well up to now without a sector-specific energy regulator. The Minister for Treasury and Resources suggested that the possibility of regulation being brought in may have helped to ensure that Jersey Electricity operates fairly in the public interest, without the need for actual regulation. However, the increasing market dominance of electricity raises the question of how best to ensure that a near-monopoly supplier of an essential utility continues to act in the public interest.

Some witnesses, including Jersey Electricity, expressed strong reservations about regulation. The cost (which would typically need to be recovered from customers in the form of higher prices) was cited by the company as one factor. Experience from other regulated markets around the world suggested that an adverse effect on investments would be another factor. The Minister for Treasury and Resources was of the opinion that specialist sectoral regulation of the electricity market would cost upwards of £500,000-£750,000. (Jersey Electricity subsequently pointed out that there would be a need for regulated entities to recruit additional staff to manage regulation issues, which would add to the costs needing to be recovered.) It was also suggested that there was probably no compelling reason for traditional narrow price and consumer protection regulation, as a previous Jersey Competition Regulatory Authority (JCRA) enquiry found that Jersey Electricity was providing good value and service to consumers.

Where some form of regulatory input may become necessary is in the area of pricing and tariff structures in future. The draft Energy Plan says little about tariffs or regulation, but in the view of the Panel's adviser there will be an increasing need to look at innovative tariffs, differential charging or cross-subsidy between groups of energy consumers, to meet the policy objectives.

A variety of market-based tools could help to motivate and incentivise energy users by deliberately raising or lowering the price that certain groups of customers pay for energy. Methods that could be considered include:

- **'Rising block' tariffs:** these could ensure that domestic customers get essential energy at an affordable rate, but pay higher rates for luxury/discretionary consumption
- **Seasonal / time dependent tariffs**: customers would pay higher rates at times of peak demand, to encourage them to use energy at less intensive times
- **Interruptible tariffs**: customers would pay less per unit in return for allowing the supply to be cut some of the time

- **Feed-in tariffs**: if customers with their own micro generation equipment (e.g. solar panels, wind turbines, anaerobic digesters) generate more electricity than they need, they could export the surplus back to the grid and be paid an agreed rate per unit
- **Social tariffs**: could give preferential terms or protection to particularly vulnerable groups

Use of these different types of tariff (and if necessary obligations on the supplier) could potentially encourage efficient use of energy and discourage waste. They could also help to tackle fuel poverty at the lower end of the scale, while giving higher users the incentive to change behaviour or consider installing more efficient technologies. However, designing and applying such schemes should not be left entirely to suppliers, whose interests are primarily to create a fair return for their shareholders and enable re-investment in the business.

A co-operative approach, where the proposed Energy Partnership (including representatives of energy suppliers) could establish goals that took account of agreed policy objectives and societal needs might be one way forward. However, if that proved impracticable, there might be a need for specialist sectoral regulation, which does not currently exist in Jersey. Design and implementation of such a scheme would require considerable technical expertise; the Channel Islands Competition and Regulatory Authorities (CICRA) could be asked to investigate the possibilities for new regulatory models, before coming to any firm decision.

The Panel's adviser suggested as an illustrative scenario a model that could give domestic energy customers a three step tariff:

1. a cheap rate for sufficient energy to provide for basic needs in an average house
2. a standard rate (similar to the current rate) for additional usage up to an 'average' household's normal consumption
3. a significantly higher rate for 'luxury' discretionary use above that level

Theoretically the 'basic needs' rate could enable a careful household to live in adequate comfort, while paying a lower rate than at present for energy; the cost to the supplier would be offset by the tariff applied to households paying for extra energy under the higher rate. For such a system to be fair to all it would require careful analysis to inform decisions about what constituted 'average' as opposed to 'luxury' use. Jersey Electricity told the Panel that they were happy to work with interested parties including the States of Jersey, JCRA, Consumer Council and Citizens Advice Bureau to consider and develop alternative tariffs to better meet customer needs.

Prior to publication of this report Jersey Electricity submitted further remarks regarding tariffs and regulation which were shared with the Panel's adviser. His observations are copied below:

"In subsequent representations JEC gave detailed comments on various potential smart tariffs. They pointed out that rising block tariffs '***were normally contemplated where energy suppliers offered discounts for higher consumption levels. Jersey Electricity does not offer these volume discounts, and therefore does not encourage excessive consumption in this way***.' This is true, but does not necessarily mean it would not be desirable to use a rising block tariff to give a disincentive for high consumption. JEC also said that rising block tariffs can '***disadvantage vulnerable customers who may in some cases consume more by virtue of them spending more time at home***.*'* This is of course possible, but could be addressed through, for example, giving higher allowances at the low rates to customers with special needs and energy inefficient homes, which would improve the commercial case for improving their insulation levels.

JEC stated that they already offer interruptible tariffs and '***tariffs that differentiate prices depending on time of day, and are working on new tariffs that more closely mirror the underlying cost structure and expect to develop this even further with the completion of their Smart Metering programme which will allow greater meter control***.' *They also offer a buy back tariff which* '***is presently set at a level which is cost neutral to the company***.'

JEC also pointed out repeatedly that if they were required to sell any power at less than cost price, or buy it at more than avoided-cost price, the resultant extra costs would have to be borne by other customers. This is true. But it does not necessarily follow that such requirements are not desirable or justified. Indeed there is no reason to assume that the pattern of energy prices that is best for Jersey's population and for contributing to States policy objectives will happen to be identical to JEC's costs of supply at particular times and places. These are in any case not objectively 'given', but depend on assumptions and accounting conventions applied to, for example, the apportionment of fixed costs and the depreciation of assets."

Findings

25. The prospect of sectoral regulation may be sufficient incentive to ensure that energy suppliers continue to act in the public interest

26. To prepare for a possible future requirement for regulation, CICRA could be asked to investigate the potential for new tariff structures to assist in delivering the aims of the Energy Plan

27. If that potential was confirmed, CICRA could be asked to look more closely at detailed design issues, ensuring the protection of vulnerable householders while providing fair and transparent tariff structures to deliver the policy aims

7. Resilience

Ensuring security of energy supply is fundamental to maintaining a successful economy and quality of life for Island residents. While Jersey has been fortunate to be able to access relatively inexpensive, low carbon nuclear-sourced electricity from France for a number of years, economic pressures across the EU and the risk of disruption to energy supplies from other parts of the world make it possible that suppliers might in future decide to sell their power elsewhere, potentially leaving Jersey with a problem.

As a relatively small consumer Jersey would under these circumstances have limited bargaining power. The JEC has the ability to generate enough electricity on-Island to provide for overall demand (as it has been doing recently owing to problems with the interconnector link to France), but to continue this for an indeterminate period would be both expensive and environmentally undesirable. It is therefore vitally important that action be taken to reduce Jersey's dependence on a single externally-controlled source of power, to increase the security and resilience of the Island's future energy supplies. Ideally Jersey should aim to become independent of outside energy sources. To this extent the energy policy needs to consider strategic issues as well as emissions and energy use.

There seems to be little doubt that there will be an increasing trend in future away from fossil fuels to a greater reliance on electricity for all forms of energy use, including transport. The convenience of electricity as a 'carrier' technology for energy that can be generated in many different ways makes it very flexible, with potential to support environmentally less damaging sources of power. Resilience can also be improved by minimising the dependence on energy, for example by designing buildings to minimise the need for artificial lighting, heating, ventilation and powered services, together with spatial planning and use of communication technology to reduce the need for business travel. However, as electricity becomes increasingly dominant in the market, unless new ways can be found to increase on-Island (including offshore) generation capacity this will lead to more, not less reliance on outside suppliers.

In discussion with gas and oil suppliers it was noted that there had been proposals in the past for a pipeline to pump hydrocarbon fuels to the Island, rather than relying on shipping as at present. Members were informed that a new gas pipeline had recently been installed between the Isle of Man and the UK mainland. However, taking into account the relatively low number of existing domestic gas installations in Jersey, the likely cost of construction and signs that consumption of both gas and oil is likely to reduce in future, the benefits of a new pipeline for Jersey would seem

to be limited. While not ruling out further discussion if suppliers were keen to invest in such a project, this is not seen as something that should be prioritised by the States.

Findings

28. There is a need for Jersey to diversify and expand on-Island generation capacity (including offshore development) to meet current and future demands and reduce dependence on external supplies

29. New generating capacity should be from renewable low carbon sources

30. Resilience will be improved by minimising the demand for energy through better design of buildings and reducing the need for business travel

8. Targets and measurement

In the context of the Kyoto treaty and internationally agreed targets to reduce carbon emissions by 80% from 1990 levels by 2050, Jersey's switch a number of years ago to import most of its electricity from nuclear sources in France rather than relying on on-Island generation has given the Island a head start in meeting the required reductions.

However, carbon is not the only environmental issue the energy policy needs to address. Witnesses to the review generally agreed that the Plan should use energy as well as carbon measures, to give a better indication of the overall carbon and energy 'footprint' of Jersey's population and economy. This approach could encourage more energy efficiency and energy saving measures than a strict focus on carbon accounting, leading to greater economies and eventually lessening the Island's dependence on energy imports.

Standard accounting rules disregard the carbon emissions of our imported electricity, which is very low in any case because of the high proportion of nuclear generation. Introducing new renewable technology to the Island so that it can be more self-sufficient in energy will in the short term bring some increases in local carbon emissions. This may seem counter-productive. However, encouraging the development of new technologies and supporting energy efficiency measures should bring improved resilience, and an overall reduction in energy use in the Island, with significant economic and environmental benefits in the longer term. The Island may no longer have a 'free pass' based on current carbon accounting methods, but will be better able to demonstrate that it is taking full responsibility for its own energy use and carbon emissions.

Findings

31. While the Plan is right to focus on carbon reduction targets in terms of Jersey's commitments under the Kyoto Protocol, there is also a need to consider other forms of measurement, such as energy demand

32. Broader measures of the carbon and energy 'footprint' of Jersey's population and economy could reasonably include consideration of energy and carbon emissions already embodied in imported goods and services (including electricity)

33. Calculations of per capita carbon and energy footprint, as well as total figures could assist the States in making policy decisions about the impact of different possible future population scenarios

9. Summary

Measures included in the draft Plan to address carbon emissions will also bring benefits to the Island's population, economy and environment, as well as improving our long term security and enhancing Jersey's international image and reputation. Many, if not all of the priorities, aims and targets of the Plan, while fully justified by current climate science, also appear as sound common sense. There was hardly any opposition to the overall aims of the Plan amongst key witnesses to the review.

However, the Plan has flaws. The main problem seen by the Panel is that the draft is much stronger in aspiration than action. Actions outlined in the Plan are not considered to be sufficiently developed to enable Jersey to meet the demanding targets for 2050. There are numerous commitments to study and consider what further measures may be needed, but the actions are poorly defined, or commit only to short term 'easy wins', with no clear path to follow them up. Some amount to little more than predictions about future developments that it is hoped will work in the Plan's favour.

The Panel believes that stronger action will be needed in the following key areas of the plan:

- Energy-efficient retrofit of existing housing and other buildings
- Low-energy design in new housing and other buildings
- A major shift to electric and potentially other low-energy vehicles
- Micro renewables
- Utility scale renewables, especially offshore wind, anaerobic digestion and harnessing waste heat from the Energy from Waste plant
- Future potential for tidal power

'Soft' measures such as education, awareness-raising, and promotion will not bring about change on their own. Focused, results-oriented partnership working will be needed to achieve these aims. Many already have some understanding of the technologies now available to improve energy efficiency and reduce carbon emissions, but few have the means to become 'early adopters' of expensive new technology without some help. The Panel would support clear, decisive, pro-active programmes of action with specific targets to secure swift progress towards the Plan's goals. They are likely to require substantial investment, financial incentives and/or regulation as well as 'softer' measures. Care will also be needed to ensure protection for vulnerable groups so that measures are seen as fair, reasonable and politically acceptable.

To assist in delivering the necessary levels of investment, methods of incentivising/financing initiatives could include partnerships with private companies for large scale renewables or electric vehicles, revolving loans repayable out of savings for energy efficiency measures or micro

renewables, new charges on energy use, cross-subsidy between different groups of energy users (through the use of smart tariffs) and hypothecation of taxes for energy-related activities, as for example the use of VED to fund the Energy Efficiency Scheme. Questions about fairness in applying new financing and tariff structures will require some form of public oversight and/or regulation of energy markets.

The Panel believes that it would be to Jersey's advantage for the principles of the draft Energy Plan to be adopted. There is very little in it which could be seen as not helpful, although there are some concerns about making commitments whose delivery is uncertain. While confident that there would be no significant downsides to adopting the Plan, the Panel considers that further and more positive action will be needed to flesh out and implement many of the initiatives contained in it if they are to have the desired result. The following are seen as priorities for the short term:

- A fully-functioning Energy Partnership structure (including subsidiary bodies as required), and relations with other energy co-ordinating bodies established
- A broader scope for the Energy Efficiency Scheme to encourage domestic energy efficiency and the take-up of micro renewables in the 'able to pay' sector, and 'spend to save' in public buildings
- Ownership of the seabed to be resolved, giving clarity on the potential for offshore wind and tidal power development
- Consultation with industry on revised building bye laws, taking account of the need for flexibility to support the introduction of new technologies
- A States initiative to accelerate Island-wide uptake of electric vehicles
- Discussions with suppliers and potential partners at a political level on the possibilities for offshore wind installations in local waters
- A study into possibilities for making use of waste heat from the Energy from Waste plant
- Consideration of the potential for local uptake of anaerobic digestion technology

An initial progress report on the above objectives could be provided to the States within 12 months, with further reports to be produced by the new Energy Partnership on an annual basis thereafter.

Findings

34. Jersey has good opportunities for:

- ***Exploiting renewable energy resources, especially offshore wind and possibly tidal power***
- ***A significant shift to electric vehicles***
- ***Reducing emissions in traditionally inefficient sectors such as buildings and road transport***

As a small jurisdiction with control over its own energy policies Jersey could make swift progress in all these areas

10. Recommendations

The Panel believes that 'Pathway 2050: An Energy Plan for Jersey' should be considered as more than a single departmental policy. It represents an important first step towards a co-ordinated, States-wide strategy to ensure the future sustainability of the Island, the greatest benefits of which will be felt by future generations. The Panel recommends that the Council of Ministers support the policy.

Recommendations:

1. ***The draft policy should be approved by the States. It offers many opportunities for environmental, social and economic benefit and will enhance the Island's reputation as a responsible jurisdiction***
2. ***Consideration should be given to the policy being proposed by the Council of Ministers, to demonstrate that energy policy affects the entire Island and should not be the responsibility of one department***
3. ***The States proposition should seek approval for the high level principles of the plan, rather than specific policy issues that have yet to be developed in detail***
4. ***The proposition should include a requirement for a detailed plan prioritising key actions that will bring benefits to be submitted to the States within 12 months of the policy being approved***
5. ***Priorities for action should include:***

1) creation of a new, strong cross-Government partnership to replace existing bodies and work alongside energy stakeholders, co-ordinate the energy strategy, set targets and monitor and report on progress

2) improved construction standards for housing and commercial buildings to be produced in consultation with industry, ensuring sufficient flexibility within any new bye laws to respond to emerging technologies

3) revision of the policies and objectives of the Energy Efficiency Scheme to broaden its scope and expand into the 'able to pay' sector

4) clarification of ownership of the seabed and independent investigation of the potential for developing wind and tidal energy schemes

5) exploratory discussions at a top political level with relevant French and/or other authorities on the potential for co-operative exploitation of offshore wind resources in Jersey or nearby waters

6) a States initiative to promote the uptake of electric vehicles

7) an assessment by the Channel Islands Competition and Regulatory Authorities of potential tariff structures to encourage energy efficiency and the uptake of renewable energy technologies, whilst avoiding future fuel poverty

8) investigation of options to make use of waste heat energy from the Energy from Waste plant

Appendices

Public hearings: list of witnesses and hearing dates

Tuesday 21st May 2013
Mr Mark Forskitt (Jersey Climate Action Network)
Sir Nigel Broomfield (Jersey Energy Trust)

Wednesday 22nd May 2013
Mr Jim Hopley (Jersey Chamber of Commerce)
Mr Mike King (Chief Officer, Economic Development Department)
Mr Tony Nicholls and Mr Neil Shaw (Jersey Gas)
Mr Andrew Riseley and Mr Michael Byrne (Channel Islands Competition and Regulatory Authorities)

Tuesday 11th June 2013
Minister for Transport and Technical Services (Deputy Kevin Lewis)
Mr Chris Ambler and Mr Ian Wilson (Jersey Electricity)
Mr Ian Wilson (Jersey Construction Council)

Wednesday 12th June 2013
Mr Arnaud Havard (Fuel Supplies CI)
Mr Mike Liston

Tuesday 9th July 2013
Minister for Treasury and Resources (Senator Philip Ozouf)
Minister for Planning and Environment (Deputy Robert Duhamel)
Mr Chris Ambler (Jersey Electricity)

Thursday 25th July 2013
Chief Minister (Senator Ian Gorst)

States of Jersey Environment Scrutiny Panel

Review of Draft Energy Policy: Adviser's report

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30 October 2013

Introduction

The review process

The Jersey Minister for Planning and Environment's draft Energy Plan (Pathway 2050: An Energy Plan for Jersey; Draft Energy Plan 2012 for consultation, States of Jersey, November 2012, referred to as 'the draft Energy Plan' or just 'the Plan' for brevity) was published for consultation between November 2012 and January 2013. This followed a long gestation, including consultation on an earlier draft in spring 2011 which was not finalised before being overtaken by the 2011 States elections.

The States of Jersey Environment Scrutiny Panel (referred to as 'the Panel') decided to carry out a review of the Plan in spring 2013. After reviewing the consultation responses the Panel held public hearings with 15 individuals and organisations in June and July 2013. These included four States Ministers and representatives of the Island's energy industries and relevant third sector bodies. (The full list is at Annex 2.)

This report draws out lessons and conclusions. It must be emphasised that this is the Adviser's report to the Panel and does not necessarily reflect the Panel's views. (Annex 1 outlines the Adviser's credentials and role in the review.)

Overview of the Plan, and priority topics for the review

The Plan is driven by an overall target of reducing carbon emissions by 80% from 1990 levels by 2050. Section 1 of this report below considers the justification and appropriateness of this target.

This target is underpinned by three principles: sustainability, affordability and security. These are explained in detail in Chapter 2 of the plan. They informed the Panel's questions in the evidence sessions, and run through this report.

The draft Plan sets ambitious targets for energy saving and low carbon energy. The review concentrated on three areas of energy use particularly important for its success:

- Energy efficiency improvements in existing and new housing (and other buildings);
- Transport, especially a shift to ultra-low emission vehicles (eg electric cars) and reduction in private car use;
- Development of renewable energy sources such as utility-scale offshore wind and tidal power, anaerobic digestion, use of waste heat and micro-renewables.

These are discussed in turn in sections 2 - 4 below.

Energy management within the public sector was only touched on in public hearings, but officials responded to written questions; this issue is discussed in section 5 below.

The review also explored institutional, financial and regulatory issues raised by the Plan:

- The proposed Energy Partnership
- The potential for 'smart tariffs', levies, loans, subsidies and such like to help deliver the Plan's targets, the issues of fairness, motivation and design and implementation these raise, and the possible need for sector specific regulation;
- What resilience entails and how it should be promoted
- The framing of carbon and energy targets and performance measures.

These are discussed in sections 6 – 9 below.

This report ends with conclusions and recommendations (section 10).

1 Climate change and its implications for Jersey policy

The issue

The Policy is driven by the aim of substantially reducing carbon emissions from energy use in order to reduce the risk of dangerous climate change. The justification for the plan depends on the validity of this aim.

The draft Plan

The draft Plan says:

1.1: 'There is overwhelming evidence and a scientific consensus that accelerated climate change is occurring and Jersey will not be immune to its effects … Regardless of the levels of their own emissions, all jurisdictions will feel the effects of climate change through impacts on society and the economy. This is a global problem that requires a collective solution …

'… current European Union targets for reduction in carbon emissions … require an 80% reduction on 1990 levels of GHGs by 2050.'

Evidence

The Plan quotes conclusions of the Intergovernmental Panel on Climate Change (IPCC) to the effect that it is very likely that human greenhouse gas emissions have caused most of the observed rise in global temperatures, and that to reduce the risk of damaging change, reductions in emissions are now urgently necessary.

The Summary for Policymakers, the first instalment of the latest IPCC report, the Fifth Assessment Report, was published on 27 September 2013. As expected, this paints an even bleaker picture than earlier reports, and implies a need for even faster and deeper emissions cuts. The IPCC's press

release (http://www.ipcc.ch/news_and_events/docs/ar5/press_release_ar5_wgi_en.pdf) summarises the conclusions as follows:

'It is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century. The evidence for this has grown, thanks to more and better observations, an improved understanding of the climate system response and improved climate models.

Warming in the climate system is unequivocal and since 1950 many changes have been observed throughout the climate system that are unprecedented over decades to millennia. Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850, reports the Summary for Policymakers of the IPCC Working Group I assessment report, *Climate Change 2013: the Physical Science Basis*, approved on Friday by member governments of the IPCC in Stockholm, Sweden.

"Observations of changes in the climate system are based on multiple lines of independent evidence. Our assessment of the science finds that the atmosphere and ocean have warmed, the amount of snow and ice has diminished, the global mean sea level has risen and the concentrations of greenhouse gases have increased," said Qin Dahe, Co-Chair of IPCC Working Group I. Thomas Stocker, the other Co-Chair of Working Group I said: "Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Limiting climate change will require **substantial and sustained reductions** of greenhouse gas emissions." '

Discussion

The Policy accurately reflects the overwhelming consensus of qualified scientific opinion. The proposed target of an 80% reduction in Jersey's emissions between 1990 and 2050 is consistent with UK and EU policy and is in line with the requirements agreed at the time that the UK's ratification of the Kyoto Protocol was extended to Jersey that the Island would 'introduce, where possible, and having taken into account local circumstances, policies in line with the objectives of the UK Climate Change Programme'.

None of this legally obliges Jersey to adopt the same 80% reduction target or indeed any carbon target. Arguments for doing so include:

- Moral responsibility. Climate change is among the greatest challenges to human security and welfare (many would say the single greatest challenge): it can only be averted by consistent action by all human societies; Jersey should take its share of responsibility.
- Political solidarity. The UK and the EU, Jersey's most important neighbours and trading partners, are in the forefront of global efforts to respond to climate change, and have set targets to reduce emissions by at least 80% by 2050.
- Access to economic opportunities. UK and EU policies are creating economic opportunities through subsidies for low carbon energy and support for green technologies. Jersey, and Jersey based businesses, could potentially greatly benefit from these. Being outside the UK and EU, Jersey would have to negotiate access to them, and is unlikely to succeed without embracing the policy objectives that justify these subsidies.
- Broader reputation. Almost all nation states, and many regional and local authorities worldwide, have active energy policies with emphasis on carbon reduction. This is becoming increasingly a sign of good governance.

Indeed a case can be made that Jersey could and should go further and faster than other jurisdictions because of:

- Relative prosperity, bringing high energy consumption, big opportunities for painless reduction, and ease (at least compared to many other jurisdictions!) of raising resources;

- Freedom from structural problems such as economic dependence on fossil fuel extraction or heavy manufacturing industry which hamper efforts to decarbonise in many places;
- High dependence on imports and low primary production and manufacturing which mean that the energy use and carbon emissions which Jersey is *responsible* for (ie the Island's carbon and energy 'footprints') probably greatly exceed the on-Island figures as reported according to standard international reporting conventions. (This is one of a number of problems with standard carbon accounting which are discussed in section 9 below);
- Good opportunities for offshore wind and (potentially) tidal power, for a major shift to electric vehicles, and for reducing emissions in currently inefficient sectors, notably buildings and road transport;
- The potential a small jurisdiction, outside many international agreements and with extensive control over domestic policy, has for nimble, coordinated administration.

Conclusions

The 80% carbon reduction target is justified by climate science and consistent with other jurisdictions' commitments. Adopting it would show Jersey taking its share of responsibility in a global challenge, be good for Jersey's reputation and image, improve the Island's future resilience and reduce vulnerability to future energy uncertainties, and help position the Island to benefit economically from UK and European carbon reduction commitments.

2 Energy efficiency measures in housing and other existing buildings

The issue

The Plan depends very heavily on achieving large reductions in energy use, and carbon emissions, from buildings.

The draft Plan

The draft Plan calls for an 82% reduction in emissions from housing from 1990 to 2050. This is a larger reduction than any other sector except power stations (where 2010 emissions were already more than 80% lower than 1990 because of the switch to French nuclear electricity.) These reductions make up 30% of the total to be achieved.

The bulk of these saving are expected to be delivered by expanding and diversifying the Eco-Active Energy Efficiency Service. About this, the draft Plan says:

'To begin to deliver this action, the EES will develop a revised delivery mechanism and help to put in place the infrastructure that will assist in the take up of these energy efficiency measures. One of the requirements is for an increased number of installers and energy auditors, in order to respond to the potential increased roll-out of these measures. Preliminary assessments have indicated that there is the potential to create up to 70 employment opportunities, sustained for the next two decades to undertake the energy audits and efficiency installations outlined. See Supporting Document B for details of this assessment. Further intervention may also need to be assessed, including the requirement to investigate a number of finance options for able-to-pay householders including low interest options, pay as you save models etc. A watching brief is being undertaken with regards to the UK 'Green Deal' policy; lessons from the Green Deal will be used to inform the future development of policy interventions in Jersey.'

The draft Plan also proposed introducing a 'carbon-neutral' standard for new homes through Building Bye Laws.

The Plan's approach to micro renewables is to offer advice and information for householders ready for the future: 'In the long term we expect to see market ready solutions that will deliver energy autonomous housing and communities that will contribute to the affordability and security of supply'.

Evidence

Sir Nigel Broomfield expressed the Jersey Energy Trust (JET)'s enthusiasm, indeed impatience, to move in to the 'able to pay' sector and described a range of initiatives they would be ready to carry out as soon as the Plan gave them a remit. However he did not offer any evidence (from either Jersey or elsewhere) that these could generate the level of savings the Plan envisages. The kinds of actions he described have been tried in various ways in the UK and, while generally valuable, have tended to achieve low uptake and not reach the sort of savings the Plan assumes for Jersey.

The UK has had a variety of energy saving incentive schemes for both poor and non poor households since the early 1980s. Overall experience is that they have effects, but take time, never achieve more than partial penetration, achieve much more modest and incremental efficiency improvements than the 80% envisaged even in households that take them up to the full, and much of this is taken up as comfort improvements (or lost in carelessness about energy use) rather than reductions in energy use.

Andrea Cook (in written evidence) argued from extensive experience in the UK and elsewhere that either substantial incentives or tough regulation would be needed. Other witnesses emphasised the need for public education and awareness raising, notably the Minister for Planning and Environment who in his verbal evidence appeared to be arguing that rational incentives and appeals to self interest were undesirable because they could distract from the ethical case for a transformation of behaviour. Some also called for more training and accreditation of suppliers and installers of energy efficiency and renewable technologies (especially heat pumps) for three reasons: to avoid incompetent installations giving green technologies a bad name, to enlist plumbers, electricians etc as ambassadors and advocates, and to maximise the economic benefits to the Island.

Discussion

The ability of the Eco-Active Energy Efficiency Service to deliver very substantial savings is pivotal to delivery of the Policy as it stands. Established in 2009, it has been highly successful in helping people on lower incomes, especially those in fuel poverty, improve their energy efficiency and access to affordable warmth.

However it has no track record in the 'able to pay' sector where, as the Policy acknowledges, motivations and behavioural triggers are completely different.

Action Statement 3 says 'Uptake assumes that energy efficiency measures are NPV (Net Present Value) positive, that able-to-pay sector have access to finance, and that decision making is rational even with long payback periods.' These are optimistic assumptions, especially the last. In particular, providing free or subsidised energy surveys relies on the assumption that, once they are informed about the actions they can take and the costs they can save, consumers who can afford to do so will instal energy saving measures. Experience shows that disappointingly few people behave 'rationally' in this way. Most fail to implement even measures with short paybacks for a variety of reasons, including feeling the hassle is not worth it, anxiety about commissioning work they are not confident they can judge, being overcharged or given inappropriate or ineffective work, and sheer inertia. However there is 30 years of evidence from the UK that moral exhortation on its own makes little difference to behaviour either.

On new buildings, there was general consensus among witnesses that tough regulation of energy efficiency of new construction is necessary. However, concerns were raised that going rapidly to a strict 'carbon neutral' standard would impose disproportionate extra costs, which would ultimately be paid by house buyers; that it would not be the most cost effective way to achieve the final

increments of energy saving; that Jersey's building industry was not yet skilled and equipped to deliver buildings of this standard; and that the (probable) resulting teething difficulties risked giving extremely low energy construction a bad reputation which would be counterproductive.

Not surprisingly, energy industry witnesses each advocated approaches to building regulation advantageous to their own fuel: an emphasis on carbon emissions from Jersey Electricity, emphasis on energy efficiency of building fabric regardless of fuel and its carbon intensity from Jersey Gas, ability to use carbon offsetting to meet targets from Rubis. Issues arising from these are picked up elsewhere.

Conclusions

The Eco-Active Energy Efficiency Service should be enabled and encouraged to extend its activities into the 'able to pay' sector forthwith: this is a 'no regrets' action. However more directive interventions are very likely to be needed to secure the savings targeted in the Plan. Ministers should consider starting work on developing these now.

Possible components include:

- High profile public education / awareness raising / motivational campaigns (though experience from the UK and elsewhere shows that these have little effect in isolation so should only be implemented together with 'harder' measures;
- Grants or subsidies. High levels of subsidy (eg at least 33% of costs of measures) are proven effective, but the political acceptability of that level of public funding for people who could afford to pay is moot;
- Revolving funds providing loans to be repaid out of energy savings (though it will be important to learn from the UK 'green deal', which appears to have got off to a very disappointing start because of high interest rates, complexity and householder resistance to long term obligations);
- Rising block, feed-in and other 'smart tariffs' to reward energy saving and renewable generation (discussed more fully at C below);
- Energy efficiency standards for existing buildings, for example by extension of Building Bye-laws energy efficiency standards to existing housing when renovated or extended.

Piecemeal, these can be ineffectual, unfair, onerous and even counterproductive. They need to be implemented as coordinated packages. The possible role of Jersey Energy Trust in helping design and coordinate such packages, as well as overseeing delivery on the ground, needs to be considered in the context of broader institutional machinery including the proposed Energy Partnership. This is discussed below.

Help for vulnerable households needs to continue, and care needs to be taken to protect vulnerable households from unwanted side-effects of broader energy policies. (Rising block tariffs, discussed in section 7 below, could potentially simultaneously help address fuel poverty and provide a stronger incentive to able-to-pay households to reduce energy use).

Jersey businesses need training to specify, design, supply and install energy efficiency and renewable energy technologies (including heat pumps) and to act as advocates / ambassadors for green energy. The States Economic Development Department should work with business organisations to maximise the economic benefits from this to the Island

Tough and increasing standards for energy efficiency in new construction are needed to drive improvement and upskilling in the construction industry. As part of the consultation process the Minister for Planning and Environment acknowledged that a 'carbon-neutral' standard would be problematic and has proposed that 'AS 2 to be amended to be an aspiration to introduce a 'low-carbon' targets for new homes through the building byelaws in recognition of experiences

elsewhere in achieving 'carbon neutrality'. However to keep up momentum it would be desirable for the Department to set a pathway towards carbon neutrality with commitments to explicit and quantified standards by specified dates.

The primary focus of standards should be on minimising the need for externally supplied energy. The framing of the current Building Bye Laws is good for this because it concentrates on maximum heat loss/gain from buildings. Any change, for example to target carbon emissions specifically, must avoid diluting the pressure on reducing energy use, and must avoid perverse effects such as allowing less energy efficient fabric if using a (currently) low carbon energy source.

The Department needs to commit enough skilled resource to ensure fair and comprehensive enforcement.

3: Transport

The issue

The plan calls for a very large reduction in emissions from transport.

The draft Plan

The Plan sets a target for a 78% reduction in transport carbon emissions. Most of this is intended to come from a 90% switch to 'Ultra low emission vehicles' (ULEVs) by 2050. ULEVs are defined as having very low emissions at the point of use.

Action Statement 13 says 'The Minister for Planning and Environment working with the Minister for Transport and Technical Services through the Sustainable Transport Policy (and its subsequent revisions) will support a modal shift towards Ultra Low Emission Vehicles (ULEVs) to meet the following targets [rising to 90% of new cars registered by 2050 being ULEVs].

An assumption underlying the target is that 'ULEVs will achieve market parity with petrol and diesel cars and ultimately become the vehicle of choice in Jersey'. Thus achievement of the reduction targets depends entirely on hoping that technical and market trends outside Jersey will make ULEVs attractive to consumers.

The draft Plan states (p62) that 'The relatively short journey lengths and the availability of low-carbon imported electricity makes Jersey well placed to make use of electric vehicles or other ultra low emission vehicle technologies.'

Evidence

Many different witnesses agreed that Jersey's short distances, Island-wide speed limit and low carbon electricity offer ideal conditions for a rapid shift to electric vehicles. Several witnesses reported being very impressed with electric vehicles they had tried, on or off -Island. Several had had promising discussions with vehicle or fuel suppliers or potential investors, either as part of their official duties or just as interested citizens. These conversations had been going on piecemeal, without knowledge of each other, and so far inconclusively: none had brought together enough pieces of the jigsaw to get near to agreeing action.

The Government has already taken two valuable steps to encourage electric vehicles: provision of public charging points, and cheaper parking for ULEVs in St Helier. However, uptake is still very low. Reasons witnesses identified include the much higher purchase cost (£10k per vehicle), image, and sheer inertia. Residents wishing to use their vehicles in Britain or continental Europe might also reasonably be concerned about charging and range elsewhere.

Witnesses were supportive of the Sustainable Transport Policy. It was recognised that some significant measures, such a big improvement in the Island bus service, had only recently happened and would take time to show results. However it was also recognised that really significant reductions in car use would be hard to achieve.

Discussion

There was a striking consensus among witnesses that Jersey is ripe for a major switch to electric vehicles, which the Island's particular conditions make particularly easy to achieve.

The much higher capital cost of new electric vehicles compared to conventional ones is a significant barrier. As several witnesses said, it would be hard to justify a public subsidy on a similar scale to the £5000 currently offered in the UK, for people by definition wealthy enough to contemplate buying a new car. However, it might be possible to negotiate a package including, potentially, concessionary prices from a vehicle manufacturer interested in a large scale exemplar, an electricity supplier (probably, though not necessarily, JEC) keen to expand their market, and one or more major employers keen to demonstrate environmental responsibility. This could potentially leave a much smaller funding gap to be bridged by Government support. This in turn could include measures such as further parking concessions and other benefits and conveniences for ULEV users which, as public policy provisions available to anyone *using* a low emission vehicle in particular circumstances, would be politically easier to justify than direct subsidies to individuals to *buy* vehicles.

Inertia is another barrier. Many vehicle users will be reluctant to be guinea pigs for what is still new technology and untried support infrastructure, so there is a chicken and egg problem.

This presupposes that electric vehicles are beneficial. Clearly they eliminate air pollution and greatly reduce noise where they are used. But electricity is only a carrier of energy, not a source, like wind or tides, so using electricity to power vehicles is only as green as the source of the power carried by the electricity. (The same applies to hydrogen, the other main potential ULEV technology.)

Electric vehicles only reduce carbon emissions overall if they run on low carbon electricity which is generated additionally rather than displaced from other uses. If they were fueled by grid electricity without any new generation capacity being created as a result, there would only be a carbon benefit if the carbon footprint of the electricity generated to power them was lower than the carbon footprint of the petrol or diesel they replaced. This may well not be the case, since the last marginal units of electricity generated on the European grid for use in Jersey at peak times will be the most expensive to generate, and often the highest carbon.

However, as the Plan points out, electric vehicles could facilitate growth of renewable energy supplies in Jersey if their batteries could be charged at times when supply exceeded demand, and used to feed power back into the grid when demand outstripped supply. This would depend on smart metering and tariffs that would give vehicle owners an incentive to co-operate, with reassurance that they would not be faced with a flat battery just when they needed to use their car. (Hydrogen can be stored compactly simply as a gas under pressure, but hydrogen vehicles and supporting systems are not yet well enough developed for it to be prudent for policy to assume they will be practicable.)

Conclusions

The Sustainable Transport Policy is valuable and supportive for the draft Energy Plan, especially in its emphasis on reducing use and reliance on car travel. It is not discussed in detail here since it is not part of the Energy Plan and responsibility for it lies with a different Minister. However, the Planning and Environment Minister should give all possible support to its implementation and further development, since the Energy Plan depends partly on its success.

Coordination between spatial planning, service delivery, transport services and fiscal policy is needed to reduce the need to travel (for example by facilitating teleworking and encouraging the closest possible match between employment locations and housing likely to be attractive to those employed, provide alternatives to the private car for as many journeys as possible, and improve energy efficiency in all transport modes.

Jersey is clearly well placed to make a big switch to electric vehicles, and could easily become a world leader and exemplar to many other jurisdictions. However this is only going to happen if some individual or organisation takes on the role of proactively championing the delivery of a step change.

This champion would need to bring all the current conversations and potential stakeholders together to construct a deal to surmount the obstacles. This will need active co-operation between TTS, Economic Development, the Chamber of Commerce, one or more vehicle manufacturers, and other public and private interests. It will need to marshal a package of incentives / concessions to overcome the (current) extra capital cost of electric vehicles, provide reassurance about their reliability and convenience (including charging) and ensure their development is coordinated with an expansion in renewable electricity (perhaps through combination with microgeneration and use of car batteries for storage.)

Ministers should consider how this should be organised. A specific task group might be best, though there is a need to consider how it would operate and relate to any wider partnership or other new arrangement (see section 6 below).

4: Utility scale renewables

The issue

Jersey has considerable scope for large scale renewables including offshore wind, tidal, biowastes and combustible wastes.

The draft Plan

The Plan proposes continuing the work already carried out by the Renewable Energy Commission to establish a framework ready for investors to develop wind, and potentially tidal, power. Key elements include clarification of ownership of the seabed, possibilities for gaining access to EU subsidies, partnership with fuel industries, investors, other Channel Islands, France, the UK and the EU.

Evidence

Reports commissioned by the Department have identified considerable physical opportunities for offshore wind and tidal power generation around Jersey. The draft Plan states:

‘There is good physical potential for exploiting off-shore wind and … the technology is commercially ready and proven in many locations globally. But, electricity generated by off-shore wind farms is currently more expensive than the electricity purchased from the French Grid … In the EU, developments are being supported by incentive funding for capital development costs and premium tariffs for electricity produced coupled with an obligation on energy suppliers to supply a minimum percentage from these sources … for off-shore wind developments in Jersey’s waters to be economically viable (at least in the short term) it will be essential for Jersey to be able to gain access to EU subsidies by selling renewable energy generated in Jersey waters into the European grid. This strategy would also overcome the problem of intermittency of supply which could be problematic if Jersey wanted to consume the electricity from this local source itself.’

'Jersey's very large tidal range, high tidal stream velocities and shallow seas, makes it attractive … It is considered that the harvesting of energy from tidal stream turbines is seen as potentially one of the best routes for Jersey to exploit its natural energy resources in the long term when these technologies reach commercialisation over the next decade.'

Some witnesses argued enthusiastically that, given the combination of potentially huge wind and tidal resources, a vast neighbouring European market, and global trends creating increasing demand for renewable power, Jersey should take bold and decisive action to secure renewable energy as a big economic opportunity. The Chief Officer, Economic Development Department reported potential interest from a sovereign wealth fund in collaborating with Jersey over tidal research and development.

Other witnesses pointed out that tidal power technology was still problematic, wind had environmental downsides, and that neither was yet near 'grid parity' (ie ability to match the current price of imported electricity), and argued that the current approach of the renewable energy commission – to ensure that the 'building blocks' of clear legal ownership of seabed and regulatory consents was in place and be ready to do deals with developers as and when they came forward – was more prudent. In this vein the Treasury Minister argued that Jersey should be a 'fast follower'.

So how much resource potentially is there? The following estimates draw on a variety of sources. It must be emphasised that they are all subject to very large uncertainties of various kinds, should not be taken as more than rough indications of potential, and need more study.

Offshore wind: Jersey Electricity estimate the total deliverable energy from Jersey's offshore wind to be up to 6 times their current supply of 650 GWh / year, ie up to 3,900 GWh / year. The relationship between the installed *capacity* of a windfarm – that is, the rate it can generate electricity, measured in megawatts or gigawatts – and the total amount it actually produces over a year, measured in megawatt or gigawatt hours – depends on how much of the time the wind blows, how strongly and steadily, and how much is lost from breakdowns, maintenance, stoppage during excessive wind, sheltering and turbulence between turbines, as well as the ability of the grid to accept and use power at the times it is produced.

If any detailed modelling has been done for Jersey offshore wind, it is not in the public domain. The following published data on some relatively large and recent UK offshore windfarms may provide some indication of what a Jersey wind farm might entail:

Site	Capacity (MW)	Output 2012 (GWh)	GWh per MW	Turbines
Thanet	300	822	2.7	100
Lynn & inner Dowsing	194	551	2.8	54
Walney 1	184	581	3.2	51
Robin Rigg	180	522	2.9	60
Gunfleet Sands	172	522	3.0	48
Kentish Flats 1	90	257	2.9	30

(sources: http://www.lorc.dk/offshore-wind-farms-map/statistics/production/annual?sortorder=desc&tab=4&sortby=Y2011Sort and http://en.wikipedia.org/wiki/List_of_offshore_wind_farms)

All these were commissioned since 2005 and use either 3MW turbines with a rotor diameter of 90m or 3.6MW, 107m ones. Six larger windfarms (from 300MW up to the London Array at 630MW) are operating in northern Europe, four more are under construction, and a dozen larger still (>1000MW) ones are proposed and have 'at least some of the formal consents required'.

Tidal power: The Panel was given sight of a *Tidal Stream Energy Feasibility Study for the States of Jersey* commissioned from IT Power by the Environment Department in 2010. The report itself is not in the public domain because of commercial confidentiality but the Panel has been authorised to publish the following comments based on it.

The most promising site for tidal power generation is the Ruau Channel off the North East coast between Bouley Bay and the group of islands of Les Dirouilles and Les Écréhous. The IT Power report and survey work estimates the total energy from tidal flows through this channel to be about 360GWh/yr. If 30% of this is extractable, the total usable energy would be about 110GWh/year. 110 GWh/year is about 5% of the Island's total energy consumption of 2,300 GWh/yr, or about 20% of the Jersey's *electricity* supply of about 650 GWh/year.

However IT Power report that two other, reputable and relatively recent, studies estimated the total resource as 282GWh/yr and 820GWh/yr. Moreover the 30% extractable ratio is only an estimate: the previous studies used 20%, and IT Power modelled everything between 5% and 50% in sensitivity analyses. The 110GWh/year figure should therefore not be treated as anything firmer than a plausible middling estimate in a range that could easily be anywhere between 56 (20% of 282) and 410 (50% of 820), ie between 9% and 50% of Island electricity consumption, and possibly even higher or lower.

The report identifies one other potential tidal site, south of the Island between St Helier and Plateau des Minquiers. This site is less promising because of lower tidal speeds and higher connection costs because it is further offshore. It is therefore not modelled in detail. However, as the report points out, 'as tidal stream energy matures and devices become cheaper, the southern site will become increasingly more economically attractive.'

Waste incineration: TTS officials informed the panel that the Energy from Waste plant at La Collette could run at up to 10.5MW electrical output. If the plant ran at full capacity about 80% of the time, this would mean about 73GWh per year of electricity, or 11% of total supply This would however depend on enough waste of high enough calorific value being available, and reliable trouble free operation. The actual amount of electricity supplied to JEC in 2012 was around half this theoretical maximum, 36 GWh (source: JEC Report and Accounts 2012) or about 5.5% of JEC's total supply, and TTS officials believe this is a more realistic figure to assume on the current waste arising.

When generating 10.5MW of electricity the plant also produces 24MW of heat. This is currently wasted as cooling water returned to the sea. This is potentially a large additional energy resource, but there are big difficulties to making effective use of it. When the plant was being designed, it was judged that investing in a distribution grid to use the heat would not be cost effective in Jersey's mild climate (unlike Scandinavian countries where this is standard practice.) Accordingly the plant was designed to maximise efficiency of electricity generation. As a result the heat is released in the form of cooling water at only 30 to 40^0C. This is too cool to be worth pumping round a grid, or to be useful for many purposes.

It would be theoretically possible to use a heat pump to 'concentrate' the heat, but doing this would require power. It would also be possible to take heat off at a higher temperature, but only at the cost of reducing the electrical output. A major rebalancing of the plant's output towards heat would require substantial investment in a different turbine; this is very unlikely to be cost effective so early in the plant's life.

Anaerobic digestion: The UK Anaerobic Digestion Strategy and Action Plan (DECC and DEFRA 2011) states: 'It is not possible at this stage to give a definitive growth potential for AD. However, based on current information available, and assuming that the real and perceived barriers are overcome through the actions undertaken, an estimated potential for AD deployment for heat and electricity could reach between 3 and 5 TeraWatt Hour(s) (TWh) by 2020.' Prorating by population this would mean between 5 and 8 GWh per year for Jersey, or around 0.8% - 1.3% of total

electricity consumption (assuming that the profile of feedstocks and practicalities of capture, processing and use of energy were broadly similar).

It is interesting to compare all these figures with a back-of-the-envelope estimate of the potential yield of **photovoltaics**. Suppose that 10,000 of Jersey's 44,000 households were both physically suitable and willing to install PV and installed an average of 20 square metres (m^2) each, this would amount to 200,000 m^2. Jersey Electricity expect the 37.5 x 3.2m ie 120 m^2 on their Powerhouse to generate up to 19,000 units [kWh] per year, ie 160 kWh per year per m^2. (Source: http://www.jec.co.uk/latest-news/jersey's-largest-solar-panel-array-unveiled/. This is the same yield as a Cambridgeshire domestic example in *Sustainable Energy Without the Hot Air*, and but double that of http://www.windandsun.co.uk/information/solar-power/calculating-pv.aspx. 200,000 m^2 x 160kWh = 32,000,000 kWh or 32 GWh, or about 5% of total electricity consumption.

Installation on public and commercial buildings could greatly increase this area. By way of rough illustration, the States building appears on Google Maps to have a roof area of about 1,500 m^2, and Fort Regent about 10,000 m^2. If it were possible to cover half of the Fort Regent roof with solar panels this could alone produce 800 MWh per year or over one thousandth of Jersey's current electricity consumption. If the central urbanized area of St Helier is taken to be about 1 km^2 then if 20% of this is building rooftops and half of these could be used for PV, this would add 100,000m^2 to the 200,000 estimated from housing If the same area of non domestic rooftops were available across the rest of the Island, the total area of PV would rise to 400,000m^2 or 10% of total electricity consumption.

Discussion

The very differing views witnesses gave the Panel reflects wide uncertainty which remains despite some high quality technical research. The amount of the reserve that can practicably be harvested will depend not only on how technology develops but also on the price power can be sold for. This in turn depends not only on market supply and demand over the whole of Europe, but on the scale and structure of subsidies and support mechanisms in the UK and EU, Jersey's eligibility for them, the costs of connection to larger electricity markets and how far these can be shared with other uses and users. All these factors are uncertain and sensitive to a range of influences outside Jersey's control. Assumptions and expectations about them can legitimately vary.

If Jersey conditions proved broadly similar to those in the UK examples above, a windfarm to provide for all of Jersey's current electricity consumption (balanced over a year) would need a capacity of about 230 MW. This would require about 64 3.6MW turbines (the largest currently in common use.) At a typical spacing of 750m they would occupy a square of sea roughly 5 x 5km (3 x 3 miles.)

The upper JEC estimate of 6 times current electricity consumption would imply about 380 such turbines occupying about 14 x 14km or 9 x 9 miles. (Of course they would not have to be in a square, or even in one block.) It is moot whether this scale of development could be accommodated within Jersey's territorial waters without unacceptable impacts on ecology, shipping, fishing or aesthetics.

The need for EU countries to secure sufficient capacity to meet tough targets for renewables by 2020 presents a particular opportunity (though there may well be further market-driving targets after that date.)

The best available current research indicates that tidal power could provide an order of magnitude less power, later, and with bigger uncertainties. If technology develops better and faster than currently seems likely, and world energy prices rise considerably, a great deal more tidal resource could become technically and economically exploitable than currently appears likely. However the

uncertainties are so great that it would be misleading to try to put numbers on it, and unwise to make any assumptions in planning.

Micro renewables, anaerobic digestion and energy from waste are all potentially beneficial, and have smaller and more manageable technical risks, but will not make more than a few percentage points difference to Jersey's overall energy balance.

Anaerobic digestion has potential, especially when the multiple benefits of sanitary disposal of potentially polluting and food farm wastes and sewage and production of useful liquid fertiliser and solid soil conditioner are considered as well as the energy benefits. As with so many energy resources, the whole system of supply, processing and consumption needs to be considered, planned and implemented in a coordinated way. For anaerobic digestion this would include:

- Collection of suitable inputs including animal slurries, other farm wastes, restaurant and other food industry wastes, kitchen and garden wastes, with provision for separation and storage;
- Digesters, either small and local or large and centralised (each has advantages)
- Provision for use of biogas for electricity generation, heating and/or sale for off-site use (piped or pressurised and bottled);
- Commercial arrangements for sale of gas, electricity, heat, digestate and solid fibrous residues.

Heat from the La Collette Energy from Waste plant is currently wasted. The decision taken, in the different energy policy climate of the time, to design the plant to maximise efficiency of electricity generation means this heat is released in cooling water at low temperatures. This is unlikely to be exploitable in significant quantities without major capital investments which are unlikely to be cost effective so early in the life of the current plant, though TTS's intention to study the options is welcome and should be progressed.

The panel were told of speculation that Jersey could have significant shale gas reserves. Even if such reserves were confirmed, and could be exploited commercially without significant risks of unacceptable local environmental damage (which currently appears unlikely given experience of fracking elsewhere, although this could change over time), the decisive fact remains that to have any likelihood of averting catastrophic climate change, humankind will need to leave much of the already known reserves of hydrocarbons in the ground.

The only environmentally sustainable and responsible exploitation of shale gas would therefore be to substitute for even dirtier hydrocarbons. Since currently shale is generally dirtier and riskier to extract than gas, oil or indeed much coal, and there is no mechanism for negotiating let alone enforcing international agreements to sterilise existing reserves in return for opening up new ones, this currently seems too remote a possibility to be worth considering. The Plan should continue not to make any assumptions about the possibility of Jersey exploiting shale gas. (Jersey's response to the possibility that exploitation of shale elsewhere will make cheaper gas imports available is considered in section 8.)

Conclusions

The estimates above of the relative potential of different renewables can be summarised as follows:

Source	**Indicative potential** as % of Jersey's current electricity consumption
Offshore wind	100 – 600
Tidal	9 – 50
Waste incineration	5.5 – 22
Photovoltaics	5 – 10
Anaerobic digestion	0.8 – 1.3

It must be stressed again that these estimates are all subject to multiple and varying uncertainties, all depend on interconnections and selling / buyback arrangements to cover for intermittency, and there may well turn out to be environmental, regulatory, commercial or aesthetic reasons barriers to exploitation.

However the relative sizes of the numbers are interesting. Subject to all these caveats it is striking that even the *lowest* estimate of the potential for offshore wind is comfortably larger than the *highest* estimates for all the other renewables considered added together. Offshore wind has potential to supply all Jersey's electricity (averaged over a year) plus significant exports. The technology is mature, European Union policies and targets create demand, and prices are getting closer to grid parity. The Renewable Energy Commission's approach of establishing a framework is right, but it should be pursued with more proactive energy, and involving all potential partners including JEC, other energy companies and renewables companies.

Tidal power appears a smaller and less certain resource, less technically developed, and further from grid parity. Jersey should prepare to exploit this as and when viable, but this should not distract attention from other renewables whose viability is clearer and earlier.

Both anaerobic digestion and use of heat from the La Collette Energy from Waste plant present significant potential opportunities for the Island to reduce carbon emissions, increase resilience and 'add value' to wastes. Providing the institutional muscle to ensure that such opportunities are thoroughly considered and exploited where possible should be a high priority for the proposed new energy partnership. This is discussed in section 6 below.

It is also notable that the aggregate potential for solar electricity is comparable to that for waste incineration and several times that for anaerobic digestion.

5: Public sector energy use and emissions

The issue

The public sector is itself a major consumer of energy in its own buildings and transport, so needs to contribute to Island wide targets and set a good example.

The draft Plan

The draft Plan states (p52) that 'The States of Jersey has an overall energy consumption reduction target of 10% from 2012 to 2015' and outlines the measures being taken to achieve this. It adds: 'In order to achieve the emissions reduction targets required, the States will need to increase this target to 15% reduction in energy use by 2020. The Environmental Action Plans generated by departments and services within them will need to reflect this target. This target is challenging, it is expected it will be achieved through a combination of improved energy efficiency e.g. insulation, behaviour change; improved and upgraded technology e.g. boiler replacement, use of low carbon fuels and possibly micro-renewables; and reduced / realignment of office space through the office accommodation strategy. Consideration will also be given to the energy demand and location of IT servers.'

Evidence

Property Holdings provided detailed written answers to questions on the progress of the Eco-Active States programme: these are available on the Scrutiny website. These added to the material already available in the published Eco-Active States Annual Report 2012.

No public hearings were devoted specifically to the States in house energy use. However, many witnesses stressed the importance of the States leading by example, 'walking the walk' or 'setting its own house in order'. Some had disobliging anecdotes of apparent waste, which evidently had a disproportionate negative effect on how the sincerity of the States commitment was perceived despite the evidence we were given of positive achievements.

Discussion

The Eco-Active States programme is in line with established good practice in internal energy management for corporate organisations. However the 10% initial savings target is towards the less ambitious end for organisations which come new to systematic energy management: it is largely composed of quick wins that can be made by fairly straightforward 'good housekeeping' and relatively unproblematic investments with fast paybacks. We were told that Jersey Co-op saved 20% with its energy efficiency programme: this is a not untypical figure for a determined energy saving initiative.

Conclusions

The current Eco-Active States programme is a good start. Fully implementing it should achieve significant energy and emission savings with quick paybacks and no significant problems or downsides for service delivery. The raised target of 15% reduction in energy use by 2020 should be regarded as the minimum necessary for the States to show it is taking responsibility itself.

Public procurement could take a proactive lead in several of the developments identified elsewhere in this report, for example:

- Installing solar water heating and solar voltaic panels on public buildings;
- Large scale procurement of electric vehicles, to secure economies of scale and give some momentum to the switch.

The States could also set an example and secure significant carbon savings by encouraging use of ferries and rail wherever practical for off Island official travel and visits to Jersey by advisers and contractors, and use of teleconferencing to avoid travel where possible: air travel will remain necessary for many purposes but should not be the default assumption. Likewise, contractors and visitors should be encouraged where appropriate to travel on Island by bus (which I personally found excellent) or cycle rather than assumed to need taxis.

6: The Energy Partnership

The issue

The Plan proposes forming a multisectoral 'energy partnership' to 'act as a coordinating body' for the Plan with a range of possible remits. (Action Statement 1, p 32). Details of its composition, powers and operation are not decided.

The draft Plan

The suggested possible roles range from very general to very specific, and including both advisory and executive actions:

- Monitor and review the plan
- Commission new policy interventions or work streams
- Receive annual updates of energy use and greenhouse gas emissions
- Review these to ensure that Jersey remains on the correct pathway
- Ensure that proposed policies and actions remain appropriate
- Review the Jersey Stern findings [referring to the Plan's proposal, at para 2.7, to carry out a Jersey level assessment of the economics of climate change and responses to it, analogous to Sir Nicholas Stern's 2007 report to the UK Government.]
- Develop a skills training programme

Evidence

Several witnesses argued forcefully that lack of a coherent, coordinated approach across different Government departments and agencies was a major weakness and should be the priority for any new institutional arrangements.

Discussion

In several of the topics explored by the review, it became clear that Jersey has major opportunities for environmental, social and/or economic benefits which require coordinated action in partnership by a range of public, private and third sector organisations. They will require partners to go beyond what each would do for its own reasons. They are therefore only likely to be secured if the relevant partners are brought together by some coordinating body or bodies with more vigorous and singleminded commitment to promote projects, construct deals and get results than has been evident up to now. These include:

- Decarbonisation of the existing building stock
- A step change to electric vehicles
- Utility scale offshore wind and (potentially) tidal power
- Anaerobic digestion
- Use of waste heat from the waste to energy plant
- Microgeneration.

Conclusions

The Plan's proposals for an 'energy partnership' are vague and do not establish the need or role for any one body. The Department should take a step back from this proposal and start from the question 'What institutional machinery would be most effective and efficient to drive delivery of the Energy Plan given Jersey's particular circumstances?'

The top priority must be to ensure an integrated and co-ordinated approach to energy across all States departments, and avoid 'exporting' problems to others.

The government also needs strong and co-ordinated internal energy management, to ensure that it at least meets with the standards it is setting for others, and preferably leads by example. The Eco-Active States programme is a good start, but is currently not particularly ambitious by comparison with other corporate organisations, and again needs more 'push'.

There is also a need for coordination between the States, other public agencies, businesses and voluntary/community organisations to deliver the necessary investments, infrastructure, services, regulatory and funding arrangements and behaviour changes.

It should not be assumed that a single 'partnership' will be the best way to do all these jobs. Nor should it be assumed that current bodies such as the Renewable Energy Commission and Jersey Energy Trust will remain the best vehicles for their objectives in the future. Some existing bodies do not seem to meet frequently enough, or have strong enough links to Ministers or key stakeholders in their fields, to progress their remits effectively.

Aspects of the Plan require active co-operation, and in some cases joint investments and other actions, with other Channel Islands, France, the UK and/or the European Union. It is not clear that current links and institutional arrangements are strong enough.

7: Regulation

The issue

Jersey has managed perfectly well up to now without a sector-specific energy regulator of the kind taken for granted in many larger jurisdictions. The review considered the topic for two reasons. First, Jersey Electricity's considerable and increasing market dominance raises the question of how best to ensure that a near monopoly supplier of an essential utility acts in the public interest and does not abuse that monopoly power. Second, some of the most promising policy instruments for reconciling the draft Plan's ambitious targets with other environmental, social and commercial objectives entail differential charging or cross subsidy between groups of energy consumers to encourage some behaviours and discourage others. These include levies, grants, revolving loans and 'smart tariffs'. Designing and applying these raises questions of fairness which cannot be left to commercial companies to decide, but need to be discussed, agreed and monitored as matters of public policy.

The Plan

The Plan says little about tariffs or regulation although Action Statement 27 acknowledges that further work is required to understand how competition in the local market place affects prices paid by consumers.

Evidence

Practical experience and research literature from other jurisdictions suggests that a range of market based instruments can play a role in helping motivate and incentivise energy users to take the actions necessary to deliver the Plan targets – reduce energy use and carbon emissions, increase energy efficiency, and generate and use renewable energy. What these instruments have in common is that they deliberately raise or lower the amounts that particular categories of customer pay for energy in particular circumstances so as to encourage some energy behaviours and discourage others. Doing this clearly raises questions of fairness and requires careful design and monitoring to ensure that customers are not unreasonably disadvantaged, and in particular that vulnerable customers are protected.

The Panel considered a range of such instruments:

- **'Rising block' tariffs**: domestic customers get essential energy at an affordable rate, but pay higher rates for luxury / discretionary consumption. This is the opposite of many UK tariffs where the price actually drops as you consume more, and a departure from Jersey Electricity's standard of charging the same price per unit regardless of the total. This is potentially a neat way to tackle fuel poverty and give higher users incentives to consume less while still recovering the costs of supply overall. There have been some inconclusive experiments in UK. A stepped tariff has been a key policy in Sri Lanka for decades, though not without complications and controversy, and this is clearly a very different context to Jersey;

- **Seasonal / time dependent tariffs:** customers pay higher rates at times of peak demand to encourage them to use energy at less intensive times. Common in institutional markets, and simple versions in households;

- **Interruptible tariffs:** customers pay less per unit in return for allowing the supply to be cut some of the time. Common for industrial processes that can tolerate intermittent input of energy. Like seasonal/time dependent tariffs, they help even out demand and 'lop' peaks, reducing the amount of generation and distribution capacity that needs to be kept inefficiently in reserve for only occasional use;

- **Feed in tariffs**, ie 'running the meter backwards' where customers with their own energy generation – for example solar cells or anaerobic digesters - are generating more than they are using, and exporting the surplus to the grid. They have been operating in Denmark and Germany for decades, supporting painless growth in small scale renewables, and more recently and controversially in the UK. The question of fair pricing is contentious. If the grid has to keep spare conventional generating capacity to cover the uncertainty of renewables, or the micro generators export at times of low demand when the grid has plenty of cheap power anyway, the commercial value to the grid in terms of actual avoided costs may be very small. In which case, guaranteeing a higher price – which may be necessary to make it worth investing in microgeneration – will effectively mean making other energy customers cross-subsidise the microgenerators. Whether this is justified is ultimately a political decision.

- **Social tariffs** that give preferential terms or protection to particular vulnerable groups;

- **Environmental obligations** on energy suppliers, eg requirements to source quotas of energy from particular technologies, or provide free or subsidised energy efficiency measures to particular categories of customer. A succession of schemes in the UK have required energy suppliers to promote insulation measures to households;

- **Least cost planning** where energy suppliers have to show the regulator that investments are the lowest cost way to meet demands, considering measures to reduce demand on the same footing as measures to meet demand, before being allowed to pass the costs on to customers. This was very effective in the US in the 1970s when energy utilities were regional territorial monopolies, and became unworkable – and arguably unnecessary anyway – when they were opened up to competition.

In subsequent representations JEC gave detailed comments on various potential smart tariffs. They pointed out that rising block tariffs 'were normally contemplated where energy suppliers offered discounts for higher consumption levels. Jersey Electricity does not offer these volume discounts, and therefore does not encourage excessive consumption in this way.' This is true, but does not necessarily mean it would not be desirable to use a rising block tariff to give a disincentive for high consumption. JEC also said that rising block tariffs can 'disadvantage vulnerable customers who may in some cases consume more by virtue of them spending more time at home'. This is of course possible, but could be addressed through, for example, giving higher allowances at the low rates to customers with special needs and energy inefficient homes, which would improve the commercial case for improving their insulation levels.

JEC stated that they already offer interruptible tariffs and 'tariffs that differentiate prices depending on time of day, and are working on new tariffs that more closely mirror the underlying cost structure and expect to develop this even further with the completion of their Smart Metering programme which will allow greater meter control.' They also offer a buy back tariff which 'is presently set at a level which is cost neutral to the company'.

JEC also pointed out repeatedly that if they were required to sell any power at less than cost price, or buy it at more than avoided-cost price, the resultant extra costs would have to be borne by other customers. This is true. But it does necessarily follow that such requirements are not desirable or justified. Indeed there is no reason to assume that the pattern of energy prices that is best for Jersey's population and for contributing to States policy objectives will happen to be identical to JEC's costs of supply at particular times and places. These are in any case not objectively 'given', but depend on assumptions and accounting conventions applied to, for example, the apportionment of fixed costs and the depreciation of assets.

There was consensus among witnesses that carrots were preferable to sticks – indeed that sticks without carrots could provoke resistance and be counterproductive. However a number of exchanges confirmed that the kinds of tariffs and obligations outlined above could potentially be valuable to reconcile the potentially conflicting objectives of serious de-carbonisation through demand reduction and renewables, protection of the vulnerable, and enabling energy suppliers to make a realistic commercial return.

Witnesses concurred that using these would have ultimately to be a political decision and that design and implementation (including avoiding unanticipated consequences) would require specialist technical expertise.

Several witnesses, especially Jersey Electricity who would be most affected, expressed strong opposition to 'regulation', though this appeared to relate mostly to simplistic price regulation in other jurisdictions. Jersey Electricity pointed out that a recent CICRA review confirmed that the company gave good customer service, fair pricing and managed its assets well. CICRA confirmed this. The Treasury Minister also confirmed this, estimated that specialist sectoral regulation of the JEC would cost 'north of £500,000 to £750,000', substantial costs that would ultimately fall on JEC's customers and/or the States, and for which there was no demonstrated need.

However he also commented that keeping the option of regulation under regular review had proved very effective in motivating JEC to operate in the public interest and respond positively to government needs and initiatives without incurring the costs of actual regulation. Moreover he pointed out that Article 6(4) of the Competition Regulatory Authority (Jersey) Law 2001 gives JCRA (now part of CICRA) a power to respond to requests from the Government on anything related to monopolies or utilities. This power is drawn broadly enough to cover a request to consider the potential for policy instruments such as those outlined above to help deliver public policy goals such as those in the draft Energy Plan.

Discussion

Consider a speculative scenario in which measures of the kinds outlined above could potentially help address several of the challenges discussed elsewhere in this report:

Box 1: Illustration of possible application of smart tariffs in Jersey

4. All domestic JEC customers would have a three step tariff: a cheap rate per kilowatt hour for enough electricity to provide for basic needs in an averagely thermally (in)efficient house, then a standard rate (similar to the current rate) for additional power up to an average household's normal consumption; then a much higher rate for 'luxury' discretionary use above that level;
5. The 'basic needs' rate would mean that a careful and prudent household could live in adequate comfort for a much lower electricity bill than at present. This would take a large number of households out of fuel poverty;
6. Households with special needs (eg very old or disabled members) would be able to ask for higher allowances at the cheap rate;
7. So would households who believe their homes are particularly hard to heat. However JEC would have the right to insulate such homes instead;
8. This would give JEC a commercial incentive to improve the energy efficiency of the worst homes so they could reduce the amount of energy they have to sell at a loss making rate;
9. The additional revenues JEC obtains from customers on the highest tariffs would pay for the loss making lowest rate;
10. The highest energy using households would get a stronger price signal to reduce consumption;
11. Any JEC customer who installed solar panels would be able to sell surplus power back to the grid at the 'standard' retail price, encouraging take-up;

- Customers with electric vehicles who were willing to allow JEC to draw power back out of their batteries while they are parked to meet demand spikes would be able to buy their power at the lower rate. JEC would recoup the costs from savings from not having to provide for such extreme peaks.

This is only an illustrative scenario. Whether it could all work so neatly is far from certain. Great care would be needed to design the various components, set the various thresholds and charging rates and so on to avoid perverse consequences and unfair differences. This would require the active involvement of JEC, but the decisions would ultimately have to be driven by, and justified in terms of, public policy rather than the company's commercial interests.

However it would be essential to ensure that the various opportunities and constraints given to JEC interacted in such a way as to enable the business to continue to operate efficiently and reliably, make necessary investments and provide a reasonable commercial return to its shareholders, including but not only the States. These opportunities and constraints would include the ability to sell some tranches of electricity to some customers at highly profitable rates, but other tranches to other customers at a net loss; to give some customers strong incentives to help the company manage demand efficiently, for example by peak lopping, but to have to accommodate other potentially inconvenient fluctuations, for example from intermittent renewables.

Jersey Electricity itself emphasised in evidence that the company is not qualified to make what must be ethical / political decisions about these. However in his second evidence session the company's Chief Executive Officer acknowledged that JEC was already doing so with a lower off-peak heating tariff. He also agreed that 'smart meters', which the company is committed to introduce, can only deliver the load smoothing benefits which JEC hopes from them if they are used to apply smart tariffs to motivate consumers to change their patterns of electricity use. So in fact the company is already, for very good reasons, moving into the territory of active tariff management which it acknowledges raise questions of policy and equity which the company is not well placed to decide by itself. JEC told the Panel that they were happy to work with interested parties including the States of Jersey, JCRA, Consumer Council and Citizens Advice Bureau to consider and develop alternative tariffs to better meet customer needs.

As reported above, a recent CICRA review confirmed there is no need for traditional narrow price and consumer protection regulation of Jersey Electricity, which gives good public service and fair prices and is efficiently run. There was no appetite among witnesses for such regulation, and considerable concern about its possible cost, which would ultimately fall on consumers and / or taxpayers. However the measures discussed above would imply a very different style of public-interest regulation.

Conclusions

JEC's comment that they were happy to work with interested parties to consider and develop alternative tariffs to better meet customer needs is constructive and welcome. Two of the Treasury Minister's comments already mentioned suggest a way to ensure that such discussions are prompt, productive and decisive. The first is the observation that the *possibility* of regulation has helped motivate JEC to ensure that it operates in the public interest without needing the expense of *actual* regulation. The second is the broad power under which the Minister could ask CICRA to review relevant matters.

The Minister should consider asking CICRA to review, in the context of Jersey Electricity's commitment to roll out smart meters:

(1) the potential for any smart tariffs (of the kinds outlined above) to help deliver the Energy Plan's targets;

and, if any such potential is confirmed,

(2) detailed design needed to safeguard vulnerable consumers and help reduce fuel poverty;
(3) the cheapest, simplest and least onerous possible way to set, enforce and monitor such tariffs, and modify and develop them as necessary in a fair, transparent and accountable way. This should include possible regulatory models, not restricted to traditional narrow regulation of prices, profits and consumer protection.

8: Resilience

The issue

Reliable access to energy dependent services such as light, warm buildings, food preservation and cooking, powered farm and construction equipment, mobility and electronic communications is fundamental to quality of life and economic activity in Jersey, like any other 'developed' jurisdiction.

The draft Plan

'Ensuring security of energy supply' is one of the top level principles of the Plan. It is construed solely in terms of maintaining reliable and uninterrupted supplies of energy, despite Jersey's almost total dependence on imports: it is not framed in terms of reliable access to sufficient energy *services* such as those listed above.

Evidence

Some witnesses were emphatic that there was no realistic risk that some equivalent of the Japanese tsunami would suddenly deprive Jersey of the advantages of cheap French nuclear electricity, so it would be perverse to incur major extra costs providing for such an eventuality. Others, however, noted that, while an actual tsunami in France was inconceivable because of completely different geology, the broader lesson from Japan was that unexpected events could transform any energy market in utterly unpredictable ways.

Jersey Gas wish the States to co-fund a feasibility study for a France/Jersey/Guernsey gas pipeline, largely on grounds of security of supply and anticipated cheap shale gas. Other witnesses doubted this could be viable for such small markets and pointed out that it was predicated on growing gas consumption which was inconsistent with the Plan's decarbonisation aims. The Jersey Gas assertion that gas should be seen as a 'bridge' to lower carbon energy might be valid in places where gas would displace (eg) coal or oil, which are more carbon intense, but did not make sense in Jersey where it would displace electricity which was already lower carbon because of its largely nuclear origin. The idea of converting vehicles to run on compressed gas on a significant scale was seen as unrealistic.

Discussion

There is no visible threat to Jersey's access to cheap nuclear electricity from France. However given the interconnectedness of continental energy markets, the continuing political and economic turbulence across the EU, predicted 'supply gaps' and the possibility of political and/or environmental disruption of energy supplies from various parts of the world, it is entirely possible that the companies involved might want to sell the power currently servicing Jersey somewhere else, or at sharply increased prices.

If this happened, Jersey would have limited bargaining power and goodwill as a small jurisdiction outside both the EU and the UK, and perceived as profiting from its exemption from many of their rules and disciplines. It is therefore a matter of basic prudence for Jersey to reduce dependence on this single power source to the maximum extent practicable without excess costs.

Conclusions

Energy security provides a further justification for the 'no regrets' policy of minimising the Island's consumption of energy (and not only reduction of carbon emissions);

In particular, reduction in the dependency of energy *services* on *energy* – for example, 'passive design' of buildings to minimise the need for artificial lighting and air conditioning, and to maintain comfortable temperatures with minimum heating, should be explicitly promoted.

Further increases in the proportion of Jersey's daily life and economy dependent on grid electricity (for example major increases in electric vehicles or fuel switching) should be linked to increases in on-Island low carbon generation capacity.

Given the small size of the Jersey market, the likelihood that consumption of both gas and oil will decline, and the imperative to reduce rather than increase carbon emissions, public funding to investigate possible gas or oil pipelines is not justified, though there is no reason for the States not to co-operate with any private sector initiative in the field.

9: Targets and measurement

The issue

Carbon accounting according to standard international conventions does not tell the whole story about the environmental impacts and sustainability of energy use, especially in a small jurisdiction such as Jersey where the import of energy and goods whose carbon is attributed to the producing countries is particularly significant.

The draft Plan

The draft Plan's statistics and targets are framed in terms of standard international carbon accounting conventions.

Evidence

Accounting conventions were not a major topic in witness sessions. When prompted with the issues discussed in the next session, witnesses generally agreed that standard carbon accounting needed to be contextualised with other measures as proposed below.

Discussion

Standard Kyoto carbon accounting does not attribute to Jersey the carbon emitted generating imported electricity and making imported goods and services. This gives a potentially misleadingly flattering picture of current emissions, and means that some changes that are good for global emissions, such as increasing renewable electricity generation on Jersey, will look neutral or even bad on the standard figures.

In any case carbon is not the only environmental issue which energy policy should be concerned with. Witnesses generally agreed that the Plan should use energy as well as carbon measures, and guard against Kyoto accounting conventions producing perverse results. Energy / carbon 'footprint' – ie total impact of Jersey consumption wherever it happens – was mentioned as a possible better measure.

Conclusions

The Plan is right to emphasise carbon targets framed in terms of Kyoto Protocol carbon accounting. However this should be set in the context of:

- Primary energy demand, as well as carbon emissions;
- Broader measures of the carbon and energy 'footprint' of Jersey's population and economy, including the embodied energy and carbon emissions incurred by imported goods and services (including electricity);
- The marginal, as well as average, carbon emissions of electricity imported from the European grid;
- Per capita as well as total figures, to help make the impacts of different possible future population levels transparent.

Disproportionate resources should not be devoted to attempting to measure all of these precisely. However they should all be kept in mind, even if only in broad brush terms, in setting and assessing the effectiveness of policy.

10: Conclusions

The current draft has many strong points:

- Its treatment of climate science follows the overwhelming consensus of informed scientific opinion.
- Its assessment of the economic and social significance of energy and energy policy for Jersey's particular circumstances is sound and consistent with a large body of well established wider research (notably the Stern report on the economics of climate change.)
- The draft Plan's proposed priorities, aims and targets are justified by climate science, would be highly beneficial for Jersey's population and economy as well as environment, and would improve the Island's security and enhance its image and reputation. As we enter a period of global turbulence and uncertainty, these factors may be increasingly important for a small jurisdiction outside, but highly dependent on, the UK and the EU.
- The actions set out in the Action Statements are almost entirely beneficial (many of them, arguably, overdue common sense.) They are going in the right direction.

It was striking that, among all the consultation responses and oral evidence, there was hardly any dissent from any of this, and a great deal of strong welcome and endorsement. Several witnesses explicitly endorsed, and none disputed, the Plan's three overall aims of climate change, energy security and tackling fuel poverty, and its goal of reducing carbon emissions by 80%. Some suggested that, if anything, even faster and deeper carbon cuts were needed. The latest climate science supports this position.

The main problem is that the draft is, as one Panel member put it, 'long on aspiration and short on action'. The actions are not strong or developed enough to set Jersey on the path to the tough 2050 targets. Many of them are vague, or commit only to short term 'easy wins' with the harder actions left to future decision. Many are only commitments to study and consider what more might turn out to be needed. Many of them amount to little more than predictions, or hopes, that technological developments and market forces in the wider world will in due course deliver what Jersey wants if the Island sits and waits patiently.

Experience elsewhere, and quite a lot of evidence presented to the review, suggests that stronger action will be needed in all the main areas of energy use and (potentially) production which the plan rightly identifies:

- Energy-efficient retrofit of existing housing and other buildings;
- Low-energy design in new housing and other buildings;
- A major shift to electric and potentially other low-energy vehicles;
- Micro renewables;
- Utility scale renewables, especially offshore wind, anaerobic digestion and harnessing waste heat from the Energy from Waste plant, with future potential for tidal power.

In all of these, 'soft' measures such as education, awareness raising, and promotion will not have enough impact without some combination of serious financial incentives and regulatory requirements. Coordinated packages of 'carrots and sticks' are needed. Careful design will be needed to protect vulnerable people and make packages fair, reasonable and politically acceptable.

Vigorous and results-oriented partnership working is needed to pursue these. Accordingly the main theme of the suggested recommendations is to press for more clear, decisive, proactive

programmes of action to secure fast enough progress towards the Plan's goals. They will generally need to involve substantial investment and/or regulation as well as 'softer' measures.

Substantial new public spending is difficult. Alternative methods of incentivising / financing should be considered. These could include partnerships with private companies (eg for large scale renewables or electric vehicles), revolving loans repayable out of savings (eg for energy efficiency retrofit or micro renewables), charges and levies on energy use, cross subsidies between different groups of energy users (for example through smart tariffs) and direct hypothecation of taxes on more or less related activities (such as the use of VED to fund domestic energy efficiency).

These all raise questions about fairness – who should pay, who should benefit? – which cannot be left to the commercial interests of private companies, or the personal discretion of their managers, however enlightened they may be.

Therefore some form of active public oversight and regulation of energy markets is likely to be needed. This needs to be more sophisticated than simple price regulation for consumer protection and competition purposes, which has been problematic elsewhere and for which there is no current need in Jersey.

Stronger policy coordination is needed, both within government and across all sectors.

The text of the draft Plan itself, and more or less formal comments from officers, make clear that, while they may be over optimistic about the likely impact of some of the actions in the Plan as it stands, they fully recognise that it is not enough and would only be the first step in a long process.

What reasons might be given for *not* adopting an energy Plan on the lines of the current draft?

- Higher priorities for officer and political time. This would seem invalid given that the time has been invested in preparing a well developed draft, and that, notwithstanding detailed criticisms and suggestions, it is widely welcomed and supported by relevant stakeholders;
- Doubt about the scientific case for carbon reduction. After repeated invitations, two States members wrote in with dissents from the carbon reduction objective, very late in the review process. The concerns they raise have been extensively discussed and answered by qualified scientists within the IPCC process and elsewhere (for example see www.skepticalscience.com). This is consistent with the broader picture that 97% of scientists agree with the view of climate change which underpins this draft Plan.
- Cynical decision to 'free ride' on others. As outlined above, this could cause serious reputational and commercial damage to the Island;
- Concern about making commitments whose delivery is uncertain. The Plan itself acknowledges, and many witnesses confirmed, that the specific actions set out in the Plan as it stands are insufficient to deliver its aims and objectives. However, the detailed discussion later in this report confirms that the problem is nearly always that the actions do not go far enough, or that further actions will be necessary, not that the actions currently proposed are wrong. In many cases, progressing the actions already set out in the plan will be necessary for deciding what more will be needed.

Adopting the Plan as it stands would be a 'no regrets' decision: one that helps move in the right direction, with no significant downsides. It would be unfortunate to delay adopting and implementing a plan that is already useful and needed, just because it could potentially be further improved.

Adviser's overall recommendation

My conclusion is that it would be to Jersey's advantage, environmentally socially and economically, for the Plan to be adopted as soon as possible. If changes can be made quickly and uncontroversially to address any of the issues raised in this report, that would be welcome.

However there is very little in the draft Plan which is not helpful, and no justification for holding up its adoption to make changes. Indeed, given the history, failure to progress the Plan now would reflect poorly on the Island.

However, further action will be needed to flesh out and implement many initiatives only outlined in the current draft Plan and to meet its objectives and targets. Work on this can and should start immediately. To help keep up momentum, I suggest the Panel commits to review progress in 12 months time, and gives the Minister for Planning and Environment advance notice of key aspects of implementation on which it will hope to see progress. These could include:

- Business plans, including risk/reward structures, finance, costings, timetables and heads of agreement for implementation agreed by the main public and commercial partners, for
    - Anaerobic digestion
    - Accelerated Island-wide uptake of electric vehicles
    - Offshore wind development including potential partnership or coordination with France at the sea boundary
- An Energy Partnership (or any alternative institutional structures) fully functioning, and its relations with other energy coordinating bodies resolved
- Ownership of the seabed, and potential 'offer' to wind and tidal developers, clarified
- European subsidies for renewable energy negotiated
- Building byelaws higher standards adopted
- Completion of CICRA review of tariffs and means of applying them, and a Ministerial decision on implementation of any recommendations (including any related to regulation)
- Secure medium term finance for domestic energy efficiency, spend to save in public buildings.
- Completion of a study of options for use of heat from the Energy from Waste plant in the short and longer term, and commitment to progress any viable short term opportunities identified.

One of the most encouraging aspects of the hearings was the clear messages from both the Chief Minister and the Treasury Minister that, if and when a case is convincingly made, they were receptive to arguments for further public spending and/or other interventions, and were in principle prepared to act decisively, vigorously and boldly. The door appears to be open to the Minister for Planning and Environment to build on the current plan to make the case to go further. It is hoped that the review, including this report, will help advance this process.

Annex 1: Adviser's role and credentials

I was appointed in April 2013 to advise the States of Jersey Environment Scrutiny Panel on its scrutiny of the Minister for Planning and Environment's draft Energy Plan.

My main activities were:

- to study documentation provided by the Scrutiny Office and any written submissions from stakeholders and members of the public and to provide in a timely manner a written critical independent analysis of the same;
- to assist the Panel in drawing conclusions from the evidence received;
- to brief the Panel in advance of public hearing sessions with the Minister and with local stakeholders on key issues arising from the evidence submitted;
- to assist, as required by the Panel, with the preparation of a question plan for the public hearing sessions;
- to attend public hearing sessions and thereafter to discuss with the Panel, as appropriate, on the oral evidence received; and
- to advise on the preparation of the Panel's report and any recommendations arising from the review.

The main sources of information I have drawn on are:

- The draft Energy Plan itself, with its appendices;
- Responses to the public consultation on it;
- The evidence given at public hearings (transcripts all available on the Scrutiny website http://www.scrutiny.gov.je/Pages/ReviewTranscripts.aspx);
- Publications and written material tabled by witnesses, including Andrea Cook who was prevented by travel problems from taking part in a public hearing;
- Written communications and supporting documents from Environment Department, Transport and Technical Services and Property Holdings officials, Senator Sarah Ferguson and Deputy Clifford Baudains;
- My notes from a series of very illuminating informal discussions held with many key stakeholders during my preparations to advise the former Scrutiny Panel on an earlier draft of the Energy Plan in 2011.

I have also drawn on 30 years involvement in sustainable development and energy policy and implementation as a public official and consultant, including:

- Private Secretary to the UK Secretary of State for Energy
- Managing the 1986 UK Energy Efficiency Year campaign and the subsequent programme of Energy Action Cities
- Promoting green business at Scottish Enterprise
- Writing two successive energy manifestos for the UK Local Government Association
- Developing the EU Eco-management and audit scheme for UK Local Government, the first management system standard for environmental performance specifically for public bodies, and helping numerous authorities develop management systems
- Giving evidence to Whitehall and Scottish Government committees on aspects of sustainable energy policy and implementation.

Everyone I have met on Jersey has been friendly and welcoming, making this a very enjoyable piece of work. I particularly wish to thank the Panel Chair and members for the enthusiasm and commitment with which they have tackled this complex and challenging topic, Malcolm Orbell the Scrutiny Officer for his help and support, and Dr Louise Magris and her colleagues both for their positive and supportive engagement with the review, and for their achievement in producing a draft Energy Plan which, albeit with opportunities for further improvement identified by the review, would in my view already be immensely beneficial to the Island, and which I hope will soon be adopted.

Annex 2: list of witnesses and hearings

Tuesday 21st May 2013
Mr Mark Forskitt (Jersey Climate Action Network)
Sir Nigel Broomfield (Jersey Energy Trust)

Wednesday 22nd May 2013
Mr Jim Hopley (Jersey Chamber of Commerce)
Mr Mike King (Chief Officer, Economic Development Department)
Mr Tony Nicholls and Mr Neil Shaw (Jersey Gas)
Mr Andrew Riseley and Mr Michael Byrne (Channel Islands Competition and Regulatory Authorities)

Tuesday 11th June 2013
Minister for Transport and Technical Services (Deputy Kevin Lewis)
Mr Chris Ambler and Mr Ian Wilson (Jersey Electricity)
Mr Ian Wilson (Jersey Construction Council)

Wednesday 12th June 2013
Mr Arnaud Havard (Fuel Supplies CI)
Mr Mike Liston

Tuesday 9th July 2013
Minister for Treasury and Resources (Senator Philip Ozouf)
Minister for Planning and Environment (Deputy Robert Duhamel)
Mr Chris Ambler (Jersey Electricity)

Thursday 25th July 2013
Chief Minister (Senator Ian Gorst)

Ms Andrea Cook (Jersey Energy Trust) was prevented by travel disruption from attending a hearing as invited, and kindly provided written responses to questions instead.