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Consultation Submission

Climate Change Contribution Consultation,
Ministry for the Environment,
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Dear Ministry for the Environment

I write as a British citizen who has close links with New Zealand, including owning a property in Auckland where my daughter and family live. I am an electrical power systems engineer and as a consultant have been pleased to work closely with New Zealand companies and organisations, including the Smart Grid Forum.

My career experience has included a number of years as the Technical Director at Ofgem, the British gas and electricity regulator, where I led the work to establish innovation incentives for regulated network companies. Ofgem took this forward and developed the Low Carbon Networks Fund that has achieved demonstrable benefit for reducing emissions by both accelerating smart grid developments in the companies and attracting and up-skilling staff and partner organisations.

It was encouraging to read your well-written consultation paper, which addresses some fundamental challenges for society and is a topic that brings particular obligations and challenges to those in the energy sector. I should like to offer some brief comments on the four questions you have set, and some wider remarks on the pitfalls and opportunities of making successful changes.

Q1. (a) Do you agree with the above objectives for our contribution? (b) What is most important to you?

I agree that this is a reasonable set of objectives. In view of the long-term nature of the challenges and the importance of managing the uncertainties, I would advise putting special emphasis on the third objective that makes reference to a long-term transition and the engagement of all New Zealanders in this.

Q2. What do you think the nature of New Zealand’s emissions and economy means for the level of target that we set?

The level of the target of course needs to be meaningful, but also achievable. I am not familiar with the detail of agricultural emissions but from what I read the potential progress here is necessarily long term and may be uncertain (e.g. vaccine and breeding developments). In contrast to this, there are opportunities in the energy sector that are likely to be achievable in the short and mid-term -
and can be packaged with definable targets that enable tracking and demonstration of progress. Examples here are in the areas of electric vehicles, distributed generation (solar and wind), distributed storage (electricity and multi-vector heat/electricity), energy efficiency, energy management, and Community Energy (including peer-peer trading of local surpluses). These each have their own uncertainties but can be seen at different stages of evolution around the world. I comment on these further in my wider remarks below.

Q3. What level of cost is appropriate for New Zealand to reduce its greenhouse gas emissions? For example, what would be a reasonable reduction in annual household consumption?

As a visitor to New Zealand I cannot offer a view on what might 'feel acceptable' to the wider public. I would however note that in my experience there is a high degree of traction for moving towards a cleaner and more sustainable economy, especially among younger people. Where innovation and changes in energy use catch the imagination of the 'early adopters' it can be expected that tipping points in behaviours will arise, which will bring scale benefits for costs and societal impacts. In the case of electric vehicles, the low fuel and maintenance costs can be expected to add to their appeal.

Q4. Of these opportunities which do you think are the most likely to occur, or be most important for New Zealand?

Please see my answer to Q2. I believe you are right to highlight the opportunities for electric transportation (and not just private cars), but I would encourage you to consider these as part of the 'smarter energy' agenda, rather than a stand-alone topic. Smarter energy includes all DER (distributed energy resources), including demand, generation and storage devices, and 'smart grids' that are needed as the enablers for change. However, in the bigger picture, this is part of Community Energy, Smart Cities, and the transformational changes now emerging under the title Internet of Things. It may be helpful to develop the big picture, then work back to the more immediate deliverables and policy objectives.

Some wider remarks

1) The importance of business and consumer engagement: As I have noted in my response to Q1, I would recommend that New Zealand develops an action plan that wherever possible builds public and business engagement. I say this particularly with the energy agenda in mind as work in recent years has demonstrated that 'smarter energy' initiatives usually require changes to consumer behaviours - creating new understanding, willing participation, and hence 'consumer pull'. Without this it is not possible to achieve wide-scale implementation, resulting in innovative solutions are little more than successful demonstrations, with limited impact at a national scale. Attracting business consumers is important as this rapidly builds scale, but investors require both clarity of policy frameworks and confidence in policy stability.

2) National benefits: Page 15 of the consultation document lists a number of opportunities for New Zealand through making progress in emissions reduction. I would suggest there are others, for example:
a. enhancing New Zealand’s international credentials and image as being clean and sustainable as both a trading partner and a desirable holiday destination;

b. creating new job and export opportunities in areas such as smarter energy where there is an expanding international market for solutions;

c. moving to electric transport resulting in cleaner air in urban conurbations and CBD’s (noting the rising concern about diesel exhaust particulates); and

d. gaining the societal/democratic benefits of building stronger social cohesion through Energy Community and Smart City initiatives.

3) The opportunity and challenge of distributed resources: The energy examples cited above have some common characteristics. One has been mentioned (the need for positive consumer engagement), but another is the surprising potential that distributed systems have when they are scaled-up to impact at wide area or even national scale. Plugging in an electric vehicle to charge it should not be viewed as ‘connecting to’ the grid, rather as ‘joining with’ the grid.

a. As a simple example, if the charging of 500,000 electric vehicles in New Zealand were controlled by time of use tariffs, and the movement from a high price to a low price period caused a simultaneous switch to charging - the load change on the national system could be some 3.5GW - this is far greater than the System Operator can currently accommodate, noting that it is a similar magnitude to the national demand, and would result in wide area power disruption or possibly a national power shutdown.

b. Importantly, this is an example of transmission-level impact being created by distribution and consumer-level activities. This is a new feature of power systems and reveals the critical importance of developing a greater ‘whole-system’ perspective so that risks can be anticipated and mitigated in a practical and cost-effective way. It is not only an issue for electric vehicles, but arises whenever distributed activities become co-ordinated whether by a price signal, a weather change or some other influencer (including cyber attack).

4) Market-led developments or coordinated action: the electric vehicle charging example above can be resolved by a number of engineering and commercial mechanisms, but it is important to:

a. anticipate the issues rather than find out by trial and error, and

b. consider whether retrospective action for coordination is likely to be a cost-effective and consumer-friendly path to follow.

This topic has been explored recently by the New Zealand Smart Grid Forum and there are a number of useful reports on their website: http://www.med.govt.nz/sectors-industries/energy/electricity/new-zealand-smart-grid-forum
I would only like to reiterate here that I believe it's important not to confuse 'coordination' with 'central planning'.

In other sectors effective market-led innovation can be observed (e.g. mobile phones, the World Wide Web), but this takes place within a framework of Open Systems and interoperability that ensures data exchange capabilities and whole-system secure operation.

Interoperability unleashes innovation, but market participants are unlikely to initiate such Open Systems for a number of rational (if self-interested) reasons. Creating interoperability as a retrospective action is likely to be costly and highly problematic, resulting in a sector 'getting stuck' and causing further innovation to stall as new entrants decline to invest where interoperability is not established.

The message for the current consultation is, I suggest, to ensure that action plans involving distributed resources include attention to necessary facilitation of Open Systems and whole-system thinking. Government should continue to avoid being a central planner or technology-chooser, but can be of great service by considering how it can build a coalition of stakeholders to develop open systems from the outset. The Smart Grid Forum may be a valuable resource here for government.

There is also relevant information in recent reports from The Institution of Engineering & Technology in Britain: [http://www.theiet.org/pnjv](http://www.theiet.org/pnjv)

I hope that the above points are useful and I will be pleased to discuss them further if that assists. I will be visiting New Zealand shortly and coming to Wellington in week commencing June 22nd for the EEA 2015 Conference.

Yours faithfully,

John Scott