Submission to Review of Clean Energy Finance Corporation

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Scope of CEFC

The request for submissions states that CEFC "…is intended to be commercially oriented and to make a positive return on its investments." One interpretation of this sentence is that CEFC will only provide finance for projects that have the same probability of providing a return as projects financed by commercial financial institutions.

If this interpretation were chosen, then there would be no point in setting up the CEFC. Clean energy would be left to the market and technologies with huge potential for cutting Australia's greenhouse gas emissions would be left on the back burner for several decades until increasing fossil fuel prices combined with the carbon price may eventually made them competitive.

Since such an outcome would defeat the purpose of CEFC, it must be rejected at the outset. CEFC must be prepared to accept a higher level of risk than commercial financial institutions. It must be prepared to fund projects that could not be sufficiently funded to become economically competitive by commercial financial institutions alone.

Principles for prioritising investments

It is suggested that the following principles form the basis of CEFC's investment decisions:

1. CEFC will foster large-scale potential reduction in greenhouse gas (GHG) emissions in short-term.

   The kinds of technology to be funded must have the potential for achieving large reductions in Australia's emissions within 10-20 years from activities such as electricity generation, industrial heating, transport, or non-energy industrial processes. CEFC must recognize that, in the short-term, the only means of achieving substantial emission reductions are the efficient use of energy and some renewable sources of energy.

2. CEFC will foster projects on technologies and other measures that can lead to very large-scale reduction in greenhouse gas (GHG) emissions in the long-term.

   To achieve the federal government's greenhouse target for 2050, CEFC must set in motion financial strategies now for achieving 80-100% emission reductions from the energy sector by 2050 (see below).

3. The technological status of projects financed by CEFC must be already beyond the basic research, development and small-scale pilot stages.

   For the technologies or measures funded, there must be already either medium-scale demonstration projects or limited mass production already operating somewhere in the world. Hence funded projects must have a significant probability of earning a financial return, without necessarily qualifying for support by commercial financial institutions.

4. There must be potential for reducing costs of technologies by stimulating early deployment and limited mass production.

CEFC finance would take the technology beyond the first demonstration plants towards limited mass production, or from limited mass production to an increased scale of mass production, thus fostering significant cost reductions.

5. The technology or project funded by CEFC would be unlikely to be funded completely by commercial financial institutions to the extent of making them economically viable.

   See comments under 'Scope of CEFC'.

Technologies and processes to be excluded or included

In Australia these principles, taken together, would exclude such technologies as conventional concentrated solar thermal (CST) power stations with parabolic trough collectors (which are already in commercial mass production), ocean current power, tidal power, solar ponds, kites to capture wind power, and solar chimneys (aka solar updraft towers).

The following kinds of technology inter alia are compatible with the proposed principles and so are likely to be suitable for financial support by CEFC. They are already at or beyond the demonstration stage, have large potential for GHG emission reductions and large potential for price reductions resulting from early deployment and limited mass production:

- Second generation CST power stations with power towers, or dish systems, or systems with compact linear Fresnel collectors.
- Thermal storage in molten salts, graphite, concrete or splitting of ammonia.
- Improved types of large solar photovoltaic power stations.
- Some wave power systems.
- Advanced batteries.
- Low-carbon alternatives to conventional cement and concrete[1].
- Many technologies and measures for improving the efficiency of energy use and reducing demand by other means.

Proposed goal of 80-100% renewable electricity

Electricity generation is the largest single source of Australia's GHG emissions. Therefore, if Australia is to achieve its long-term target of 80% reduction in emissions below the 2000 level by year 2050, it must cut emissions from electricity to almost zero. The principal technologies available to achieve this are efficient energy use and renewable energy. Therefore I recommend a long-term renewable energy target of 80-100% of all end-use energy in Australia. It is recommended that CEFC be guided by this requirement in prioritising funding.

[1] There are several products, such as 'Eco-cement', that have passed the basic R&D stage and need further assistance to bring them through the 'Valley of Death' to market.

Several years ago, this would have been seen as an impossible target. However, detailed overseas computer simulations have been published recently showing that this is achievable in several countries. Numerous countries (eg, Germany, Denmark, New Zealand) have, or are planning, substantial renewable electricity targets over the coming decades.

For Australia, a research group at UNSW has performed a series of hour-by-hour computer simulations of the 2010 electricity demand in the five Australian states covered by the National Electricity Market, with demand being met reliably with 100% renewable energy (Elliston, Diesendorf & MacGill, 2011).

Its energy mix comprises parabolic trough CST technology with thermal storage, wind in existing wind farm locations, solar PV in the major population centres, biofuelled gas turbines and existing hydro, all commercially available technologies. Together the two types of solar technology provide about half the electricity generated.

The study finds that it is indeed technically feasible to supply current electricity demand by 100% renewable energy with the same reliability as the existing fossil fuelled system. The key challenge is meeting demand on winter evenings. A large part of this demand is of course residential space heating. At sunset of overcast days, the thermal energy storages are only partially charged and sometimes wind speeds are low as well. A combination of energy efficiency to reduce peak electricity demand on winter evenings and biofuelled gas turbines fills the gap. (Elliston, Diesendorf & MacGill, 2011).

Economic analysis will be the subject of a future paper. However, it is likely that the economics of a 100% renewable electricity system would be greatly improved by financing some of the technologies recommended for support in the previous section: second generation CST systems, advanced batteries and various types of thermal energy storage.

How could CEFC facilitate investment?

CEFC could assist projects to obtain part of their required finance from commercial institutions by:

- providing loan guarantees, to reduce the investment risk to commercial financial institutions;
- purchasing partial equity in projects;
- making low-interest loans.

Thus CEFC's finance would act as a lever in gaining partial commercial finance for projects involving successfully demonstrated technologies with high potential for reducing GHG emissions that are not yet ready to compete with fossil fuels. CEFC would fund the finance 'gap'.

Conclusion

1. CEFC must be prepared to accept a higher level of risk than commercial financial institutions.

2. According to the funding principles recommended in this submission, CEFC would give financial support to technologies/projects that are already at or beyond the demonstration stage (overseas, if not in Australia), have large potential for GHG emission reductions and large potential for price reductions resulting from early deployment and limited mass production.

3. CEFC would undertake the goal of assisting Australia to achieve its long-term greenhouse target by financial measures that would assist a transition to a national energy system that is highly energy efficient and supplied by 80-100% renewable energy by 2050.

4. CEFC would finance projects to foster the growth of efficient energy use, renewable energy, low-carbon industrial processes and low-carbon transportation. These would include supporting technologies and measures, such as energy storage and 'smart grid' technologies.

Reference

Elliston, B, Diesendorf, M & MacGill, I (2011) 'Simulations of scenarios with 100% renewable electricity in the Australian National Electricity Market', Solar 2011 Conference, Australian Solar Energy Society, Sydney, 30 Nov - 2 Dec. Available at <http://www.ies.unsw.edu.au/staff/mark.html> or <http://www.ceem.unsw.edu.au/content/userDocs/Solar2011100.pdf>.