



Submission to

CLEAN ENERGY FINANCE CORPORATION EXPERT REVIEW

A submission by

**The Australian Academy of Technological Sciences and
Engineering (ATSE)**

to

**Clean Energy Finance Corporation (CEFC)
Expert Review Panel**

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The Australian Academy of Technological Sciences and Engineering (ATSE)¹ is pleased to respond to the *Clean Energy Finance Corporation Expert Review*.

Executive Summary

The Academy's view is that a portfolio of new clean energy targets will be required to ensure that Australia reaches its clean energy targets². In this submission, the Academy notes that the Clean Energy Finance Corporation (CEFC) will need to undertake strategic investment decisions to overcome the "Twin Valleys of Death" and that there are opportunities for CEFC to partner with private investors to achieve this.

The Academy recommends that the CEFC should adopt a strategy of reducing the financial risks for financial institution investors, one option would be providing debt funding at a relatively low rate of return in partnership with a private investor who provides equity. Further the CEFC could provide expert advice to technology proponents about how to develop the key elements of a robust business plan for technology development and also facilitate independent evaluation of technologies.

The Academy sees an opportunity for the CEFC to support energy efficiency projects, particularly those that are transferrable to other companies, thus leveraging CEFC funding. The Academy recommends that there should be further co-ordination between funding agencies for existing clean energy government initiatives, in order for the CEFC to be most effective as the 'next stage'.

The Academy is committed to providing independent evidence-based advice on clean energy and is prepared to provide further advice to the *Clean Energy Finance Corporation Expert Review*.

Background: Key Issues

Cleantech Ventures, a small venture capital firm, has noted that investment in new technologies for clean energy face the "Twin Valleys of Death" problem. The first "Valley of Death" is the funding gap in moving from government-funded bench-scale embryonic scientific studies into pilot scale development. Energy technology is capital intensive so to move to pilot scale, several tens of millions of dollars are often required, and technology proponents using private sector funding need to rely on venture capital equity to provide this. Venture capitalists (VC) provide equity funding for this level of development, but require high projected rates of return (typically >25% per year) over a relatively short time scale (e.g. 5 years) to provide funding.

¹ The Australian Academy of Technological Sciences and Engineering (ATSE) is an independent body of 800 eminent Australian engineers and scientists driving technological solutions for a better Australia. ATSE was established in 1976 with the mission to promote the application of scientific and engineering knowledge to the future benefit of Australia. ATSE is one of four learned national Academies, which have complementary roles and work together both nationally and internationally. www.atse.org.au

² ATSE (2010) *Low Carbon Energy* <http://www.atse.org.au/resource-centre/func-startdown/286/>

Only a small proportion of projects (typically <5%) manage to achieve venture capital funding to overcome this first “Valley of Death”. The second “Valley of Death” occurs prior to “first-of-a-kind” demonstration projects. Here, several hundreds of millions of dollars may be required. If the venture capital funded pilot studies have been successful and risk has been reduced, the VC will receive its return by selling its equity interest to a willing buyer. This could be via an IPO or a private equity firm, with debt being provided by a commercial bank. Generally, the risk at this stage will need to be low enough to justify the investment returns of the large financial sums involved. Unfortunately, the perceived risk at this stage is often too high for the technology to cross this “Valley of Death”.

Clean energy technologies are at this stage expensive relative to the alternative, even with a carbon price. They are at many stages of development: wind technologies have virtually crossed the second “valley of death”, but other technologies such as geothermal and some solar thermal technologies have not. Most new clean energy technologies require subsidies and a carbon price to be financially viable, and at this stage both RECs and the carbon price are too low to ensure financial viability. Further, the technology and financial risks are still too high for private investors to provide funds (either equity or debt) at the appropriate returns commensurate with the risk.

Responses to Questions Raised

1. *How do you expect the CEFC to facilitate investment?*

As the CEFC will not make grants, it is left mainly with equity or debt options. The amount of money available to CEFC (especially when divided into the two streams³) is not large in comparison with the investments planned/needed in the energy sector (probably less than 6 months of investment cash flow) thus investment needs to be strategic in nature. With debt and equity investments, the quantum needs to be significant in the context of total funding needs of a project/initiative, thus the investments need to be focussed and large to have an impact on the investment environment of commercial sources of funds. Experience with Solar Flagships suggests that investments of the order of \$300M to \$500M are necessary if given as grants, and will be larger if invested as debt/equity.

The CEFC will need to use funds strategically to reduce the risk to private investors of clean energy technologies to assist them to overcome the “Twin Valleys of Death”. This could involve assisting with the funding of pilot-scale developments like a venture capital company to gain equity in the technology prior to its sale to others, or to provide debt and/or equity funding for the large-scale “first-of-a-kind”

³ The Australian Government announced that it will establish a \$10 billion commercially oriented Clean Energy Finance Corporation (CEFC) with funding divided into two streams:

- a renewable energy and enabling technology stream (have half of the funding allocated); and
- an energy efficiency and low emissions technologies stream (have half of the funding allocated)

and will be able to fund renewable energy projects in addition to the dedicated stream. The CEFC will not provide grants, but will make investments in businesses and projects in the clean energy sector with the objective of facilitating the flow of funds into the commercialisation and deployment of clean energy technologies.

developments. It could provide this funding at a rate of return lower than private investors would expect given the risk in order to lower the risk for the private investors.

The implication of this is the CEFC investment portfolio will need to take on a higher risk profile than private investors; this should not deter the CEFC from undertaking strategic investment decisions.

2. *Are there principles beyond financial viability that could be used to prioritise investments, such as emissions impact or demonstration effect?*

Given the stated role of CEFC, commercial viability will be the key, other principles will be secondary. Nevertheless, CEFC needs to ensure that it does not move into the RD&D space covered by ARENA. Clearly, the potential of the technology in terms of its ability to provide large emission cuts, the ability to provide security for electricity supply in Australia, the size of the potential market and Australia's ability to capture the benefits of developing these technologies should be taken into account in government funding decisions. It is the view of the Academy that a portfolio of new clean technologies will be required to ensure that Australia reaches its clean energy targets. This means that a "picking a single technology winner" strategy is not appropriate.

3. *What are the opportunities for the CEFC to partner with other organisations to deliver its objectives?*

Private investment presently requires relatively large returns to compensate for the perceived large risk associated with clean energy investments. The major opportunity is for the CEFC to provide funding aimed at reducing this risk so that private investors can be induced to provide funds. In addition to the perhaps limited opportunities that partnering with targeted VCs may provide, a further possibility is for CEFC to provide debt funding at a relatively low rate of return in partnership with a private investor who provides equity. The aim should be to smooth the transition across the "Twin Valleys of Death". Given that the sector is currently not attracting adequate investment, partnering with successful private investment organisations should be seen as an attractive proposition.

4. *How could the CEFC catalyse the flow of funds from financial institutions?*

As stated above, the CEFC should adopt a strategy of reducing the financial risks for the financial institution investor. This probably means that the CEFC needs to be foundation investor, willing to take risk without the risk premium on the investment return. In addition to the financial engineering described above, the CEFC could assist by providing expert advice to technology proponents about how to develop the key elements of a robust business plan for the technology development to present to financial institutions such as venture capitalists or banks. Whether or not funding is provided depends critically on the strength of the proponent's business development plan and its risk mitigation strategies. To further assist in the mobilisation of funds

the CEFC could facilitate organising independent evaluation of technologies by recognised specialists.

5. *What experiences have firms in the clean energy sector had with trying to obtain finance; have term, cost or availability of funds been the inhibitor?*

The Academy understands that less than 5% of applications to Cleantech Ventures are funded. This means that there are very large barriers to overcoming the first “Valley of Death”. The CEFC should consider having discussion with VC companies to establish the conditions under which a venture capital firm will, or will not, fund technology developments in the clean energy sector. CEFC should then develop a strategy to increase this type of funding in collaboration with private industry.

6. *What non-financial factors inhibit clean energy projects?*

According to Cleantech Ventures, the following factors are highly relevant to achieving a successful outcome for a clean energy development. If any are absent, the venture will likely fail:

- High quality science and R&D backing the technology,
- Management team skills and experience for the venture,
- Robustness of the technology development and commercialisation plans, including risk management strategies,
- Intellectual property status and plan,
- Target markets for the technology and a robust marketing plan, and:
- Proposed exit strategy for investors, providing solid financial returns.

A further issue is the need for substantial investment in the further development/extension of the grid, including storage if there is to be a substantial penetration by intermittent renewables.

7. *Are there special factors that inhibit energy efficiency projects?*

Energy ‘inefficiencies’ are widely distributed and gaining critical mass for such initiatives is a major factor. Energy efficiency projects in private industry need to achieve the same investment returns as any other project, i.e. significantly greater than the weighted average cost of capital. It can sometimes be difficult to achieve these returns in comparison with the “core business” projects of a firm. Moreover, capital is generally rationed in a large company and the internal management proponents of an investment are more likely to propose projects in their core business area, leaving little cash flow for other projects seen as “peripheral” to the main business of the firm. Energy efficiency projects are also more likely to be proposed in competition with line operating managers of a firm, which makes them difficult to fund in a capital rationed situation. Accordingly, regulation can often be a better driver for new initiatives/projects (e.g. buildings).

An interesting opportunity exists for the CEFC to support projects that are transferable to other companies. A condition of investment in such projects would be that other companies can access the learnings, or send operating personnel along for training from the company receiving funding. This approach has the opportunity to significantly leverage CEFC funding.

8. How do you see the CEFC fitting with other government initiatives on clean energy?

Ideally the CEFC should be the next stage for projects funded under existing programs. To be effective this will require coordination between such funding agencies.

The CEFC, with the assistance of the Commonwealth and State governments, should conduct a technology evaluation scan to identify strategic investment opportunities. This would place the CEFC in an informed position and to actively seek expressions of interest before it undertook any investments.