AMWU SUBMISSION
TO THE REVIEW OF THE CLEAN ENERGY FINANCE CORPORATION

Introduction

As noted in the cabinet decision establishing the Clean Energy Finance Corporation (CEFC) and the supporting material released publicly including that on the CEFC website:

> *"The Clean Energy Finance Corporation (CEFC) will be established to invest in the commercialization and deployment of renewable energy and enabling technologies, energy efficiency and low emission technologies. It will also invest in the transformation of existing manufacturing businesses to re-focus on meeting demand for inputs for these sectors…*
>
> *The CEFC will provide finance for projects through commercial loans, concessional loans, loan guarantees and equity."* [1]

As noted in the material prepared to guide submissions on the establishment and operation of the CEFC:

> *"The objective of the CEFC is to overcome capital market barriers that hinder the financing, commercialisation and deployment of renewable energy, energy efficiency and low emissions technologies…*
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> *The CEFC will not provide grants. It is intended to be commercially oriented and make a positive return its investments…*
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> *The CEFC will invest in firms and projects utilising these technologies as well as manufacturing businesses that focus on producing the inputs required. It will not invest in carbon capture and storage technologies.*
>
> *The CEFC is not intended to compete directly with the private sector in the provision of financing to these businesses. The CEFC will act as a catalyst to private investment which is currently not available and thereby contribute to reducing carbon emissions and cleaner energy."*[2]

This submission from the Australian Manufacturing Workers Union goes to two key issues in the setting up and operation of the CEFC.

1) What is the most efficient and effective way for the CEFC, consistent with its mandate from the Government, to *overcome capital market barriers that hinder the financing, commercialisation and deployment of renewable energy, energy efficiency and low emissions technologies …through supporting… the transformation of existing manufacturing businesses to re-focus on meeting demand for inputs for these sectors…*

[1] Securing a clean energy future: The Australian Government's Climate Change Plan. Page 121

2) Consistent with other Commonwealth Government policies, how should Australian participation policies apply to the portfolio transactions of the CEFC.

Helping Manufacturers Diversify into Making Products for the Cleantech Industry

The potential opportunity for diversification and manufacture of cleantech products by Australian based manufacturers is substantial. Many manufacturers already make parts for renewable energy facilities such as wind turbine systems, tidal wave facilities or solar energy installations. Australia is developing a bio fuels industry and there are manufacturers active in that space as well. Our auto component manufacturers make parts for hybrid vehicles as well as providing the intellectual property for leading global electric vehicle platforms. Our manufacturers of building materials have substantial growth prospects for lighter more environmentally friendly products for residential and non residential construction. Australian manufacturers already make both goods as well as providing services to a variety of low emission technology systems and energy efficiency solutions.

More often then not this involvement comes from the skills and capabilities that existing manufacturers have developed from work in other industries. For example Hoffman Engineering has long serviced the mining and oil/gas industries in WA and in export markets. In doing this the firm has developed capabilities in gear design, cutting and grinding as well as finite element analysis heat treatment, heavy plate bending and fabrication. These capabilities made it relatively easy for the company to apply the same "making it" capabilities to the manufacture, maintenance, modification and repair of parts for wind turbine and tidal wave energy systems.

But there are also many new manufacturing start-ups in the cleantech space and existing manufacturers who are setting up new divisions and undertaking new product development and capacity expansion for opportunities in this rapidly expanding industry.

One of the best studies of the manufacturing opportunities in the global Low Carbon and Environmental Goods and Services Industry was undertaken by the consultancy firm Innovas for the UK Government in 2009. In assessing the importance of Britain's role in the $6 trillion global Industry the report pointed out.

- The cleantech industry supply chain extends from Research and Development through manufacturing and into distribution, retail, installation and maintenance services.

- The industry has three sectors being the emerging low carbon sector (including activities such as building materials/technologies and new fuels) renewable energy (including activities such as wind, solar and geothermal) and the traditional environment sector (including activities such as waste management, recycling, water and waste water treatment).

- In specialist activities and through the supply chain the industry employs (in the UK) 881,000 workers.

- In the Uk the industry is one of the fastest growing in the country despite the GFC and involves 54,835 companies of which 17,303 are manufacturers.

- While economy wide in the UK manufacturing is 17% of the value of domestic activity, in the cleantech sector manufacturing is 31% of the activity which is why the authors of the report note the significant potential for manufacturers to diversify and revitalise their businesses and for new technologies and the commercialisation of these new technologies to create a new generation of manufacturing firms.[2]

However for many manufacturers in the UK, Australia and elsewhere there is a financial constraint to participating in the cleantech revolution. In part it stems from the perception of Banks and other financial institutions of manufacturers and manufacturing industry risk in general. This is even more apparent in the current volatile global environment as the sovereign debt risk issues impact the global financial system.

Then there is the added risk of lending for an expansion activity in a new industry (cleantech) where there are perceived to be high risks. Finally, and encompassing some of what has been said previously, there is the issue of market failure, externalities and spillovers that impact the research, development demonstration, commercialisation and manufacture of goods and services for newly emerging low emission technologies. This issue was canvassed by Professor Garnaut in his review of designing a carbon pricing regime and we have incorporated the main points made by Professor Garanut in Appendix One.

In addressing the portfolio activities that will provide support for manufacturers, the first two defining issues for CEFC should be:

1) Is the manufacturer seeking support for a product, technology or application that falls within the definition of energy efficiency, renewable energy or low emission technologies?

2) Does the manufacturer satisfy a need for funding criteria consistent with the mandate of the CEFC?

1. Definition of eligible activities. Consistent with its mandate and with the approach adopted by the Government, CEFC will need to define what constitutes "eligible activities" that fall within the definition of energy efficiency, renewable energy and low emission technologies. As AMWU has argued in previous submissions a broad definition should be adopted.

   The AMWU supports a broader definition of low emission technology than "renewable energy" or "clean energy". As suggested by the Australian Centre for Renewable Energy (soon to become ARENA), *"maximising the benefits of renewable energy sources requires a complementary focus on enabling technologies and systems. These may include resource assessments, new materials, integration systems, and information and communication technologies, forecasting systems, control systems, fuel supply logistics, energy storage and smart grids. Improving supply reliability and grid integration of electricity from intermittent renewable resources is a key objective of this support."* (Source ACRE consultation draft December 2010).

[2] The study can be found at www.berr.gov.uk/files/file50253.pdf

A similar position was put by CSIRO…

"A priority should be to support critical enabling technologies for Australian conditions, as the gap between technology invention and full commercial implementation is still significant. Enabling technologies which ease or simplify this integration and enable multiplication of benefits by increasing the technology's usability or appeal, decreasing the cost or improving its effectiveness. Energy management and efficiency technology such as minigrid design and control tools and storage-minimising energy management technologies are prime examples of such critical enabling technology." (Source: CSIRO submission to the ACRE Review).

The AMWU supports a broad definition so that in addition to renewable energy, energy efficiency technologies, products and applications are included as well as technologies, products and applications relating to water management systems, alternative fuels and transport equipment and systems so that the full dimension of technological applications for Australia's transition to a low pollution economy is taken into account and supported.

The AMWU also recommends that in considering the products and activities manufacturers require support for, the CEFC remains open to those technologies, products and applications related to agriculture and bio-sequestration. This could include anything from new tillage equipment through to products for more energy efficient watering systems.

For the remainder of this submission the AMWU will refer to this broad definition as clean tech manufacturing.

2. Need for Funding Criteria. The segment of the cleantech industry into which the manufacturer is selling is one issue. A related matter will be what the manufacturer requires the funds for and whether the business meets the criteria of CEFC for the need for funding.

   At the outset it needs to be emphasised that the overwhelming majority of existing manufacturers have long standing financing arrangements with the banks. As shown in data collected by the RBA, in the June Quarter 2011 manufacturers had nearly $40 billion of credit outstanding with the banking system. Nearly $28 billion or 70% of this amount was credit arrangements where the manufacturer had more then $2million of credit from the banks; another $6.2 billion or 16% was credit arrangements of $500,000 to $ 2million with the remaining 14% being in credit arrangements where the manufacturer had a credit exposure of less then $500,000.

   The need for funding issue arises for manufacturers as a result of two pressing issues, both of which were contemplated by the Government when it included manufacturing within the portfolio mandate of the CEFC and both of which were referred to earlier.

   a) Manufacturing Industry has had to confront a number of problems that are well known. These include, the high dollar, rising energy and other input costs, the "lost productivity decade" and new challenges from global competitors. This has seriously impacted cash flow and profitability for many firms which in turn diminish the capacity of these manufacturers to invest in energy efficient capital equipment, low

pollution technologies, processes and products. It also acts as a constraint to their diversifying their customer base by looking to make products for opportunities that arise in the cleantech space including for renewable energy projects, or manufacturing goods and providing solutions for projects in the energy efficiency and low emission technologies space.

Not surprisingly these circumstances impacting manufacturers result in barriers to accessing working capital, expansion capital and funds to rationalize and diversify the firm's activities to participate more effectively in the cleantech industry.

b) The finance sector in general and Banks in particular are fairly risk adverse to new technology intensive industries. This theme is picked up in Appendix One.

CEFC has been given the task of helping to overcome this finance constraint to growth. But in order to do so, criteria need to be established to ensure a manufacturer applying to the CEFC actually has a need for funding. This matter is dealt with in some other Government programs. For example, Commercialisation Australia uses the following criteria on "Need for Funding":

"Commercialisation Australia supports only those applications that demonstrate a high level of merit against the 'Need for funding' merit criterion. This is consistent with general government policy that business support programs should focus on activities that would not take place (or might be significantly delayed) without public support. In other words, the public support (in this case Commercialisation Australia funding), should not crowd out investment (or other funding) that would have occurred anyway.

In the case of Commercialisation Australia the relevant considerations in determining 'Need for funding' are the applicant's current and future funding capacity and the applicant's potential to raise funds from alternative sources, such as directors, shareholders, related entities, professional investors or financial institutions. Specifically, in order to satisfy 'Need for funding' an applicant needs to demonstrate that:

- *the applicant has insufficient financing to fund the entire project; and*
- *it would be unreasonable to expect that the applicant should obtain financing from alternative sources.*

The level of evidence required to substantiate claims made in relation to 'Need for funding' depends on the size of the project and/or the stage of development of the applicant. For example, it may be evident that a particular project would be too early in its stage of development to be of sufficient interest to professional investors. The applicant therefore may not be expected to approach venture capital funds before seeking Commercialisation Australia assistance, whereas an applicant with a large, later stage project that has already attracted external funding would be expected to do so. Case Managers will be able to provide further guidance to applicants in relation to evidence required in relation to their specific application.

The Case Managers will endeavour to provide applicants with guidance and feedback in relation to the 'Need for funding' criterion as early as possible in the application process. However, as 'Need for funding' is a merit criterion, it is the Commercialisation Australia Board that ultimately assesses whether an application has sufficiently demonstrated a need for public support.[3]

The AMWU believes that a similar need for funding criteria should exist for CEFC's commercial and concessional loans, or loan guarantees. It would mainly focus on exhausting all possibilities of Bank finance or being offered finance with an unrealistic/unacceptable risk premium built into the terms and conditions of the loan.

In addition the main parameters of the CEFC's operations in supporting manufacturing should involve the following.

- Most CEFC loans or guarantees should be with established manufacturers expanding/diversifying into the cleantech manufacturing space. As will be suggested later, while there will be cases for CEFC to back start up manufacturing firms, earlier stage support for manufacturers is best catered for in other programs. The focus of CEFC loans and guarantees should be the finance required for "making it" rather then the funding for R&D/innovation that is catered for in other programs
- Most loans or guarantees should be for less then $ 5 million. Evidence that banks in particular are being risk adverse in not lending the funds to the manufacturer on commercial terms would constitute a prima facie case of need for funding.
- However, due diligence will be required on each application to determine the commercial merit of the venture, the management capability of the business to follow through on the proposal, and the adequacy of the firms finances to continue its other operations successfully. This will also include due diligence on the firms business plan, the end customers it is focused on, the business model and value proposition of the firm and its capacity to execute.

These factors described above raise the question of the size of the CEFC operations and how it might undertake the financing of manufacturers that is being proposed. There are several options here:

a) CEFC does all operations including loan execution and due diligence in house
b) Sub contract the due diligence function
c) Call a tender from the Banks to bid for a contract to execute the loans/guarantees approved by CEFC.

The AMWU will canvass these issues directly in consultation with those individuals appointed by the PM for determining the CEFC's mandate. Suffice it to say that the large multi million dollar clean energy projects and similar transactions of a large scale for emission reduction technologies is likely to be the "big dollar" commitments and exposures of the CEFC. Would the organisation also be able to progress 25-100 or more applications/expressions of interest per month for manufacturers seeking $100,000 to $5 million (and more then that in special circumstances) and if not what are the alternatives beyond those listed above?

[3] CA Customer Information Guide

One option which might be considered in the first year of operation so as to assess demand from manufacturers, would be for the CEFC to set aside a fixed amount of funds available for loans or guarantees and for a deadline for applications to be set and for the best applications to be funded on merit. A year later, the CEFC would then establish and publish guidelines for ongoing operations and finalise its decision on what to do in house and what to outsource.

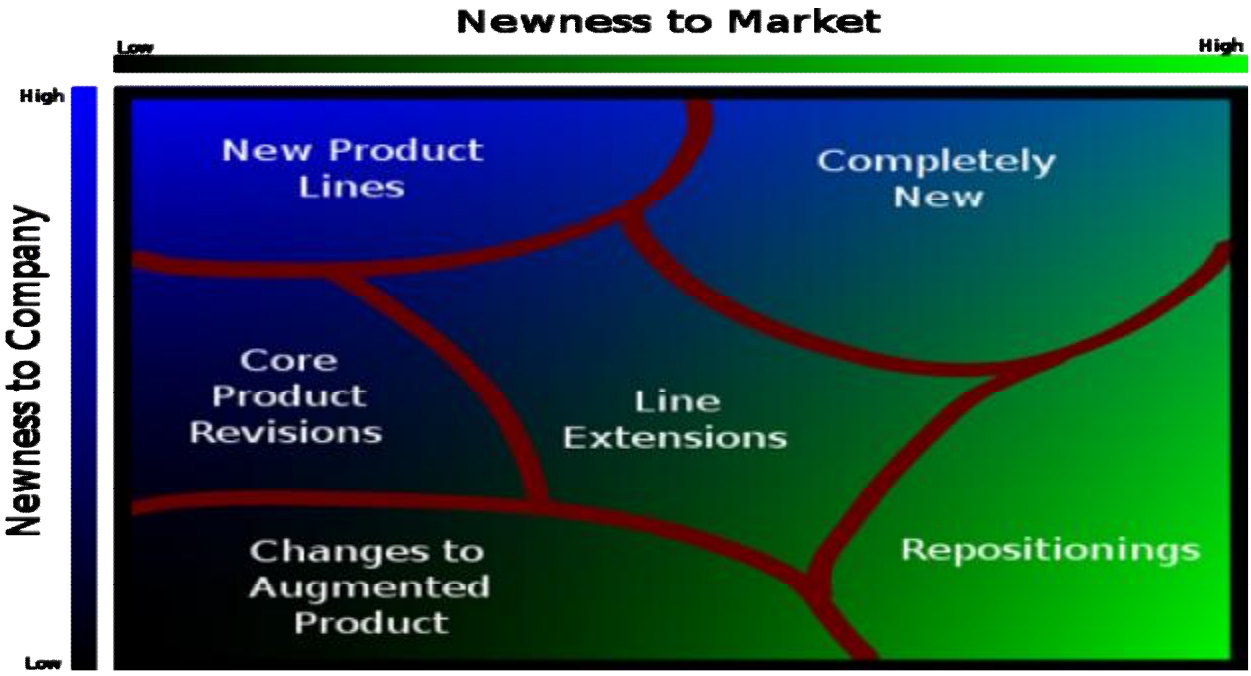
In following through on the option described above, or as part of another approach CEFC may wish to partner with an organisation like Low Carbon Australia, either in terms of the processing of the due diligence function on applications for finance or for the processing of loans/guarantees.

In determining whether the loan or guarantees from the CEFC to the manufacturer are to be on commercial terms or concessional the AMWU believes the main criteria should be:

i. Potential contribution of the manufacturers product or project to emission reductions in Australia and globally.
ii. Spill-over benefits. The size and nature of the benefits that accrue to the rest of Australia over and above the benefits to the manufacturer.
iii. The risk/return profile; how much technical, innovation and capital risk is involved in what the manufacturer is doing and the size/time horizon of prospective returns to the manufacturer and investors.

A manufacturer's product assessed as having the potential to make a very significant contribution to emission reductions with high technical risk, high capital risk as well as very large spill-over benefits and uncertain returns would receive a higher subsidy (i.e. the concessional loan or guarantee might be zero % interest rate over 10 years with repayments of principle starting in year four). A less risky project with less in the way of emission reduction and spill-over benefit potential might receive a loan on commercial terms at the going market rate for fixed/variable loans depending on security covering the loan.

Put another way, and as highlighted below, a manufacturer investing in a cleantech product new to the company and new to the market would, all other things being equal, be considered for more concessional support via a loan or loan guarantee then would a proposal from a manufacturer whose proposal involved small scale modifications.



The final specification of CEFC support for manufacturers should be canvassed in an issues paper much like the one released by ACRE in 2010 outlining preferred options for CEFC's manufacturing loans. Such a paper should be forthcoming in early 2012.

By the end of the December quarter 2012 the CEFC manufacturing loans facility should be open for businesses and undertaking due diligence on manufacturers applications. The AMWU appreciates that we are recommending an earlier start up date then that proposed by Government.

The AMWU believes that financing requests from manufacturers may include a wide range of requirements including:

a) To expand or modify an existing factory building/facility or to construct a new one as a result of moving the business more into manufacturing for cleantech industry segments.

b) For prototype/proof of concept activities and later moving to related activities including tooling up for product development.

c) Working capital requirements.

d) New plant and equipment leasing or purchase for cleantech manufacturing

e) Merger and acquisition costs as a manufacturer takes over a business to more effectively participate in the cleantech industry and in the process requires capital for capacity rationalisation, relocation and other related expenses.

CEFC needs to determine the purposes for which commercial or concessional loans, guarantees or equity is available to manufacturers and the terms.

There are a number of examples of programs overseas which have dealt with these issues. In California for example, the Clean Energy Manufacturing Program and Clean Energy Business Financing program:

"Encourages the production and manufacture of energy efficiency and renewable energy components; systems and technologies; alternative and renewable fuels; and vehicles and vehicle components…

Loans to qualifying applicants will range from $50,000 to a maximum of $5 million and may be used to expand existing or retool facilities or the manufacturing of eligible energy efficiency or renewable energy products, components, systems, and technologies. Loan funds are also available to successful applicants for projects generating either new production or expanded production of biomethane gas from biomass that is direct-injected into natural gas transmission lines.

Successful applicants will meet program requirements and lending qualifications. Projects must demonstrate program success, leverage other project funds, demonstrate profitability, and show California job creation and/or retention.[4]

In New Jersey:

"IF YOU ARE: A qualified manufacturer of Class I renewable energy or energy efficiency systems, products or technologies.

YOU MAY BE ELIGIBLE FOR: Up to $3.3 million in grants and loans through the Edison Innovation Clean Energy Manufacturing Fund (CEMF) program.

TO BE USED FOR: Project assessment and design, and project construction and operation, associated with a new manufacturing line or the material expansion of an existing line of a New Jersey manufacturing facility.

PROGRAM DETAILS: Funding is available under two separate components:

- *Project Assessment and Design Grant – Up to $300,000, not to exceed 10% of total CEMF project funds requested, is available as a grant to assist with the manufacturing site identification and procurement, design, and permits.*
- *Twenty per cent of the grant is available up front as seed funds at closing.*
- *Project Construction and Operation Loan – Up to $3 million is available as a 10-year loan with repayments to start at the beginning of the fourth year, to support site improvements, equipment purchases, and facility construction and completion.*
- *One-third of the loan, up to $1 million, may convert to a performance grant if business and technology-based milestones specific to each company are met during the first three years.*
- *No more than one-half of the funds may be advanced prior to commercial production on the manufacturing line.*

Please note that the terms are subject to change…CEMF provides support for manufacturers that need to identify a manufacturing site, perform site improvements, construct a facility, and/or purchase equipment"…[5]

[4] http://www.energy.ca.gov/recovery/cleanenergy.html

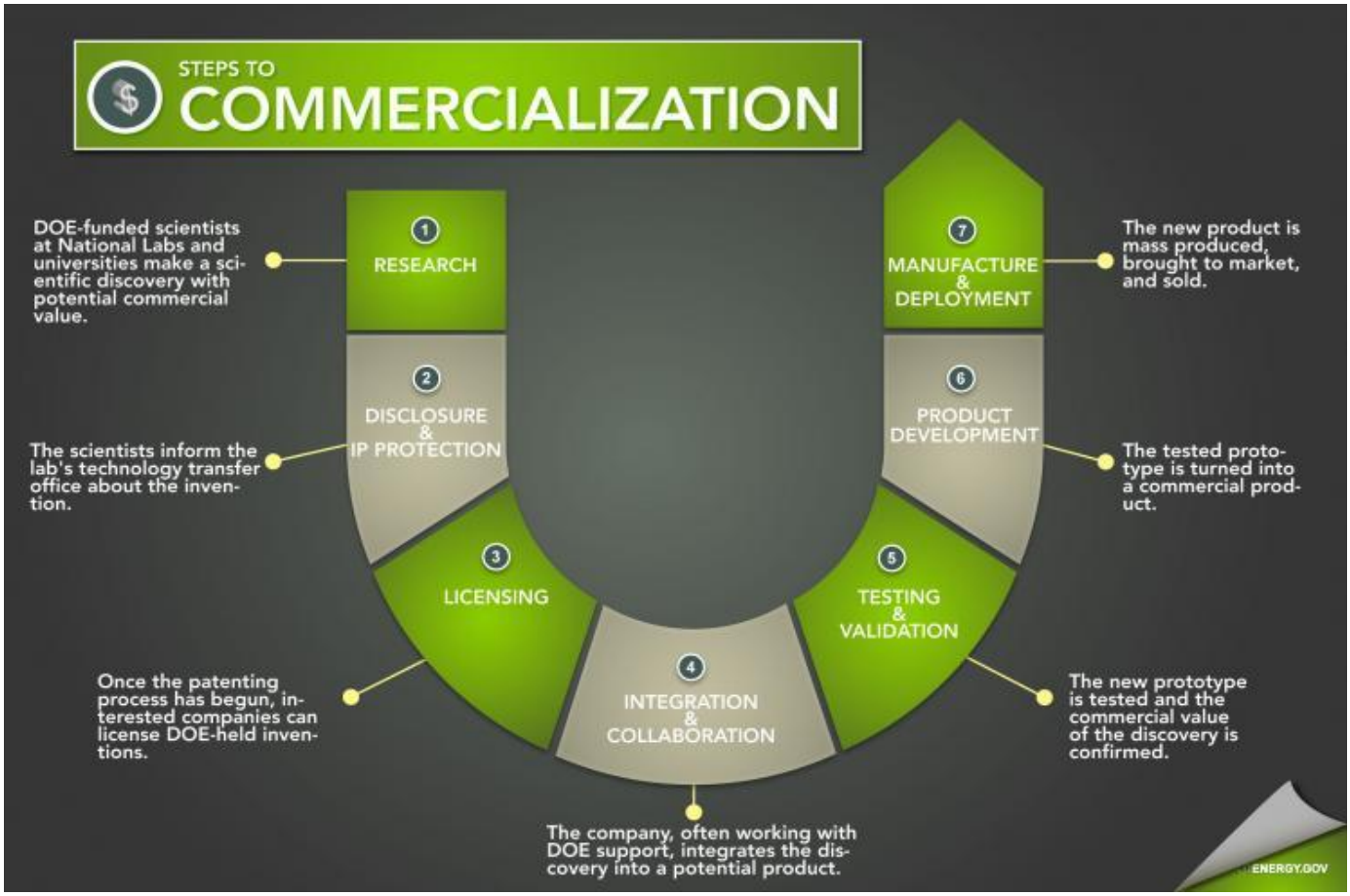
AMWU notes that CEFC is not in the "grants business" and some overseas programs such as those above involve a mixing of loans and grants.

Similarly CEFC is not a comprehensive one stop shop like the US Department of Energy where cleantech activities from research through manufacture are financed as shown below.

However, the CEFC is part of a network of Commonwealth programs for supporting cleantech including the Australian Renewable Energy Agency, Commercialisation Australia, the Clean Technology Investment Program and the Clean Technology Food and Foundries Program as well as the Clean Technology Innovation Program. CEFC's mandate for portfolio activities that support manufacturing needs to fit within this network so that for any application it receives:

i) It can be determined if another funding source is more appropriate for a manufacturer then CEFC finance.

ii) CEFC funds might be mixed with funds from other programs.



[6] http://www.njeda.com/web/Aspx_pg/Templates/Npic_Text.aspx?Doc_Id=1085&menuid=1287&topid=718&levelid=6&midid=1175

For example:

- Most R&D support for manufacturers will be available from programs such as the R&D tax credit program.

- the proof of concept and early stage commercialisation financing available from Commercialisation Australia may be the most appropriate support for the majority of early stage cleantech manufacturing activities. However where the funding required is over and above CA's limit, and/or the project is well advanced and includes some expenditure not eligible under the CA program, and the need for funding has been demonstrated then a commercial or concessional loan from CEFC may be added to the mix.

- Building a prototype for cleantech activities and its subsequent trial and demonstration might best be funded by the Australian Renewable Energy Agency (ARENA). However at that point where the prototype goes into commercial production and the funding for tooling up, capacity modification and related expenditure is required by a manufacturer then, provided the need for funding criteria is met a CEFC loan for a manufacturer would be appropriate.

In conclusion, the AMWU believes there is an important role for the CEFC to play in helping manufacturing firms become participants in the cleantech industry. However the CEFC will need to work with others as part of a network and it will need to seriously assess what functions it does in house and which it outsources as well as what activities will constitute eligible activities for loans or guarantees.

AUSTRALIAN INDUSTRY PARTICIPATION PLANS FOR CLEAN ENERGY FINANCE CORPORATION BACKED PROJECTS INVOLVING LOANS, GUARANTEES, EQUITY OR OTHER FUNDING INVOLVING MORE THEN $20 MILLION.

1) The portfolio transactions of the CEFC should require Australian industry participation arrangements consistent with Government policy.

2) Since 2001 the Commonwealth and the States have had an agreed national framework for Australian Industry Participation in major projects. The agreement is a set of principles to help ensure Australian industry has a full, fair and reasonable opportunity to compete for major projects in both the public and private sector.

3) Australia has rules and procedures for certain types of procurement whereby firms who wish to tender must demonstrate that they are giving Australian industry a full and fair opportunity to win business. The guidelines for how this applies in Commonwealth tenders above $20 million are highlighted in the box below. A key mechanism to make this work are Australian Industry participation Plans. Similar arrangements including AIP Plans apply in the Enhanced Projects By-Law Scheme (EPBS).These arrangements have recently been extended to large Government grants over $20 million and a working Party has been established to operationalize how this will work.

4) Consistent with the above, clean technology businesses who are applying for and receive CEFC loans, guarantees, equity or other funding involving more then $5 million should be required to develop and implement an Australian Industry Participation Plan. The plan would be assessed, approved and administered by DIISR consistent with existing arrangements and the criteria set out below. The smaller threshold ($5 million compared to $20 million) is consistent with the expectation of substantial opportunities for projects receiving a Commonwealth loan or similar benefit through the CEFC in the $5 to $ 20 million range. We note that a smaller threshold (below $5 million in some cases) is used by State Government's and their ICN's.

In A Commonwealth Tender of $20 million or more the following Australian Industry Participation Criteria have been in effect since January 1, 2010

1. The core requirement of an AIP Plan is demonstrating how full, fair and reasonable opportunity will be provided for capable Australian and New Zealand small and medium sized enterprises (SME's) to supply goods and services to the contractor and their supply chains. A communication strategy is fundamental in demonstrating how opportunities will be conveyed to SMEs, along with the length of notice given to SMEs to participate in projects (i.e. when the communication strategy is implemented). Both considerations are deemed equally important and are given significant consideration when assessing an AIP Plan.

   These criteria will not be deemed to be 'met' if a tenderer states that they will only rely on pre-existing, closed supply chains and sub-contractors and will not communicate opportunities for SMEs. A key consideration in providing full, fair and reasonable opportunity is the degree of notice SMEs are given of opportunities to participate. Therefore, a tenderer's communication strategy is encouraged to be implemented as early as possible. This aims to maximise the length of notice given to SMEs and hence increase the opportunities available for SMEs.

2. The tenderer must outline actions proposed to be taken to provide SMEs with full, fair and reasonable opportunity to access opportunities through the entire supply chain (from prime contractors to second and third tier suppliers) and the measures they propose to encourage this in all stages of the project (i.e. through design, procurement, construction, operation and whole-of-life support).

3. The tenderer must explain how the actions in (2) above will assist SMEs develop capabilities and participate in the project developers supply chain over time. Proposed actions should promote long term industry participation by SMEs.

4. Tenderers must demonstrate that they have appropriate resources and procedures in place within their company to effectively implement the actions they have outlined when addressing the three criteria above. By having such resources and procedures in place, tenderers will also find collecting evidence for Implementation Reports simpler.

5. It is anticipated that additional changes will be made to AIP Plans and include the requirement to indicate where potential opportunities may be available for Australian Industry, an estimate of Australian content to be used in the project and other additional enhancements. These should be incorporated within the AIPP's of the CEFC.

While the guidelines above seem relatively straight forward they were initially only applied to procurement tenders and not grants, loans or other forms of support. When Australia's solar flagship program was short listing potential firms (no Australian prime made the short list) the Department of Finance determined that no Australian Industry Participation Plan was required because it was a grant rather then a tender.

The Commonwealth Government determined that this needed to change if Australia was to have the opportunity to develop a clean tech industry of substance. Hence AIP plans were extended to grants of more then $20 million. A further extension to the Loans and other portfolio transactions of the CEFC (with a $5millon threshold) is a logical extension of Government policy on AIP.

Such an approach is consistent with what is happening in some jurisdictions overseas.

In the United States the finance and construction of the world's largest solar facilities and wind farms would not have occurred without the Loan Guarantee program from the Department of Energy. Similarly many of the large demonstration and trial commercial scale bio-fuel projects could not have gone ahead without the co investment facility the Obama Administration made available. What is interesting to note is the very specific industrial relations standards and the application of the Buy American Act requirements that apply to any applicant wanting to access the Loan guarantees or co-investment facilities.

APPENDIX ONE

MARKET FAILURES, EXTERNALITIES AND SPILL OVERS IN THE CLEANTECH INDUSTRY

As pointed out by Professor Ross Garnaut:

> *"The carbon price will make it more profitable for firms and industries to invest in research, development, demonstration and commercialisation of low-emission technologies. Firms will be seeking new goods and services that release fewer emissions and ways of producing them that embody lower emissions. Firms will be encouraged to innovate to reduce emissions because they will make more money by doing so...*
>
> *But while the carbon price will lead to an increase in investment in innovation, on its own it will not increase it by enough...*
>
> *In the context of significant reform and structural change, market failures such as innovation spillovers that lead to suboptimal levels of investment increase the economic cost of the transition.*
>
> *While an emissions trading scheme will drive the development and uptake of new technologies, market failures that impinge on the efficient and competitive functioning of markets for new ideas and technologies are likely to result in suboptimal levels of investment in innovation. This could lead to unnecessarily expensive substitutes being deployed to reduce emissions and to a carbon price that is higher than it would otherwise be (Garnaut 2008).*
>
> *There are large 'external benefits' from one company's investment in innovation. When a private firm invests in research, development, demonstration or commercialisation of new technologies, it takes large risks, and spends money on discovering knowledge. If it is successful, it reduces risks and discovers knowledge from which it will receive some benefits in future, but which other firms will share. Patents can hold a proportion of the benefits within the innovating firm, but sometimes a small proportion, and only for a while.*
>
> *Innovation is especially valuable at a time of large and rapid changes in relative prices and in economic structure. Private under-expenditure is especially large and the case for public subsidy especially strong in these circumstances. Moreover, the general and potentially large change in incentives leads to a clearer understanding of the value of innovation in a particular area (in this case, new products and processes that are associated with lower emissions) than is generally the case. These are the circumstances in low-emissions technologies now and in the years immediately ahead. These circumstances warrant a higher rate of subsidy for a transitional period for innovation to reduce emissions than in other activities, during which the exceptionally large gap between actual and optimal rates of investment in innovation is reduced to levels that are typical across the rest of the economy.*
>
> *There is therefore a general economic case for exceptionally large fiscal support for firms that invest in research, development and commercialisation of new low-emissions technologies in the world as a whole and in Australia, through a transitional period. The Update suggests that the transitional period could be considered to cover a decade with special support being gradually withdrawn after that time.*

This rationale provides necessary but not sufficient grounds for special support for innovation in the transition to a low-emissions economy. Government must also be able to assure the Australian community that its approach to innovation support is efficient, effective and likely to yield a net benefit to society. This assurance must come through policy design. This is a large challenge, because innovation is inherently risky and unpredictable and traditional indicators of performance—efficiency, effectiveness, value for money—are difficult to specify, and even harder to measure in relation to fiscal support for innovation."

(Source: Garnaut Climate Change Review Update paper 7)

"*As discussed in 2008, the primary market failure at the demonstration and commercialisation phase is one of spillovers (see also Productivity Commission 2008). There can be strong competition for the economic rents that are captured by innovators but, as Griliches (1992) describes it, the attraction of such rents is dominated by the problem of a firm's imperfect ability to capture the returns from such activities. For instance, while some knowledge spillovers can be internalised through the creation and enforcement of intellectual property rights under the patent system, not all knowledge lends itself to patent protection (Jaffe et al. 2005; Fri 2003).*

The spillovers identified in the Review comprise the following:

- *Knowledge externalities — Early movers who make the initial high-cost investment to demonstrate or apply new technologies, which benefits the industry more widely.*
- *Skills spillovers — Early movers bear the costs of training a new labour force and later movers are able to draw on this pool of skilled labour.*
- *Regulatory and legal spillovers — Early movers bear the large initial costs of working with government and other industries to develop new regulations and standards, including the costly resolution of legal disputes. Later movers benefit from regulatory clarity and have established avenues for secure agreements and contractual arrangements.*
- *Support sector externalities — The development of supporting industries and a reliable supply chain requires heavy investment by early movers to identify suppliers with appropriate manufacturing capabilities, develop suitable products and product standards with those suppliers, and test new parts and components.*
- *Social acceptance spillovers — Later movers can enjoy the fruits of the efforts of early-movers that bear the costs of demonstrating and communicating the safety and effectiveness of new technologies to the community. The difficulties in building community acceptance for an onshore Carbon Capture and Storage demonstration project in the Dutch town of Barendrecht highlights the value of such spillovers for some technologies (see Global CCS Institute [2010]).*
- *Communities in countries and regions with nuclear power facilities are usually more supportive of their expansion than are communities in other places of the development of a new nuclear power industry.*

One further externality has come to light and can be added to this list: financial market spillovers. *These are benefits that are created by early movers in educating providers of debt and equity about the technical and commercial dimensions of a new technology*

- *This can make a big difference in capital-intensive industries. Banks do not like to take risks with new technologies. Once a new technology is technically and commercially proven, subsequent projects benefit from a better informed financial sector being willing to lend."*

(Source Garnaut Review Paper 7)