

Hypothecating Revenue from a Carbon Price

The Case and Model for a Clean Energy Fund

A Report to the Clean Energy Council

May 2011

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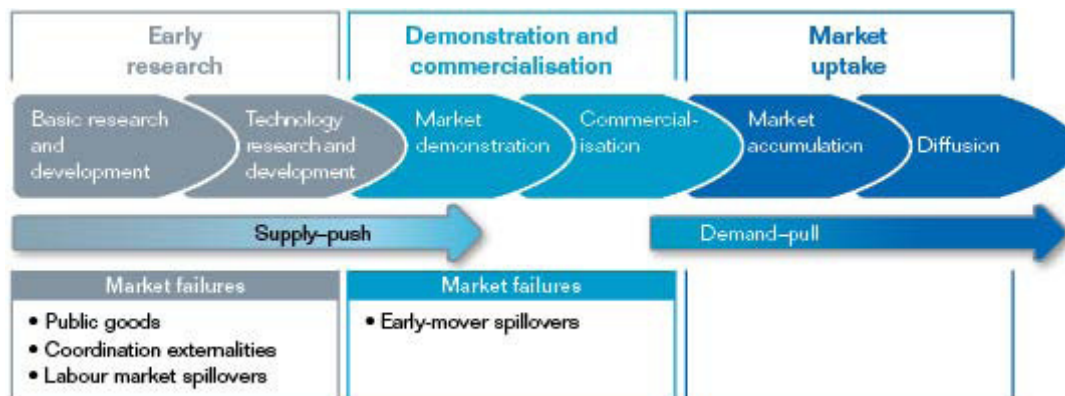
1. Executive summary

Clean energy is one of the world's fastest-growing sectors, and is a critical component in driving sustainable economic growth. There are a number of proven clean energy technologies which are being deployed and which are beginning to become competitive with conventional energy sources. However, two key issues need to be addressed in accelerating the development and deployment of these technologies:

- Ensure an appropriate level of fiscal support (in its various forms) for these early stage technologies to ultimately achieve an optimal level of deployment; and
- Provide continuity and long term commitment of this given level – and in some cases form – of support.

1.1 Barriers to development of emerging clean energy technologies

The public benefit associated with the development of clean energy technologies often presents a variety of market failures and results in under-investment in many phases of the technology development lifecycle. **Annexure 1** describes the technology life cycle. The figure below summarises key market failures that arise at each stage of that cycle.¹



There are several aspects to this suboptimal participation in clean energy investments across each stage of the technology development cycle. These include:

- Private firms are unlikely to be able to capture the full benefit generated by their investment in emerging technologies.
- The second mover advantage in research and development (R&D). It is more beneficial for individual firms to imitate rather than initiate R&D in this area as the nature of emerging technology is that there are unknown risks associated with it which are borne by the initiators. This preference for imitation rather than innovation is disadvantageous to the industry.

¹ Garnaut Climate Change Review Update 2011, Paper & *Low Emissions Technology and the Innovation Challenge*.

- The cost of establishing these renewable energy projects is often not as low as their fossil fuel counterparts, the price of which is artificially low as it does not reflect the real cost to society taking all things, including environmental sustainability, into consideration.²

Of these items, it is widely recognised that the cost of renewable technology in Australia is the major cause for under-investment in renewable energy.³ This is particularly the case in relation to the demonstration and deployment phase.

This report is focused on the demonstration phase of the technology development lifecycle. Note that there are additional issues in relation to the early research and R&D phase which are well documented elsewhere.⁴ While this report focuses on early stage development of renewable energy technology, many of these same challenges and solutions also relate to energy efficiency.

A recent report by Ernst & Young describes the demonstration and deployment phase as being where many clean energy technologies hit the "valley of death".⁵ That is, where it becomes extremely difficult to meet the challenges associated with moving from small scale to large scale financing required to upsize a technology for commercialisation. As noted above, there are a number of emerging technologies facing this challenge in Australia, including large scale photovoltaic (PV), thermal and concentrated solar PV, geothermal, waste to fuel, waste to energy and bio-energy conversion.

What is critical to emerging technologies is those policies and measures that address the challenge of raising upfront capital, particularly in the Australian investment environment. That environment is characterised with only a small number of venture capitalists and investment banks willing to provide sufficient capital or to take on the technological or execution risks – particularly over the longer term.⁶

In Australia investors also face a lack of patient capital and lower awareness of technology risk, which are contributing factors to the weak private investment level in emerging technologies.⁷ In particular, and especially since the global financial crisis, there has been a general reluctance among financiers to participate in high risk projects, and the cost of capital has gone up.⁸ In a post global financial crisis climate, investments will most likely be directed towards more conventional, tried and tested energy sources rather than renewable energy which is considered to be a riskier investment.⁹

² Waite, *A Investment in Clean Technologies as a public good: a discussion paper prepared for the Clean Energy Council* (April 2010)

³ Ernst & Young *Navigating the valley of death: exploring mechanisms to finance emerging clean technologies in Australia* (March 2010)

⁴ See for example the Garnaut Climate Change Review Update 2011 – Update Paper 7 *Low Emissions Technology and the Innovation Challenge*

⁵ Ernst & Young *Navigating the valley of death: exploring mechanisms to finance emerging clean technologies in Australia* (March 2010) p.19

⁶ Ernst & Young *Navigating the valley of death: exploring mechanisms to finance emerging clean technologies in Australia* (March 2010) p.20

⁷ Ibid

⁸ P Curnow, L Tait and I Millar, "Financing Renewable Energy Projects in Asia: Barriers and Solutions", RELP, 2010

⁹ Ibid

To counter these conditions, there needs to be incentives to enter the renewable market at an early stage in order to circumvent this general reluctance to invest and to ensure an optimal level of investment that will achieve long term, lower costs abatement in the energy sector. This is where governments and public sector funding plays a significant role.

1.2 Traditional Government funding programmes

The Australian Government supports industry development for renewable energy through a wide range of policy mechanisms. Key government initiatives include:

- the Clean Energy Initiative;
- Clean Business Australia;
- the former proposed Carbon Pollution Reduction Scheme and current carbon price mechanism;
- the Mandatory Renewable Energy Target; and
- State and Territory feed-in tariffs.

Government funding programmes are traditionally set through the annual budget process, with funding for programmes usually allocated by Treasury (from consolidated revenue) over a three year budget cycle.

In recent years, there have been a number of initiatives established to support emerging technologies in the development and deployment phase. Most notably these include the establishment of the Global Carbon Capture and Storage Institute (GCCSI) to support carbon capture and storage (CCS) projects both in Australia and overseas; and the establishment of the Australian Carbon Trust which provides finance and advice to Australian businesses and the wider community under innovative programs to catalyse investment in, take-up and use of energy-efficient technologies and practices for cost-effective carbon reductions. The Government has also providing significant capital for demonstration projects being developed through the Solar Flagships Programme and the CCS Flagships Programme.

There has unfortunately been a tendency for policy makers to design such programs to achieve political, rather than industry objectives. The key challenge faced by all of these programmes is the political risk that funding may cease at the end of the budget cycle or be deferred or cancelled during the term of the programme such as the case with funding cuts to the GCCSI.

This presents significant challenges to the energy sector investors, where investments are long-lived and require long term policy certainty.

1.3 Hypothecating revenue for the clean energy sector

One way of seeking to address political risk is through the provision of dedicated Government funding which is insulated from this risk over the short and long term, ideally delivered through an independent body at arms length from the Government. Hypothecation models are able to address the first point, by linking the revenue stream to a particular tax, trade or compliance scheme such as the proposed carbon price mechanism.

Hypothecation involves the ear-marking of funds from a particular revenue source for use in particular programmes. Hypothecation schemes can securely deliver the much needed

funding for early stage research and development and offer investment in commercialisation and deployment projects which helps to leverage further investment from the private sector. However, compliance hypothecation schemes that recycle the revenue back into the industry from which it is obtained risk reducing the incentives to innovate and narrowing the type of innovation that is stimulated.¹⁰ Breakthrough renewable energy innovation is less likely to be achieved in schemes that solely reward immediate improvements and innovation. These schemes must therefore be designed with great care to offer flexibility and long-lasting and secure funding of research and development, if innovation is the goal.

Through a comparative analysis of hypothecation schemes around the world, section three of this report establishes a list of key criteria to be used in assessing hypothecation programmes. There are two ways in which hypothecation is typically put into practice:

- **Hard hypothecation** is where the link between the revenue generated and the permitted use of that revenue is included legislation and the Government is required to collect and distribute monies in accordance with this legislative mandate; and
- **Soft hypothecation** is where the Government makes policy announcements regarding commitments to the use of revenue for certain purposes, but in practice the funds actually used to fund these commitments are drawn from consolidated revenue as part of the standard budgetary process.

Clearly defined purpose models serve a wider public purpose in that, unlike with general taxation, hypothecation schemes tax payers can more easily identify the innovation, improvement or support that is facilitated by the funding. This generally leads to an understanding and acceptance of the system and a greater willingness to finance the cause and encourages private investment. This is particularly relevant to the hypothecation of funds to the clean energy sector. In this sector there is increasing public awareness of environmental externalities and the need for climate change action and the support for alternative energy innovation is growing.

Hard hypothecation models may be unpopular with Governments in Australia, in particular in Treasury. In addition, they face legal and practical challenges in their implementation.

Our preferred institutional structure, the Clean Energy Technology Trust Fund (CETT Fund), is aligned with Garnaut's proposal for the establishment of an independent body for the governance of funds. However, we propose a more active link between the carbon price mechanism and the operation of the Council / Fund.

Finally, emerging technologies require a mix of public and private sector funding in order to harness the large volumes of capital required to establish demonstration and commercial plants. This has been recognised internationally with a range of existing hypothecation models, including through the EU Emission Trading System (EU ETS) which allocates apportion of revenue directly to clean energy.

It is also important for any new funding model to be designed in a way that leverages private sector investment. A range of financing mechanisms may be used to distribute and leverage hypothecated revenues. The table in **Annexure 5** briefly describes the key types of public/private funding mechanisms commonly used to drive private investment in renewable energy as well as other sectors, in Australia and around the world, and briefly reviews the potential advantages and disadvantages of each.

¹⁰ *Taxation, Innovation & Environment*, Organisation for Economic Co-operation and Development, 2010.

2. Linking clean energy development to a carbon price

2.1 Establishing a carbon price in Australia

On 24 February 2011, Australia's Multi-Party Climate Change Committee (MPCCC)¹¹ announced its proposed carbon price mechanism, designed to help Australia mitigate climate change and transition to a low-carbon economy. The proposed cap and trade scheme, with an initial fixed price period, is intended to commence on 1 July 2012.

Subject to further political scrutiny, the mechanism would commence effectively as a fixed carbon price payable in respect of greenhouse gas emissions in the following sectors:

- stationary energy;
- transport;
- waste;
- industrial processes; and
- fugitive emissions.

Emissions from the agriculture sector are to be excluded.

The proposed mechanism's fixed price structure would remain in place for three to five years, during which time the price (which is yet to be set) would increase annually in pre-determined graduations. Significantly, the use of international carbon credits issued under the Kyoto Protocol or other emissions trading schemes to meet domestic carbon price obligations would not be permitted. It has not yet been decided whether there will be any link between the fixed price mechanisms and the government's proposed Carbon Farming Initiative (CFI) which enables project-based offsets to be created in the agriculture, land use and forestry sectors.

After this initial period the mechanism would evolve to a fully-fledged emissions trading scheme, with a flexible price determined by market forces and potentially linked to international emissions trading and offsetting schemes, subject to appropriate eligibility criteria. The transition to an emissions trading scheme is conditional and may be deferred having regard to certain issues, including:

- the state of the international carbon market, including the availability, integrity and price of international carbon credits;
- carbon pricing in competitor economies;

¹¹ The Committee is chaired by the Prime Minister, Julia Gillard. The Deputy Prime Minister and Treasurer, Wayne Swan, will serve as the Deputy Chair of the Committee. The Government will invite two representatives from the Coalition, two from the Australian Greens, and representation from Independent MPs. Australian Greens Senators Christine Milne and Bob Brown have already accepted the invitation and will sit on the Committee. Tony Windsor has indicated his willingness to be a member of the Committee. Four independent experts, Professor Ross Garnaut, Professor Will Steffen, Rod Sims and Patricia Faulkner will support the Committee as expert advisers.

- progress made in agreeing and achieving Australia's international carbon reduction targets;
- the fiscal implications of any on-budget purchases of internationally accepted emissions units that may be required for Australia to comply with any internationally agreed emissions target;
- potential impacts on the Australian economy including impacts on households, workers, regions and communities, and the competitiveness of the Australian industry; and
- the implications for investment certainty in clean technologies, energy efficiency and carbon markets.

It is important to remember that the carbon price mechanism announced by the MPCCC currently represents only a proposed climate change framework for Australia, based on agreement reached between Australia's Labor Government and the Australian Greens. Key Independents, Tony Windsor MP and Rob Oakeshott MP, have agreed that the proposed mechanism be released for public consideration and consultation. The Opposition (which has refused to participate in the MPCCC)¹² has labelled the carbon price mechanism a carbon tax and rejected the proposal outright, vowing to repeal any scheme that is introduced.

The MPCCC announcement does not include certain important details, for example as to precisely how the fixed price mechanism will function, or compliance with it, will be enforced. The Government has indicated that revenue generated by the carbon price will be used to:

- assist families with household bills;
- help businesses make the transition to a clean energy economy; and
- tackle climate change.

However, the details of these assistance packages is still to be determined, in particular, how emissions intensive trade exposed (EITE) businesses may be compensated and the extent to which revenue will be available to support clean energy technologies.

2.2 Policy support to link revenue from a carbon price to clean energy technologies

The volume of revenue from the introduction of a carbon price that is available to fund low emissions technologies will depend upon a range of other policy measures that are introduced in connection with the carbon price, in particular commitments to assist low-income households, EITEs and other adversely affected sectors. The Government has also committed to the principle of revenue neutrality.

The 2008 Garnaut Review recommended that 20% of Carbon Pollution Reduction Scheme (CPRS) revenue be dedicated to clean technology development split between Australia (10%) and developing countries (10%) plus additional permit revenue going to support adaptation. It recommended this revenue to be allocated to matched funding of

¹² Joe Kelly, 'Committee Ignores Third Way in Tackling Climate Change, says Coalition' *The Australian* (28 September 2010) <http://www.theaustralian.com.au/national-affairs/committee-ignores-third-way-in-tackling-climate-change-says-coalition/story-fn59niix-1225930647950>

demonstration and commercialisation projects for low-emissions technologies because of the link between early R&D, the long-term costs of mitigation and a carbon price. It also recommended allowing funds to accumulate for use in future years due to lags in the approval process for appropriate candidate technologies.

The final version of the CPRS Bill that was negotiated between the Government and Opposition in late 2009 included extensive assistance packages for households, coal-fired electricity generators, EITEs and the coal sector. It did not earmark revenue for clean energy technologies. Limited support to this sector was proposed through the Climate Change Action Fund.

Paper 7 of Professor Garnaut's update of the Garnaut Review, titled *Low Emission Technology and the Innovation Challenge*, was released in March (Update Paper 7).¹³ Update Paper 7 reviews recent developments and trends in cost reduction of low-emission technologies and considers the Garnaut Review's recommendations on support for research, development and commercialisation for new, low-emission technologies. To ensure the optimal level of innovation in Australia in the transition to a low-emissions economy, Garnaut has proposed a package of measures including:

- increasing support for public and private basic research;
- market-led support for private demonstration and commercialisation;
- a low-emissions technology commitment on total funding, leading to roughly a doubling of research, development and commercialisation expenditure to \$2-3 billion per annum; and
- strong and independent governance arrangements.

One of the key lessons Garnaut emphasises is the need for funding continuity for research, development, demonstration and commercialisation in low-emissions technologies. He highlights that reductions in funding allocations over time have become a common problem for previous government programmes.

2.3 Legal basis of assistance packages

Following the release of the MPCCC's carbon price proposal, the Government's Climate Change Minister, Greg Combet stated that a portion of revenue would be directed to tackle climate change and indicated the Government's intention to provide support for low-emissions technology and innovation. For the purposes of this paper, we have, therefore, assumed that the Government will set aside a certain amount or percentage of revenue raised through the carbon price mechanism to support clean energy technologies, along with providing support to households and EITEs.

Whilst it is unclear at this stage whether the revenue will be raised through a fixed payment by a liable entity for a number of units representing that entity's emissions or just a fixed payment for the emissions, we have assumed for the purposes of this paper that it will be the former. On this basis, the assistance packages that were proposed as part of the CPRS are worth revisiting to see how they proposed to allocate funds. The following table summarises these assistance packages.

¹³ Garnaut Climate Change Review Update 2011, Paper & *Low Emissions Technology and the Innovation Challenge*.

Table 1 – Assistance packages proposed as part of the CPRS and their limitations

Assistance to Low-income Households	
Type of Assistance	Households would be eligible for cash payments, based on their income levels and other concessional status.
Mechanism	To be delivered through existing Government transfer payments and tax offsets on the basis of Treasury’s modeled impacts of the CPRS on different household types. Calculations were set out in the Carbon Pollution Reduction Scheme Amendment (Household Assistance) Bill 2010. Payments were to continue to be made under the existing schemes which are ultimately funded through standard budget processes.
Limitations	No direct hypothecation of CPRS revenue to these payments – payments were to be made through existing schemes which limited their flexibility. Clean energy companies do not necessarily have access to existing tax rebates.
Climate Change Action Fund	
Type of Assistance	Delivery of information, grants and other support to business, community sector organisations, workers, regions and communities that may be affected by the introduction of the CPRS.
Mechanism	Payments from a fund.
Limitations	No direct hypothecation of CPRS revenue – funding realistically coming out of consolidated revenue as a programme item.
EITEs	
Type of Assistance	The issuance of free units to entities that met prescribed eligibility criteria.
Mechanism	To be provided on a transitional basis through the allocation of units.
Limitations	Under a fixed price mechanism, a similar approach could be adopted for those sectors that are eligible for assistance however free allocations of units are not entirely appropriate to the clean energy sector.

Each of these programmes was supported by the federal budget as line items delivered through either grants, tax credits or other traditional funding models.

2.4 Conclusion

The assistance packages described above do not provide ideal models to delivering a portion of the carbon price revenue to clean energy technology development. As a general rule, the clean energy companies that would be seeking assistance do not need a free allocation of units and do not have access to existing rebate or tax credit programmes that could be supplemented. Whilst the Climate Change Action Fund model is useful, the source of revenue was not directly linked to auctioning revenue and ultimately was symbolic, with funding realistically coming out of consolidated revenue as a programme item. In this respect, it would remain subject to the same challenges as other budget-linked programmes in terms of ensuring longer term predictable revenue.

One way of seeking to address this political risk is through the provision of dedicated Government funding which is insulated from political risk over the short and long term. This is where the hypothecation examples described below are instructive.

3. Assessing the Model for Clean Energy Hypothecation

Before considering the best way in which funds from carbon price revenue can be best hypothecated to the clean energy sector in Australia, this section explains the background and basic structure of a hypothecation programme, how it applies and gives some comparative examples from the clean energy sectors around the world.

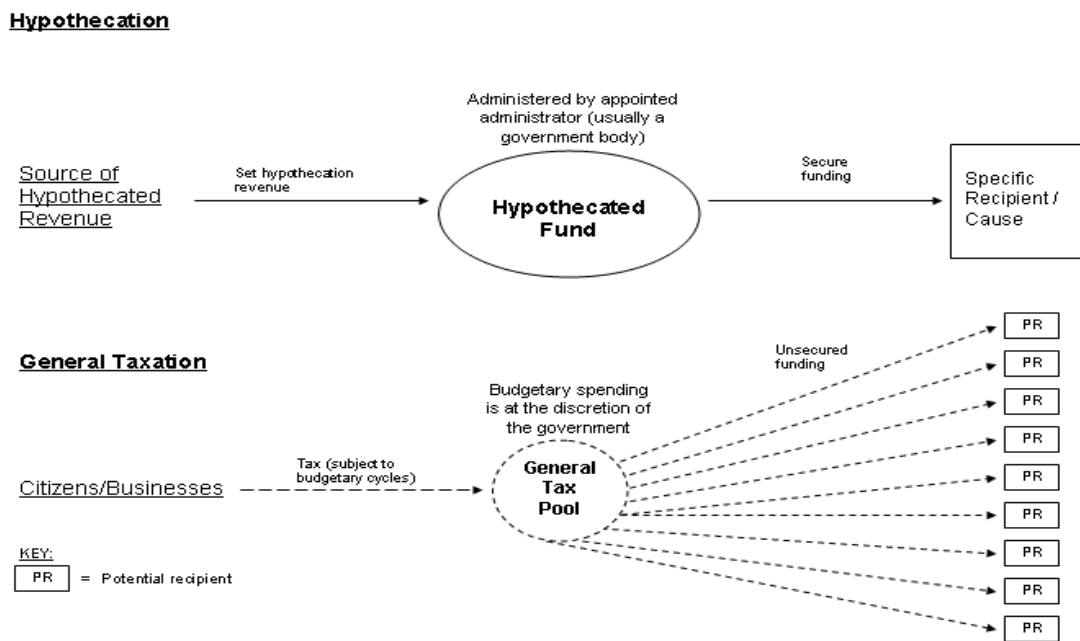
3.1 The Basic Structure of a Hypothecation Programme

Hypothecation is the term used for the ring-fencing or quarantining of a revenue stream for the purpose of devoting the funds to a specific programme or cause. The word's origins are the Greek *hypotithenai*, 'to give as pledge' and the Latin *hypotheca*, which describes the act of pledging property as security.¹⁴

Hypothecation programmes are usually established in legislation and are commonly administered by government bodies. Their duration and the source and level of revenue is generally set out in the legislation and any changes will usually require legislative amendments. The revenue is thereby safeguarded from many political and economic pressures during the programme's life.

Unlike general tax revenue, which is allocated according to the budgetary spending decisions of the government, hypothecated revenue has a fixed recipient and/or defined aim. Hypothecated revenue is usually kept from mixing with other general funds and is protected from diversion to an alternative purpose, often through legislative rules regarding its use and control. Occasionally the revenue is physically mixed into a consolidated revenue fund, but it is formally earmarked for a specific project. Figure 1 below depicts a simple comparison of the flow of revenue in hypothecation programmes and general taxation.

Figure 1. A basic comparative flow chart of hypothecation programmes and general taxation



¹⁴ *Hypothecation of tax revenue for health*, Ole Doetinchem, World Health Report (2010), Paper 51.

Funding for hypothecation schemes is commonly obtained through:

- **General taxation** – either a portion of income tax is identified as being specifically collected for a named purpose;
- **A named levy** – a set charge or income based percentage charge collected for a specific cause that is added to the income tax charge;
- **The sale or licensing of products and services** – revenue, or portions thereof, from sales or charges (often taxes) that are added to sales prices can be earmarked for a specific purpose; or
- Statute driven **compliance** schemes.

There are many benefits to be gained through hypothecation programmes, including:

- **Transparency** – hypothecation schemes are far more transparent in their funding and expenditure than general taxation and government budgeting. This transparency means that there is better administrator accountability and therefore greater public confidence in and support of hypothecation programmes;
- **Public support** – is further strengthened by the clear link between funding and services provided or resulting benefits, especially where the aim of the scheme is socially desirable as is generally the case with renewable energy technologies;
- **Security of funding** – a hypothecated revenue stream can provide the reliable and long standing funding required to facilitate research and development of renewable energy technologies; and
- **Leveraging private sector investment** – hypothecation programmes benefit from security of funding and therefore have greater potential to leverage private sector investment.

3.2 Examples of Hypothecation Schemes

Many government programmes are held up as examples of hypothecation around the world. In Australia, for example, Medicare, introduced in the 1980s, is a taxation hypothecation scheme that raises money through a progressive income tax and an income-related levy and uses the fund to offer free or subsidised health care and services to eligible Australian residents.

One example of the use of stand-alone legislation in Australia is the hypothecation of a surcharge on petrol and diesel excises to provide grants to the States for road construction under the *Australian Bicentennial Road Development Trust Fund Act 1982* (ABRD Act). The ABRD Act established a trust account known as the Australian Bicentennial Road Development Trust Fund (Bicentennial Road Fund) and required monies to be paid out of consolidated revenue into the Road Fund based on a proportion of the petrol and diesel surcharges collected. The money held in the Road Fund was to be paid out to the States in the form of financial assistance for bicentennial road projects. Projects seeking funding were to apply to the Minister through the Australian Bicentennial Road Programme and the grant of funding was subject to certain mandatory conditions. The ABRD Act had a sunset date for the close of the Road Fund of 31 December 1989. However, aspects of the programme were continued through subsequent transport development legislation.

The EU, Ireland, Canada and the US exhibit examples of hypothecation programmes in the clean energy sector. In this section we review relevant schemes.

European Union Emissions Trading Scheme – New Entrant Reserve

The EU has dedicated up to 300 million EU ETS allowances (EUAs) from the New Entrant Reserve (NER) to help stimulate construction and operation of up to twelve CCS commercial demonstration projects and up to 34 demonstration projects for innovative renewable energy schemes (RES). This hypothecation programme, NER300, is designed to inject over €4 billion into carbon capture and storage (CCS) and RES and it is hoped that this amount will be doubled by project sponsors and national contributions in order to fund the construction and operation of the selected projects.

Individual projects that are selected for funding are to be allocated a number of EUAs on trust (up to a maximum of 15 percent of the 300 million EUAs), which will be monetised at a later date. This award can be used to leverage further public and also private funding and projects can try to increase the interest from investors by securing underwriting contributions (as the current value of post-2012 EUAs is relatively low and is likely to rise). The Directive encourages co-funding by Member States through either cash injections, underwriting the future value of EUAs, tax provisions or regional grants and many Member States have indicated their willingness to help finance CCS and RES projects.

The NER programme is established under Article 10a(8) of the *EU ETS Directive 2003/87/EC* and *Decision C (2010) 7499* sets out the mechanics and detail of the programme. Under Article 10 of the Decision, the earmarked EU allowances are transferred to the European Investment Bank (EIB), which monetises them and manages the revenue. In this regard the revenue is initially kept separate from any other revenue stream. However, the EIB passes the revenue to Member States for yearly disbursements to be made to the selected projects.

The EU instruments do not prescribe how the Member States must manage the funds, other than requiring that revenue that is not dispersed is returned to the EIB. Member States may therefore hold the NER300 revenue in a general consolidated fund and distribute disbursements when they are due to projects or may choose to keep the revenue separate from consolidated funds. As Member States are encouraged to co-fund their national projects using public funding, the NER300 revenue is mixed with public funds that are ring-fenced for this purpose.

British Columbia's Innovative Clean Energy Fund

The Innovative Clean Energy (ICE) Fund, established in 2007 by the *Finance Statutes (Innovative Clean Energy Fund) Amendment Act*, was designed to support clean energy initiatives and local economies and livelihoods in communities in British Columbia using the \$25 million yearly revenue from an energy levy. From 1 September 2007 a 0.4% levy was added to the price of electricity, natural gas, grid propane, fuel oil and any other product prescribed by regulation as an energy product (except transportation fuels) purchased by industrial, residential and commercial customers in British Columbia. The yearly levy paid per customer was capped at \$100,000.

The ICE Fund was administered by the Ministry of Small Businesses, Technology and Economic Development and governed by the ICE Fund Governance Committee which was made up of senior government and external representatives. The ICE Fund was discontinued with the introduction of the Harmonised Sales Tax in July 2010.

The scheme was originally designed to raise a one off \$25m fund in 12-14 months, but its success in encouraging clean energy innovation, reducing British Columbia's greenhouse gas emissions and meeting its clean energy targets resulted in the government continuing it as a yearly programme. Today some \$60 million has been injected into 41 projects that

involve a range of renewable energy resources, including solar, wind, tidal, geothermal, ocean wave and bioenergy and now represent a value of over \$234 million.¹⁵

The Climate Change Levy

In 2001 the UK government introduced an energy levy, the Climate Change Levy (CCL), which is charged to all businesses (including the public sector) at the point of final consumption. The aim was to encourage energy efficiency in businesses and the public sector in a bid to reduce UK greenhouse gas emissions. All of the CCL's revenue is recycled back into business, a small portion of it funds the Carbon Trust, a non-profit organisation that provides carbon reduction advice and loans to business to help implement energy saving projects, and some of the revenue facilitates an Enhanced Capital Allowance Scheme (administered by the Carbon Trust), with the aim of encouraging the purchase of energy efficient equipment.

The CCL, along with the rest of the UK Climate Change Programme, was legislated for in the *Finance Act 2000*. From April 2001 power companies have collected the levy from customers and delivered it to HM Revenue & Customs.

Under Schedule 6 section 140 of the *Finance Act 2000*, the CCL is paid into the general account of the Commissioners of Customs and Excise kept at the Bank of England if collected in Great Britain and paid into the Consolidated Fund of the United Kingdom if collected from Northern Ireland. The fund is therefore not kept physically separate from revenue from other taxes.

The CCL has received much criticism for its lack of transparency regarding the application of the revenue that it raises.¹⁶ The intended use and exact division of funds amongst beneficiaries is not clear in the legislation and it appears that the revenue may simply be distributed at the discretion of the Treasury (as set out in the yearly budget).

Irish Renewable Energy Electricity Levy

The Irish electricity consumption hypothecation scheme was established to recover the additional costs of generating electricity from peat and renewable sources. A Public Service Obligation (PSO) levy, which is charged to every electricity consumer, is set yearly and from October 2010 domestic customers will pay €32.76 per annum and small commercial customers will pay €99.03 per annum. These figures have been set by the Commission for Energy Regulation (CER) in a bid to raise US\$156.63 million to help secure energy supply, support indigenous fuels (i.e. peat) and subsidise electricity generated from renewable energy sources¹⁷.

The *Electricity Regulation Act 1999* sets out the legal basis for the PSO levy and Statutory Instrument No.217 of 2002 requires that the CER calculates the levy level in accordance with the relevant legislation and sets the PSO levy for the required period. Suppliers are mandated to collect the levy from their customers and the Transition System Operator (TSO)

¹⁵ *The innovative Clean Energy Report, 2010*, Ministry of Small Businesses, Technology and Economic Development; http://www.climateactionsecretariat.gov.bc.ca/mitigation/ice_fund.html; <http://www.tted.gov.bc.ca/ICEFund/About/Pages/default.aspx>.

¹⁶ Pages 26-36 of *Reducing Emissions from UK Business: The Role of the Climate Change Levy and Agreements*, House of Commons Environmental Audit Committee, Second report of Session 2007-08.

¹⁷ Commission for Energy Regulation, Decision Paper 30 July 2010, CER/10/131.

and Distribution System Operator collect the funds from the suppliers. The TSO has the responsibility of overseeing distribution of the PSO fund.

Californian Electricity Levy

In 1996, *Assembly Bill 1890* established a Public Goods Surcharge (PGS) that was charged by Californian investor-owned utilities to their customers on a volume-consumption basis. The revenue from the PGS is used to fund four areas: energy efficiency programmes, research, development and demonstration (i.e. the PIER Programme), the Renewable Energy Programme, and low income assistance (i.e. CARE).

The Renewable Energy Programme aims to increase the supply of renewable energy in California by providing financial incentives to renewable energy generators and end-use customers who install renewable energy generators on their homes or businesses.

The PIER Programme funds the following seven research areas: i) Buildings end-use energy efficiency, ii) Energy innovations small grant programme, iii) Energy-related environmental research, iv) Energy systems integration, v) Environmentally-preferred advance generation, vi) Industrial/Agricultural/Water end-use energy efficiency, and vii) Renewable energy technologies. The programme aims inter alia to reduce the environmental impacts of electricity generation and the cost of electricity.

The Renewable Energy Programme and PIER Programmes are administered by the California Energy Commission.

Other hypothecation schemes

In addition to these schemes, the table below summarises hypothecation schemes in Australia and elsewhere in both the clean energy and other sectors. See **Annexure 3** for a summary of the primary hypothecation schemes not detailed above.

Table 2 – Summary of Hypothecation Schemes

Clean Energy Sector						
Scheme	Location	Purpose	Source of Funding	Duration	Legal Framework	Administrative body
EU ETS NER	Europe	CCS and renewables innovation	Revenue from sale of allowances	Awards to be made from 2011 and funding from 2015 for five to ten years	EU ETS Directive 2003/87/EC	The EU Commission
ICE Fund	British Columbia	Clean energy innovation	Consumption based levy on power customers	Sept 2007 to July 2010	Finance Statutes (Innovative Clean Energy Fund) Amendment Act 2007	Ministry of Small Businesses, Technology and Economic Development
CCL	UK	Energy efficiency and carbon reduction	Consumption based energy levy charged to all businesses	Commenced in 2001 and indefinite	Finance Act 2000	The Carbon Trust

Clean Energy Sector						
Scheme	Location	Purpose	Source of Funding	Duration	Legal Framework	Administrative body
PSO Levy	Ireland	Energy from renewable sources	Consumption based levy on electricity customers	Commenced Oct 2010 and the levy is set yearly.	Electricity Regulation Act 1999	The charges are set by the Commission for Energy Regulation and distribution of funds is the responsibility of the Transition System Operator
Electricity Levy	California	Energy from renewable sources	Consumption based levy on electricity customers	Commenced in 1996	Assembly Bill 1890	California Energy Commission
Geothermal Programme	California	R&D, commercialisation and demonstration of geothermal energy production	Portion of the revenue from geothermal production in plants on federal leases	Commenced in 1981	Assembly Bill 1905 (Bosco)	California Energy Commission
Other Sectors						
Scheme	Location	Purpose	Source of Funding	Duration	Legal Framework	Administrative body
SOx emissions tax	Japan	Compensation for victims of pollution related illnesses	Levy on SOx emission by businesses	Commenced in 1974	Compensation Law for Pollution-Related Health Damage	Government body
Natural Resources Management Levy	South Australia	Funding natural resources management	Levy charged to all ratepayers	Commenced in 2004	Natural Resources Management Act 2004	Local Government
Petrol Taxation	US	Transport	Consumption based tax on petrol customers	Commenced late 19th century	Federal-Aid Highways Act	Federal Highway Trust Fund
Medicare	Australia	Medical services and health care	Income based taxation of citizens	Commenced in 1980s and indefinite	Medicare Levy Act 1986	Medicare Australia, a government agency
National Lottery	UK	Various cultural, educational and medical causes	Portion of revenue from ticket sales	Commenced in November 1994 and indefinite	National Lottery etc Act 1993	Regulated by a non-departmental public body, the National Lottery Commission
TV Licence	UK	Independent broadcasting	Revenue from license fees	Commenced in 1946 and indefinite	A Royal Charter	The British Broadcasting Corporation Trust, an independent body

Other Sectors						
Scheme	Location	Purpose	Source of Funding	Duration	Legal Framework	Administrative body
Ansett Levy	Australia	Funding the entitlements and redundancies of the bankrupt airline's employees	Levy on airline tickets	2001- June 2003	Air Passenger Ticket Levy (Collection) Act 2001	The Department of Employment and Workplace Relations

3.3 Legal basis for hypothecation in Australia

There are two ways in which hypothecation is typically put into practice:

- **Hard hypothecation** is where the link between the revenue generated and the permitted use of that revenue is included in legislation and the Government is required to collect and distribute monies in accordance with this legislative mandate; and
- **Soft hypothecation** is where the Government makes policy announcements regarding commitments to the use of revenue for certain purposes, but in practice the funds actually used to fund these commitments are drawn from consolidated revenue as part of the standard budgetary process.

Many of the schemes that are held up as examples of hypothecation in Australia, for example, the Medicare levy and tobacco and alcohol taxes, whilst established through legislation, do not hard-wire the link between the collection and payment of the money raised.

Hard hypothecation models may be unpopular with Governments in Australia, in particular in Treasury. In addition, they face legal and practical challenges in their implementation.

The most significant of these legal challenges is that section 81 of the *Commonwealth Constitution* specifies that "All revenues or moneys received by the Executive Government of the Commonwealth shall form one Consolidated Revenue Fund ...". Essentially this prevents the Commonwealth Government from collecting taxes into special accounts; they first have to pass through consolidated revenue and then be appropriated. There are examples of where government business enterprises are able to collect user charges and apply them to business operations. However, those entities do not form part of the "Executive Government".

In the case of Executive Government seeking to formally appropriate revenue and distribute it for a particular purpose along the lines of hard hypothecation, this may be done through stand-alone legislation or amendments to existing tax, excise or social security legislation. Whilst this does not necessarily by-pass consolidated revenue, it does establish a more secure funding model which can only be revised or repealed by a separate Act of Parliament.

3.4 Key criteria for assessing a hypothecation model

Based on our review of the hypothecation programmes described above, we set out below the key criteria for a possible hypothecation model for clean energy technologies linked to revenue from a carbon price in Australia.

Transparency – Defined purpose

Hypothecated funds should have a clearly defined purpose prescribed through legislation

The hypothecation model is based on the quarantining of revenue for a specified purpose. Therefore, by definition the use of the funds should be distinct and identified. However, the extent to which the specific purpose is defined and limited can vary.

In broad purpose funding, funds are earmarked for a general cause, but they can be used in a number of ways. In narrow purpose funding the use of quarantined revenue is far more defined and predictable. The broad purpose model offers flexibility in allocation and allows administrators the opportunity to address the needs of beneficiaries. However, this flexibility can lead to a lack of transparency and even misallocation of funds.

One of the most common criticisms of hypothecation programmes is their lack of transparency. This can be due to a number of reasons but can be somewhat mitigated by prescribing clearly defined purposes for the funds.

Garnaut's Update Paper 7 supports this view and contends that multiple and mixed objectives dilute effectiveness and highlighted the need to set clear and measureable objectives.¹⁸ The opposing narrow purpose model may be inflexible and narrow in scope, but offers transparency and reliability.

Clearly defined purpose models also serve a wider public purpose in that unlike with general taxation, in hypothecation schemes tax payers can more easily identify the innovation, improvement or support that is facilitated by the funding. This generally leads to an understanding and acceptance of the system and a greater willingness to finance the cause and encourages private investment. This is particularly relevant to the hypothecation of funds to the clean energy sector as with increasing public awareness of environmental externalities and the need for climate change action, the support for alternative energy innovation is growing.

Funding Flexibility

Programmes should retain some degree of flexibility regarding funding

Hypothecation schemes are sometimes criticised for the methods used to determine levels of funding. It is claimed that target funds will sometimes simply depend on how much money a fund raising scheme can achieve, rather than being based on a thorough assessment of the needs of the cause in question.

Even where reasoned estimates are made as to the levels of funds required by a hypothecation programme, if they are inaccurate the fund levels may be inappropriate for the duration of the programme.

For example, the National Lottery scheme in the UK encountered problems in the ability of the government to alter the portions of the revenue injected into the different causes and to add new causes to the scheme.

¹⁸ Garnaut Climate Change Review Update 2011, Paper & *Low Emissions Technology and the Innovation Challenge*.

Hypothecation schemes should retain some degree of flexibility to allow partnerships with public and private sector entities where necessary to cover the cost of research, development and demonstration in the field. This can be facilitated through the institutional structure chosen to administer the funds and the financing models chosen to deliver the funds.

In addition, the way in which a programme allocates its funding should also retain a degree of flexibility. Garnaut's Update Paper 7 highlights that there is limited evidence of the most effective and efficient measures for supporting innovation and criticises the Low-Emission Technology Development Fund, which involves one-off funding decisions, as inflexible.¹⁹ **Annexure 5** provides an outline of the key types of public/private funding mechanisms commonly used to drive private investment in renewable energy as well as other sectors, in Australia and around the world and briefly reviews the potential advantages and disadvantages of each.

Term

The term of the programme needs to be carefully determined based on its specific purpose

Breakthrough renewable energy innovation is less likely to be achieved in schemes that solely reward immediate improvements and innovation. These schemes must therefore be designed with great care to offer long-lasting and secure funding of research and development.

There is a need to ensure that the scheme is on foot for the appropriate term. Many hypothecation schemes have an indefinite term. However, as noted in the Bicentennial Road Fund, the programme only operated under legislation for an initial fixed period. The appropriate term for each scheme is dependant on its purpose.

In the clean energy sector the aim of a scheme is to incentivise research and development and promote investment in demonstration and commercialisation of clean energy technologies. Therefore, such a scheme is not designed to continue indefinitely but rather is designed to continue until the technologies and private sector investment reach an independently sustainable point.

Independence of the Institutional Structure

The institutional structure used to manage the hypothecated funds must be carefully selected based on the specific purpose of the programme

It is important to note that the cross subsidisation referred to above can open up the system to political influence and may result in the decisions being made that are not otherwise economically justified.

To avoid this, it is critical to ensure that a programme remains independent from changing government policy objectives (so that fund allocations are not wound back where policy objectives shift) and also outside influence such as private companies with a vested interest in the direction of funds a particular way that may not be in the industry's best interest. The independence of a programme is best ensured through the choice of the governing framework and can be reinforced through legislation.

¹⁹ Garnaut Climate Change Review Update 2011, Paper & *Low Emissions Technology and the Innovation Challenge*.

The effective administration and deployment of hypothecated carbon revenues to suitable recipients within Australia's clean energy sector will necessitate the development of an appropriate institutional framework, capable of receiving, managing and distributing such funds. One of a variety of institutional frameworks may provide such a structure:

- the relevant functions may be retained within a government department;
- the functions may be allocated to an existing discrete organisation established under the auspices of a government department - such as the Australian Centre for Renewable Energy the Australian Solar Institute (see discussion of these bodies in **Annexure 4**); or
- the functions may be assumed by a newly established discrete organisation.

The advantages and disadvantages of each approach summarised in the table below.

Table 3 – Advantages and disadvantages of institutional frameworks to support public/private finance deployed through a hypothecation model

Advantages	Disadvantages
Department of Resources, Energy and Tourism (DRET)	
<ul style="list-style-type: none"> – Least cost method - avoids the expenses associated with the establishment of a dedicated new body or the expansion of an existing body. – Draws on experience. 	<ul style="list-style-type: none"> – Excludes the value likely to be added through independent industry stakeholder involvement. – Subject to the ongoing support of government and shifts in policies and objectives.
Newly Established Independent Body	
<ul style="list-style-type: none"> – Resources focused solely on the prescribed objective. – Degree of independence from, and resilience to, changes in government and policy – potentially greater stability of policy and administrative direction. – Involvement of industry, private sector and other independent stakeholders. – Potentially increased funding from non-government sources. 	<ul style="list-style-type: none"> – High establishment costs. – Heavy administrative burden.
Existing Independent Body	
<ul style="list-style-type: none"> – Minimise establishment and administrative costs. – Stability of policy and administrative direction. – Involvement of industry, private sector and other independent stakeholders. – Potentially increased funding from non-government sources. 	<ul style="list-style-type: none"> – Inability to focus resources on once single task. – Additional funding potentially to be shared with body's broader scope and mandate.

Garnaut's Update Paper 7 also supports the view that the best results regarding fund allocation will be obtained by the government entrusting the task to 'a well-equipped independent body that is able to allocate finite resources'.²⁰

3.5 Assessing the delivery model for clean energy hypothecation

We consider there to be three different options that may be used for the allocation and management of hypothecated funds from a carbon price revenue to the clean energy sector.

1. **Policy allocation** - a form of soft hypothecation where funds are allocated to the clean energy sector through policy announcements.
2. **Government administered fund** - the creation of a fund administered by an existing government department.
3. **Independently administered Fund** - the creation of a fund administered by an independent body.

Both Option 2 and Option 3 could be financed through soft or hard hypothecation.

Table 3 assesses these options based on the key criteria described above.

In our view the greatest transparency is achieved through using legislation that clearly specifies the purposes for which funds are to be allocated. This can be achieved in either of the fund models. Flexibility is achieved through the ability to access additional sources of revenue and to be able to apply that funding to a broad range of projects that fall within the scheme's mandate. We see an independently administered fund as having a higher degree of flexibility than policy measures or government administered funds. An independently administered fund will also be less affected by changes in government and government policy, therefore, its ability to pursue a clean energy mandate over the long-term will be enhanced. In order to provide greater long-term certainty regarding the ability to source revenue for clean energy technologies, we are of the view that the 'hard-hypothecation' model, explained above, should be pursued.

Table 4 – Assessment of models for clean energy hypothecation based on key criteria

Criteria	Policy Allocation	Government Administered Fund	Independently Administered Fund
Transparency	No specifically prescribed purpose. Purpose defined in policy announcement may be subject to change.	Legislation to prescribe specific purpose. Government required to collect and distribute monies in accordance with legislative mandate.	Legislation to prescribe specific purpose. Independent body required distribute monies in accordance with legislative mandate.

²⁰ Garnaut Climate Change Review Update 2011, Paper & *Low Emissions Technology and the Innovation Challenge*, p.6.

Flexibility	Potential additional funding from general revenue pool subject to policy decisions.	Flexibility regarding additional funding from government sources.	Greater access to private sector funding.
Independence	Subject to policy shifts.	Greater long term certainty however still linked to government through administration.	Independent from government - greater long term certainty.
Term	Term prescribed by policy announcement and not concrete – subject to termination due to policy shift.	Regular review provisions and details regarding term may be prescribed in legislation.	Regular review provisions and details regarding term may be prescribed in legislation and monitored by independent governing body.

Delivery of the optimal model, in our opinion, would require the establishment of a CETT Fund and the direction to the Government to channel a portion of the carbon price revenue into that fund on a quarterly or annual basis. The CETT Fund could be included in the carbon pricing mechanisms legislation, however, in our view, a stand-alone Act (CETT Fund legislation) to establish and implement the hypothecation objectives would be preferable. The CETT Fund legislation would need to set out the purpose for which monies from the fund could be applied and who would be eligible to access those funds.

We also recommend that the CETT Fund legislation establish an independent body to administer the fund, with provisions related to the governance structure of that body, its constitution, mandate, powers and responsibilities. As opposed to an existing government agency or body, this framework would ensure the ability to focus the relevant body's resource on the single task of administering hypothecated funds and to leverage private sector investment.

Depending on the success of a carbon price and the CETT Fund in bridging the gap between technology development and deployment, it would be necessary to include regular review provisions and possibly a sunset date for the operation of the Fund. In Update Paper 7, Garnaut proposed a package of measures comprising four main elements:

- driving public and private basic research in low-emissions technologies – the allocation of new and additional funding to businesses, industry research and development corporations and public sector research organisations;
- market-led support for demonstration and commercialisation – up-front grants provided using a simple assessment criteria;
- the Low-Emission Technology Commitment – a funding pledge that increases over time for both public and private commitment; and
- strong and independent governance arrangements – a new Low-Emissions Innovation Council to administer government policies and programmes. The Council would be responsible for administering policies and programmes across basic research, commercialisation and demonstration and the design of the various parameters of each

scheme to ensure budget neutrality in conjunction with the Australian Treasury and Finance Departments.²¹

These recommendations build on the policy progress of recent years and are essentially a modified package of existing policies and mechanisms. While Garnaut recognises that there are other methods that could be implemented, the balance of his paper leans towards traditional funding mechanism and tax incentives.

Our preferred institutional structure, the CETT Fund, is aligned with Garnaut's proposal for the establishment of an independent body for the governance of funds. However, we propose a more active link between the carbon price mechanism and the operation of the Council / Fund.

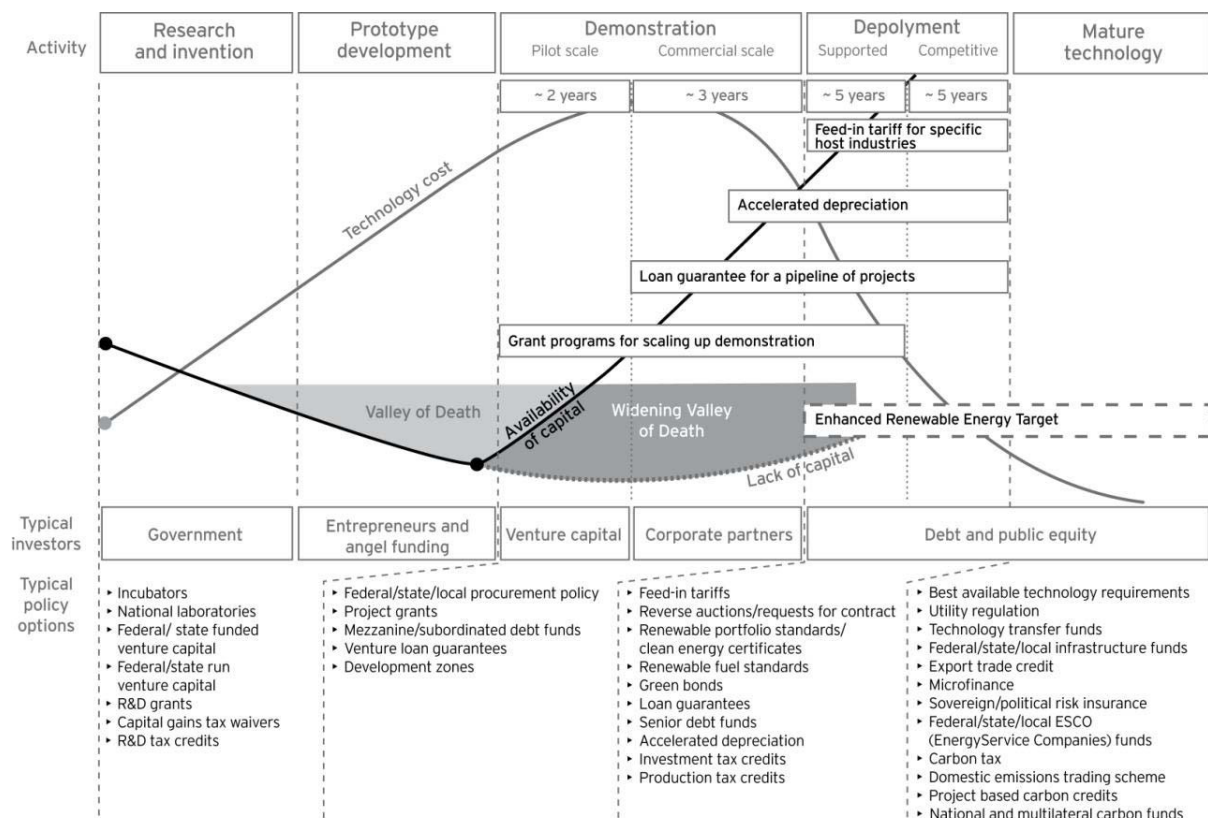
We are of the view that an hypothecation model designed on the basis of the criteria proposed in section 3.4, and as summarised above, would be a more effective mechanism for delivering a portion of the carbon price revenue to clean energy technology development.

²¹ Garnaut Climate Change Review Update 2011, Paper & *Low Emissions Technology and the Innovation Challenge*.

Annexure 1 – Clean Energy Technologies: The Project Lifecycle

Broadly speaking in Australia each clean technology can be defined as falling into one or several of these stages of development. For example, while wind turbines, small scale solar PV, solar hot water technologies and conventional forms of bioenergy conversion technologies are typically defined as more mature technologies, marine, geothermal, storage and enabling technologies, large scale solar PV, thermal and concentrated solar and some waste to energy projects can range from R&D to demonstration.

Figure 1 – scope of government action to support emerging cleantech investment. (Ernst and Young – Navigating the Valley of Death, p41.)



Annexure 2 – Hypothecation: Sources of Funding, Benefits and Pitfalls

Sources of Funding

Taxation

The funding from hypothecation programmes is commonly obtained through taxation. In the case of general taxation, either a portion of income tax is identified as being specifically collected for a named purpose or, more commonly, a named levy (i.e. a set charge or income based percentage charge collected for a specific cause) is added to the income tax charge. These charges are commonly set out clearly on tax bills and receipts so that tax payers can easily identify them. Other forms of tax hypothecation involve adding a tax or levy to the price of a product or service (see the section on 'Trade' below for further discussion of this).

Trade

Funds for hypothecation programmes can also be obtained through the sale or licensing of products and services; revenue, or portions thereof, from sales or charges (often taxes) that are added to sales prices can be earmarked for a specific purpose.

An example of a hypothecation scheme that sources revenue from pure trade-revenue, whereby consumers voluntarily purchase a product and part of the revenue from the product price is directed to a specified cause, is the UK National Lottery, which funds various cultural, educational and medical causes in the UK. This funding was a fundamental part of the lottery scheme's purpose and so from its conception, the hypothecated portion of revenue was factored into the mechanics of the scheme.

In contrast, an example of a hypothecation scheme that was 'tacked' onto an existing trade is Australia's 2001 Ansett Levy. A surcharge was added to the price of all airline tickets in order to raise funds to pay the entitlements and redundancies of over 13,000 former employees of the collapsed Ansett airline. This type of hypothecation scheme can work well, but may face resistance from consumers who are used to the lower pre-levied price. However, where the extra charge is either in response to an emergency or for a socially desirable cause linked to the product or service, consumers can be more accepting of their role in financing the fund.

"Sin taxes" provide an interesting example of an effective and widely used trade hypothecation model where extra charges are "tacked" onto existing trade prices. Sin taxes are charged on products or services which have impacts that are viewed negatively by society. For example alcohol or tobacco, which are detrimental to health, or petrol, which is bad for the environment. The use of the revenue is often linked to combating or financing the negative impacts, for example tobacco taxes are often diverted into healthcare and promotion of the health risks of smoking. The state of Victoria introduced the world's first sin tax that was hypothecated for health in the form of a tobacco tax in 1987 and the tool is now used all over the world.²²

²² *Hypothecation of tax revenue for health*, Ole Doetinchem, World Health Report (2010), Background Paper 51.

Compliance Schemes

The revenue from statute driven compliance schemes can be captured to finance hypothecation programmes. These compliance scheme will usually comprise participants paying a fee for the right to something, for example emit greenhouse gases. This fee may be a set price for a period of use, for example a yearly licence fee, may be determined by the frequency of use of a product, or may be based on an output reading, for example a charge per tonne of greenhouse gases emitted.

Hypothecation revenue from compliance schemes is commonly recycled back into the industry, or subsections thereof, from which it is obtained. This recycling tool is often employed to maintain the profitability and competitiveness of the entities that are charged. It should be noted, that some studies suggest that recycling of revenue in this way may weaken the incentives to innovate, especially at the collective level.²³ However, effectively targeted recycling of revenue can encourage favoured methods, resources or classes of participant or can be used to reward the most efficient or successful participants. Performance based recycling can result in a net charge to the weaker performers and a net payout to the stronger performers, which may further incentivise innovation.

Benefits and downfalls of hypothecation

Micro-economic theory

Political opponents of hypothecation often cite micro-economic theory, stating that the raising of revenue (often through taxation) and the allocation of funds are two separate tools for governments to achieve income distribution and welfare improvement. They reason that centralised assessment of the economy and the needs of the system, and complete discretion in taxation and fund allocation decisions will result in the best economic outcomes. They argue that the linking of these two tools imposes constraints that prevent optimal resource allocation.

This line of reasoning, although theoretically sound, relies on the 'perfect knowledge' of decision makers and their absolute flexibility in taxation and fund allocation decisions. However, in reality the majority of governments do not have complete flexibility in revenue raising nor fund allocation as these decisions are commonly controlled or constrained to a large extent by legislation and policy. In addition governments do not frequently conduct all encompassing reviews of the needs across all sectors and prioritise programmes, thus their knowledge is far from perfect. For these reasons, blinkered reliance on micro-economic arguments alone is widely criticised.

However, there is some truth in the argument that by hypothecating funds and thereby diverting funds away from the general pool that is subject to the government's discretion, the government's ability to deal with economic cycles and respond to a range of needs when they arise is diminished. General taxes, which are pooled in a general fund and allocated to different causes as and when funds are required, provide greater flexibility to address the needs of communities and industries. Whether or not hypothecation of some revenue is supported by the public will largely depend on the public trusts the government to allocate funds wisely and effectively.

²³ *Taxation, Innovation & Environment*, Organisation for Economic Co-operation and Development, 2010.

Transparency and Accountability

The lack of transparency in expenditure of general taxes means that it is extremely difficult to know how and where money from a specific source is allocated. This difficulty in tracing funds often results in tax payers lacking in support for or interest in the causes receiving their funds. It also reduces the accountability of the decision makers and thereby reduces the public's trust in them.

Hypothecation of taxes provides the transparency that general taxation lacks. Monies can more easily be traced from payment of taxes to expenditure of the funds and this greater transparency and accountability means that the public usually have more faith in the administrative body and increased support for the relevant cause. Hypothecation can therefore be a useful tool for restoring public trust in an administration.

Clear Purpose

Whereas general taxation addresses a plethora of needs and prioritisation, with one specified cause at the heart of every hypothecation scheme, it is easier for administrators and governments to communicate the purpose of the related taxes or other revenue raising charges and persuasively educate citizens and businesses about the need for the funds. With just this linear message to digest, the public are generally more accepting of the charges in hypothecation schemes.

In addition, whereas with general taxes funding and expenditure is complicated and difficult to trace, hypothecated schemes have a simpler revenue stream and a clear focal cause, so the public can more easily understand the level of funding required to attain certain standards or achieve results.

Further, with a sole clear message about the need for the cause, in this case innovative renewable energy technologies, it is easier for a government through education and effective promotion to create a positive public perception of the sector in question, thereby attracting private involvement and investment to the sector.

Visible Benefits and Service Provided

Unlike with general taxation, in hypothecation schemes tax payers can more easily identify the innovation, improvement or support that is facilitated by the funding. This generally leads to an understanding and acceptance of the system and a greater willingness to finance the cause.

Conversely however, the simplicity and transparency of hypothecation schemes means that any failures or inefficiencies are to a greater extent exposed. It is common for new environmental technologies to be cost ineffective in the early stages of research and development, commercialisation and deployment. Generally when innovations are developed that improve the environmental performance of society, they will be expensive in comparison to their environmentally unfriendly alternatives and it will take some time for improvements and scale of economies to make them economically competitive.²⁴ This is largely true for the development of renewable energy technology and the public may perceive hypothecation schemes as yielding little benefit.

²⁴ *Environmental and Eco-Innovation: Concepts, Evidence and Policies*, Organisation for Economic Co-operation and Development, 21 January 2010.

In the past, despite the difficulty in measuring the economic benefits of investing in education and health, these have been areas with strong public support for funding from taxes and in some countries groups of the public have called for higher taxes in these sectors.²⁵ This is because these sectors are socially desirable irrespective of their economic performance. With increasing public awareness of environmental externalities and the need for climate change action, the support for alternative energy innovation is growing. Environmental innovations may therefore be socially desirable even if they do not immediately improve the economic performance of society.

Secure funding

Whereas causes that are funded through general funding are in danger of budgetary changes, insufficient funding and delays due to "red tape", hypothecated funds are generally secure for the entirety of the scheme, sufficient and delivered in a timely fashion. This reliability of funding facilitates better fund allocation planning and attracts private sector investment and partnering.

Inappropriate funding levels

Hypothecation schemes are sometimes criticised for the methods used to determine levels of funding. It is claimed that target funds will sometimes simply depend on how much money a fund raising scheme can achieve, rather than being based on a thorough assessment of the needs of the cause in question.

Even where reasoned estimates are made as to the levels of funds required by a hypothecation programme, if they are inaccurate the fund levels may be inappropriate for the duration of the programme. Whereas with general taxation funding funds can usually be reallocated to and from other areas at regular intervals, this is not always the case with hypothecation schemes.

Unassailable funding

Hypothecated revenue is generally not subject to the reviews and spending cuts that general funds are. For these reasons and because they undermine the discretion of ministries of finance to determine all budgets, they are generally not favoured by these ministries.

Innovation

The importance of renewable energy technology eco-innovation (i.e. innovation that improves environmental outcomes at lower costs) is critical to climate change action. Although many studies of international environmental instruments demonstrate that taxes can stimulate the development of incremental innovations (i.e. improvements on existing technologies or techniques), for example through putting a price on pollution, numerous studies support the need for complimentary public investment in and incentivisation of research and development to facilitate the development of breakthrough technologies that lead to fundamental environmental improvements.²⁶ This is because this kind of innovation will generally entail greater costs, longer periods of research and development and a higher incidence of failure, all of which are not desirable to private investors.

Hypothecation schemes can securely deliver the much needed funding for early stage research and development and offer investment in commercialisation and deployment

²⁵ *Hypothecation of tax revenue for health*, Ole Doetinchem, World Health Report (2010), Background Paper 51.

²⁶ *Taxation, Innovation & Environment*, Organisation for Economic Co-operation and Development, 2010.

projects which helps to leverage further investment from the private sector. However, compliance hypothecation schemes that recycle the revenue back into the industry from which it is obtained risk reducing the incentives to innovate and narrowing the type of innovation that is stimulated.²⁷ Breakthrough renewable energy innovation is less likely to be achieved in schemes that solely reward immediate improvements and innovation. These schemes must therefore be designed with great care to offer long-lasting and secure funding of research and development, if innovation is the goal.

²⁷ *Taxation, Innovation & Environment*, Organisation for Economic Co-operation and Development, 2010.

Annexure 3 – Hypothecation Schemes

The UK National Lottery

Since its inauguration in November 1994, 28 percent of the revenue from the National Lottery has been used to support various cultural, educational and medical causes in the UK. The consumption hypothecation scheme was originally set up to support the arts, sport, heritage, charities and projects to mark the millennium in the UK. Its success has enabled and policy changes have warranted an extension of its scope to now include medical and educational causes.

The National Lottery was established under the *National Lottery etc Act 1993* and has been reformed by two further national Lottery Acts in 1998 and 2006. The 1993 Act established the initial lottery regulator and the areas that were to benefit from the lottery fund, namely sport, the arts, heritage, charities and. The 1998 Act appointed the Nation Lottery Commission, a non-departmental public body, as the new regulator and added a sixth cause and a new distributor to administer the portion of the funds for the new cause. Finally, the 2006 Act made several changes to the provisions for licensing and regulation of the lottery, notably replacing the three distributors with a single body, the Big lottery Fund. The governmental Department for Culture, Media and Sport has the responsibility for National Lottery policy and for setting the financial framework.²⁸

The National Lottery is widely regarded as a success in relation to its funding of cultural, educational and medical projects and causes. However, contention surrounds the ability of the government to alter the portions of the revenue injected into the different causes and to add new causes.

Medicare

The Medicare scheme is a taxation hypothecation scheme that raises money through a progressive income tax and an income-related levy and uses the fund to offer free or subsidised health care and services to eligible Australian residents.

Australian tax payers are charged a Medicare levy which is income dependent. For 2009-10 the charge was 1.5% of the taxable income for the majority of tax-payers, but this percentage was reduced for taxable incomes of \$21,750 or less and a levy exemption applied for taxable incomes of \$18,488 or less (with higher thresholds for seniors). Tax-payers with incomes above a certain threshold may be charged a levy surcharge. It should be noted that the levy covers only a fraction of the cost of Medicare and that the rest of the necessary funding is obtained through the general tax revenue pool. Medicare spending is therefore neither limited nor defined by the Medicare levy.

The predecessor to Medicare, Medibank, was established in the *Health Insurance Bill 1973* and several accompanying bills by the Whitlam government and the scheme commenced in 1975. After various reincarnations, with varying tax levels, the *Health Legislation Amendment Act 1983* paved the way for the modern Medicare levy which commenced on 1 February 1984.

The Medicare scheme is administered by Medicare Australia, a Government agency that was established by *the Financial Management and Accountability Act 1997* and is a statutory

²⁸ *National Lottery – Questions and Answers January 2010*, The National Assembly for Wales, Paper No 10/002, Neil Cox.

agency under the *Public Services Act 1999*. The policy development of Medicare is the responsibility of the Department of Health and Ageing.²⁹

Tobacco and Petrol "Sin Taxes"

In 1987, Victoria was the first jurisdiction to implement a tobacco consumption hypothecation scheme. A tax was added to the price of tobacco and revenue from this 'sin-tax' was used to fund healthcare. In 1990, in Western Australia, a similar tobacco taxation scheme was introduced which used a portion of the tobacco tax to fund tobacco control activities. These schemes have been followed internationally by several other state and national schemes are supported by the World Health Organisation.³⁰

Federal aid for roads in the United States began in the late 19th century and under various reincarnations of the *Federal-Aid Highways Act*, revenue from hypothecated taxes has funded this. Currently, taxes from transport fuel, new trucks and tyres finance the federal scheme which is administered by the Federal Highway Trust Fund. In addition, in many US states, petrol tax is hypothecated for use on state transportation projects, such as upgrading highways.

The British TV License

From its inception in 1946, the British Television Licensing scheme, a licensing hypothecation scheme, has diverted revenue from the sale of television licences into funding the British Broadcasting Corporation (**BBC**), an independent broadcasting body. In October 2010 the BBC agreed with the UK government to freeze its yearly licence fee at £145.50 until 2016 and to extend the use of the revenue to cover, amongst other broadcasting services, funding the World Service, BBC Monitoring and S4V from 2015 and the roll-out of broadband in rural areas from 2013.

The BBC is established under the Royal Charter and this is accompanied by an Agreement which sets out its editorial independence and its public responsibilities. The current Charter came into force in 2007 and runs until the end of 2016. In accordance with the charter, the BBC is governed by the BBC Trust, an independent body made up of twelve trustees, who each have a duty to represent the interests of the licence fee payers, and a trust unit, comprising a support team that give the trustees strategic and logistic assistance and provide independent and objective advice. The BBC Trust determines the BBC strategy and top-level budgets and ensures that BBC standards are maintained. The Executive Board of the BBC is responsible for managing the organisation and running it, with the help of four sub-committees, according to the strategy and direction set by the BBC Trust.

French Road Tolls

For decades the French government has offered design, build, finance and operate (DBFO) contracts to private sector consortia who construct roads and recover their investments over a concession period of up to 30 years through toll charges or payments from the state. The use of revenue from tolls to recover investment funds follows the licensing hypothecation model, whereby road users pay a licence fee for the right to use a road.

²⁹ <http://www.medicareaustralia.gov.au/>

³⁰ World Health Organisation, *The World Health Report 1999: Making a Difference*. Geneva: World Health Organisation, 1999; World Health Organisation. *Framework Convention on Tobacco Control*. Geneva: World Health Organisation, 2003.

The system is widely reported to effectively stimulate innovation as the private sector seeks to reduce costs, increase the speed of construction and improve the quality of infrastructure (and in doing so reduce maintenance costs). Examples of innovative advances include porous and ultra thin asphalt. Until 1998, the main criticism of the system was the cross subsidisation of some old sections of road with new parts, as this opened up the system to political influence and resulted in the construction some stretches of road that were not economically justified. However, following an EU ruling that this was anti-competitive in 1998, projects have since been tendered on an open basis.³¹ Similar schemes in other European countries have highlighted the need to ensure that the concession period is the right length, as if it is too short innovation will be focussed on cost saving and ongoing operation and maintenance will not be so important, resulting in a reduction in the quality of design and finish.

Japan's SO_x emissions tax – revenue compensates victims

In 1974 Japan's *Compensation Law for Pollution-Related Health Damage* came into force. Under this law companies that produced soot and smoke with SO_x in Japan and had maximum gas emissions of 5,000 Nm³ per hour or more in areas that the government designated as having a high incidence of related illness, and 10,000 Nm³ or more in other areas paid a the Levy in proportion to their emissions volume. The revenue from this, along with a smaller amount of money raised through vehicle taxes, funded a compensation scheme for certified victims. The government estimated the size of the fund required for compensation for the coming year on a yearly basis and set the level of the levy accordingly each year.

California's Geothermal Programme

The California Energy Commission's Geothermal Programme commenced in 1981 under Assembly Bill 1905 (Bosco). Revenue paid to the US government by geothermal plants from production on federal leases in California is used to, *inter alia*, provide assistance to public and private entities for research and development, demonstration and commercialisation projects in the field of geothermal generation. The programme has partnered with over 160 public and private entities to cover the cost of research, development and demonstration in the field and is administered by the California Energy Commission.

South Australia's Natural Resources Management Levy

The Natural Resources Management (NRM) levy was introduced through the *Natural Resources Management Act 2004* in South Australia. Under the 2004 Act, Southern Australia is divided into eight NRM regions. Local councils collect the NRM levy from all ratepayers and forward the revenue to regional NRM Boards to supplement the state and federal government funding to natural resources management. The regional boards are responsible for applying the funds and helping their region to protect and restore its soil, water, landscapes, marine environments, native animals and plants and ecosystems.

Ansett Levy

Australia's Ansett levy was introduced at the Commonwealth level, by the *Air Passenger Ticket Levy (Collection) Act 2001*, in 2001 to finance the entitlements and redundancies of over 13,000 former employees of the collapsed Ansett airline. The levy instigated a \$10 surcharge on top of all airline ticket prices and the fund was administered by the Department for Employment and Workplace Relations. The levy was cancelled on 30 June 2003.

³¹ *Private Finance Paves the Road Ahead*, NYNAS, http://www.nynas.com/templates/Page_____10503.aspx?epslanguage=EN

Annexure 4 – Existing Institutional Structures

Global Carbon Capture and Storage Institute (GCCSI)

The GCCSI was incorporated as a public company limited by guarantee, with an independent board of directors and non-profit status. As a company, it is owned by its members, who include a wide range of Australian and international governments, private companies and other public and private entities. The GCCSI's mandated responsibilities and objectives include:

- collecting and consolidating information and knowledge relating to CCS, as well as analysing and disseminating this information and knowledge, in order to provide both a central repository for the same and a vehicle for CCS capacity building;
- facilitating the commercialisation of CCS technologies by promoting the use of appropriate CCS funding, financing and risk management frameworks;
- drawing on its information and knowledge resources to shape domestic and international climate change mitigation and clean energy policy;
- increasing awareness of CCS, its benefits, and the role it can play in climate change mitigation and clean energy strategies and programs; and
- assisting with the implementation of CCS projects, particularly demonstration and "early-mover" projects.

The GCCSI's board of directors and senior management are drawn from government, the private sector and academia, in each case on the basis of expertise and experience across relevant sectors such as energy, mining and resources. This leadership affords the GCCSI the advantages of mixed but balanced membership as described above.

The Australian Carbon Trust

The Australian Carbon Trust, which was established by the Australian Government in 2010 to facilitate the dissemination of energy efficient technologies and practices within Australia in order to drive the country's transition to a low carbon economy, was also constituted as a company limited by guarantee with an independent board of directors with diverse private commercial and government experience, as well as detailed knowledge of climate change and strategies for its mitigation.

This discrete structure blending public and private leadership endows the Australian Carbon Trust with a similarly broad and balanced base of expertise upon which to draw, in developing and implementing its various programs in pursuit of the above objectives.

Australian Cooperative Research Centre for Renewable Energy (ACRE)

ACRE was established to promote the development, commercialisation and deployment of renewable energy and enabling technologies in Australia, and to improve their competitiveness within the domestic marketplace. Similarly to the GCCSI and Australian Carbon Trust, ACRE comprises an independent, statutory Advisory Board, a statutory Chief Executive Officer (who is an *ex-officio* member of the ACRE Board) and staff drawn from DRET.

ACRE enjoys a very broad mandate to support Australia's renewable energy sector. However, certain of its objectives are of particular relevance to the administration and distribution of hypothecated funding to Australia's renewable energy sector, including:

- developing and implementing a funding strategy capable of supporting renewable energy projects along the innovation chain
- encouraging additional investments, including investments from the private sector and state and territory governments; and
- managing the cost effective delivery of government-funded renewable energy and enabling technology programs.

The deployment of hypothecated carbon revenues to help fund renewable energy demonstration activities sits clearly within each of the above objectives, which have been expressly adopted by ACRE.

ACRE's combination of an independent structure and mandate focused on the development, demonstration and commercialisation of renewable energy technologies in Australia mean ACRE is potentially well suited to take on the role of administering hypothecated carbon revenues for distribution to Australia's renewable energy sector.

The Australian Solar Institute (ASI)

Like the GCCSI and Australian Carbon Trust, the ASI is a company limited by guarantee established within DRET's ministerial portfolio. Although the Australian Government is currently the ASI's sole member, it is intended that the ASI will attract new partners and investors over time such that it will be sustained by private investment beyond its initial funding term (of four years).

The ASI was established specifically to support R&D within Australia's solar power sector (across both solar photovoltaic and concentrating thermal technologies). The ASI invests in R&D to accelerate innovation in solar power technologies, while also promoting skills development, knowledge building, and strengthening collaboration between Australian and international solar research and industrial experts. This includes dissemination of the outcomes of the Australian Government's Solar Flagships solar demonstration project program.

The ASI's concentration on solar technologies, and narrower focus on technology R&D rather than subsequent demonstration and deployment, suggest that it may not be as well suited as ACRE to house the institutional framework required to administer and deploy hypothecated carbon revenues to be channelled to a broader range of Australian renewable energy demonstration projects.

Annexure 5 – Financing Mechanisms to Leverage Private Sector Investment

As noted above, the funding required to finance the global transition from fossil fuel-fired power generation to renewable energy "vastly exceeds the capability of the public sector"³² Beyond public funding, significant private investment will also be needed to finance this transition. The ability of carbon revenue hypothecation to channel funding to Australia's renewable energy sector will therefore be significantly enhanced by the use of public/private financing mechanisms with which to promote parallel private investment.

Mechanisms such as grants, investment funds, loans and guarantees have proven effective in attracting complementary private finance for these recipients by sharing risks. Such mechanisms have, for example, increased private investment in the climate change mitigation sector by factors of between three and fifteen.³³

A range of financing mechanisms may be used to distribute and leverage hypothecated revenues. This following table briefly described the key types of public/private funding mechanisms commonly used to drive private investment in renewable energy as well as other sectors, in Australia and around the world, and briefly reviews the potential advantages and disadvantages of each.

Table 5 – Advantages and disadvantages of different financing mechanisms to support leveraging private investment

Grant programs	
Description	A non-commercial funding injection that does not require repayment. Grants are a vital source of funding for earlier stage R&D in a range of sectors.
Advantages	<ul style="list-style-type: none"> – strong and immediate private investment incentive through the use of matched funding requirements. – does not require repayment. – does not give rise to any ownership or equity interest in the funded business. – Grantor may impose conditions, controls or other supervision on the grantee.

³² Green Investment Bank Commission (2010), *Unlocking Investment to Deliver Britain's Low Carbon Future*, Green Investment Bank Commission, at p 9.

³³ UNEP Sustainable Energy Finance Initiative (2008), *Public Finance Mechanisms to Mobilise Investment in Climate Change Mitigation*.

Disadvantages	<ul style="list-style-type: none"> – greater burden on the grantor's funding resources. – Can create only a short term private investment incentive where the grant program is confined to a limited set of grant award rounds. – likely to require ongoing funding support to replenish funds.
Examples	<ul style="list-style-type: none"> – Australian Government's Solar Flagships Program – Australian Government's Low Emissions Technology Demonstration Fund
Investment funds	
Description	An investment fund of any description is essentially a special purpose vehicle into which multiple investors (including other funds) can pool capital, for investment into in a wider range of investments than would be feasible for any one investor acting individually. Investments are made over a certain term, after which the fund liquidates its investments. Funds are a commonly used funding model for investment in higher risk sectors
Advantages	<ul style="list-style-type: none"> – Ability to mitigate investor risk exposure by distributing risk amongst several investors. – Costs and benefits are shared by investors. – Provided investments have appreciated in value, investors are returned their respective principals plus a dividend. – The private investment incentive created will continue for as long as the fund remains open for investment.
Disadvantages	<ul style="list-style-type: none"> – Can be administratively complex, in the identification and assessment of potential targets and its ongoing management. – Restricted in their ability to support investment in pre-demonstration businesses, as the time and risk associated with the development and delivery of earlier stage technologies may be too great for investors.
Loans and subordinated debt	
Description	<p>Loans are characterised by terms relatively favourable to the borrower, most frequently low or zero interest rates (reducing the cost of capital) and longer tenors (reducing the level of ongoing repayments).</p> <p>Provision by a trust of subordinated debt involves a lender accepting a lower priority ranking than other lenders in the event of a default, such that other lenders are more likely to recover a greater proportion of their loans and are therefore more willing to lend at lower cost (given their reduced risk exposure).</p>

Advantages	<ul style="list-style-type: none"> – Other debt finance becomes more affordable for a borrower who may not otherwise have been able to service the debt were it provided on commercial terms. – Generates strong and immediate private investment incentives. – Permits the lender to recover funds via borrower repayments.
Disadvantages	<ul style="list-style-type: none"> – Loans can still present too great a risk of repayment default.
Trust-backed guarantees	
Description	<p>Loan guarantees mitigate the risk to a lender of a loan being lost should a borrower become insolvent (as the guarantor will repay the guaranteed part of loan should the borrower default).</p> <p>Performance guarantees provides an investor with a guarantee for the performance of the relevant technology by reference to specific performance indicators.</p>
Advantages	<ul style="list-style-type: none"> – No up-front funding commitments. – Able to increase the willingness and ability of other financiers to fund what may otherwise be unacceptably risky businesses.
Disadvantages	<ul style="list-style-type: none"> – Generally apply in respect of only a part of the total amount invested by the party obtaining the guarantee.

Different stages in the renewable energy innovation cycle exhibit different parameters. Perhaps most significantly, early stage renewable energy R&D opportunities may not entail significant upfront expenditure on costly plant and equipment, and so may have relatively low capital intensity profiles, whereas demonstration projects (the key focus of this report) generally entail the construction of full-scale plant, and so may be comparatively capital-intensive. These and other variations may mean that a particular funding model is relatively well-suited to a particular stage in the innovation cycle (such as a grants for early stage R&D when capital requirements are relatively low), but not so suitable for other stages. In this context, the above financing mechanisms should not be considered in isolation, but rather as potential components in a portfolio of instruments targeting different renewable energy activities, including demonstration.

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