



# REDGTF Policy Inventory and Analysis: Policy mechanisms that directly support renewable energy and distributed generation in member countries of the Asia Pacific Partnership on Clean Development and Climate

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In 2007, the Renewable Energy and Distributed Generation Task Force (REDGTF) undertook to develop an inventory and analysis of policy measures that directly support renewable energy and distributed generation (RE&DG) in APP countries. The inventory is intended to assist decision making by industry and policymakers, and share experience in implementing measures to support renewable energy and distributed generation within the Partnership.

## Inventory

Information on RE & DG policy mechanisms in each Partner country was supplied by the relevant REDGTF delegates and compiled into an inventory, provided in Attachment A. Delegates nominated the purpose of each policy mechanism according to the following four categories:

- Market making - Mechanisms that support the development and growth of the market for RE and DG technologies
- Industry support - Mechanisms that support industry development and growth (eg deployment) in a targeted market sector or sectors
- Capacity building - Mechanisms that support the development of institutional, financial, political or human infrastructure necessary for increased uptake of RE and DG technologies
- RD&D - Mechanisms that support research, development and demonstration of new RE and DG technologies, noting that “demonstration” is defined as the incorporation of a proven concept in a prototype device or unit (eg pilot device or plant) that has a practical application in a targeted market sector.

Noting that some of the policy mechanisms address multiple purposes, Table 1 provides a breakdown of the number of measures in the inventory against the four categories above. The large number of market making mechanisms implemented in APP countries reflects the widely accepted view that they are the most cost-effective in stimulating development and deployment of RE & DG technologies. There are relatively fewer measures to support research, development and demonstration of emerging technologies within the APP.

**Table 1. Number of measures in the REDGTF Policy Inventory and Analysis against the four categories.**

<i>Purpose of the Mechanism</i>	<i>No.</i>
Market making	36
Industry support	26
Capacity building	16
RD&D	12

A breakdown of the types of policy measures used in individual APP countries to support RE & DG is provided in Table 2. A total of 15 policy measures were identified, with a wide spread across the 7 partner countries. Table 2 illustrates the broad range of measures implemented in each country, according to their specific circumstances. Capital grants, tax incentives and targets are particularly popular.

**Table 2. Breakdown of policy measures used in APP countries to support RE & DG.**

<i>Policy Measures</i>	<i>Country</i>						
	<i>Australia</i>	<i>Canada</i>	<i>China</i>	<i>India</i>	<i>Japan</i>	<i>Korea</i>	<i>United States</i>
Emissions trading scheme	✓ <sup>1</sup>						
Feed-in tariffs	✓ <sup>2</sup>		✓	✓		✓	
RE targets							
Mandatory RE targets/RE Certificates	✓	✓ <sup>3</sup>					✓ <sup>2</sup>
Renewable Portfolio Standards		✓ <sup>3</sup>			✓		✓ <sup>2</sup>
Voluntary RE targets			✓	✓	✓	✓	✓ <sup>2</sup>
Capital Grants, subsidies, loans or rebates	✓	✓		✓	✓	✓	✓
Tax Incentives (exemptions, rebates, credits, etc)		✓	✓	✓		✓	✓
Production Incentives		✓					
Quota systems (resource based)			✓	✓	✓		
Net Metering		✓					✓
Competitive tendering	✓	✓	✓	✓			
CDM			✓	✓			
Obligation/Certification (public buildings)						✓	
Stand-by rates							✓
Lost revenue adjustments							✓
Interconnection standards							✓
Voluntary Schemes (e.g. community)	✓						

*1 Under development at a National level*

*2 At a State level*

*3 At the provincial level*

## **Analysis**

The inventory was supplemented by an analysis of selected policy mechanisms prepared by government and industry commentators in each country. In undertaking this analysis, delegates were asked to consider the following questions:

- To what extent did the measure meet its objectives?
- The number of systems installed, projects funded, capacity deployed, investment leveraged, new industry created?
- The effect on the RE&DG industry in the member country?
- Challenges and/or gaps remaining (administrative issues, barriers not overcome, issues not addressed within the industry)?

- Other learnings?

Key learnings from selected analysis of policy inventory measures are summarised below:

#### *Renewable Energy Targets/Renewable Portfolio Standards*

This type of measure has resulted in significant greenhouse gas reductions and has been observed to create a substantial renewable energy industry, with an associated increase in employment. When combined with other incentives such as tax credits, targets can be an extremely important driver that allow RE projects to be profitable. Consequently, this type of measure is in strong demand from the RE & DG industry.

The uptake of RE & DG has been faster or slower than anticipated for different target schemes, depending on the scheme design. For example, in Australia and Japan, the target was met early, while in Korea, the target was not achieved in the projected timeframe although a strong increase in RE generation was stimulated. It is important to anticipate the effect on the RE & DG industry once the target is reached, as the sudden removal of the incentive can be disruptive. The size of the target and length of scheme can also favour early movers with least cost technologies. Indeed, targets can be deliberately configured to favour one or more technologies. In addition, it has been argued that clean distributed generation and combined heat and power (CHP) should be included in target schemes to maximise the energy savings benefits and greenhouse gas reductions inherent in these technologies.

A difficulty that has been encountered as a consequence of targets is the limitation on large scale deployment created by existing energy system structure and regulations. For example, the intermittent electricity supply of some RE & DG technologies is a barrier to their introduction to grids on a large scale, despite the market signal introduced by a target.

#### *Feed-in Tariffs*

This type of market scheme has even stronger demand from the RE industry than targets, since it typically guarantees a steady price to RE generators over the long term. In several countries, feed-in tariffs have been shown to strongly assist deployment of solar and wind technologies in particular, with strong investment stimulated in these sectors.

As above, this market signal can be hampered by electricity networks not being able to cope with large quantities of intermittent RE. Capping the number of generators to which the tariff is applied can also lead to a sharp drop off in investment once the cap is reached.

#### *Grant programs and tax credits*

Grant programs and tax credits have a positive impact on RE & DG economics and increase market acceptance. They can also lead to significant capacity building and employment. Grant programs and tax credits allow developers/users of RE& DG to capture some of the monetary value for the societal benefits of RE & DG and help offset some of the technical and business risks of emerging technologies. These incentives can be instrumental in enhancing project economics that are often marginal when based on user cost savings alone.

Grants can provide a step change to specific industry players, but without a broad market mechanism do not develop a broad industry. Successful commercialisation of RE technologies on a significant scale requires both developmental assistance and market incentives. There is a need for “technology push” programs to be accompanied by “market pull” mechanisms.

The requirement to provide matching funding in some grant programs has proven difficult for some RE R&D projects that have not yet attracted commercial interest and investment. Consideration needs to be given to

the likely technology ‘winners’ resulting from conditions set by the grant program. Grant programs also need to be sensitive to the fluctuating prices of equipment and labour. The excessive administrative burden for some programs can be a barrier to greater access by the RE & DG industry.

Industry has expressed a strong need for further commercial development and demonstration of low carbon technology. For example, combined heat and power technologies are often not supported by grant programs and are undervalued in terms of the increased efficiency inherent in CHP. Further, emerging technologies pass through a grey area in terms of being classified ready for commercialisation or needing further development and demonstration. This can lead to difficulty in assessing the need for funding of some technologies.

### *Rebates*

Rebate schemes are very successful in stimulating greater use of RE technologies at the residential scale; however they may have limited impact in reducing the cost of technologies if there are larger factors at play. Rebates have been found to increase demand, strengthen the skills base, stimulate local manufacturing and R&D, improve quality and standards, and increase public awareness.

The annual funding profiles of rebate programs needs to be flexible (funding can be moved from one financial year to another) to avoid stop-start processing of grants/rebates, and loss of experienced staff, which is disruptive to industry.

### *Low Interest Capital Loans*

This type of measure has been reasonably successful, and provides a useful model for public venture capital programs. However, small grants often represent too high a transaction cost for companies to drive real technology change.

## **Literature Review**

The REDGTF inventory and analysis was supplemented with a high level literature review of readily available published data and analyses of policy measures adopted in other countries (not just APP countries). The literature, together with discussion among REDGTF delegates, points to the importance of complementary policy measures across three broad areas in reducing the cost of emissions from the energy sector over time. These areas are:

- Market support mechanisms – such as feed-in tariffs, renewable portfolio standards, quotas, investment grants and tax breaks that are designed to positively discriminate for new, market-ready, low-emission, energy supply and use products, processes and services to drive down their volume-cost learning curves.
- Innovation support mechanisms – including, but not limited to, grants for research, development and demonstration assist productivity and/or cost improvements in new, low-emission products, processes and services.
- Pricing greenhouse gas (GHG) emissions – whether through a trading or taxation mechanism – which are designed to correct market failure by internalising the cost of the environmental externalities of GHG emissions.

The literature review and associated documents are provided at Attachments B through F:

- The literature review prepared for the 5<sup>th</sup> REDGTF meeting in Seoul, Korea, is provided at Appendix B.

- An inventory of current support systems in European Countries is provided at Appendix C.
- An overview of global renewable energy promotion policies contained in REN21's Renewables 2007 Global Status Report is provided in Appendix D.
- Current support schemes for combined heat and power (CHP) are summarised in Appendix E.
- A comparison of various policy mechanisms, particularly in the context of liberalised electricity markets, is provided in Appendix F.

## Appendix A – Inventory and Analysis of existing policy mechanisms that directly support RE&DG in APP countries

Key to “Purpose of the Mechanism”
<b>Market making:</b> Mechanisms that support and encourage the development and growth of the market for RE and DG technologies.
<b>Industry support:</b> Mechanisms that support and assist industry development and growth (eg deployment) in a targeted market sector or sectors.
<b>Capacity building:</b> Mechanisms that support the development of institutional, financial, political or human infrastructure necessary for increased uptake of RE and DG technologies (e.g. reducing barriers but excluding physical RE and DG deployment).
<b>RD&amp;D:</b> Mechanisms that support research, development and demonstration of new RE and DG technologies, noting that “demonstration” is defined as the incorporation of a proven concept in a prototype device or unit (eg pilot device or plant) that has a practical application in a targeted market sector.

### AUSTRALIA

INVENTORY			ANALYSIS	
<i>Policy mechanisms/ Programs/ Laws/ Existing Plans</i>	<i>Purpose of the Mechanism/ Objective(s)</i>	<i>Type and Size of Measure (e.g. \$\$ leveraged, years, % deployed, MW generation, etc) Method of Implementation</i>	<i>GOVERNMENT ANALYSIS (for selected programs) (See page 1 for questions for analysis)</i>	<i>INDUSTRY ANALYSIS (for selected programs) (See page 1 for questions for analysis)</i>
<b>Commonwealth</b>				
National Emissions Trading Scheme	Market making  To place Australia on a low emissions trajectory, with a target of a 60% reduction in carbon emissions on 2000 levels by 2050, while managing the economic costs of transition, and to provide incentives for development and investment in low-emissions technologies.	<u>Cap and trade emissions trading scheme</u>  A detailed design will be prepared by the end of 2008 and the scheme itself will begin in 2010.  The Scheme will have maximum practical coverage of greenhouse gases and industry sectors and will be designed to link with other schemes. It will address the competitive challenges facing emission-intensive trade-exposed industries in		

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		<p>Australia.</p> <p>Caps will be consistent with the medium term and long term emissions reductions targets for Australia. The government has committed to reduce Australia's emissions by 60% below 2000 levels by 2050. A firm indication of the medium term target will be made by the end of 2008.</p> <p>Measures will be developed to assist households – particularly low income households – to adjust to the impact of carbon prices.</p>		
Mandatory Renewable Energy Target (MRET)	<p>Market making</p> <p>Objectives are: To provide renewable energy deployment and industry development pull-through to complement other technology support measures;</p> <p>To reduce emissions of greenhouse gases; and</p> <p>To ensure that RE sources are ecologically sustainable.</p>	<p><u>Legislation</u> Renewable Energy (Electricity) Act 2000/Renewable Energy (Electricity) Regulations 2001</p> <p>9,500 GWh of additional renewable electricity per year by 2010 maintained until 2020.</p> <p>The legislation places a legal liability on wholesale purchasers of electricity (retailers and large users) to purchase Renewable Energy Certificates (RECs) that are created by renewable</p>	<p>1. MRET significantly increased renewable energy generation in Australia in an ecologically sustainable manner, while providing abatement of greenhouse gases from stationary energy generation.</p> <p>MRET is currently projected to abate around 6 million tonnes of carbon dioxide equivalents in 2010. This is around 17% of all abatement from measures being undertaken in the stationary energy sector.</p> <p>2. Over 200 renewable energy power stations harnessing a wide range of renewable energy technologies have been accredited under the scheme. The scheme has leveraged around</p>	<p>This policy has resulted in significant quantities of renewable energy generation plant being installed. The new renewable energy projects stimulated by the measure include over 800 MW of wind and over 150 MW of cogeneration fired by sugar cane by-products. Solar hot water system installation has also been strongly supported by the measure.</p> <p>The new renewable energy generation has resulted in significant greenhouse gas reductions of over 6 million tonnes per annum from the business as usual scenario.</p> <p>The MRET scheme has been instrumental in creating a substantial renewable energy industry in Australia and has resulted in</p>

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		<p>energy generators.</p> <p>MRET is administered by a Statutory Authority (the Office of the Renewable Energy Regulator).</p> <p><b>Expanded Renewable Energy Target</b> The new Government has a policy commitment to achieving a 20 per cent share of renewable energy in Australia's electricity supply in 2020. As a key measure in delivering on this goal, the Government will establish a national Renewable Energy Target scheme. This will increase the previous Mandatory Renewable Energy Target (MRET) by over 4 times to 45,000 gigawatt-hours in 2020.</p> <p>Existing and proposed state and territory renewable energy targets, along with the current MRET, are to be brought into the single national scheme. The Commonwealth Government is designing the national scheme in co-operation with state and territory governments through a Council of Australian Governments (COAG)</p>	<p>\$3.5 billion in private sector renewable energy investment.</p> <p>3. The scheme has played a significant role in supporting the renewable energy sector, increasing renewable generation by more than 50 per cent above the 1997 level.</p> <p>4. Size of target and length of scheme favoured early movers with least cost technologies.</p>	<p>significant employment associated with the construction and operation of the projects built under the measure.</p> <p>Faster than anticipated response and project development from industry has resulted in oversubscription of the target measure. As a result there is no longer any incentive for the deployment of renewable energy from this measure.</p> <p>The initial target of 9,500 Gwh by 2010 was met by 2005 leaving the scheme largely oversubscribed.</p> <p>Overall the scheme resulted in 850 MW of wind and 2,500 GWH of output from the wind industry.</p>

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		<p>working group process. Design of the expanded national scheme, which will be based on the MRET scheme's legislative and administrative framework, is expected to be completed late in 2008 and legislation put in place during early to mid 2009.</p> <p>The target will assist in the transition towards an Emissions Trading Scheme and will be phased out between 2020 and 2030 as the Emissions Trading Scheme matures.</p> <p>Under the auspices of COAG, state and territory governments are also working to develop a nationally harmonised approach to renewable energy 'feed in tariffs' for micro-generation .</p>		
Energy Innovation Fund	<p>RD&amp;D</p> <p>Re-establish Australia as a global leader in scientific research and development in clean energy technologies.</p> <p>The fund aims to retain Australian ownership of technologies developed in</p>	<p><u>Capital Grants</u></p> <p>\$150 million over four years to support development of clean energy technologies in Australia.</p> <p>Initiatives to be supported include \$50m for the Australian Solar Institute to expand Australia's solar</p>		

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	Australia, and to foster jobs and economic opportunities that flow from their commercialisation.	thermal research capacity and build on the existing CSIRO centre in Newcastle, \$50m for photovoltaic research and development and \$50m for general clean energy research and development, including energy efficiency, energy storage technologies and hydrogen transport fuels.		
Renewable Energy Fund	<p>Market Making / Industry support</p> <p>To accelerate development, commercialisation and deployment of renewable energy technologies in Australia.</p> <p>The fund aims to embrace Australian economic opportunities represented by the growing global market for renewable energy.</p>	<p><u>Competitive Capital Grants</u></p> <p>Funding of \$500m available from 2009/10. Competitive grants between \$10m and \$75m will be provided to develop, commercialise and deploy renewable energy in Australia. Private sector encouraged to contribute \$2 for every \$1 in government support to generate \$1.5bn worth of investment in renewable energy technologies.</p> <p>This measure includes \$15m over 4 years for second generation Biofuels Technology Research and Development program. This program will assist in developing the next generation of ethanol technology utilising sugar cane waste and other woody material as alternative</p>		

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		fuel sources.		
National Solar Schools Program	Market making/Capacity building  To facilitate the installation of solar panels and other energy and water efficiency improvements in all schools throughout Australia. To raise public awareness through the education system about renewable energy and options to improve energy efficiency	<u>Capital Grants</u>  The Government will provide \$480.6m over 8 years in the form of grants of up to \$50,000 for Australian schools. To receive the maximum grant schools must install a minimum 2kW solar power system. The program also supports the installation of other renewable generation technologies and expenditure on water and energy efficiency.		
Clean Business Australia (Green Building Fund, Re-tooling for Climate Change and Climate Ready)	Capacity building  To establish a partnership between business and industry to deliver energy and water efficient projects with a focus on productivity and innovation.  The program aims to implement efficiency gains in the building sector, which have been estimated to significantly reduce the costs of tackling climate change across all sectors of the economy.	<u>Capital Grants</u>  \$240 million over four years across three programs:  - Green Building Fund (\$90m) Program will assist Australian business to implement energy efficient measures. The Fund will subsidise 50 % of the cost of retro-fitting and retro-commissioning existing commercial office buildings, up to a maximum of \$200,000 per building. Funds will be awarded to organisations on a competitive basis, with priority given to large building (over 5000 m <sup>2</sup> ).  - Re-tooling for Climate		

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		<p>Change (\$75m) Program will assist Australian manufacturers to improve their production processes, energy and water efficiency and to reduce their carbon emissions. Grants of between \$10,000 and \$500,000, up to a third of the cost of each project, will be provided to small and medium sized companies.</p> <p>- Climate Ready (\$75m) This competitive grants program will assist small and medium enterprises to develop and bring to the market new products that save energy and water and reduce pollution.</p>		
Clean Energy Export Program	<p>Industry support</p> <p>The measure is aimed at promoting Australian clean energy capability and facilitating export opportunities.</p> <p>The program will provide critical capacity to promote Australian clean energy exports, by connecting Australian firms with opportunities in clean energy growth markets such as China, India, Japan and the United States.</p>	Proposed funding of \$15 million over three years.		

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	The program will build on international efforts to foster clean energy technologies, most notably the Clean Development Mechanism of the Kyoto Protocol.			
Clean Energy Enterprise Connect Centre	Industry support  To assist clean energy small and medium sized enterprises to grow and become export ready through the delivery of business and technical services	\$20m over four years – Method of implementation to be confirmed.  The Clean Energy Enterprise Connect Centre is a subsidiary activity to the Clean Energy Export program, and has the same aims.		
Low Emissions Technology Demonstration Fund (LETDF)	Industry support  The objective of LETDF is to demonstrate the commercial potential of new technologies or processes or the application of overseas technologies or processes to Australian circumstances to deliver long-term large-scale greenhouse gas emission reductions.	<u>Capital Grants</u>  AU\$500m LETDF fund (2005/2006 – 2019/2020)  Originally designed to leverage an additional AU\$1 billion in private sector investment  Expected Government \$ to private sector \$ ratio of 1:2	1. Six projects were approved under LETDF accounting for \$410 million of the \$500 million allocated to the program. Thirty applications were processed covering a diverse range of low emission technology projects worth more than \$10 billion.  2. Up to \$75 million was awarded under LETDF to construct a 154 megawatt solar power station in north-west Victoria, using new solar concentrating technology. This grant is being matched with \$295 million of private investment.  3. The funding provided to the solar concentrating project under this program has led to the planned development of a manufacturing and test facility.	It is difficult to judge the success or otherwise of this measure at this time because a number of projects funded under the scheme are yet to be implemented.  There is a strong need for further commercial development, and demonstration, of greenhouse gas reduction technology. The level of support, at up to 33% of total project costs is welcomed by industry as representative of the risks associated with the demonstration of new technologies

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			<p>4. The LETDF aims to address the demonstration phase within the technology innovation chain. Once demonstrated, these technologies may still require Government support to encourage deployment of the new technologies, such as mandated clean energy targets.</p> <p>5. Assessing and contracting large scale technology demonstration projects is complex and takes time.</p>	
Renewable Energy Development Initiative (REDI)	RD&D  To support the development of new RE technology products, processes or service including research and development, proof of concept and early-stage commercialisation with high commercial and greenhouse gas abatement potential.	<u>Capital Grants</u>  AU\$100m (2004/2005 – 2010/2011)  AU\$50,000 up to \$5m per project.  Government \$ to private sector \$ ratio of 1:1.  Program is no longer accepting new applications. It has been replaced by new initiatives including Clean Business Australia and the Renewable Energy Fund	<p>1. REDI provides a continuation of Government support for late stage research and development, demonstration, and commercialisation of renewable energy technologies, that was initially provided by the Renewable Energy Commercialisation Program (RECP).</p> <p>2. To date, allocation of \$66 million for 30 projects has been approved under the REDI program.</p> <p>3. As most projects are still at an early stage, analysis of the effect of the program is not yet considered appropriate.</p> <p>4. The REDI program requires the applicant to provide matching funding for the project. This requirement has proven difficult for</p>	<p>This initiative has funded some promising renewable energy technology demonstrations. There have been some challenges in determining the eligible status of some technologies, as they may:</p> <ul style="list-style-type: none"> <li>• Already be seen as commercial, or</li> <li>• Seen as requiring further R&amp;D before being suitable for demonstration.</li> </ul>

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			some renewable energy R&D projects which have not yet attracted commercial sector interest and investment.	
Renewable Remote Power Generation Program (RRPGP)	Market making / Industry support  To increase use of RE generation technologies (including individual systems and community systems) in remote areas not serviced by the main electricity grid.	<u>Capital Grants</u>  AU\$205m in 2000 An additional \$80.5m allocated in 2007. (2000/01-2011/12)  Year 2000 funds are delivered through approved State and Territory programs.  From 1 July 2007, new funds are delivered through the Australian Government. Funding of up to 50% of eligible costs. New system must reduce reliance on fossil fuel generation.	The program is successful in providing an effective electricity supply to users in rural and remote areas, stimulating the development of renewable energy. It is reducing reliance on diesel in remote off-grid areas.  2. To June 2007, the program has supported the installation of 5485 systems, totaling 9489 kW, and leveraging about AU\$99.7 million in private investment.  3. RRPGP has led to a strengthened skills base, has helped retain manufacturing and R&D in Australia, improved quality and standards and brought about much greater visibility for renewable energy in the media and public in remote areas.  4. The RRPGP is a popular program with industry and the public, and has been expanded from 1 July 07 to include all states.  5. Strong demand for program funds has been driven by the large number of eligible applicants. In addition to individual householders, proponents	This measure has been very successful in promoting the use of renewable energy technologies in replacing fossil fuel generation (mainly diesel generation) in remote grids. It has also provided support for new renewable energy technologies such as concentrated solar PV and innovative wind-diesel control systems.  The measure has led to significant capacity building and employment in the remote power sector, with projects being installed in WA, NT, QLD, SA and TAS.  A key issue for the measure, however, has been the large disparity on a state-by-state basis for funding [which was based on historical use of diesel fuels by public generators]. Victoria for example has been allocated no funding. This issue has been addressed through the new funding arrangements proposed from 1 July 2007.

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			have put forward a large number of proposals for major projects to supply renewable energy at a community level. This demand has not subsided over time. The program has needed to be sensitive to the financial contribution required of the rebate recipient, and to the fluctuating prices of equipment. Focused support has been necessary in remote areas due to limited number of installers, and additional costs incurred for remote installations. Flexibility in annual funding profiles (ie the ability to move money from one financial year to another) has been necessary to avoid stop-start processing of rebates and projects, and loss of experienced staff which is disruptive to industry. The program has been successful in increasing uptake of PV and wind turbine systems, increasing capacity of industry and improving the quality of installations.	
Solar Cities	RD&D/Capacity building  To show how solar power, smart meters, energy efficiency and new approaches to electricity pricing can combine to provide a sustainable energy future.  Primary objectives of the	<u>Capital Grants</u>  AU\$94.1m  Six Solar Cities have been announced in Australia – Adelaide, Blacktown, Townsville, Alice Springs, Central Victoria and Coburg, with Commonwealth funding totalling \$77.1 m (of which	1. The Solar Cities program will be implemented over a number of years up to 2013.  2. Four of the six announced Solar Cities have signed Funding Agreements with the Australian Government and have been provided with initial grant funding. Blacktown Solar City launched on 28 July 2007, Adelaide Solar City was launched on	This program has generated significant public interest in the cities which lodged applications to become a Solar City. The full effectiveness of the measure will begin to be evident in 3 – 5 years time after the installations that have been funded are completed.  High level grants for demonstration like LETDF and Solar Cities provide a step change to specific industry players but

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	<p>program are to:</p> <p>i) demonstrate the economic and environmental impacts of integrating cost reflective pricing with the concentrated uptake of solar, energy efficiency and smart metering technologies; and</p> <p>ii) identify and implement options for addressing barriers to distributed solar generation, energy efficiency and electricity demand management for grid-connected urban areas.</p> <p>These objectives will be met by collecting data from the Solar Cities projects over a number of years, to inform future policy development.</p>	<p>\$8.3m will be provided for the Alice Springs Solar City through RRP GP funds). Matched funding is to be provided for each trial Solar City by the relevant consortium.</p> <p>The Government will also expand the program to include Perth as a Solar City.</p>	<p>6 October 2007, and Alice Solar City was launched on 10 March 2008. The Program is at an early stage and further analysis not applicable.</p> <p>3. The program is at an early stage and analysis not yet possible.</p> <p>4. Four Solar Cities have Funding Agreements in place – negotiations are underway for the remaining two announced Solar Cities.</p> <p>5. Program at early stages and analysis not applicable.</p>	<p>without a broad market mechanism do not develop a broad industry.</p> <p>The program will provide some great data about solar and energy efficiency performance on the grid to inform future developments in energy supply (policy, retail sales, distribution co.s). However, this will occur some years after the policy was first announced (White Paper, 2004)</p>
Solar Homes and Communities Plan (formerly Photovoltaic Rebate Program)	<p>Market making / industry support</p> <p>The primary objectives of the extended program are to:</p> <p>Support the design and installation of solar PV systems on residential and community buildings, and schools.</p>	<p><u>Rebate scheme for residential use.</u></p> <p><u>Capital Grants for schools and communities.</u></p> <p>AU\$52m in 2000 -07</p> <p>Additional commitment in 2007/2008 of AU\$150m over 5 years.</p> <p>To substantially increase the number of rooftop solar power</p>	<p>1. The program has been successful in encouraging greater use of PV systems at the residential scale, developing the photovoltaic industry and increasing public awareness of renewable energy. There has been limited impact in reducing costs, largely because of the global nature of the PV industry.</p> <p>2. Around 9,000 systems generating about 11,200 kW have been installed</p>	<p>The recent doubling of the PVRP rebate to \$8/kWp for residential systems has provided a very significant boost to the PV industry in Australia with consumer interest and demand rising substantially.</p> <p>The presence of the rebate has contributed to the strong growth in PV installations in Australia.</p>

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	<p>Encourage more people to use low emission PV technology</p> <p>Stimulate Solar industry and R&amp;D community to improve effectiveness and decrease cost.</p> <p>Support training and accreditation of solar designers and installers.</p>	<p>systems installed throughout Australia over three years (expectation is that around 25,000 households and community buildings will access the program between program inception (2000) and 2010.</p> <p>Originally, funds were managed through States and Territories. New funds, from July 2007 are managed through the Commonwealth.</p> <p>A means test was introduced in May 2008 to target households with taxable incomes of less than \$100,000 per annum.</p> <p>The rebate are paid at the rate of \$8/watt up to a maximum of \$8,000 (1kW). Grants for up to half the cost of a 2kW system are available to up to 400 community buildings per year.</p>	<p>to June 2007, leveraging more than AU\$120million in private investment.</p> <p>3. The program has increased Australian demand for PV, strengthened the skills base, helped retain manufacturing and R&amp;D in Australia, improved quality and standards, and brought about much greater awareness of renewable energy in the public and media.</p> <p>4. A popular program with the industry and public which has been extended and strengthened.</p> <p>5. Demand for rebates is sensitive to the rebate level and hence the contribution required by the applicant, and the retail price and buy-back rate for electricity. Flexibility in annual funding is needed to avoid stop-start processing of rebates, which is disruptive to the industry. The program has been successful in increasing uptake of grid connected and stand alone PV systems, and increasing industry capacity and installation quality. The photovoltaics industry is a global industry with costs driven by global demand and availability of materials.</p>	
Renewable Energy Commercialisation Program (RECP)	<p>Industry Support</p> <p>To support and/or promote the demonstration and</p>	<p><u>Capital Grants</u></p> <p>AU\$42.6m (1998-2007)</p>	<p>1. The program supported a broad range of energy technologies, including: wave, tidal, biomass, hot rocks, solar PV, solar thermal, hydro,</p>	<p>This program was successful in promoting the use of new renewable energy technologies in demonstration projects. This funding has allowed</p>

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	<p>commercialisation of innovative renewable energy equipment, technologies, systems or processes that:</p> <ul style="list-style-type: none"> <li>- have strong potential for widespread commercial application; and</li> <li>- offer the prospect of significant abatement of greenhouse gas emissions over the longer term.</li> </ul> <p>To support industry development activities that will facilitate the wider application of renewable energy technologies, and encourage the development of a sustainable and internationally competitive Australian renewable energy industry.</p>	<p>AU\$6m set aside for the RE Industry Development (REID) Program.</p> <p>Up to 50% of the project costs, from AU\$100,000 up to AU\$1m per project.</p> <p>Last funding round was in 2001. Further funding for commercialisation and demonstration was provided under REDI (see above) in 2004/05.</p>	<p>wind and enabling technologies.</p> <p>2. 48 projects were offered funding between 1998 and 2001. A total of \$34.9m in grants was provided over the life of the program, leveraging approximately \$35 million from project partners and created around 500 direct jobs.</p> <p>3. 25 of the supported projects have either been commercialised or are undergoing further development. Examples are Solahart's high temperature vacuum tube solar thermal collector and Origin Energy's Sliver solar cells. The program contributed to building and diversifying a skills base, widening the manufacturing base, assisting R&amp;D, and adding to the awareness of the renewable energy sector in the market place.</p> <p>4. Commercial success depends on a range of factors including technical innovation, market outlook and timing, and product promotion.</p> <p>5. RECP's maximum of \$1 million per grant was in some cases insufficient incentive for projects to attract investment. Successful commercialisation of renewable energy technologies on a significant scale requires both developmental assistance and market incentives.</p>	<p>companies to assume additional risks on new technologies developed by Australian companies and Universities.</p>

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			The RECP experience highlights the need for “technology push” programs to be accompanied by strong market demand and/or “market pull” mechanisms. A component of RECP for industry development, known as REID, allowed development of capacity building projects for the industry. This has now been superseded by LETA-Renewables.	
Renewable Energy Equity Fund (REEF)	<p>Industry Support</p> <p>To provide early-stage seed funding to encourage the commercialisation of RE technologies;</p> <p>To leverage private sector investment; and</p> <p>To develop fund managers with experience within the RE industry.</p>	<p><u>Low interest capital loans</u></p> <p>AU\$26.6m equity fund (2000-2010 with a possible extension to 2013)</p> <p>(AU\$17.7m from Government + AU\$8.8m from the private sector to establish CVC REEF Investment Managers Ltd.).</p> <p>The Fund makes independent investment decisions into companies requiring seed, start up or early expansion stage RE funding.</p>	<p>1. Program became operational in December 2000 with the engagement of the fund manager. Investments in 13 companies supporting R&amp;D and early stage commercialisation of enabling technologies, wind, hot rocks, biomass, biofuels and marine energy. Eight fund managers have been trained. With the current unrealised internal rate of return in excess of 10 percent REEF is one of the most successful of the Commonwealth’s venture capital funds.</p> <p>2. Total Commonwealth investment to date is \$15 million and \$8 million of private investment. Returns to the Commonwealth of \$7.048 million.</p> <p>3. An early stage evaluation found that the program provides a useful model for public venture capital programs and management of the fund has been prudent, proficient and professional, with the investee</p>	Incentives and tax breaks for research and development are vital. Small grants though are often too high transaction cost for companies to apply for and drive real technology change.

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			<p>companies highly supportive of the program.</p> <p>4. This Fund was restricted to small RE companies with a requirement to return divestments on realisation immediately to the Commonwealth.</p> <p>5. New venture capital programs have broadened the criteria for eligible investments from renewable to low-emission technologies.</p>	
Solar Hot Water Rebate	<p>Market making / Industry support</p> <p>To accelerate the uptake of efficient hot water technologies to achieve cost-effective greenhouse gas abatement, and shield Australian homes against possible energy price rises due to emissions trading.</p>	<p><u>Rebate scheme for residential use</u></p> <p>AU\$252m (2007 – 2012)</p> <p>Rebates of \$1000 available to up to 225,000 households.</p> <p>Solar hot water system must replace electric storage hot water system</p>		
Advanced Electricity Storage Technologies (AEST)	<p>RD&amp;D</p> <p>To maximise the value of RE from intermittent electricity generation through the development and application of advanced electricity storage technologies.</p> <p>Priorities to achieve the objective include: On-grid, megawatt-size</p>	<p><u>Capital Grants</u></p> <p>AU\$20.4m (2004/5-2008/09)</p> <p>Government \$ to private sector \$ ratio of 1:1 expected.</p>		

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	storage for large wind energy systems; On-grid, kilowatt-size storage for household photovoltaic electricity systems; and Remote Area Power Supplies and other renewable electricity applications.			
Renewable Energy & Distributed Generation Task Force (AP6-REDGTF)	Market making / capacity building / RD&D / Industry support  Collaboration amongst partner countries to increase access to, and accelerate the uptake of, affordable and reliable RE&DG across the Partnership countries to achieve sustainable economic, social and environmental development.	<u>Competitive grants process in Australia.</u>  AU\$25m specifically for REDG from a AU\$100m Australian Government APP fund. (2007-2011)  Three key areas for expenditure - deployment; market enabling and RD&D projects.  Three aspirational goals: Measurable outcomes that accelerate deployment of RE&DG over the next five years; To close the remaining gap between the cost of RE generation and conventional generation; and To identify market and policy barriers, and implement mechanisms to overcome them		

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		to enable Partner countries to achieve their deployment goals.		
Greenhouse Gas Abatement Program (GGAP)	Industry support / RD&D  To deliver an abatement of 5 Million tonnes (Mt) of carbon dioxide equivalent (CO <sub>2</sub> -e) per year during the Kyoto period (between 2008-2012)  To leverage private sector investment in emissions reduction technologies.	<u>Capital Grants</u> – no further funding rounds available  AU\$400m (1999 –2012)  Not restricted to RE.		
Low Emission Technology and Abatement (LETA)	RD&D/Capacity Building/Industry support  To encourage uptake of technologies that reduce energy demand and emission intensity across business, industry and local communities;  To leverage private sector investment in emissions reduction technologies; and  To complement other climate change initiatives.	<u>Capital Grants</u>  AU\$26.9m across 3 areas.  One of the 3 sub-programs, <u>LETA - Renewables</u> - aims to complement other climate measures through additional support for strategically important projects that contribute to a stronger RE industry.  Not restricted to RE		
GreenPower	Market making  Joint initiative of ACT,	<u>Voluntary Scheme</u>  No target set.		

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	NSW, SA, QLD, VIC and WA government agencies  To guarantee that the renewable electricity purchased from energy suppliers meets stringent environmental standards.	Customers pay electricity retailers a premium to purchase a percentage of their electricity from accredited GreenPower renewable sources.  Price depends on retailer and percentage purchased.		

## Inventory and Analysis of existing policy measures that directly support RE&DG in APP countries

### CANADA

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ecoENERGY Renewable Initiative	<p>Industry Support</p> <p>The objective of the ecoENERGY for Renewable Power Program is to help position low-impact renewable energy industries to make an increased contribution to Canada's energy supply, thereby contributing to a more sustainable and diversified energy future.</p>	<p>The ecoENERGY for Renewable Power program will provide a production incentive of \$CAD 0.01 per kilowatt-hour for up to 10 years for electricity generated from eligible renewable energy projects commissioned between April 1, 2007 and March 31, 2011, inclusive. The program will encourage the production of 14.3 terawatt-hours of new electricity from renewable energy sources, enough electricity to power approximately one million homes.</p>	<p>This is one of a number of recently introduced ecoENERGY initiatives that are designed to support clean energy technology, increase renewable energy supply, and improve energy efficiency in Canada. This program replaces the Wind Power Production Incentive, which successfully provided 0.1cents/kWh for qualified wind farms for 10 years. The current measure supports a broader range of technologies than the former but it is expected that because of the size of the incentive, it will likely be subscribed highly by wind projects.</p>	<p>According to the Canadian Wind Energy Association (CanWEA), this program signals another exciting period of strong growth for Canada's burgeoning wind energy industry, with support for the deployment of 4,000 MW of new renewable energy capacity in the country. This program is seen as a key incentive for wind development. The Canadian Hydropower Association is pleased to see that there is a commitment to ensuring projects will receive the incentive for a sufficient period of time, and also believes the incentive is sufficient to be effective. However, CHA also expresses concerns because of use of a fixed preset capacity factor of 40% for all hydropower projects; the lack of capacity to accommodate interannual variations of production; and the 1000MW limit for all forms of renewable power except wind citing concerns that the incentive could limit the number of hydropower projects benefiting from the program.</p>
ecoENERGY for Renewable Heat	<p>Market making</p> <p>This program aims to increase use of renewable thermal heat by industry,</p>	<p>The program will pay 25% of the capital costs to industrial, commercial and institutional organizations installing solar thermal technology (air and/or water heating) systems. Program runs</p>	<p>This program is considered a key policy initiative in government's pursuit to promote energy diversification and increase access to clean energy technologies. Program replaces a similar program that was in existence for 8 years.</p>	<p>Canadian Solar Industries Association calls the program a 'substantial step in the right direction' for the federal government that will help ensure that solar industry will continue to expand production and that uptake of solar technology will continue to grow.</p>

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	business and institutions, and boost amount of renewable thermal energy created	April 1, 2007 to March 31, 2011.		Organization advocates similar programs for solar PV. Canadian GeoExchange Coalition also welcomed the initiative in its provision of skills, standards and certification development.
ecoENERGY for Biofuels initiative	Market Making  Program supports production of renewable alternatives to gasoline and diesel with aim of encouraging the development of a competitive domestic industry for renewable fuels.	ecoENERGY for Biofuels will invest up to \$1.5 billion over nine years in support of biofuels production in Canada. Incentive will run from April 1, 2008 and March 31, 2017.  The program will provide an operating incentive to facilities that produce renewable alternatives to gasoline and diesel in Canada. Incentive rates will be up to \$0.10/L for renewable alternatives to gasoline and up to \$0.20/L for renewable alternatives to diesel for the first three years. These maximum rates will decline after three years.	This initiative will make investment in production of biofuels in Canada more attractive by reducing some of the risks associated with fluctuating fuel and feedstock prices. This funding follows several measures to assist farmers and rural communities seize new market opportunities in the biofuels and bioproducts sectors, including the \$200 million ecoAgriculture Biofuels Capital (ecoABC) Initiative, administered by Agriculture and Agri-Food Canada. ecoABC will provide up to \$25 million towards the capital costs of new biofuels production facilities, based on the level of farmer ownership. This also supports \$500M in funding that the government has recently made available, to invest in with the private sector in establishing large-scale demonstration facilities for the production of next-generation renewable fuels. All of these measures complement the renewable fuel regulations that the Minister of the Environment announced in December 2006. These regulations will require 5 percent renewable content based on the gasoline pool by 2010 and 2 percent renewable content in diesel and heating oil by 2012, ensuring that	The Canadian Renewable Fuels Association (which represents ethanol and biodiesel stakeholders) expressed support for this program on its announcement; it is believed that ecoABC will revitalize farms and rural communities throughout Canada; reduce GHGs, and improve energy diversity.

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			these fuels have a robust national market.	
Class 43.2 Accelerated Capital Cost Allowance of the Income Tax Act	Capacity Building  Class 43.2 provides an accelerated rate of write-off for certain capital expenditures on equipment that is designed to produce energy in a more efficient way or to produce energy from alternative renewable sources.	Class 43.2 allows taxpayers to deduct the cost of eligible equipment at up to 50 percent per year, on a declining balance basis. Without this accelerated write-off, many of these assets would be depreciated at annual rates of 4, or 20 percent (with the exception of expenses eligible for the pre-existing Class 34, which were deductible at an annual rate of up to 50 percent).	Class 43.2 is designed to encourage taxpayers who either generate and sell electricity or use energy in other industrial sectors to make efficient use of fossil fuels and increase their use of both alternate and renewable energies. Certain types of property that is part of a system within an industrial process that saves energy and/or uses renewable or alternative forms of energy may be eligible for Class 43.2.	Industry members feel that Class 43.2 send a significant message to both investors and to potential industrial/commercial purchasers of renewable technologies and could result in a considerable increase in sales.
Canadian Renewable and Conservation Expenses	Capacity Building  Canadian Renewable and Conservation Expenses (CRCE) is a category of fully deductible expenditures associated with the start-up of renewable energy and energy conservation projects for which at least 50 percent of the capital costs of the property would be described in Class 43.1.	Under CRCE, eligible expenditures are 100 percent deductible in the year they are incurred or can be carried forward indefinitely for deduction in later years. These expenditures can also be renounced to shareholders through a flow-through share agreement, providing the agreement was entered into before the expense was incurred. To be eligible, costs must be incurred after December 5, 1996.	The early development phase of renewable energy and energy conservation projects typically involves certain intangible costs, such as feasibility and resource assessment studies. The CRCE category of expenditures was introduced in the 1996 Budget to allow investors to fully write-off certain intangible costs associated with investments in renewable energy and energy conservation projects. CRCE is intended to promote the development of conservation and renewable energy projects in the same way that is currently done for investments in other types of resource activities (e.g. oil).	The Canadian Renewable Conservation Expense (CRCE) was designed to support the first “test” wind turbines within a wind energy development. Such testing is useful for several reasons: (a) wind data from meteorological towers is often different than what is actually experienced by a wind turbine, (b) the wind resource can vary significantly at different locations over the land mass covered by a wind farm, and (c) wind turbine technology continues to evolve and new turbines require testing under Canadian conditions.
Net Metering	Capacity Building  Net metering regulation allows the producer to send	Netting period, price for electricity and net metering power limits are determined by each provincial	Net metering can be established either by a utility or through legislation at a provincial government level. In many jurisdictions, net metering is	Two of the target markets (residential and farm & commercial) would require favourable small wind turbines (SWT) net metering policies to reach their full

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	electricity generated from renewable sources to the electrical grid for a retail credit toward the energy costs	jurisdiction.	considered a foundation for promotion of small wind and other distributed energy systems.	potential. A number of provinces are currently developing net metering policies and the MicroPower Connect initiative is working to guide this process at a national level. It will be important to ensure that this process and resulting policies adequately consider issues specific to SWT
Scientific Research and Experimental Development Program (SR&ED)	RD&D SR&ED is a federal tax incentive program to encourage Canadian businesses of all sizes and in all sectors to conduct R&D in Canada that will lead to new, improved, or technologically advanced products or processes. The SR&ED program is the largest single source of federal government support for industrial R&D.	Canadian-controlled private corporation (CCPC) can earn an investment tax credit (ITC) of 35% up to the first \$2 million of qualified expenditures for SR&ED carried out in Canada, and 20% on any excess amount. (This amount was increased to \$3M in Budget 2008) Other Canadian corporations, proprietorships, partnerships, and trusts can earn an ITC of 20% of qualified expenditures for SR&ED carried out in Canada. Established 1986.	The SRED program is considered a key tool to promote private sector R&D in science and innovation, having provided \$3B in tax credits to Canadian companies in 2006; the Government is currently looking at ways to improve the SR&ED program to further encourage this business R&D. Changes announced in Budget 2008 aim to enhance access to R&D funds to small and mid-sized firms.	Some renewable and alternative energy sectors have identified some challenges in benefiting from the SRED program, due to program limitations. Suggestions to make it more effective include harmonization of the rules for the SRED tax credit, or the creation of other means to provide financial support for R&D in small, innovative companies that do not yet have taxable profits.
Various Provincial initiatives	Market Making There are a number of provincial policy incentives; examples include: renewable portfolio standards in several provinces. These RPFs ensure a set amount of electricity is produced from renewable sources; standards are either		Seen as complementary to federal initiatives	

<b>INVENTORY</b>			<b>ANALYSIS</b>	
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	voluntary or mandatory standards. In British Columbia, a carbon tax was recently introduced, effective July 1, which puts a price on carbon-dioxide emissions starting at \$10 per tonne. The measure, applicable to virtually all fossil fuels, is expected to add 2.4 cents to a litre of gasoline initially, rising to 7.2 cents by 2012. This is the first of its kind in Canada. Ontario offers a Standard Offer program, whose intent is to help ON meet renewable energy supply targets by providing a standard pricing regime and simplified rules for small renewable energy electricity generating projects.			

## Inventory and Analysis of existing policy measures that directly support RE&DG in APP countries

### CHINA

<i>INVENTORY</i>			<i>ANALYSIS</i>	
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Renewable Energy Law	<p>Market Making</p> <p>To promote the development and utilisation of RE, improve the energy structure, diversify energy supplies, safeguard energy security, protect the environment and realise the sustainable development of the economy and society.</p>	<p><u>Legislation</u></p> <p>Enacted by the National People’s Congress Standing Committee. Came into effect January 2006.</p> <p>To increase RE to 15% of total energy production by 2020</p> <p>Specific targets include:</p> <p>Hydro - 180GW by 2010-300GW by 2020                      Biomass – 5.5GW by 2010-30GW by 2020                      Wind – 5GW by 2010-30GW by 2020                      Solar – 300MW by 2010-1.8GWGW by 2020                      Solar collectors – 150m<sup>2</sup> by 2010-300m<sup>2</sup> by 2020                      Biogas – 15bn m<sup>3</sup> by 2010-30bn m<sup>3</sup> by 2020                      Liquid fuel – 2.2m tonnes by 2010-12m tonnes by 2020.</p> <p>Implementation incorporates compulsory grid connections; power pricing</p>		

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		and cost sharing.		
Pricing Laws (Feed-in tariffs / competitive tendering)	Market Making  To offer RE generators a guaranteed power price, coupled with a purchase obligation on utilities to stimulate market development.	<u>Feed-in tariffs / competitive tendering.</u> RE Law obliges utility companies to purchase all energy generated from RE sources  Separate pricing laws are applicable for each type of RE source. Only solar, biomass and wind have been determined to date.  Solar – feed-in tariff A payback price calculated for solar PV and solar thermal, based on reasonable production costs and reasonable profit  Biomass – feed-in tariff Price for coal plus 0.25 Yuan/kWh, decreasing by 2% per year from 2010  Wind – Tendering Potential investors selected through a competitive bidding process. Price and domestic content are the key criteria.		
Tax Exempt surcharges	Market Making  Requires end users to pay a	<u>Surcharges</u>  Calculated according to a		

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	tax exempt surcharge to cover part of the difference between grid-connected RE and local desulphurised coal power as well as cost of grid extensions.	formula in the pricing guidelines – the current surcharge is 0.001 Yuan/kWh (0.004-0.006 Yuan/kWh for residential electricity) collected by grid corporations.  Implemented through State Council (pricing department).		
Tax Credits	Market Making  To increase the attractiveness of wind energy projects in China.	<u>Excise tax exemptions</u> <u>Sales tax rebates</u> <u>Tax credits</u>  VAT for wind generation equipment lowered from 17% to 8.5% Income tax for wind projects lowered from 33% to 15%.		
Clean Development Mechanisms	Capacity building  To assist developing countries in achieving sustainable development while contributing to stabilisation of greenhouse gas concentrations in the atmosphere.	<u>CDM Credits for industrialised countries</u>  Priorities in China:  Energy efficiency improvement, development and utilisation of new and renewable energy and methane recovery and utilisation. China Clean development mechanism fund approved more than 300 projects by January 2007. Not restricted to RE		

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### INDIA

<i><b>INVENTORY</b></i>			<i><b>ANALYSIS</b></i>	
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<p>The Electricity Act (2003) / National Electricity Policy (2005)</p>	<p>Market making</p> <p>The Act makes provision for the promotion of co-generation and generation of electricity from non-conventional by the State Electricity Regulatory Commissions (SERCs).</p> <p>This is to be achieved by :</p> <p>Providing suitable measures for connectivity with the grid; For sale of electricity to any person; and</p> <p>Specifying the purchase of a percentage of the total consumption of electricity in the region from non-conventional sources.</p>	<p><u>Legislation</u> <u>Competitive bidding processes at the regional level.</u></p> <p>Section 86(1) (e) of the Act makes it mandatory for distribution companies to buy a certain percentage of total energy consumption from renewable sources of energy.</p> <p>SERCs have responsibility for determining the percentage (or a quota) for renewable power.</p> <p>Existing State-based Renewable Purchase obligations (in % of total energy consumption) include:</p> <p>Andhara Pradesh – 5% 05/06-07/08 (0.5% reserved for wind); Gujarat – 1% 06/07 to 2% 08/09; Himachal Pradesh – Min</p>	<ol style="list-style-type: none"> <li>1. The Ministry provides both fiscal and financial incentives for development of various renewable energy technologies. However, there has been a gradual shift from financial to fiscal incentives. The fiscal policy measures are aimed to make renewable energy technologies ultimately compete in a market mode with all other competing technologies. The research and development effort is primarily to enhance efficiency and bring down the cost of these technologies.</li> <li>2. The aims and targets are at Annexure-1.</li> <li>3. Achievements on account of the measures are annexed in table at end of Indian</li> </ol>	

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		20% 2007/10; Haryana – up to 2% 06/07 to 10% 09/10; Karnataka – Min 5% and max 10%; Kerala – Min 5% (2% from SHP, 2% from wind & 1% from all other non- conventional sources); Madhya Pradesh – Min 0.5% (including 3 <sup>rd</sup> party sales from wind energy) 04/07; Maharashtra – Min 3% 06/07 to 6% 09/10; Orissa – 3% (for wind and SHP 07/08 Rajasthan – min 4.8% 07/08 to 9.5% 11/12; Tamil Nadu – Min 10% 06/09; Uttar Pradesh – 5%; West Bengal – Min 1.9% 06/07 to 3.8% 07/08	submission.	
National Tariff Policy	Market making  Under the Electricity Act to fix a minimum percentage for purchase of energy from RE sources taking into account availability of such resources in the region and the impact on retail tariffs.  In the long-term these technologies will need to	<u>Legislation</u>  The Electricity Act 2003 / National Electricity Policy (2005)  Most states have specified tariffs for procurement of power from RE based projects.  Tariffs vary from state to state and are generally		

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	compete on a “full cost” basis with other sources of supply.	worked out on the basis of cost of generation assuming 14% to 16% return on equity by investors.  Competitive bidding (as far as practicable) within the same type of source.		
Wind power policies	Market making  To support private development of wind farms	<u>Wheeling, Banking, Buy-back, 3<sup>rd</sup> party sale, guarantee of payment by SEB</u>  Participating States: Andhra Pradesh, Gujarat, Maharashtra, Karnataka, Kerala, Madhya Pradesh, Rajasthan, Tamil Nadu, West Bengal		
IREDA (Indian Renewable Energy Development Agency Limited)	Industry support  Established as a public sector enterprise in 1987 to promote, develop and extend financial assistance for Renewable energy and Energy Efficiency projects in the country.	<u>Annual loan disbursements</u>  For the financial year 1 April 2006 to 31 March 2007 the sector-wise disbursement of loan in US\$ million is as under: Wind - 64.6 Small Hydro - 14.6 Biomass Cogeneration – 4.9 Biomass Power – 9.7 Waste to Energy – 0.3		
Foreign Investment Policy	Industry Support  To provide a liberalised	<u>Joint ventures with Indian partners</u>		

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	foreign investment approval regime to facilitate foreign investment and transfer of technology with the purpose of setting up RE based power generation projects (Build, own and operate basis preferred).	100% FDI allowed in renewable energy sector through automatic route		
Clean Development Mechanisms	Capacity building  To assist developing countries in achieving sustainable development while contributing to stabilisation of greenhouse gas concentrations in the atmosphere	<u>CDM Credits for industrialised countries.</u>  599 projects approved by the national CDM authority as at April 2007. (220 or approx. 35% of total projects registered by the CDM Executive Board ).		
Integrated Rural Energy Program	To provide for minimum domestic energy needs for cooking, heating, and lighting purposes to rural people in selected village clusters in each District, with a focus on renewable energy.	<u>Administrative Sanction (2005/06)</u>  IREP Program was discontinued on 1.4.2007. It proposed to electrify 10,000 remote villages by the year 2012.		

**Estimated medium-term (2032) potential and cumulative achievements as of 30.06.2007**

S.No.	Sources/Systems	Estimated Potential	Cumulative Achievements (as on 30.06.2007)
<b>I.</b>	<b>Power From Renewables</b>		
<b>A.</b>	<b>Grid-interactive renewable power</b>		
1.	Bio Power (Agro residues & Plantations)	16,881 <sup>1</sup>	542.80 MW
2.	Wind Power	45,195 <sup>2</sup>	7230.99 MW
3.	Small Hydro Power (up to 25 MW)	15,000	2013.17 MW
4.	Cogeneration-bagasse	5,000	634.83 MW
5.	Waste to Energy	2,700	43.45 MW
6.	Solar Power		2.12 MW
	<b>Sub Total (in MW)</b>	<b>84,776</b>	<b>10,467.36 MW</b>
<b>B.</b>	<b>CHP / Distributed renewable power</b>		
7.	Biomass / Cogen.(non-bagase)		45.80 MW
8.	Biomass Gasifier	-	86.53 MW
9.	Energy Recovery from Waste	-	19.76 MW
	<b>Sub Total</b>		<b>155.09 MW</b>
	<b>Total (A + B)</b>		<b>10,622.45 MW</b>
<b>II.</b>	<b>Remote Village Electrification</b>	-	3207 / 830 (villages / hamlets)
<b>III.</b>	<b>Decentralised Energy Systems</b>		
10.	Family Type Biogas Plants	120 lakh	39.34 lakh
11.	Solar Photovoltaic Program	20 MW/Sq.km.	
	i. Solar Street Lighting System	-	61,321 nos.
	ii. Home Lighting System	-	3,17,066 nos.
	iii. Solar Lantern	-	5,65,828 nos.
	iv. Solar Power Plants	-	1870.00 kWp

12.	Solar Thermal Program	-	
	i. Solar Water Heating Systems	140 million sq.m. collector area	1.95 million sq.m. collector area
	ii. Solar Cookers	-	6.17 lakhs
13.	Wind Pumps	-	1180 nos.
14.	Aero-generator /Hybrid Systems	-	608.27 kW
15.	Solar Photovoltaic Pumps	-	7068 nos.
<b>IV.</b>	<b>Other Programs</b>		
16.	Energy Parks	-	494 nos.
17.	Aditya Solar Shops	-	268 nos.
18.	Battery Operated Vehicle	-	258 nos.
19.	Research, Design, Development	-	600 Projects

*MW = Megawatt , kW = Kilowatt, kWp = kilowatt peak, sq.m. = square metre, CHP = Combined Heat & Power*

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### JAPAN

<i><b>INVENTORY</b></i>			<b>ANALYSIS</b>	
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Special Measures Law concerning Promotion of the Use of New Energy	Market making  To accelerate the advancement of the introduction of New Energy, aiming to achieve its targets by 2010.	<u>Legislation</u>  Capital Grants  Based on this law, actionable policy measures for each area that the public, utilities, and governments should consider were determined. In 2002, the ordinance of this law was revised to include biomass energy and the usage of snow as cooling medium.	This is the law to define new energy and its importance. This law has provided broad support and incentives to promote various types of new energy including those of renewables.	The capital grants for various types of renewables are welcome. However, the law does not touch upon the problems of existing energy structure and regulation, which limits large-scale deployment, especially the issue of intermittency.
Special Measures Law on Use of New Energy, etc., by Electric Utilities  Common name: RPS (Renewables Portfolio Standard) Law	Market Making  Expanding introduction of new energy, etc., in the electric field, and to contribute to the securing of stable energy supply and environmental protection, by obligating electric utilities to use electricity generated using new energy, etc., for a certain volume or more.	<u>Legislation</u>  16.0TWh by 2014 (Eligible RE technologies: Solar PVs, offshore and onshore wind, bioenergy, hydropower, geothermal.)  Electric utilities select the most advantageous method from among the following. 1)To generate electricity of new energy, etc., on their own, 2) To purchase electricity of new energy,	1. Very effective in promoting renewables in a cost-effective manner. So far planned targets have been achieved with surplus.  2. Based on achievements to date, increased targets have been announced beyond 2010 until 2014.	1. From the point of renewable supplies, the targets are still too low in consideration of the potential for renewables. For example, the number of wind power applications to utility companies is larger than the acceptance by the utility companies.  2. From the point of Utility companies, the government should take care of the problems of grid connection to increase the share of renewables especially from wind. Also power companies are accepting a kind of voluntary feed-in tariff for residential customers setting the

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		etc., from another power generation utility, or 3) To purchasing the volume equivalent to electricity of new energy, etc., from another power generation utility, etc.		buying price at the same level of selling price.  3. The advantages of RPS have not yet been fully exploited in consideration of the existence of potential renewable suppliers.
Actual Result of Introducing New Energy, and Introduction Targets	Market making  To promote nation-wide uptake of RE by setting a long-term target of new & renewable energies in the total primary energy supply.	<u>Introduction Targets</u>  In 2005, METI published a report on “Energy Supply and Demand Projection by 2030” in which 19.1MMkl of new & renewable energies is projected to supply (3% of the total primary energy supply). The 2010 targets for each type of new energy sources are: Solar PV: 4,820MW -Solar thermal: 900,000kl -Wind: 3,000MW -Waste and biomass power: 4,500MW -Waste thermal use: 1,860,000kl -Biomass thermal: 3,080,000kl -Others (black liquor, waste wood, etc): 4,830,000kl	This measure provides an outlook of governmental targets by types of renewables. This is necessary and useful to formulate individual governmental policy to identify priorities and to formulate individual promotional measures.	1. This provides the future outlook of Japanese renewable energy industry. The PV industry will be very happy with the exceptionally bright outlook for solar PV.  2. However from the point of view of other renewable industry sources of supply, the high expectation and strong prioritization of PV may lead to non-optimal renewable energy mix in terms of cost-benefit.
Technology Development	RD&D  To conduct technology development essential for reducing the cost of new	<u>Subsidies</u>  New energy technology R&D: 4.58 billion yen	Technology R&D is the most important part of Japan's renewable energy policy aiming to lead the future technological competitiveness.	1. Policy evaluation of R&D policy should be more on cost-effectiveness not on an ambiguous future picture.  2. Technology development may be

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	energy technology and improving performance.	Fuel cell-related projects: 14.8 billion yen ·Strategic technology development for next-generation storage battery commercialization: 4.9 billion yen.		biased to PV industries if considered other potentials like energy technology of wind and ocean.  3. Advanced technologies are already the issue of private companies. The effectiveness of governmental R&D often in basic issues, but not marketability and commercialization.
Demonstration Testing	RD&D  To implement demonstration tests based on technology development already implemented, with a view to identifying and resolving problems that may hamper the commercialization of new energy technology and verifying the effectiveness of the technology.	<u>Subsidies</u>  New energy technology field test project: 10.82 billion yen  Demonstration project for introduction of biomass-derived fuel: 0.95 billion yen  E3 regional distribution standard model project: 0.76 billion yen  Solid oxide fuel cell demonstration research: 0.77 billion yen	Demonstration is very important for Renewables, because of its intermittency and its sustainability.	1. Demonstration programs, especially large-scale demonstration is helpful for market penetration.  2. However, without acceptance by utility companies the policy does not work.
Promotion of introduction of New Energy	Industry support  To create initial demand for new energy in the initial stage of commercialization in order to induce mass production and early market growth and promote the use of new energy by supporting efforts of	<u>Subsidies</u>  Support for new energy business enterprises: 31.6 billion yen  Projects related to regional new energy planning: 1.33 billion yen	New energy has various significances, such as:  Contributing to the construction of a sustainable economic society;  Creation of new industries and employment;  Contributing to securing stable energy	1. The success of residential PV can be attributed not only to the governmental program, but also the tariff rate voluntary accepted by the power companies.  2. In case of other industries such as windpower and biomass, capital grants for investment are very helpful for their introduction with the help of RPS.

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	companies and local governments to introduce such energy.	<p>Promotion of regional introduction of new energy: 4.47 billion yen</p> <p>Projects related to wind power grid connection: 2.68 billion yen</p> <p>Support for introduction of clean-energy vehicles: 1.98 billion yen.</p>	<p>supply and addressing global environmental problems;</p> <p>As energy resources with low restriction;</p> <p>As oil-alternative energy that contributes to lowering oil dependency, and</p> <p>That places a low burden on the environment, such as low emission of carbon dioxide.</p>	

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### KOREA

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Promotional Act of NRE Development, Utilization & Deployment	<p>RD&amp;D mechanism / Market making / Industry support</p> <p>To reduce Korea's dependence on imported fossil fuels</p> <p>To develop new &amp; renewable energy technologies in Korea</p>	<p><u>Legislation</u></p> <p>The act constituted the initial framework for the development of new and renewable energy technologies in Korea.</p> <ul style="list-style-type: none"> <li>• 1987 : Promulgation of the Promotional Act of NRE Development (Legal basis for NRE R&amp;D activities)</li> <li>• 1997 : 1<sup>st</sup> Amendment - renamed into the Promotional Act of NRE Development, Utilization &amp; Deployment (revised to provide a legal basis for NRE dissemination)</li> <li>• 2002 : 2<sup>nd</sup> Amendment (Including obligation on pub. bldg, certifications, FIT)</li> <li>• 2004 : 3rd Amendment (Including standardization, RESCOs. etc.)</li> </ul>	The Korean government clearly expressed its willingness to the development and uptake of NRE through this Act. Consequently, it has led to the increased awareness and uptake of NRE in the industries and public.	
The 2 <sup>nd</sup> Basic Plan for NRE Technology Development,	RD&D mechanism / Market making / Industry support	<u>Mid- and Long-Term Goals and Action Plan</u>	The original Plan set a deployment target of 3 % share in the total energy consumption by 2006. However, only	

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Utilization, and Deployment	<p>To set goals for NRE sources and technologies, considering the present domestic technological level, available funds and the supply potential</p> <p>To prioritize R&amp;D areas and build infrastructure NREs</p> <p>To promote commercialization and a wide uptake of NREs</p>	<p>Approximately US\$ 6.0 billion (US\$ 9.1 billion, if loans included) of government budget would be required between 2004 and 2011 to achieve the goal of supplying 5% of primary energy consumption with NRE by 2011.</p> <p>Three areas of high-priority</p> <ul style="list-style-type: none"> <li>• Solar PV : Creating a solar PVs industry based on domestic hi-tech semiconductor display industries</li> <li>• Wind Power : Indigenization of advanced technologies to foster the domestic industry</li> <li>• Hydrogen/ Fuel Cell : Narrowing the technology gap with developed countries and deploying the distributed generation systems..</li> </ul>	<p>a 2.26% share was achieved.</p> <p>Although the initial deployment target was not achieved, the energy supply from overall NRE sources has increased by 15% from 2003 to 2006 with wind and solar areas experiencing more than 100 percent increases in deployment.</p> <p>Entering the year of 2008, the government is planning to revise and rename it as the 3<sup>rd</sup> Basic Plan in which goals and strategies will be reset and whose time horizon will be extended up to 2030. At the moment, the Korea Energy Economics Institute (KEEI) is in charge of the national research project to establish the 3<sup>rd</sup> Basic Plan for NRE Technology Development, Utilization, and Deployment. Outcome of this project is expected to be released at the end of September or October.</p>	
Feed-in Tariff for Renewable Energy Technologies (Electricity Business Law)	<p>Industry support / Market making</p> <p>To promote a wide uptake of NRE-based power generation</p> <p>To facilitate market development through</p>	<p><u>Capital grants - Feed in tariffs</u></p> <p>Differentiated feed-in tariffs (2006)</p> <ul style="list-style-type: none"> <li>•Solar PV : KRW 667.38~711.25</li> <li>•Wind : KRW 107.29</li> <li>•Small hydro: KRW</li> </ul>	<p>Feed-in tariff system is one of the most effective programs in expanding NRE markets in a relatively short period.</p> <p>Feed- in tariff was applied to 309MW from 138 power generating facilities in March, 2007.</p> <p>Through the system, 36,057 million Won had been subsidized for</p>	<p>1. The policy measures by the Korean government have played a significant role in deploying new &amp; renewable energy technologies.</p> <p>2. Feed in Tariffs for renewables have played a key role in deployment of Solar PV and Wind.</p>

<b>INVENTORY</b>			<b>ANALYSIS</b>	
<b>Policy mechanisms/ Programs/ Laws/ Existing Plans</b>	<b>Purpose of the Mechanism/ Objective(s)</b>	<b>Type and Size of Measure (e.g. \$\$ leveraged, years, % deployed, MW generation, etc) Method of Implementation</b>	<b>GOVERNMENT ANALYSIS  (See page 1 for questions for analysis)</b>	<b>INDUSTRY ANALYSIS  (See page 1 for questions for analysis)</b>
	compensating the cost difference between the conventional power generation and the NREs	<p>66.18~94.64</p> <ul style="list-style-type: none"> <li>·Tidal : KRW 62.82~90.5</li> <li>·Bio : KRW 68.07~85.71</li> <li>·Fuel cell : KRW 234.53~282.54</li> </ul> <p>Guarantees fixed rates for 5 years for small hydropower, biomass and waste, and for 15 years for wind and solar PV</p> <p>Set an upper limit of support for 1,000 MW for wind and 100 MW for solar PV.</p> <p>This system was recently revised for solar PV in consideration of the possibility that the 100MW cap would be reached earlier than expected. The tariffs were lowered to 8% and 33% depending on capacity and scale. The applicable period has been extended from 15 to 20 years.</p>	<p>179MWh.</p> <p>100MW cap will be reached in the 2<sup>nd</sup> quarter of this year. Confronting the strong request from the industry for the repeal of the cap, the government considers to repeal it on condition that premium of FIT be reduced. In addition, the duration of FIT payment might be elongated for a couple of NREs.</p>	<p>3. The newly established Tariff for Fuel cells will promote domestic deployment and investment in Fuel technology for power generation applications.</p> <p>4. Effects on Solar PV and Wind seem to be most significant. Investment in all aspects of Solar PV industry have increased recently with more and more companies announcing interest in solar cells and systems.</p> <p>5. As more and more DGs are connected to the grid, power fluctuations and unstable frequency could act as a barrier in deployment of RE &amp; DG. Equipment for grid stabilization such as Energy storage and power electronic based grid solutions when installed with RE&amp;DG should receive the same level of subsidy as the RE&amp;DG technologies.</p> <p>6. The current upper limit of support for wind (250MW) and Solar PV (100MW) need to be increased to at least double the current value to promote continued investment and deployment of RE&amp;DG by industry.</p> <p>7. Government should take a more active role in educating the people about the merits of RE&amp;DG utilization and provide more extensive tax credits for installation.</p>

<b>INVENTORY</b>			<b>ANALYSIS</b>	
<b><i>Policy mechanisms/ Programs/ Laws/ Existing Plans</i></b>	<b><i>Purpose of the Mechanism/ Objective(s)</i></b>	<b><i>Type and Size of Measure (e.g. \$\$ leveraged, years, % deployed, MW generation, etc) Method of Implementation</i></b>	<b><u>GOVERNMENT ANALYSIS</u></b> <i>(See page 1 for questions for analysis)</i>	<b><u>INDUSTRY ANALYSIS</u></b> <i>(See page 1 for questions for analysis)</i>
				8. Government should provide more policy measures to promote development and share the risks taken in innovative new clean technologies.
Local NRE deployment subsidy program	Capacity building  To improve energy supply & demand conditions.  To boost local economies by promoting a wide uptake of region-specific NREs	<u>Capital grants</u>  Supporting various projects which are being implemented by local autonomies.  Subsidies can be grouped into two categories, depending on the subsidy ratio and the nature of a project. <ul style="list-style-type: none"> <li>• Subsidies to building infrastructure: Feasibility studies, human resources development, and public relations for development and utilization of region-specific NREs (up to 100%)</li> <li>• Subsidies to installing NRE systems: Deployment of NRE systems such as PV and wind power, etc. (up to 70%)</li> </ul>	Local governments have been subsidized 187,560 million Won since 1996 and 64% of the total subsidy has been provided into wind, PV and solar thermal facilities.	
Loans and Tax Incentive Program	Industry support / Market Making  To expand the deployment of NRE systems and promote commercialisation of scaled-up facilities.	<u>Low Interest Loans and tax incentives</u>  The Government provides long-term low-interest loans to customers or manufacturers of NRE	In 2006 alone the total amount of loans provided to customers or manufacturers of NRE systems was 120 billion Won with 91,325 million Won and 29,148 million WON provided to the installation of NRE systems and NRE manufacturing	

<b>INVENTORY</b>			<b>ANALYSIS</b>	
<b><i>Policy mechanisms/ Programs/ Laws/ Existing Plans</i></b>	<b><i>Purpose of the Mechanism/ Objective(s)</i></b>	<b><i>Type and Size of Measure (e.g. \$\$ leveraged, years, % deployed, MW generation, etc) Method of Implementation</i></b>	<b><u>GOVERNMENT ANALYSIS</u></b> <i>(See page 1 for questions for analysis)</i>	<b><u>INDUSTRY ANALYSIS</u></b> <i>(See page 1 for questions for analysis)</i>
		<p>systems.</p> <ul style="list-style-type: none"> <li>Loans are provided up to 90% of the total investment cost.</li> </ul> <p>About 10% of total investment in installation of NRE systems can be deducted from income or corporate tax.</p>	<p>facilities respectively.</p> <p>The loan system has accelerated the implementation of many projects in the private sector.</p>	
100,000 PV House Project	<p>Market making</p> <p>To reduce the use of fossil fuel.</p> <p>To promote solar power deployment and develop a long-term export market.</p>	<p><u>Capital Grants - Feed-In Tariffs</u></p> <p>Commenced in 2004 The government plans to deploy 100,000 PV systems in residential houses by 2012.</p> <ul style="list-style-type: none"> <li>'04 ~ '06 : 70% subsidized</li> <li>'07 ~ '08 : 60% subsidized</li> <li>'09 ~ '10 : 50% subsidized</li> <li>'11 ~ '12 : 30% subsidized</li> </ul>	<p>7,181 solar systems for homes had been installed by 2006.</p> <p>8,000 homes will be newly installing the systems in their premises.</p>	
NRE obligation for public facilities	<p>Market making</p> <p>To promote the dissemination of new &amp; renewable energy.</p>	<p><u>Obligation / Regulation</u></p> <p>Commenced in 2004. Government enacted legislation which requires that all newly public buildings with over 3,000m2 of gross area allot over 5% of their construction costs to installation of NRE facilities.</p>	<p>From 2004 to June 2007, 343 public institutions have established a plan to install NRE facilities in their premises.</p> <p>They are required to invest 162 billion Won, 5.7% of total investments, into the NRE facilities which will contribute to a substantial NRE deployment equivalent to 15,226 toe.</p>	

<b>INVENTORY</b>			<b>ANALYSIS</b>	
<b><i>Policy mechanisms/ Programs/ Laws/ Existing Plans</i></b>	<b><i>Purpose of the Mechanism/ Objective(s)</i></b>	<b><i>Type and Size of Measure (e.g. \$\$ leveraged, years, % deployed, MW generation, etc) Method of Implementation</i></b>	<b><u>GOVERNMENT ANALYSIS</u></b> <i>(See page 1 for questions for analysis)</i>	<b><u>INDUSTRY ANALYSIS</u></b> <i>(See page 1 for questions for analysis)</i>
Certification of NRE systems	<p>Industry support / Market making</p> <p>To guarantee the quality of systems domestically manufactured or imported.</p> <p>To expand the deployment of NRE systems and to help creating the foundation for market growth by enhancing the consumer reliability</p>	<p><u>Certification/ Regulation</u></p> <p>The certification scheme is currently applied to 5 areas with 14 items.</p> <p>The certification authority is New and Renewable Energy Center and the certification is composed of Technical Evaluation and Facilities Evaluation.</p>	<p>The government promotes NRE deployment by installing NRE-certified systems primarily in government-funded projects.</p> <p>It plans to expand the NRE certification-applicable facilities.</p>	
Human Resource Development Program	<p>Capacity building</p> <p>To strengthen the NRE R&amp;D infrastructure.</p> <p>To meet the human resource demands of NRE-related industries.</p>	<p><u>Capital grants for Training and Education</u></p> <p>Commenced in 2005. Government provides financial support to universities or research institutes to nurture experts in the field of NRE.</p> <p>This Program consists of three different components: Core-technology Research Centre, Specialized Graduate Program, Best Laboratory.</p>	<p>It is a bit early to evaluate the output of the program since it is still at the beginning stage.</p> <p>This program is expected to foster NRE experts in the future and identify the technical barriers to NRE deployment which industries face.</p>	
Subsidy program	<p>Market Making / Capacity building</p> <p>To create initial NRE markets for new technologies and systems.</p>	<p><u>Capital grants</u></p> <p>The subsidy program consists of a pilot deployment program and a general deployment program and it had invested</p>	<p>The subsidy program has provided 66 billion Won to qualified applicants and deployed 13,611 toe-equivalent NRE systems in 460 facilities from 1993 to 2006.</p>	

<b>INVENTORY</b>			<b>ANALYSIS</b>	
<b><i>Policy mechanisms/ Programs/ Laws/ Existing Plans</i></b>	<b><i>Purpose of the Mechanism/ Objective(s)</i></b>	<b><i>Type and Size of Measure (e.g. \$\$ leveraged, years, % deployed, MW generation, etc) Method of Implementation</i></b>	<b><u>GOVERNMENT ANALYSIS</u></b> <i>(See page 1 for questions for analysis)</i>	<b><u>INDUSTRY ANALYSIS</u></b> <i>(See page 1 for questions for analysis)</i>
	To establish and activate deployment infrastructure of commercialized technologies and equipment.	<p>Pilot deployment program It aims to build a basis for new technology development and it takes up 80% of total amount of the subsidy program</p> <p>General deployment program is to expand markets by subsidizing part of installation expenses and it takes up 20% of total amount of the subsidy program.</p>		
Renewable Portfolio Agreement	<p>Market making</p> <p>To facilitate markets' participation in investing in the NRE facilities, particularly power and heat providers through the agreement between Government and Public Energy companies.</p>	<p><u>Agreement</u></p> <p>Renewable Portfolio Agreement is an NRE investment agreement between the government and major energy suppliers.</p> <p>9 energy suppliers including Korea Electric Power Corporation, District Heating Corporation, agreed to invest 1 trillion 261.3 billion Won for three years starting 2006. In 2006, 120.1 billion Won was invested and 429.9 billion won will be invested over this year.</p>	<p>Public Energy suppliers began to establish the NRE team responsible for NRE-focused work.</p> <p>It is projected to deploy 348MW with NRE sources by 2008.</p>	

## Inventory and Analysis of existing policy measures that directly support RE&DG in APP countries

### USA

<i>INVENTORY</i>			<i>ANALYSIS</i>	
<i>Policy Measures/ Programs/ Laws/ Existing Plans</i>	<i>Purpose of the Mechanism/ Objective(s)</i>	<i>Type and Size of Measure (e.g. \$\$ leveraged, years, % deployed, MW generation, etc) Method of Implementation</i>	<i><u>GOVERNMENT ANALYSIS</u></i>  <i>(See page 1 for questions for analysis)</i>	<i><u>INDUSTRY ANALYSIS</u></i>  <i>(See page 1 for questions for analysis)</i>
<b>Federal</b>				
Federal Financial Incentives	Market making / industry support  To promote the development of renewable energy and DG through financial incentives.	<p><u>Legislation:</u> Loans, loan guarantees, tax incentives, grants, bonds</p> <p>A number of federal financial incentives exist. These include:</p> <ul style="list-style-type: none"> <li>• Renewable Energy Systems and Energy Efficiency Improvements Program</li> <li>• Renewable Energy Production Incentive (REPI)</li> <li>• Renewable Electricity Production Credit (REPC)</li> <li>• Residential Solar and Fuel Cell Tax Credit</li> <li>• Modified Accelerated Cost-Recovery System (MACRS)</li> <li>• Business Energy Tax Credit</li> <li>• Clean Renewable Energy Bonds (CREBs)</li> <li>• Federal Loan Guarantee Program</li> </ul>	Numerous federal programs exist that directly improve the cost-competitiveness of clean energy sources through grants, incentives, low interest loans and tax incentives. Federal grants are often competitive and not guaranteed. In many cases, a project will not be allowed to take advantage of multiple grant and loan programs and therefore the developer will need to carefully consider which federal and state financial incentive programs are the best fit for the project and the relative stability of the funding source..	<ol style="list-style-type: none"> <li>1) Federal financial incentives allow the users of RE and DG to capture some monetary value for the societal benefits of RE and clean DG (increased energy efficiency, reduced GHG emissions, etc.), and help offset some of the technical and business risks of emerging RE and DG technologies. These incentives can be instrumental in enhancing project economics that are often marginal when based on user cost savings alone.</li> <li>2) For wind, the single biggest driver is the Production Tax Credit. For solar, this is one of the biggest policy drivers as well.</li> <li>3). This would be of greater interest to the distributed generation/combined heat and power (CHP) industries if the definition “renewable energy” included CHP. CHP is undervalued because the current incentive structure does not incentivize the increases of efficiency.</li> </ol>
<b>State</b>				

<p>State Grants, Buy-Downs, Tax and Generation Incentives</p>	<p>Market making / industry support</p> <p>To provide funding and incentives for developing energy efficiency and clean generation technologies.</p>	<p><u>Legislation:</u> Grant, buy-down, tax incentives, generation incentive</p> <p>As of October 2007, 31 states and Washington D.C. offer grants, buy downs, tax or generation incentives for clean energy (AL, AZ, CA, CO, CT, DE, FL, ID, IL, IN, IA, ME, MA, MI, MN, MT, NH, NY, ND, OH, OR, PA, SC, SD, TN, VT, VA, WA, WV, WI, WY).</p>	<p>Although state financial incentives are typically less valuable than federal incentives, these programs when bundled can have a significant effect on lifecycle economics for projects. In addition, the presence of state financial incentives impacts the overall market for RE/DG in the state and may foster market transformation.</p>	<ol style="list-style-type: none"> <li>1) State financial incentives can have a positive impact on DG economics and increase market acceptance. Incentives can be structured to promote desired market behaviour (e.g., promote DG development in transmission constrained areas).</li> <li>2) Value varies tremendously state by state. Photovoltaics incentives in California and New Jersey have been extremely important.</li> </ol>
<p>Renewable/ Energy Portfolio Standards (RPS or EPS)</p>	<p>Market making</p> <p>To supply a specified minimum percentage (or absolute amount) of customer load with eligible sources of renewable electricity</p>	<p><u>Legislation</u></p> <p>As of October 2007, 25 states and the Washington D.C. have adopted RPS laws, and another four states have RPS goals.</p>	<p>The newest and seemingly the single biggest policy driver for increasing RE and CHP in the US. The value of Renewable Energy Credits (RECs) is widely variable state to state.</p>	<ol style="list-style-type: none"> <li>1) Properly designed RPS and EPS programs can be powerful drivers for promoting RE and DG development. RECs can enhance project economics, again allowing users to capture some monetary value to societal benefits.</li> <li>2) When combined with other incentives such as tax credits, RPS can be an extremely important driver which allows RE projects to be profitable. RPS can drive behaviour and determine which states will have RE/DG, but alone are not enough.</li> <li>3) An RPS should also consider including clean distributed generation and CHP to maximize the benefits of energy savings and green house gas reductions.</li> </ol>
<p>Interconnection Standards for Clean DG</p>	<p>Market making / Industry support</p> <p>To reduce uncertainty and delays that clean DG systems can encounter when obtaining electric grid connection.</p>	<p><u>Utility commissions; Standard</u></p> <p>As of October 2007, 19 states have interconnection standards for clean DG (CA, CO, CT, DE, HI, IN, KA, MA, MI, MN, NM, NY, NY, OH, PA, SC, TX, WA, WI).</p>	<p>An enabling policy, which prevents an unintended barrier to DG, especially customer-sited systems. Historical utility opposition to RE/DG connecting to the grid has often taken the form of punitive or unpredictable interconnection procedures and policies.</p>	<ol style="list-style-type: none"> <li>1) Consistent interconnection standards and procedures are critical to the ultimate market success of RE and small DG. Standard technical and contractual requirements are necessary for the development of national and regional suppliers.</li> <li>2) Without standards it can be difficult to do DG project. Interconnection standards are a prerequisite to successful deployment.</li> <li>3)</li> </ol>

Net Metering	<p>Market making</p> <p>To allow excess electricity generated from on site (commercial, industrial, and residential) clean energy technologies to be sold back to the grid</p>	<p><u>Legislation</u></p> <p>As of October 2007, 42 states and the District of Columbia have net metering (AZ, AR, CA, CO, CT, DE, FL, GA, HI, ID, IL, IN, IA, KY, LA, ME, MD, MA, MI, MN, MO, MT, NV, NH, NJ, NM, NY, NC, ND, OH, OK, OR, PA, RI, TX, UT, VT, VA, WA, WV, WI, WY).</p>	<p>Overcomes the tie between demand and supply for distributed applications by allowing excess power produced to flow back into the grid at a value equal to retail power. Although a powerful financial incentive where applicable, typically net metering is limited to very small distributed renewable systems such as residential scale solar PV.</p>	<ol style="list-style-type: none"> <li>1) Net metering is a critical requirement for the deployment of very small DG and RE. Net metering simplifies interconnection requirements and eliminates costs that would otherwise overwhelm small DG installations</li> <li>2) Especially important for customer-sited systems.</li> </ol>
Decoupling or Lost Revenue Adjustment Mechanisms	<p>Capacity building / Industry support</p> <p>To allow a utility to directly recoup the “lost” revenue associated with not selling additional units of energy because of the success of energy efficiency or DG programs in reducing electricity consumption</p>	<p><u>Utility commissions or Legislation</u></p> <p>States that implemented natural gas decoupling policies (13): AR, CA, IN, MD, MO, NC, NJ, NV, NY, OH, OR, UT, WA</p> <p>States with pending natural gas decoupling policies (11): AZ, CO, DE, IL, MA, MN, MI, NM, PA, TN, VA</p> <p>States that implemented electric decoupling policies (5): CA, DE, ID, NY, MD</p> <p>States and DC with pending electric decoupling policies (6): DC, HI, MA, NH, NJ, WI</p>	<p>Many of the previously described policies are in place to overcome utility objections and barriers to RE and DG. These objections are a natural outcome of how most utility revenue mechanisms are set up, ie, profit based on throughput of electrons to customers. Decoupling of utility profits from throughput has the potential to eliminate utility opposition to RE and DG, thereby impacting many of the other disabling utility policies.</p>	<ol style="list-style-type: none"> <li>1) Many utilities actively work against RE and DG projects because reduced kWh sales result in reduced revenues. Decoupling, if properly applied, could support cost effective RE and DG and influence utilities to become, at the very least, neutral to DG development.</li> <li>2) Making it is in the self-interest of all interested parties and is obviously a good idea. Decoupling is unique to efficiency dialogue. For efficient generation (CHP) this is the policy that matters.</li> <li>3) In reality U.S. regulators have yet to find the value in decoupling policies. Policy makers need to look at performance-based rate making.</li> </ol>
Revised Standby Rate Structures	<p>Capacity building / Industry support</p> <p>To remove financial impediments to renewable energy and DG systems. Electric utilities often assess standby charges on onsite generation to cover the additional costs they incur</p>	<p><u>Utility Commissions;</u> <u>Utility/rate incentive</u></p> <p>Examples of states that have established revised standby rate structures to ensure fair and reasonable treatment of clean DG include California and New York.</p>	<p>Punitive standby rates can kill projects where they are in effect, even when all other project economics are compelling. Revising rate structures to fairly account for the costs and benefits of DG to the grid is essential to achieve long-term deployment goals.</p>	<ol style="list-style-type: none"> <li>1) Unreasonably high standby rates are a key impediment to DG deployment in many areas. The development of new approaches to standby rate structures that fairly account for the cost of standby service and recognize the specific operating characteristics and potential benefits of DG would enable cost-effective DG projects to move forward.</li> </ol>

	<p>as they continue to provide adequate generating, transmission, or distribution capacity (depending on the structure of the utility) to supply on site generators when requested (sometimes on short notice)</p>			<ol style="list-style-type: none"> <li>2) Again, more the removal of a barrier than an incentive. It is important not to overburden projects with unreasonable or punitive charges.</li> <li>3) One alternative policy option is the elimination of standby rates in favour of raising the variable electric rate.</li> <li>4) Separate peak and off peak rates should be established.</li> </ol>
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## Appendix B – Literature Review of Policies and Metrics

### SUMMARY

- A brief literature review has been undertaken to source published data and/or analyses of policy in other countries – particularly in Europe.
  - An inventory of the current support systems in European countries is provided at Appendix C.
  - Appendix D provides an overview of global renewable energy promotion policies contained in the REN21's *Renewables 2007 Global Status Report*.
  - Current support schemes for combined heat and power (CHP) are summarised in Appendix E.
  - A table comparing the advantages and drawbacks of various policy mechanisms, particularly in the context of liberalised electricity markets, is provided in Appendix F
- Various analyses point to the importance of complementarity of policy measures. For example, McLennan Magasanik Associates' noted in a recent report<sup>1</sup> that “*without an enabling policy framework which includes ongoing research and development of new technologies, [a scheme to capture externalities], and a complementary measure to encourage deployment of commercialised technologies..., emissions could cost more to abate over time, resulting in... higher energy supply costs.*”
  - Market support mechanisms such as feed-in tariffs, renewable portfolio standards, quotas, investment grants, tax breaks, etc are designed to positively discriminate for new, market-ready, low-emission, energy supply and use products, processes and services to drive them down their volume-cost learning curves.
  - Innovation support measures including, but not limited to, grants for research, development and demonstration assist productivity and/or cost improvements in new, low-emission products, processes and services – thereby contributing to continuing learning curve cost improvements for them.
  - Pricing greenhouse gas (GHG) emissions – whether through a trading or taxation mechanism – is designed to correct a major market failure by internalising the cost of the environmental externalities of GHG emissions.
- To date, feed-in tariffs (FITs) have been the policy instrument of choice to support market penetration of REDG in Europe – with quota systems favoured by only a few countries.
  - FITs have been particularly successful in Germany in stimulating local industry development as well as growing local deployment of REDG products.
  - However, this success has not been uniformly replicated across Europe – whether with FITs or other policy instruments.
  - General design criteria for any market-support policy instrument are to ensure effectiveness, reduce risks to investors, minimise cost for consumers by:
    - Setting long term, sufficiently ambitious but realistic targets.
    - Ensuring policy stability – no stop and go policy.
    - Not mixing existing capacities and new capacities.

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<sup>1</sup> McLennan Magasanik Associates, *Increasing Australia's Low Emission Electricity Generation - An Analysis of Emissions Trading and a Complementary Measure*, A Report to Renewable Energy Generators of Australia, 24 October 2007.

- Restricting the duration of support for new capacities.
  - Removing non economic barriers such as administrative, legal, grid, etc.
  - Implementing technology specific support systems.
- A very recent analysis comparing various policy mechanisms, particularly in the context of liberalised electricity markets, concluded that “*any support scheme should be integrated into a liberalized electricity market, reflecting different renewable energy source potentials, enhancing competition between generators, encouraging operation performance and technological efficiency and offering objective information to end users. .... tradeable green certificates and tradable pollution permits are the incentive schemes that, respectively directly and indirectly, fulfill liberalized and competitive electricity market rules.*”

## REVIEW OF OTHER DATA

- An inventory of current support systems in the European Communities is provided at Appendix C. This data was sourced from a recent European Commission report entitled “*The support of electricity from renewable energy sources*”.

This report provides relevant data on metrics and policies in place in the European Communities and gives an update on the performance of these support schemes. Its overall findings suggest that well-adapted feed-in tariff regimes are generally the most effective and efficient support mechanisms for promoting renewable electricity.

The report also examines the relationship between support schemes and the internal electricity market, underlining the need to improve the competitive situation through implementation of Commission proposals regarding unbundling, improved regulatory oversight and cooperation, network cooperation and transparency. Administrative, grid and market barriers are also discussed.

- REN21 has recently published its “*Renewables 2007 Global Status Report*”. Appendix D provides an overview of global renewable energy promotion policies contained in the REN21 report.
- A search was also undertaken for CHP support schemes. A recent IEA Report entitled “*Combined Heat and Power, Evaluating the Benefits of Greater Global Investment*” has been published to assist policy makers in the development of appropriate policies and measures to support an increase in the share of CHP in the generation of electricity. A further report is to be produced in 2008 documenting best practice policy approaches that have been used to expand the use of CHP.

An overview of current support schemes for CHP is provided in Appendix E. This data was presented in an article entitled “*CHP support mechanisms in different countries - from feed-in tariffs to investment incentives*”.<sup>2</sup>

- The IEA also released in 2007 a report entitled “*Emissions Trading: Trends and Prospects*”.
- A presentation by Mario Ragwitz and Anne Held from the Fraunhofer Institute Systems and Innovation Research<sup>3</sup> classifies policy measures to support renewable energy sources – electricity (RES-E) as depicted in the table below, noting the clear majority of the EU member States use feed-in tariffs as their main

<sup>2</sup> [http://www.cospp.com/display\\_article/314976/122/CRTIS/none/none/1/CHP-support-mechanisms-in-different-countries---from-feed-in-tariffs-to-investment-incentives/](http://www.cospp.com/display_article/314976/122/CRTIS/none/none/1/CHP-support-mechanisms-in-different-countries---from-feed-in-tariffs-to-investment-incentives/)

<sup>3</sup> M Ragwitz and A Held, *Effectiveness and Efficiency of present RES-E support policies in EU Members States*, Global Best Practice in Renewable Energy Policy Making, Expert Meeting, Paris, June 29, 2007 (available at <http://www.iea.org/textbase/work/2007/bestpractice/Ragwitz.pdf>).

policy instrument.

Price-based mechanisms	Quantity-based mechanisms
<ul style="list-style-type: none"><li>• Feed-in tariff</li><li>• Fiscal incentives</li><li>• Investment grants</li></ul>	<ul style="list-style-type: none"><li>• Quota/TGC</li><li>• Tender schemes</li></ul>

TGC: Tradeable Green Certificates

They conclude that:

- For electricity generators, it's not the expected profit but the potential risk that determines the effectiveness of the policy.
- The effectiveness of various RES-E support schemes largely depends on the maturity and the credibility of the system.
- A stable planning environment is important to create a sound investment climate and to lower social costs as a result of lower risk premium.
- Administrative barriers can have a significant impact on the effectiveness of an instrument and hamper the effectiveness of generally very powerful policy schemes.
- Effective instruments for renewable electricity support are frequently economically efficient as well.

They go on to offer guidelines for design of policy instruments, as follows:

- General design criteria – ensure effectiveness, reduce risks to investors, minimise cost for consumers.
  - Set long term, sufficiently ambitious but realistic targets
  - Policy stability – no stop and go policy
  - Existing capacities and new capacities should not be mixed
  - Duration of support for new capacities should be restricted
  - Remove non economic barriers, administrative, legal, grid, etc
  - Technology specific support systems should be implemented
- Design criteria for quota systems
  - Set correct penalty (higher than marginal production costs at quota level)
  - Guaranteed minimum tariff should be implemented in immature markets
  - Ensure a sufficient market size in order to guarantee liquidity and to increase competition
  - In case of an ambitious quota, costs for society (windfall profits) can be reduced through:
    - Additional technology specific support, e.g. tax relief, investment incentives, soft loan (this can be a problem in international systems); or
    - Technology-dependent length of certification period (e.g. 8 years wind onshore, 12 years wind offshore).
- Design criteria for feed-in systems
  - Use technology-specific tariffs
  - Apply a stepped tariff scheme (where appropriate)
  - Tariffs should decrease over time for new installations in order to account for technology learning
  - Options to participate in liberalised power markets could facilitate the integration into the market

- Implement a forecast obligation in order facilitate the integration of electricity using fluctuating RES into the grid
- A more recent paper by Pireddu<sup>4</sup> also compares various policy mechanisms, particularly in the context of liberalised electricity markets, with the results set out in the table below. A table comparing the advantages and drawbacks of various policy mechanisms, particularly in the context of liberalised electricity markets, is provided in Appendix F.

Pireddu concludes that *“any support scheme should be integrated into a liberalized electricity market, reflecting different RES potentials, enhancing competition between generators, encouraging operation performance and technological efficiency and offering objective information to end users. Our analysis shows that tradable green certificates and tradable pollution permits are the incentive schemes that, respectively directly and indirectly, fulfill liberalized and competitive electricity market rules.”*

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<sup>4</sup> G Pireddu, *Subsidies and Market Mechanisms in Energy Policy*, in C. Clini et al. (eds.), *Sustainable Development and Environmental Management: Experiences and Case Studies*, 301-315, Springer 2008 (in press).

## Appendix C – Overview of the main policies for renewable electricity in EU

From: European Commission report entitled “*The support of electricity from renewable energy sources*”.  
SEC(2008)57

Country	Main electricity support schemes	Comments
<b>Austria</b>	Feed-in tariffs combined with regional investment incentives.	Until December 2004 feed-in tariffs were guaranteed for 13 years. From 2006 onwards full feed-in tariffs for new renewable electricity generation are available for 10 years, 75% and 50% available for year 11 and 12 respectively. The new feed-in tariffs are announced annually and support is granted on a first-come, first-serve basis. From May 2006 there has been a smaller government budget for renewable electricity support.
<b>Belgium</b>	Quota obligation system / TGC <sup>18</sup> combined with minimum prices for electricity from RES.	The Federal government has set minimum prices for electricity from RES.  Flanders and Wallonia have introduced a quota obligation system (based on TGCs) with the obligation on electricity suppliers. In Brussels no support scheme has been implemented yet. Wind offshore is supported at federal level.  The scheme is qualified as a public service obligation.
<b>Bulgaria</b>	Combination of feed-in tariffs, tax incentives and purchase obligation.	Relatively low levels of incentive make penetration of renewables especially difficult as the current commodity prices for electricity are still relatively low. A green certificate system to support renewable electricity developments has been proposed. Bulgaria recently agreed upon an indicative target for renewable electricity, which is expected to provide a good incentive for further promotion of renewable support schemes.
<b>Cyprus</b>	Feed-in tariffs (since 2006), supported by investment grant scheme for promotion of RES.	Enhanced Grant Scheme introduced in January 2006 to provide financial incentives for all renewable energy in the form of government grants worth 30-55% of investment. Feed-in tariffs with long-term contracts (15 years) also introduced in 2006.
<b>Czech Republic</b>	Feed-in tariffs (since 2002), supported by investment grants	Relatively high feed-in tariffs with 15-year guaranteed support. Producer can choose between a fixed feed-in tariff or a premium payment (green bonus). For biomass cogeneration, only green bonus applies. Feed-in tariff levels are announced annually.
<b>Denmark</b>	Premium feed-in tariffs (environmental adder). Tender schemes for wind offshore.	Duration of support varies from 10-20 years depending on the technology and scheme applied. The tariff level is generally rather low compared to the previously high feed-in tariffs. A net metering approach is taken for photovoltaics
<b>Estonia</b>	Feed-in tariff system	Feed-in tariffs paid for 7 -12 years but not beyond 2015. Single feed-in tariff level for all technologies. Relatively low feed-in tariffs make new renewable investments very difficult.
<b>Finland</b>	Energy tax exemption combined with investment incentives.	Tax refund and investment incentives of up to 40% for wind, and up to 30% for electricity generation from other RES.
<b>France</b>	Feed-in tariffs plus tenders for large projects.	For power plants < 12 MW feed-in tariffs are guaranteed for 15 years or 20 years (wind onshore, hydro and PV).  From July 2005 feed-in tariff for wind is reserved for new installations within special wind energy development zones.  For power plants > 12 MW (except wind) a tendering scheme is in place.  The scheme is qualified as a public service obligation
<b>Germany</b>	Feed-in tariffs.	Feed-in tariffs are guaranteed for 20 years (Renewable Energy Act). Furthermore soft loans are available.

<b>Greece</b>	Feed-in tariffs combined with investment incentives.	Feed-in tariffs are guaranteed for 12 years with the possibility of extension up to 20 years. Investment incentives up to 40%.
<b>Hungary</b>	Feed-in tariff (since January 2003, amended in 2005) combined with purchase obligation and grants	Fixed feed-in tariffs recently increased and differentiated by renewable electricity technology. No time limit for support defined by law, so in theory guaranteed for the lifetime of the installation. Plans to develop a TGC system.
<b>Ireland</b>	Feed-in tariff schemes introduced in October 2006, replacing a tendering scheme.	New premium feed-in tariffs for biomass, hydropower and wind introduced in October 2006. These tariffs are guaranteed for up to 15 years. Purchase price of electricity from the generator is negotiated between generators and suppliers. However, support may not be extended beyond 2024, so guaranteed premiums payments should start no later than 2009.
<b>Italy</b>	Quota obligation system / TGC.  Feed-in tariff system for photovoltaic (introduced in August 2005).	Obligation (based on TGCs) on electricity producers and importers. Certificates are only issued for renewable electricity capacity during the first 12 years of operation, except biomass which receives certificates for 100% of electricity production for first 8 years of operation and 60% for next 4 years.  Separate fixed feed-in tariff for PV, differentiated by size and building integrated. Guaranteed for 20 years. Increases annually in line with retail price index.
<b>Latvia</b>	Quota obligation system (since 2002) combined with feed-in tariffs.	Frequent policy changes and the short duration of guaranteed feed-in tariffs have resulted in high investment uncertainty.  Main policy instrument reformed in 2007, maintaining the basic structure of the scheme. At national level there are yearly quotas and a mandatory purchase framework is set up for RES-E (combined with tendering for wind). Quantity of RES-E sold under the scheme is limited.  Quota system (without TGC) typically defines small RES-E amounts to be installed. High feed-in tariff scheme for wind and small hydropower plants (less than 2 MW) was phased out in January 2003.
<b>Lithuania</b>	Feed-in tariffs combined with a purchase obligation	Relatively high fixed feed-in tariffs for hydro (<10 MW), wind, biomass, guaranteed for 10 years.  Closure of the Ignalina nuclear plant which currently supplies majority of electricity in Lithuania will strongly affect electricity prices and thus the competitive position of renewables as well as renewable support. Investment programmes limited to companies registered in Lithuania.
<b>Luxembourg</b>	Feed-in tariffs.	Feed-in tariffs guaranteed for 10 years (for PV for 20 years). Investment incentives are also available.  The scheme is qualified as a public service obligation
<b>Malta</b>	Low VAT rate and very low feed-in tariff for solar.	Very little attention to renewable electricity support so far. Very low feed-in tariff for PV is a transitional measure.
<b>Netherlands</b>	Premiums payments (abruptly abolished in August 2006).	Premiums guaranteed for 10 years were in place from July 2003. For each MWh renewable electricity generated, producers received a green certificate [GO] from the issuing body, which was redeemed for the premium payment.  Government put all premium renewable electricity support at zero for new installations from August 2006 as it was believed that the renewable electricity target would be achieved in advance of 2010. Premium for biogas (<2MWe) immediately reinstated. The Netherlands aims to introduce a new support scheme as early as possible in 2008. The preferred support policy option is currently improved premium payments.  Fiscal incentives for investments in RES are available.
<b>Poland</b>	Quota obligation system. TGCs introduced from end 2005 plus renewables are exempted from the (small) excise tax	Obligation on electricity suppliers with targets specified from 2005 to 2010. Penalties for non-compliance were defined in 2004, but were not sufficiently enforced until end of 2005. It has been indicated that from 2006 on the penalty will be enforced.

<b>Portugal</b>	Feed-in tariffs combined with investment incentives	Fixed feed-in tariffs guaranteed for 15 years. Level dependent on time of electricity generation (peak / off peak), renewable electricity technology, resource, and corrected monthly for inflation.  Investment incentives up to 40%.
<b>Romania</b>	Quota obligation with TGC since May 2005.	A system of Green Certificates is in place, including a purchase obligation for distribution companies and the obligation to fulfil an annual quota of purchased green electricity. Quota obligation increase from 0.7% in 2005 to 8.3% in 2010. For the period 2005-2012, the annual maximum and minimum value for Green Certificates trading is 24 Euro/certificate, respective 42 Euro/certificate
<b>Slovak Republic</b>	Programme supporting RES and energy efficiency, including feed-in tariffs and tax incentives	Fixed feed-in tariff for renewable electricity was introduced in 2005. Prices are set so that a rate of return on the investment is 12 years when drawing a commercial loan.  Low support, lack of funding and lack of longer-term certainty in the past have made investors very reluctant.
<b>Slovenia</b>	Feed-in system and premium, CO <sub>2</sub> taxation and public funds for environmental investments	Renewable electricity producers can choose between fixed feed-in tariff and premium feed in tariff. Tariff levels are defined annually by Slovenian Government (but have been unchanged since 2004).  Tariff guaranteed for 5 years, and then reduced by 5%. After 10 years reduced by 10% (compared to original level). Relatively stable tariffs combined with long term guaranteed contracts makes system quite attractive to investors.
<b>Spain</b>	Feed-in tariffs and premium	Electricity producers can choose a fixed feed-in tariff or a premium on top of the conventional electricity price. No time limit, but fixed tariffs are reduced after either 15, 20 or 25 years depending on technology. Transparent system. Soft loans, tax incentives and regional investment incentives are available.
<b>Sweden</b>	Quota obligation system with TGC.	Obligation (based on TGCs) on electricity consumers. For wind energy, investment incentives and a small environmental bonus are available.
<b>UK</b>	Quota obligation system with TGC.	Obligation (based on TGCs) on electricity suppliers. Obligation target increases to 2015 and guaranteed to stay at least at that level until 2027. Electricity suppliers which do not comply with the obligation have to pay a buy-out penalty. Buy-out fund is recycled back to suppliers in proportion to the number of TGCs they hold. UK is currently considering introducing technology banding by differentiating certificates awarded to renewable electricity technologies. A tax exemption for electricity generated from RES is available (Levy Exemption Certificates which give exemption from the Climate Change Levy).

The European Commission report provides relevant data on metrics and policies in place in the European Communities and gives an update on the performance of these support schemes. Its overall findings suggest that well-adapted feed-in tariff regimes are generally the most effective and efficient support mechanisms for promoting renewable electricity.

The report also examines the relationship between support schemes and the internal electricity market, underlining the need to improve the competitive situation through implementation of Commission proposals regarding unbundling, improved regulatory oversight and cooperation, network cooperation and transparency. Administrative, grid and market barriers are also discussed.

## Appendix D – Global Status - Renewable Energy Promotion Policies

From: REN21. 2008. “Renewables 2007 Global Status Report” (Paris: REN21 Secretariat and Washington, DC:Worldwatch Institute). Copyright © 2008 Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH.

Country	Feed-in tariff	Renewable port-folio standard	Capital subsidies, grants, or rebates	Investment or other tax credits	Sales tax, energy tax, excise tax or VAT reduction	Tradable renewable energy certificates	Energy production payments or tax credits	Net metering	Public investment, loans, or financing	Public competitive bidding
<b>Developed and transition countries</b>										
Australia		✓	✓			✓			✓	
Austria	✓		✓	✓		✓			✓	
Belgium		✓	✓	✓	✓	✓			✓	
Canada	(*)	(*)	✓	✓	✓			(*)	✓	(*)
Croatia	✓			✓					✓	
Cyprus	✓		✓							
Czech Republic	✓		✓	✓	✓	✓				
Denmark	✓				✓	✓		✓	✓	✓
Estonia	✓				✓	✓				
Finland			✓		✓	✓	✓			
France	✓		✓	✓	✓	✓			✓	✓
Germany	✓		✓	✓	✓	✓			✓	
Greece	✓		✓	✓					✓	
Hungary	✓				✓	✓			✓	
Ireland	✓		✓	✓		✓				✓
Italy	✓	✓	✓	✓		✓		✓		
Israel	✓		✓							
Japan	(*)	✓	✓			✓		✓	✓	
Korea	✓		✓	✓	✓				✓	
Latvia	✓								✓	✓
Lithuania	✓		✓	✓					✓	
Luxembourg	✓		✓	✓						
Malta	✓				✓					
Netherlands	✓		✓	✓		✓	✓			
New Zealand			✓	✓					✓	
Norway			✓	✓		✓				✓
Poland		✓	✓	✓	✓				✓	✓
Portugal	✓		✓	✓	✓					
Romania					✓					
Russia			✓			✓				
Slovak Republic	✓			✓					✓	
Slovenia	✓								✓	
Spain	✓		✓	✓					✓	
Sweden		✓	✓	✓	✓	✓	✓			
Switzerland	✓									
United Kingdom										
United States	(*)	(*)	✓	✓	(*)	(*)	✓	(*)	(*)	(*)
<b>Developing countries</b>										
Algeria	✓			✓	✓	✓				
Argentina	✓		✓	(*)	✓		✓			
Brazil	✓								✓	✓

Country	Feed-in tariff	Renewable port-folio standard	Capital subsidies, grants, or rebates	Investment excise, or other tax credits	Sales tax, energy tax, or VAT reduction	Tradable renewable energy certificates	Energy production payments or tax credits	Net metering	Public investment, loans, or financing	Public competitive bidding
Cambodia			✓							
Chile			✓							
China	✓		✓	✓	✓				✓	✓
Costa Rica	✓									
Ecuador	✓			✓						
Guatemala				✓	✓					
Honduras				✓	✓					
India	(*)	(*)	✓	✓	✓		✓		✓	✓
Indonesia	✓									
Mexico				✓				✓		
Morocco				✓						
Nicaragua	✓			✓	✓					
Panama						✓				
Philippines			✓	✓	✓				✓	
South Africa			✓							
Sri Lanka	✓									
Thailand	✓		✓					✓	✓	
Tunisia			✓	✓						
Turkey	✓		✓							
Uganda	✓								✓	

Note: Entries with an asterisk (\*) mean that some states/provinces within these countries have state/province-level policies but there is no national-level policy. Only enacted policies are included in table; however, for some policies shown, implementing regulations may not yet be developed or effective, leading to lack of implementation or impacts. Policies known to be discontinued have been omitted. Many feed-in policies are limited in scope or technology. Some policies shown may apply to other markets beside power generation, for example solar hot water and biofuels. Source: All available policy references, including the IEA online Global Renewable Energy Policies and Measures database and submissions from report contributors.

## Appendix E: Overview of CHP Support Mechanisms in Europe

From: [http://www.cospp.com/display\\_article/314976/122/CRTIS/none/none/1/CHP-support-mechanisms-in-different-countries---from-feed-in-tariffs-to-investment-incentives/](http://www.cospp.com/display_article/314976/122/CRTIS/none/none/1/CHP-support-mechanisms-in-different-countries---from-feed-in-tariffs-to-investment-incentives/)

In addition to the data provided below, the IEA has published a report entitled “*Combined Heat and Power, Evaluating the Benefits of Greater Global Investment*” to assist policy makers in the development of appropriate policies and measures to support an increase in the share of CHP in the generation of electricity. A further report is to be produced in 2008 documenting best practice policy approaches that have been used to expand the use of CHP.

**Table 1. Overview of support mechanisms in Europe**

Country	Measures for CHP	Measures for RES/District heating	Types of measures
Austria	The feed-in tariffs are linked to CHP electricity. A support scheme for existing fossil CHP plants (apart from subsidies for renewables).	Subsidy for biomass DH CHP. Investments are subsidized by 15%–30% depending on heat supplied. Subsidy on industrial buildings: 30% on investments for DH systems when heat is 100% produced out of renewables; 15% when the heat is produced by fossil fuels	Feed-in tariff for CHP. Investment grant funded as a percentage of investment costs for DH and RES in DH
Croatia	Premium price for CHP electricity. For new capacities, priority should be given to CHP technologies		Premium price for CHP
Czech Republic	CHP electricity purchasing obligation for a stated price, including a bonus for small and decentralized units. Evaluation of the economical and technical possibility of installing CHP units for capacities over 5 MWth and 10 MWe		Purchasing obligation for CHP
Denmark	A special regulation gives priority to and ensures fixed prices for back-pressure CHP plants and for all forms of renewable electricity production (wind, waste, bio fuels, etc.), but the system changes towards market prices.	Municipalities may oblige a building to be connected to a DH network or to prevent it from being disconnected. The use of electricity for heating is forbidden, except in those buildings in which the connection was already in existence before the prohibition measure came into effect	Purchasing obligation for CHP and RES Obligatory connection for DH Prohibition of a technology
Finland		Energy taxation and refunds as subsidies, especially for CHP based on renewables	Tax incentives

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Country	Measures for CHP	Measures for RES/District heating	Types of measures
Germany	Feed-in tariff, especially for small-scale CHP	CHP installations are exempted from the energy tax on natural gas when their efficiency exceeds 70%. Heat as an end product is not taxed. Low-interest loans (with interest set for 10 years) as well as partial debt release for new large-scale biomass facilities	Feed-in tariff Tax incentive for CHP and related DH use Low-interest loans Debt release
Hungary	Purchasing obligation and feed-in tariffs for CHP units under 50 MW. The existing CHP heat potential is close to saturation. However, CHP electricity production can be increased by 10%–20%.	CHP support is foreseen for units which are mainly DH units. The support is foreseen until 2010	Purchasing obligation and feed-in tariff for CHP; threshold for capacity
Italy		Financial support is granted for the conversion of electrical water heaters into installations fuelled by RES	Conversion grant
Lithuania		Support scheme for electricity produced in CHP plants that run on biofuel. This applies to plants where the ratio of nominal power to heat capacity is over 0.23 and the amount of renewable energy resource used is not less than 70%	Purchasing obligation
Latvia	Feed-in tariff for CHP capacities below 4 MW and using local fuels		Feed-in tariff for small-scale CHP Possible zoning in the municipalities for DH and natural gas
The Netherlands	Discounts/tax exemption aimed at stimulating energy efficiency		Fiscal incentive
Poland	Purchasing obligation for electricity and heat produced in CHP for capacities below 5 MW		Purchasing obligation for small-scale CHP
Slovakia	Purchasing obligation for CHP electricity and renewables	Potential for biomass is 75.6 PJ; use of geothermal energy has been considered.	Purchasing obligation for CHP and RES Acknowledgement of RES potential
Slovenia	CHP support. If the producer qualifies regarding high performance, it has the right for primary dispatch of electricity and also the right for getting the premium price for produced electricity. The level of premium is set by the government		Purchasing obligation and premium price
Sweden	Favourable taxation for CHP. Potential for CHP is 20 TWh	Support, through taxation, for biomass and natural gas for CHP ensures the development of DH. Renewables support through green certificates for electricity	Tax incentives for CHP and biomass Green certificates
UK	Community Energy Programme provides capital grant aimed at improving the refurbishment of community and household heating systems with a primary focus on CHP	Support under the form of capital grants for DH as well as RES heating	Investment incentive

## Appendix F – A comparison of policy mechanisms in the context of liberalised electricity markets

From: G Pireddu, *Subsidies and Market Mechanisms in Energy Policy*, in C. Clini et al. (eds.), *Sustainable Development and Environmental Management: Experiences and Case Studies*, 301-315, Springer 2008 (in press)

	Advantages	Drawbacks
Financial and Fiscal Subsidies	<ul style="list-style-type: none"> <li>✓ Easy to implement</li> <li>✓ Usually put in place to stimulate demand as a second tier incentive</li> </ul>	<ul style="list-style-type: none"> <li>✓ No incentive to operate RETs as efficiently as possible</li> <li>✓ No RES-E output guarantee</li> </ul>
Feed-in Tariffs	<ul style="list-style-type: none"> <li>✓ Very effective regarding RES-E development</li> <li>✓ Few regulatory and administrative costs</li> <li>✓ Stable basic condition and high planning reliability</li> <li>✓ Bankable project financing</li> </ul>	<ul style="list-style-type: none"> <li>✓ Non cost-efficient</li> <li>✓ Non market-oriented approach</li> </ul>
Tendering Procedures	<ul style="list-style-type: none"> <li>✓ Competition between RES-E</li> <li>✓ Awarded bids work as a feed-in tariffs scheme</li> </ul>	<ul style="list-style-type: none"> <li>✓ Complexity of tendering procedures</li> </ul>
Green Pricing	<ul style="list-style-type: none"> <li>✓ Consumers voluntarily promote RES-E</li> </ul>	<ul style="list-style-type: none"> <li>✓ Success depends on the willingness-to-pay on the part of consumers</li> </ul>
Tradable Green Certificates	<ul style="list-style-type: none"> <li>✓ Flexible and market-oriented</li> <li>✓ Economic efficient</li> </ul>	<ul style="list-style-type: none"> <li>✓ Volatile certificate prices</li> <li>✓ Higher insecurity for investors</li> <li>✓ Weak bankable project financing</li> </ul>
Tradable Pollution Permits	<ul style="list-style-type: none"> <li>✓ Effective regarding the «polluter pays principle»</li> <li>✓ Market-oriented approach</li> <li>✓ Innovation and investment in cleaner technology promotion</li> </ul>	<ul style="list-style-type: none"> <li>✓ Indirect form of RES-E promotion</li> <li>✓ Possible windfall profits and market power abuse</li> </ul>