Executive Summary

Introduction

Recent IEA and other scenarios have demonstrated that a large basket of sustainable energy technologies will be needed to address the challenges of moving towards clean, reliable, secure and competitive energy supply. Renewable energy sources (RES) and technologies (RETs) can play an important role in achieving this goal. Many countries have made progress in promoting renewables in their energy mix, but obstacles remain and greater efforts are needed. This report provides an assessment of the effectiveness and efficiency of renewable energy policies in OECD countries and Brazil, Russia, India, China and South Africa (BRICS). In 2005, these 35 countries accounted for 80% of total global commercial renewable electricity generation, 77% of commercial renewable heating/cooling (excluding the use of traditional biomass) and 98% of renewable transport fuel production.

In 2005, renewables (including hydropower) contributed 18% of global electricity generation, less than 3% of global heat consumption (excluding the use of traditional biomass[2]) and 1% of global transport fuel consumption. By 2030, renewables are projected to contribute 29% to power generation and 7% of transport fuels according to the IEA *World Energy Outlook* (*WEO*) Alternative Policy Scenario 2007 – in which policies currently under consideration are implemented. By 2050, the contribution of renewables could rise even further to almost 50% of electricity if the ambitious goal of a 50% global reduction in 2005 CO_2 emissions over that time horizon is met, represented by the BLUE scenarios in the IEA *Energy Technology Perspectives* (*ETP*) *2008*. While attainable, this objective will require very strong political and financial commitment as well as immediate action by all governments.

Some renewable energy technologies (RETs) are close to becoming commercial and should be the first to be deployed on a massive scale. Other RETs, which have a large potential, are less mature and require long-term visions. Reducing their costs will require a combined effort in research, development and demonstration (RD&D), and technology learning resulting from marketplace deployment. *ETP 2008* emphasises that a combination of both more and less mature RETs will play a major role in achieving deep CO_2 emission cuts in a competitive fashion. This finding highlights the urgency with which a framework of consistent, effective and long-term policies need to be implemented if a wide range of RETs is to be encouraged to move towards full market integration.

This report comprehensively examines data and information relating to renewable energy markets and policies over the period 2000-2005. It discusses wind, biomass, biogas, geothermal, solar PV, and hydro power in the electricity sector; biomass heat, geothermal and solar thermal in the heating sector; and ethanol and biodiesel in the transport sector.[3]

2. The use of traditional biomass is around 40 EJ or 9-10% of world primary energy supply.

3. In effect, this means that the study places emphasis on more mature RETs which have already progressed beyond the demonstration phase. Therefore, currently less mature technologies, such as offshore wind, enhanced geothermal systems (EGS), wave and tidal and marine currents, are not taken into account in this assessment.

Methodology

- This assessment aims to measure the effectiveness of policies forpromoting renewables, over the period 2000 to 2005, by applying a quantitative *policy effectiveness indicator*. This indicator is calculated by dividing the additional renewable energy deployment achieved in a given year by the remaining mid-term assessed "realisable potential" to 2020 in the country concerned. The rationale for such an effectiveness indicator is that it minimises the risk of bias when comparing countries of different sizes, starting points in terms of renewable energy deployment and levels of ambition of renewable energy policies and targets, while taking into account the available renewable energy resource.

- The "realisable potential" is based on a long-term view of the technical potential adjusted to take account of unavoidable medium-term constraints on the rate of change, such as maximum market growth rates and planning constraints,. The mid-term realisable potentials for each RET are derived for the resources of each country, taking into account technology development.

- For most countries, the additional realisable potential to 2020 far outstrips the achieved deployment of renewables to date. The aggregate additional potential to 2020 for renewable electricity (RES-E) in OECD countries and BRICS amounts to 6 271 TWh. This is equivalent to 41% of 2005 total electricity generation and represents almost 2.5 times the current RES-E generation. In absolute terms, China has the largest additional potential, followed by the EU-27, the United States, India, Russia, Canada and Brazil. Overall, BRICS account for 47% of the additional realisable potential among those countries analysed.

- The ratio of additional potential to achieved generation in 2005 is even larger for renewable heat (RES-H). For solar thermal and geothermal heat the additional potential is almost thirty times the achieved heat production from these sources.

- In the case of renewable liquid transport fuels (RES-T), the estimated additional realisable potential of first-generation biofuels is more than five times the current production. This estimate is based on the conservative assumption that a maximum of 10% of current arable land would be used for energy crop cultivation in 2020, with a lower share (3.5-8.5%) assumed for the emerging economies (BRICS) due to potentially stronger competition with food production and environmental pressures.

- The assessment also addresses the cost of the incentives for each renewable energy technology in all OECD countries and BRICS. Different kinds of renewables incentives have different time patterns – depending, for instance, on whether they influence upfront investment costs or operating returns. The remuneration for each technology in every country was calculated by annualising the levels over a common period of 20 years. This report does not address the cost efficiency of renewable energy systems compared to other carbon abatement technology options.

Main analytical findings

Renewable electricity (RES-E)

Onshore wind energy

Generally, the presence of non-economic barriers has a significant negative impact on the effectiveness of policies to develop wind power, irrespective of the type of incentive scheme. Such barriers include administrative hurdles (*e.g.* planning delays and restrictions, lack of co-ordination between different authorities, long lead times in obtaining authorisations), grid access, electricity market design, lack of information and training, and social acceptance.

A minimum level of remuneration[4] appears necessary to encourage wind power deployment. Until 2005, none of the countries that provide overall levels of remuneration below USD 0.07/kWh[5] witnessed significant deployment effectiveness.

The group of countries with the highest effectiveness (Germany, Spain,[6] Denmark and, more recently, Portugal) used feed-in tariffs (FITs) to encourage wind power deployment. Their success in deploying onshore wind stems from high investment stability guaranteed by the long term FITs, an appropriate framework with low administrative and regulatory barriers, and relatively favourable grid access conditions. In 2005, the average remuneration levels in these countries (USD 0.09-0.11/kWh) were lower than those in countries applying quota obligation systems with tradable green certificates (TGCs) (USD 0.13-0.17/kWh).

Beyond some minimum threshold level, higher remuneration levels do not necessarily lead to greater levels of policy effectiveness. The highest levels of remuneration on a per-unit-generated basis for wind among the countries studied are seen in Italy, Belgium, and the United Kingdom, which have all implemented quota obligation systems with TGCs. Yet none of these countries scored high levels of deployment effectiveness. This is likely related to the existence of high non-economic barriers as well as to intrinsic problems with the design of tradable green certificate systems in these countries, which cause higher investor risk premiums.

Wind development in the United States is supported by a mix of state and federal policies. At the federal level, wind power receives generous tax incentives in the form of a 10-year production tax credit – which, in effect, acts like a feed-in premium – and 5-year accelerated depreciation. The combination of federal tax incentives with state-level financial incentives and renewable energy quota obligation systems was a major driver in wind power capacity additions in the United States. To date, neither federal nor state support has been sufficient in isolation to foster growth in wind power. In addition, the lack of stability in the provision of the production tax credit on an ongoing basis has led to substantial boom-and-bust cycles in United States wind power installations in the 2000s.

4. Remuneration levels encompass the sum of the electricity price plus any premiums and/or incentives received for every unit of renewable electricity.
5. All figures are in USD 2005, evaluated at market exchange rates.
6. Since 2004, Spain offers renewable energy generators a choice between FITs and feed-in premiums (FIPs).

Solid biomass electricity

The most successful countries in deploying biomass electricity over the 2000-2005 timeframe, relative to their respective realisable potential, are EU-OECD countries. The Netherlands, Sweden, Belgium, and Denmark have the highest levels of effectiveness.

As in the case of wind energy, a certain minimum level of remuneration, in this case about USD 0.08/kWh, is necessary to initiate deployment, and non-economic barriers impact negatively on policy effectiveness. Solid biomass generally shows that different types of incentive schemes can be effective. For example in Sweden quota obligation systems have been effective at moderate cost (USD 0.08/kWh), while in Belgium the quota obligation system has encouraged biomass deployment at high cost (USD 0.14/kWh). In the Netherlands (USD 0.12/kWh), Denmark (USD 0.09/kWh) and Hungary (USD 0.10/kWh), feed-in tariff and premium systems are in place.

The countries with high growth in deployment (Netherlands, Sweden, Belgium, and Denmark) succeeded due to the availability of abundant biomass combined with the opportunity for co-firing in coal-fired boilers. However, life-cycle assessment of bioenergy production is necessary to ensure the sustainability of this resource covering the full supply chain and possible land use changes. This might be a constraint for future exploitation, together with competition from other uses for access to the resource.

Biogas electricity

The amount of electricity generated from agricultural biogas, landfill gas and sewage gas between 2000 and 2005 was low relative to wind and solid biomass electricity. No generation of electricity from biogas was reported from any of the BRICS countries.

The level of remuneration necessary to create financially viable projects strongly depends on the specific fuel used as well as on the size of the project. Strong competition for feedstocks has recently developed from agricultural markets, and affects the viability of projects in many countries. Countries using FIT systems often implement very different remuneration levels for the promotion of different biogas technologies, and also differentiate by size of the installation.

The highest growth of biogas generation from 2000 to 2005 was in Germany, the United Kingdom and Luxembourg, with Germany and Luxembourg applying FITs and the United Kingdom a quota obligation system with TGCs. In Germany the FIT incentive scheme has shown relatively high costs compared with other countries due to the small-to-medium scale and type of feedstocks used in agricultural applications.

Besides the United Kingdom, Italy's quota obligation system with TGCs has shown some of the highest effectiveness levels, with the strong growth in both countries mainly based on an expansion of landfill gas capacity producing methane that is cheap relative to other biogas feedstocks.

Solar photovoltaics

The total mid-term realisable technical potential for photovoltaics (PV) in the OECD countries and BRICS is 394 TWh, equivalent to the United Kingdom's 2005 electricity production.

However, the investment costs of PV systems, which represent the most important barrier to PV deployment, are still high. Since only 1% of the realisable potential had been exploited by 2005, the average 2000-2005 policy effectiveness levels for PV are lower by a factor of ten than for a more mature RET such as wind energy. The development of PV in terms of absolute installed capacity has been dominated by Germany and Japan, followed at some distance by the United States. These three countries were responsible for roughly 88% of the globally installed capacity at the end of 2005.

Feed-in tariffs (complemented by the easy availability of soft loans and fair grid access) have been very effective in Germany, albeit at a high cost (USD 0.65/kWh). In recent years, the level of the German FIT for solar PV has decreased to some extent, and an element of degression[7] has been introduced. The German parliament has approved proposals for acceleration of degression rates for stand-alone installations from 5% per year in 2008 to 10% per year in 2010 and 9% from 2011 onwards. This creates incentives to reduce costs, and hence move down the learning curve.

For many years, PV installations in the United States have benefited from federal tax incentives, but these have been insufficient to motivate PV installations. Therefore, more recently, California (which alone represents nearly 80% of the total national inventory), Arizona and New Jersey established aggressive incentive policies for PV, including tax rebates for residential and commercial installations and quota obligation systems with a solar-specific set-aside. Net metering, favourable retail rate structures and streamlined interconnection rules have also been enablers of sizable PV markets. These measures may become important triggers for PV market take-off in other countries as well.

Hydropower

In most OECD countries, with the exception of Canada and Turkey, the additional potential for hydropower deployment is small because the potential has either already been exploited or is affected by legal frameworks concerning integrated water management, such as the EU Water Framework Directive, and occasional public resistance. In many EU-OECD countries, growth is mostly takes the form of re-powering or upgrading existing large-scale plants or building new small-scale plants.

Nonetheless, in most BRICS, there has been remarkable progress in hydropower in recent years and there remains substantial additional potential to 2020. This growth is mainly driven by the drastically increased demand for electricity in BRICS countries. There is also a need for capacity expansion with regard to the hydrological aspects of water storage and management systems. Thus, with hydropower constituting an important element of integrated energy policy in these countries, renewable energy support schemes have – to a large extent – not been necessary to stimulate its development.

As large hydropower is often competitive with thermal and nuclear electricity generation, many countries have a strong interest in developing this technology. A main constraint can be the environmental impacts of large-scale development, which can severely delay the planning process and even derail the implementation of major projects.

7. Degression refers to a pre-determined (often annual) percentage decrease in the support level for a given renewable energy installation.

Geothermal electricity

The main driver for the deployment of geothermal electricity is having suitable high temperature geothermal resources readily available without the need for deep drilling. This explains why only ten of the OECD countries and BRICS have any production of geothermal electricity. Iceland, Mexico and the United States showed the highest growth rate in recent years. Italy, the country with the highest policy effectiveness based upon a quota obligation system with TGCs, produces over 90% of all the geothermal electricity from EU-OECD countries.

Renewable heating (RES-H)

Policies to encourage the development and deployment of RES-H technologies have largely been neglected compared with those supporting renewable electricity or biofuels for transport. The relative absence of support policies, whether effective or not, and significant unexploited mid-term potentials, is why overall average policy effectiveness levels are lower by a factor of more than twenty relative to RES-E technologies. There is a lack of available data on RES-H markets and policies, especially in BRICS countries.

Geothermal heat

Despite the fact that the use of geothermal heat is well established in many countries, relative progress, as appraised by the effectiveness indicator, is slow, at least relative to the very large mid-term realisable potentials. A distinction also needs to be made between deep geothermal heat, often competitive with conventional heat where it is available, and heat from shallow ground source heat pumps. The main deployment barriers are cost, complex planning and permission procedures, and the distance between deep geothermal resources and centres of heat demand. Ground source heat pumps can be employed virtually anywhere in the world for both heating and cooling but have high investment costs, which necessitate policy support. This has been the reason for their limited deployment to date.

Switzerland and Turkey were by far the most effective countries in deployment of geothermal heat between 2000 and 2005. However, due to the lack of a significant high-temperature hydrothermal resource they do not belong to the leading group of countries for geothermal electricity production. Enhanced geothermal systems from deep drilling are at an early stage of maturity and costly but have widespread potential, if current cost barriers can be overcome.

Solar hot water

While solar thermal heat resources are abundant in many world regions, the impressive progress made in recent years – with production and installation having doubled over the period 2000-2005 – is concentrated in only a few countries. China is responsible for approximately half the global solar thermal heat generation and, together with Brazil and Austria, is currently progressing most quickly in utilising its realisable potential. In China, development can be attributed to the cost competitiveness of solar thermal heat in many regions of the country. The main drivers of burgeoning consumer demand in China are a poorly developed conventional heating infrastructure, a well-developed domestic manufacturing industry and changes in population demographics. Brazil does not provide policy support to solar thermal heat but has high solar radiation levels, whereas Austria has achieved an almost equally high effectiveness due to rather modest investments in grants, information dissemination and training programmes.

Main barriers to the deployment of solar thermal heat in most countries include inadequate planning guidelines, and lack of consistent economic incentives, awareness programmes and training opportunities. Some regulatory policies such as the solar heating obligation in Barcelona and other Spanish municipalities represent very interesting innovative policy measures to overcome these barriers, which could lead to significant growth.

Biomass heat and combined heat and power (CHP)

District heating and CHP plants are efficient uses of biomass resources if there is adequate heat demand sufficiently close to the production. Nonetheless, the overall achievement of CHP-based heat generation is rather moderate on a global level. The vast bulk of this technology is implemented in Europe, amounting to 80% of the overall generation of biomass CHP in all OECD countries and the BRICS. The BRICS countries represent 11% of biomass CHP heat while other OECD countries add the remaining 9%.

The effectiveness of this sector is higher than for other RES-H technologies but still significantly less than for RES-E technologies. By far the highest growth from 2000 to 2005 was reached in Scandinavian countries, in particular Denmark and Sweden. The critical success factors are cheap and abundant biomass potentials, which may be derived from a strong forest industry combined with effective incentives for the promotion of biomass electricity and biofuels for transport. As in the case of biomass-based electricity, the net life-cycle environmental benefits of biomass heat need to be carefully assessed in light of land-use change and feedstock transportation impacts arising from a large-scale expansion of bioenergy production. Also, funding of biomass CHP should be consistent with support for biomass electricity, based on the overall seasonal efficiency of the installation.

A further important success factor for biomass CHP-based heat generation is the existence of heating grids or the feasibility to construct new ones. This depends strongly on the density of heat demand and the tradition of grid-connected heat deployment which explains some of the success in Scandinavian countries. These basic conditions are also fulfilled in some of the BRICS countries such as China and Russia, where good potential exists.

Biofuels

From 2000 to 2005, OECD countries and the BRICS doubled their production of first-generation biofuels (ethanol and biodiesel). In 2005, they substituted 20 Mtoe of fossil fuels, representing 1% of 2005 worldwide transport energy. Ethanol production is clearly dominated by Brazil and the United States (where it benefits from considerable subsidies), with shares of 41% and 44% respectively of total 2005 ethanol production in OECD countries and the BRICS. Biodiesel production and consumption in turn have shown growth mostly in the EU region, supported by very high subsidies through tax exemptions. China and India also show relatively high effectiveness in their deployment of ethanol, the former having introduced a blending quota and the latter a tax exemption as well as a guaranteed price for ethanol producers.

In contrast to most forms of renewable energy, which tend to be consumed and financed domestically, liquid biofuels can be traded and exported on a large scale. This means that a broader range of policies, such as import and export tariffs, can be used to influence the amount of biofuels consumed domestically, so that some countries produce biofuels in large quantities while consuming only a small part of the product.

The most widespread support measures are full or partial exemption from excise tax, eco-tax or value added tax as well as mandatory blending. Most countries promoting biofuels had tax measures in place or implemented them between 2000 and 2005, while blending quotas have been adopted only more recently.

Of all the countries examined, Brazil remains the front-runner in the production of sugarcane ethanol, which is driven by cost competitiveness and now relies on indirect tax relief. Germany, focusing primarily on biodiesel, enjoyed the highest policy effectiveness from 2000 to 2005 relative to its additional realisable potential to 2020. Nevertheless, Germany's progress came at a relatively high cost, mainly through a tax exemption which made biodiesel significantly cheaper than regular fossil-based diesel. It remains to be seen how the biodiesel market in Germany will develop now that the tax exemption has been removed. The United States had the second-highest effectiveness level, concentrating on the production of corn-based ethanol granting producer tax credits in addition to agricultural support mechanisms. Sweden was third-highest but at a relatively high cost, concentrating its efforts on ethanol in contrast to most other EU countries, which concentrated on biodiesel.

Most EU-OECD countries which were required to transpose the EU Biofuels Directive into national legislation showed accelerated growth in biofuel consumption over 2004-2005, in trying to achieve the indicative biofuel targets of a 2% transport fuel market share in 2005 and 5.75% in 2010, respectively.

This analysis focuses on the period 2000 to 2005 and, therefore, does not consider more recent policy developments and significant ramping up of biofuel targets. The higher targets have stimulated growing public concern surrounding the impacts from increasing biofuel production on land use change, agricultural product prices, deforestation and water use. Competition for the feedstock between energy and food production is increasingly being debated. Strong policy signals on the sustainable production and use of biofuels will need to accompany their large-scale market penetration, as is planned in the United States and the European Union.

Second-generation biofuel technologies under development are projected to play a vital part in achieving the objective of sustainable biofuel production sand consumption by widening the range of feedstocks and improving the environmental and cost efficiency of biofuels. Effective policies, including RD&D efforts, are needed to foster a rapid transition to second-generation technologies.

Key messages and conclusions

To date, only a limited set of countries have implemented effective support policies for renewables which have resulted in acceleration in renewables diffusion in recent years. There is a large potential for improvement of policy design in most countries and considerable realisable potential across all RETs in all the OECD countries and BRICS reviewed. If effective policies were adopted in many more countries, this potential could be exploited more rapidly and to a much larger extent.

The EU-OECD, other OECD countries and the BRICS showed substantial diversity in the effectiveness of policies implemented to support the individual RETs in the electricity, heating and transport sectors. The EU-OECD countries, which, overall, have a longer history of renewable energy support policies, feature among the countries with the highest policy effectiveness for all new renewable electricity generation technologies. The picture is more varied among the most mature renewable electricity technologies (*e.g.* hydro) and among renewable heating and transport technologies, with some other OECD countries and the BRICS also having implemented relatively effective policies.

A wide variety of incentive schemes in place can be effectively applied depending on the specific technology and country. However, to date non-economic barriers have significantly hampered the effectiveness of renewable support policies and driven up costs in many countries, irrespective of the type of incentive scheme.

It is therefore recommended to move beyond discussions over which specific incentive scheme functions best. The assessment must be of the entire policy framework into which incentive schemes are inserted. Overall, the effectiveness and efficiency of renewable energy policies are determined by the adherence to key policy design principles outlined below, as well as the consistency of measures.

Renewable policy design should reflect five fundamental principles:

- The removal of non-economic barriers, such as administrative hurdles, obstacles to grid access, poor electricity market design, lack of information and training, and the tackling of social acceptance issues – with a view to overcoming them – in order to improve market and policy functioning;
- The need for a predictable and transparent support framework to attract investments;
- The introduction of transitional incentives, decreasing over time, to foster and monitor technological innovation and move technologies quickly towards market competitiveness;
- The development and implementation of appropriate incentives guaranteeing a specific level of support to different technologies based on their degree of technology maturity, in order to exploit the significant potential of the large basket of renewable energy technologies over time; and
- The due consideration of the impact of large-scale penetration of renewable energy technologies on the overall energy system, especially in liberalised energy markets, with regard to overall cost efficiency and system reliability.

Reflecting these five principles in an integrated approach allows two concurrent goals to be achieved, namely to exploit the "low-hanging fruit" of abundant RETs which are closest to market competitiveness while preserving and implementing the long-term strategic vision of providing cost-effective options for a low-carbon future.

The main objective of an integrated approach is to achieve a smooth transition towards mass-market integration of renewables. This will also require a profound evolution of markets transforming today's situation - characterised by an inadequate price placed on carbon and other externalities, most renewables needing economic subsidies, and additional non-economic barriers preventing RET deployment – into a future energy system in which RETs compete with other energy technologies on a level playing field. The evolved market should place an appropriate price on carbon and other externalities and help to develop an infrastructure to accommodate large-scale RET integration. Once this is achieved, no or few additional economic incentives will be needed for RETs, and their deployment will be accelerated by consumer demand and general market forces.

Analysis suggests that policy frameworks which combine different technology-specific support schemes as a function of RET maturity would be best suited to successfully implement the key policy design principles and foster the transition of RETs towards mass-market integration.

Governments should develop a combination policy framework increasingly applying market principles as technology maturity and deployment increase. This is possible with a range of policy instruments, including price-based, quantity-based, research and development (R&D) support, and regulatory mechanisms.

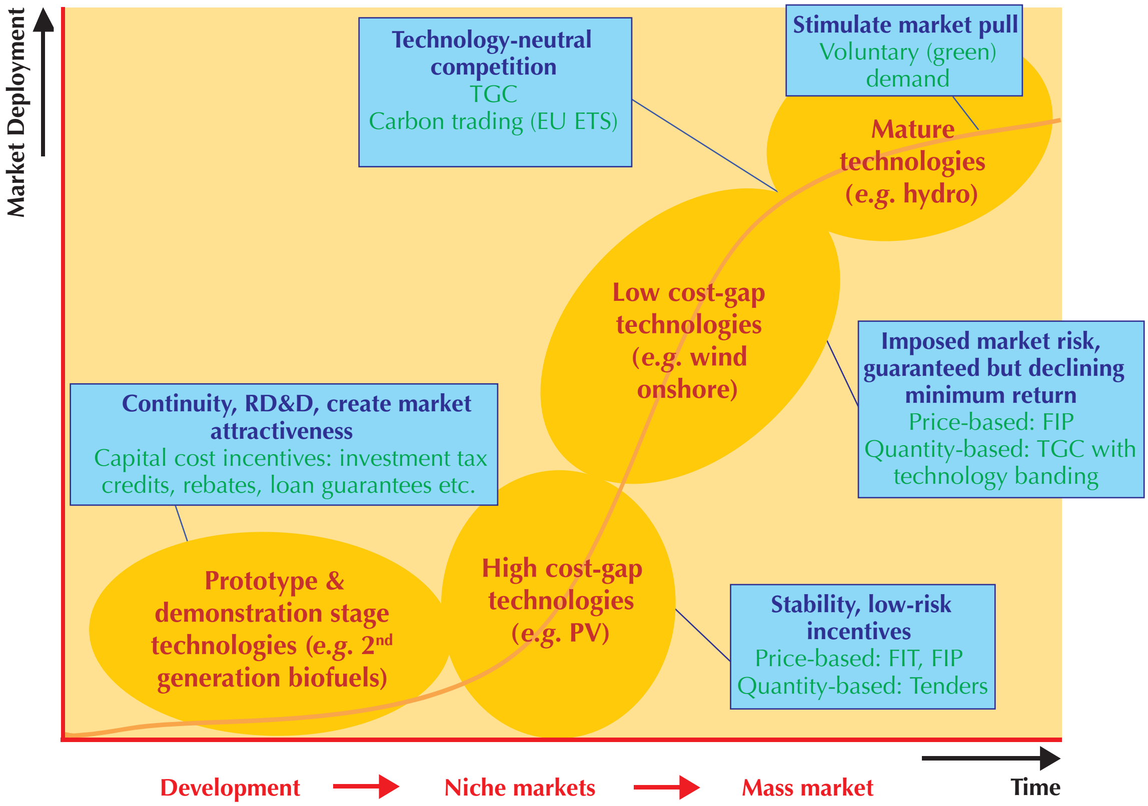
As a general principle, less mature technologies further from economic competitiveness need, beyond continued R&D support, very stable low-risk incentives, such as capital cost incentives, feed-in-tariffs (FITs) or tenders (see Figure 1). For low-cost gap technologies such as on-shore wind or biomass combustion, other more market-oriented instruments like feed-in-premiums and TGC systems with technology banding[8] may be more appropriate. Depending on the specific market and resource conditions, and level of market integration across countries, technology banding may be necessary only in a transitional phase or may be bypassed in favour of a technology-neutral TGC system. Once the technology is competitive with other CO_2-saving alternatives and ready to be deployed on a large scale, and when appropriate carbon incentives are in place, these RET support systems can be phased out altogether. At that stage, renewable energy technologies will compete on a level playing field with other energy technologies.

National circumstances (RET potential, existing policy framework, existence of non-economic barriers, degree of market liberalisation, and energy system infrastructure) will influence the actual optimal mix of incentive schemes, and choosing when to complement R&D support with deployment support will be critical to the overall success of support policies.

All RET families are evolving rapidly and show significant potential for technology improvement. Renewable energy policy frameworks should be structured to enable the pursuit of technological RD&D and market development concurrently, within and across technology families, in order to address the various stages of development of different renewables and markets.

8. Technology banding refers to the technology differentiation of a quota obligation either by awarding technology-specific multiples of TGCs or by introducing technology-specific obligations.

Figure 1. **Combination framework of policy incentives as a function of technology maturity**



NB: The positions of the various technologies and incentive schemes along the S-curve are an indicative example at a given moment. The actual optimal mix and timing of policy incentives will depend on specific national circumstances. The level of competitiveness will also change as a function of the evolving prices of competing technologies.

Recommendations

All governments are encouraged to note the following principles relating to policies supporting RET deployment:

- Realise the urgency of implementing effective support mechanisms in order to accelerate the exploitation of the major potential of renewable energy technologies to improve energy security and tackle climate change;
- Remove and overcome non-economic barriers as a first priority to improve policy and market functioning;
- Recognise the substantial potential for improvement of policy effectiveness and efficiency in most countries and learn from good practice;
- Focus on coherent and rigorous implementation of the five fundamental policy design principles, with the aim of maximising long-term cost efficiency while having regard to national circumstances;

- Create a level playing field by pricing greenhouse gas emissions and other externalities appropriately in the market; and
- Move towards a combination framework of support schemes as a function of technology maturity level in order to foster smooth transition of renewable energy technologies towards mass-market integration, progressively employing market forces.