



E3G



# Scorecards on best and worst policies for a green new deal

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## Foreword

Can countries take bold steps to get the economy back on track, and at the same time safeguard the environmental pillars of global prosperity and security?

Economic decision-makers and government leaders are finally starting to get the message: it is a good thing for economic development to be based on environmental sustainability. Environmental pollution and an unstable climate threaten the welfare of their citizens and the economic fundamentals of their country.

WWF and E3G commissioned the new *Scorecards on best and worst policies for a green new deal* to demonstrate some of the successful policies and measures that countries have implemented - and to expose some of the worst.

Choosing such dual benefit policies isn't just a smart thing for the short term – it is the only way to help the world avoid catastrophic climate change. And we need to act fast: smart policies need to be rolled out widely and rapidly as the economy recovers so the next wave of investment is green rather than brown.

Ministers responsible for economics and finance are under the spotlight. Groups like the G20 have been tasked with rolling back fossil fuel subsidies and with finding means to provide finance for climate change action in developing countries. In 2010, the OECD will publish a green growth strategy.

Securing a fair, ambitious and binding climate agreement at the UN Climate Conference in Copenhagen in December is a key test of the collective global commitment to a green new deal. WWF and E3G are working for a positive outcome in Copenhagen, including a legally binding agreement with concrete commitments that provide a solid foundation for global cooperation on climate change up to and beyond 2012.

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### NOTE:

The scorecards provide an assessment of individual policies across a range of countries. In no way do the scorecards pass a judgement on the overall performance of countries – such national rankings can be found for example in the WWF climate scorecards 2009, where all G8 and G5 countries are examined. Specifically, Germany gets high marks in these scorecards for two of its policies, but also gets low marks for detrimental policies such as subsidised coal production.

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# 1 Summary and conclusions

## ***Integrating efforts to safeguard the climate and boost the economy***

Climate change and economic recovery are at the centre of current high-level political discussions.

Scientists warn more urgently than ever that the expected impacts of climate change exceed even the most pessimistic models. The window of opportunity is closing fast if we wish to keep climate change and the warming of the atmosphere below the danger threshold defined as a 2°C rise in average global temperature compared to pre-industrial times. To achieve this, we need to put the world on a pathway whereby global emissions peak and decline well before 2020 and are reduced by more than 80% below 1990 levels by 2050.

The economic recovery packages put forward by many countries involve very large sums of money. But economic recovery packages so far have not generated a green new deal. While some countries have devoted a proportion of their expenditure to climate-friendly stimuli, the impact is too small. Furthermore, for some countries the positive climate-friendly stimulus in areas such as buildings, energy efficiency and transport is outweighed by negative-stimulus spending in areas such as new roads.<sup>1</sup>

It is critical now to truly integrate efforts that safeguard the climate *and* boost the economy. This is a crucial year. High-level government representatives are meeting at various levels to consider these fundamental issues. In a pivotal UN conference in Copenhagen at the end of 2009, world governments need to agree on the next steps towards global climate treaties, building on and strengthening the UN Framework Convention on Climate Change and other international agreements. The G8 and the G20 are meeting regularly to discuss regulation of financial markets and economic recovery. There are ample opportunities to agree on a green new deal.

This report clearly shows that a well-designed climate policy will not adversely affect economic welfare.

## ***Collecting and rating best and worst policies***

For this reason, the report presents simple overview scorecards on the best policies implemented by governments that reduce greenhouse gas emissions, have other environmental benefits and, at the same time, are good for the economy.

The report also presents worst policies through which governments increase emissions and incur a cost to the economy. In most cases these are implemented for other reasons (energy security or support for local industry). Changing these policies would free up financial resources, while at the same time reducing greenhouse gas emissions.

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<sup>1</sup> For details see WWF/E3G report "Economic/climate recovery scorecards - How climate-friendly are the economic recovery packages?", March 2009, by Ecofys and Germanwatch

The scorecards of the best and worst policies can be seen as good and bad examples of policy. They present key characteristics, keys to success, potential pitfalls, and identify additional areas for improvement.

In a preliminary analysis we evaluated the climate policies of the G20 plus several other important countries for their green effects, economic effects and the potential for outreach to other countries. We included only policies that are already implemented and therefore have identifiable effects. After an initial assessment of around 100 policies, the top 14 were analysed in detail. We rated the policies in the categories to the best of our expert knowledge, but there is an inevitable element of value judgement. We also identified five general areas where government policies increase greenhouse gas emissions as well as incurring economic costs. These were not rated.

### ***Diverse opportunities for governments to enhance mitigation and improve the economy***

The top 12 examples of policies that we identified are presented in Figure 1 - 1. Governments have various proven tools, which they can use to reduce emissions, support the economy and provide useful models for other countries.

Several issues are important in relation to this list:

- Each country has its own specific characteristics. Policies may work in one set of circumstances but not in another, for example depending on whether there was significant mitigation potential before the measure was implemented.
- Other countries with less effective or more recent implementation of the same policy are not listed separately. For example, feed-in tariffs for renewable electricity are now implemented in over 40 countries. Examples of other countries with similar policies are listed in the scorecards.
- Even the best policies have substantial potential for improvement. What's more, they need to be seen in a wider context to ensure that their positive aspects are not counteracted by other measures.

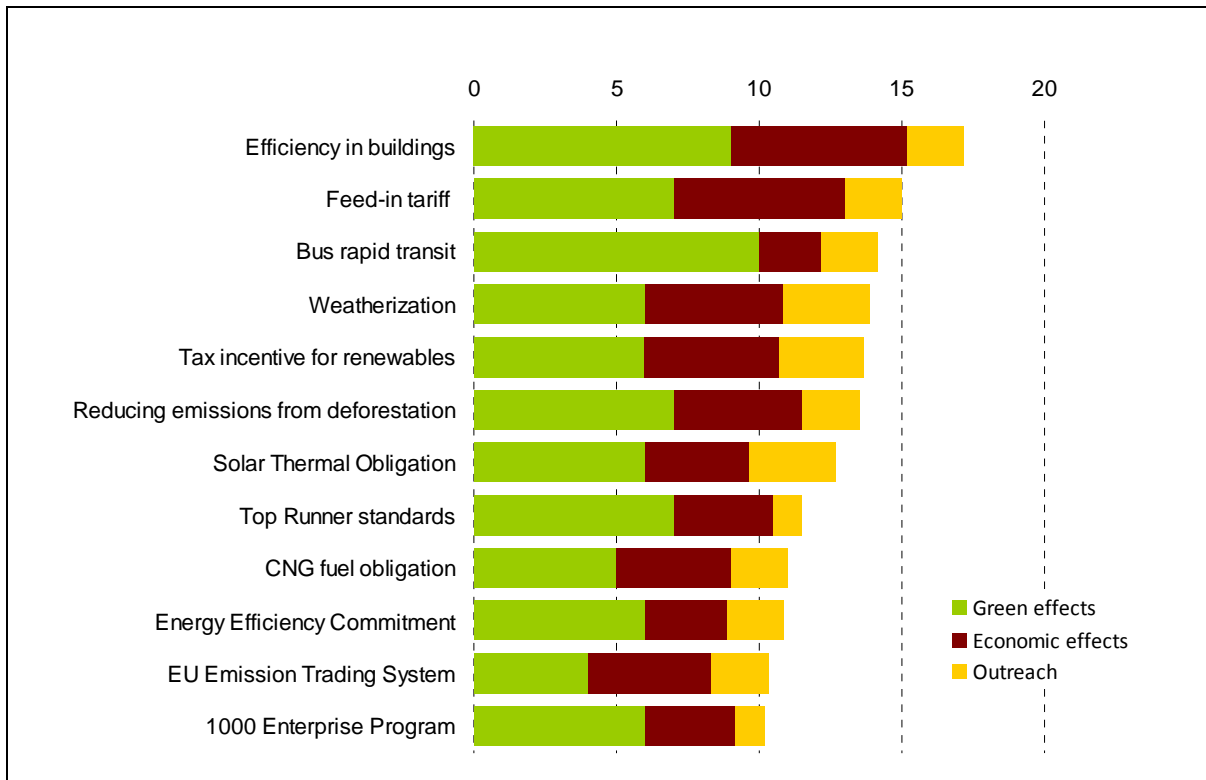


Figure 1 - 1 Overview of 'best policy' measures

### ***The best policies in detail***

- Germany's 'efficiency in buildings' programme came first in this ranking. This is an integrated package of building standards, subsidies, loans, grants and retrofit programmes. It reduces emissions substantially in the short and in the long term, creates jobs in the building market and can easily be implemented in most countries. Some elements of this package can be found in many other countries, but these are not as broad and well-integrated as those described in this case.
- Germany's feed-in tariff for renewable electricity guarantees a producer of renewable electricity a fixed feed-in tariff for 20 years. It ranks second in our list, with very high emissions-reduction potential in the long term. Long-term predictability in terms of the financial conditions affecting renewable energy installations is the key to the success of this measure. This highly successful policy has now been implemented in over 40 countries.
- Mexico's Bus Rapid Transit (BRT) system rated high on green effects, because it not only reduces greenhouse gas emissions significantly, but also has additional benefits in relation to health and comfort. It leads to long-term structural changes. It only has this positive effect where there is currently no effective public transport infrastructure. Other examples can be found in Columbia, Brazil, Chile and Indonesia.
- The USA's Weatherization Assistance Program provides energy-efficiency support for low-income homes. Due to previous low efficiencies, emissions are substantially reduced and there are numerous positive economic effects. The outreach effect of this policy is high, as it focuses on low-income households.

- The USA's tax incentive for renewable electricity generation allows producers to receive a tax credit per kWh produced. It is supported by several additional, sometimes state-led, incentives for renewable energy in the USA. The standard tariff for all technologies mainly stimulated wind-power developments and does not support a range of technological innovations.
- Brazil's actions designed to reduce emissions from deforestation in the Amazon region include creating new protected areas and enforcing the prevention of illegal logging. These activities significantly changed the deforestation rate and thus avoided a substantial volume of emissions. However, these actions need to be maintained to prevent trees being cut in the future. The policy has led to a structural change to the forces affecting deforestation.
- Spain has implemented an obligation to install solar thermal and PV in new buildings. The package is complemented by subsidies, low-interest loans and tax incentives. While avoiding significant volumes of emissions, it has also created jobs and led to a structural change towards more climate-friendly architectural design. Spain is a front runner in renewable obligations in buildings. A similar element was also recently integrated into the German buildings package that is described above.
- Japan's dynamically increasing (Top Runner) standards for vehicles and for household appliances has been successful in significantly increasing energy efficiency. This measure also has positive long-term effects on emissions outside of Japan, as other countries use the products. The key to success is that the standard is automatically updated in relation to the most efficient product on the market, thus providing a direct benefit to innovative companies. However, the system, which includes a range of standards, requires a considerable amount of administration. There are energy efficiency standards in many countries, but few apply the 'Top Runner' principle.
- India's obligation for Compressed Natural Gas (CNG) fuel for commercial vehicles not only reduces greenhouse gas emissions significantly, but also has additional benefits in relation to health through the reduction of other air pollutants. It leads to long-term structural changes favouring cleaner and less carbon intensive gas use in transport. The development of the CNG infrastructure additionally provides positive employment effects.
- The UK has implemented an obligation for energy and gas suppliers to increase energy efficiency in homes. As a result, suppliers have offered insulation or energy-efficient appliances to customers. Putting the obligation on suppliers and not on consumers was the key to overcoming barriers to investments. The economic benefits went to customers. Such an obligation could easily be implemented in other countries but so far this has not happened.
- The EU's Emission Trading System (EU ETS) is not delivering the expected level of emission reductions in its current form, but has significant potential in the long term. At the same time it ensures that reductions are implemented in the most efficient way. The key to success is the distribution of emissions allowances to participants in a system that must be stringent enough and predictable in the long term to ensure long-term structural change. It has succeeded in bringing



greenhouse gas emissions to the boardrooms of many companies. The EU was a front runner in setting up an emission trading system; many other systems are now in operation or being prepared.

- China has allocated mandatory reduction targets to the 1000 most energy-intensive enterprises accompanied by incentive schemes. The programme has led to energy management and energy-efficiency projects in the companies. It has avoided significant volumes of emissions and started a structural change towards more energy-efficient production. It requires considerable administrative and enforcement capacity at the government level. Similar, mostly voluntary, agreements have been implemented in many other countries.

### ***Significant gains could be made if the worst policies were changed***

At the other end of the spectrum, certain costly government policies actually increase emissions or are a barrier to structural change towards a low-carbon economy. In this report we identified a few generic examples that apply to many countries. Reversing these policies would reduce emissions significantly and free up financial resources to stimulate the economy in an environmentally friendly way.

- **Local coal-mining subsidies:** Many countries directly subsidize the production of coal, support mining related R&D and implement tax exemptions or tax reductions. The main reasons for these policies include providing cheap fuel for national consumption or for export and securing jobs in the mining industry. This support, however, is a barrier to structural transformation to a low-carbon economy. The net effects on employment are marginal anyway since jobs saved in the coal-mining industry could be replaced by jobs in renewable energy industries and energy-efficiency technology sectors.
- **Preferential treatment of energy-intensive industries:** In many countries energy-intensive industries are exempt or receive reductions from energy taxes. The intention is to keep production costs low and to enhance competitiveness. Often jobs are preserved at the cost of creating a barrier to the necessary structural change towards low-carbon industry. Governments must critically review whether the preferential treatment of specific industries is necessary or whether the same resources could be spent on climate-friendly activities, securing an equal number of jobs.
- **Subsidies for nuclear power production:** Government support to nuclear power production takes many forms, from supporting research and development - both for generation technology and for storage - to tax exceptions and direct subsidies. Often nuclear power production is seen to avoid GHG emissions, because one assumes that it replaces fossil-fuel-based electricity generation. However, since nuclear generation units can only provide base-load electricity, this can lead to the need for emission-intensive peak load facilities. In the mid to long term, investments in nuclear generation capacity divert investment away from renewable energy sources. Radioactive waste is dangerous and adequate long-term storage solutions have yet to be found. What's more, nuclear industries tend to privatize profits while socializing costs. After weighing all of these factors, many countries have decided to phase out nuclear energy.

- **Subsidies for car-based transport and aviation:** Countries provide tax rebates for private car purchases, for company cars and for the costs of commuting. Airplane fuel is usually tax exempt. This gives fossil-fuel-intensive modes of transport an advantage and increases transport in general. Phasing out these subsidies would create the right incentives for a greener transport sector.
- **Lack of comprehensive water management in arid and semi-arid regions:** In most arid and semi-arid regions, irrigation of agricultural land and the provision of water for consumption is a major challenge. Often there is a lack of an integrated approach and an excessive reliance on the short-term goal of ensuring a cheap supply of water for target sectors. Inefficient, electricity-based desalination technology is often used. A comprehensive water management system that integrates the efficient use of water and use of renewable energy for desalination would achieve the same economic outcome.

### ***The need for a holistic long-term view and more integrated policy***

We draw the following general conclusions:

- The list of ‘best policy’ measures illustrates the wide range of opportunities for governments to combine climate and economic policies. It shows the different ways in which governments can achieve shared objectives with a variety of policy instruments that best fit their national circumstances.
- Almost all policies could be improved, for example the EU Emission Trading System in its current form barely made it onto the top 12 list. It has, however, the potential to significantly reduce emissions while at the same time supporting the economy, assuming that caps are set appropriately for the participating companies.
- Significant gains could be made by changing the worst policies, which are currently harming both the climate and the economy. For each worst policy there are countries that have found alternatives.
- Integration and a long-term perspective are essential. Some countries appear on the ‘best’ and ‘worst’ policy lists simultaneously. This illustrates the fact that it is not sufficient to be performing well in one area while underperforming in another. An integrated view is needed to ensure that the overall balance of activities is consistent. A very good example of a framework that ensures the overall coherence of national policy – and keeps emission-reduction efforts on track – is the UK Climate Change Act, which established a system of five-year broad reviews of all policy areas, linking these to long-term national carbon budgets with regular reporting of progress to Parliament and scrutiny of policies and emissions trends by independent experts. This model offers a good starting point and model for other developed countries wishing to develop Zero Carbon Action Plans and put their policy making in a comprehensive long-term perspective.

## 2 Method

The analysis focuses mainly on the G20 countries plus a few others. We recognize that there are potentially excellent policies and measures in other countries. We have concentrated on these countries since they are the world's largest economies where massive action is required.

All policies and measures are at a federal level. They are either directly implemented on a national level or supported through federal funds. This scope potentially excludes many interesting and useful measures on state, provincial or local level. However, due to the required scope of action the national focus seemed most appropriate.

We first scanned the climate policies for their green effects, economic effects and the potential for outreach to other countries. Policies score well when they:

- **Green:** reduce greenhouse gas emissions in the short term
- **Green:** reduce emissions in the long term
- **Green:** provide for a positive lock-in to environmentally friendly technologies
- **Green:** have other positive environmental effects
- **Economic:** have in total more financial benefits to society than costs
- **Economic:** have positive employment effects
- **Economic:** remove barriers to investment
- **Economic:** trigger innovation
- **Outreach:** show a good applicability to other countries

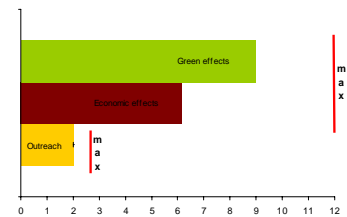
These subcategories were rated in an initial assessment of around 100 policies. The full list of measures with the initial scoring is included in section 5.2. Following this, the top 14 were evaluated in more detail, of which 12 made it into our top 12 list. The subcategories were broken down into a limited set of relevant indicators. A questionnaire was elaborated on the basis of these indicators providing additional information and, where available, numbers supporting the assessment. The subcategories were rated on a scale from -3 to 3 and the scores were added for a final rating. Due to the number of subcategories it becomes clear that the 'outreach' category has a lower weight than green and economic effects and reflects 1/9<sup>th</sup> of the overall score.

The overall score for each measure is determined by adding the scores of the three main categories. The score for each subcategory is derived through addition and weighing of the scores for each indicator, taking into account that in cases where there can be positive and negative effects this is reflected through the positive/negative score.

### **3 Best policy scorecards**

The German building regulation (EnEV), the renewable energy heat law (EEWärmeG), the building-related support programmes of the KfW banking group and the support programme known as Marktanreizprogramm (MAP) together form a policy package designed to increase energy efficiency in buildings. The German building regulation prescribes energy performance in terms of maximum primary energy consumption, depending on type and shape for both new and existing buildings. The renewable energy heat law (EEWärmeG) regulates the use of renewable energy for a certain amount of heat used in newly constructed buildings. To encourage widespread adoption of the standards, there are support programmes through low-interest loans and investment subsidies.

## Score 17.2



### Green effects

- Emissions saved through the subsidy programmes are estimated at around 1.2 Mt CO<sub>2</sub>/year.
- Lifetime for construction techniques of about 30 years and for technologies of about 20 years, the measures implemented in recent years achieve long-term savings of about 72 Mt CO<sub>2</sub>. Emissions data is only available for the subsidy schemes. The overall reductions are estimated to be up to four times higher.
- Energy efficiency in German buildings improved from before the implementation of the first EnEV until now from approximately 120kWh/m<sup>2</sup>a to 60kWh/m<sup>2</sup>a energy demand in new buildings and to approximately 80 kWh/m<sup>2</sup>a in existing buildings after renovation. Impact of the EEWärmeG cannot be calculated as it was only implemented recently.

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### Economic effects

- Most energy-efficiency measures in buildings are cost-effective in the long run, requiring considerable initial investment, which is recuperated through savings on energy costs.
- Thanks to a combination of obligations combined with financial support, the financial constraints connected with relatively high investment costs in particular were overcome.
- For the subsidy schemes it has been calculated that on average around 203,000 jobs could be safeguarded or created for at least one year thanks to co-financed investments since 2006.
- The leverage effect, i.e. how much investment is triggered by one Euro of subsidy of the KfW programmes, has been estimated to be 10 (for the MAP 12.5).

6.2

### Outreach

- The measure can easily be implemented in many countries. However, the required legal framework is complex and substantial administrative and enforcement measures are needed.
- Measures supporting energy efficiency in buildings have been implemented in many countries. Examples include:
  - **Australia:** The Government's Energy Efficient Homes Package is designed to encourage installation of ceiling insulation in many Australian homes and to get up to 420,000 households to install a solar hot water system.
  - **Indonesia:** Tax incentives for energy conservation compliance in buildings.
  - **South Korea:** Building standards such as insulation and efficiency, green building certification programme.

2

### Implementation

- The first EnEV came into force in 2002, building on earlier existing standards the EEWärmeG had started in 2009.
- Each construction requires a permit. Information on compliance with the regulation must be submitted for approval. The building authority may conduct on-site inspections to check compliance. Support schemes are operated through the banking system for KfW and directly for BAFA schemes.

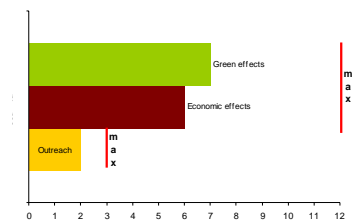
### Success factors

- A combination of performance/efficiency obligations, prefinancing, information campaigns and additional capacity building combined in a coherent package.

### Potential improvements

- The requirements of the EnEV could be even more ambitious (e.g. the passive house standard), this way achieving greater reductions. Studies showed that this standard can be cost-effective. A better compliance system also needs to be put in place.
- The EEWärmeG requires the use of a certain amount of renewable energy for new buildings only, so there is a lack of such a requirement for existing buildings (where most of the potential lies). The MAP also needs to be increased.
- In the future the law has to be changed. It should no longer be possible to substitute insulation measures by the use of renewables energy. Buildings are longlived capital stocks – once the chance for insulation has been passed it will not appear in the next 25 years.

**Score 15.0**



Energy providers are obliged to prioritize renewable energy over non-renewable energy in their grids and to pay suppliers a defined sum per kWh, depending on the type, size and location of the facility, for a total of 20 years. The supplier receives more money per kWh from the grid provider than the end-user pays per kWh. This price increase is passed on to end-users, which had the effect in 2008 that end-users paid an average of 1.1 cent/kWh more per kWh i.e. €3.10 more per month for an average household that consumes 3500 kWh per month (conventional and renewable energy). There are no caps on the amount of renewable energy fed in.

### Green effects

- Since the policy was implemented, there has been an increase in renewable energy from ~30 billion kWh/a in 2000 to ~90 billion kWh/a in 2008. Not only companies but also private investors are getting strongly involved.
- In 2008 112 Mt CO<sub>2</sub> emissions were reduced due to renewable energy, 56 Mt of these reductions were due to the effects of Germany's Renewable Energy Law EEG (7.5% of the country's total emissions (748 Mt).

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### Economic effects

- High investments in renewable energy created a new job market: up to 2008 approx. 187,000 jobs (thus approx. 0.5% of the total German workforce had jobs that were created as a result of the EEG).
- Money spent: €4.5 billion is the sum of feed-in-tariffs paid (2008), end-users pay 1.1 cent/kWh more (2008).
- Money saved: €2.7 billion saved through import reduction of coal and natural gas for electricity (2008); €2.9 billion saved through avoidance of external electricity costs (2008), total domestic revenue €14.2 billion in the electricity sector, with windenergy and solar energy contributing more than ¼ of the income (2006)

6

### Outreach

The measure can easily be implemented in many other countries. A feed-in tariff has now been implemented in over 40 countries. Other countries' feed-in tariffs were rated lower, e.g. because Turkey has the same price for all renewable energy sources and Spain has included a cap for photovoltaics.

2

### Implementation

The EEG law and its predecessor have been in force since the year 2000. Every two years, reports are published by the Federal Ministry of Economics and Technology, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and the Federal Ministry of Food, Agriculture and Consumer Protection, which describe the experiences and results of the EEG up to that point and potential improvements and adjustments. The EEG gets continuously improved and adapted to newly occurring problems/changes (e.g. repowering). A Clearing Agency EEG has been established which shall solve disputes on the EEG and its application if both parties agree to it. The Clearing Agency EEG works free of charge.

### Success factors

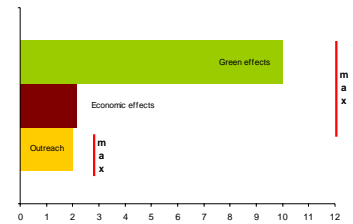
A high degree of planning certainty (e.g. a guaranteed income for 20 years) attracts investors, incentives lead to removal of barriers and structural change, tariffs should be in accordance with the energy source (e.g. solar is more expensive than the other sources, so should receive a higher feed-in tariff).

### Potential improvements

- Variations in the tariff over time.
- Automatic adjustment of the EEG to high inflation.

## Score 14.2

The 'Metrobus' is a bus rapid transit system that serves the Mexico Federal District, consisting of two main lines. The first 'Insurgentes', which started operating in 2005, covers a distance of 30 km. The second line 'Eje 4 Sur', which was inaugurated in December 2008, covers 20 km and runs from West to East. The system has partly replaced old buses and minibuses and to some extent also private vehicles. It provides more efficient transport and helps to ease congestion, plus providing positive environmental and economic effects.



### Green effects

- GHG emission reductions were calculated at around 107,000 t CO<sub>2</sub>eq in the period 2008-2009.
- Estimated averages of other annual emission reductions between 2005 and 2015: 690 tons of oxides of nitrogen, 2.8 tons of fine particulate matter, and 1.3 tons of sulphur dioxide.
- Improved air quality.

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### Economic effects

- Average health benefits are estimated in US\$3 million per year.
- Over 2 million hours of travel time were saved each year (economic value: US\$1.3 million).
- The number of accidents has been reduced.
- People, especially women, feel safer using the new bus system.

2.2

### Outreach

This measure has been implemented in several other countries with large cities including:

- The cities of Bogotá (Colombia) and Curitiba (Brazil), which were pioneers in successfully applying the system
- The system has been also implemented in Chile with less success, mainly due to an inadequate infrastructure.
- A similar system has been implemented as part of the Blue sky programme in Jakarta (Indonesia).
- The system could be implemented in other large cities with similar conditions, for instance in other emerging economies.

2

### Implementation

- The Metrobus is part of the 'Project for the Introduction of Environmentally Friendly Transport Measures (PIMAAT)' led by the Ministry of the Environment. The project is carried out by the Government of the Federal District and two transport companies that have been given the concession to operate the system. A public organization is in charge of planning, control and administration of the system.

### Success factors

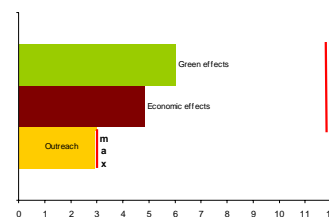
- Good quality infrastructure planning and implementation.
- Sufficient capacity.

### Potential improvements

- The frequency and capacity of the buses needs to be improved.

## Score 13.8

The Weatherization Assistance Programme (WAP) was created in 1976 under Title IV of the Energy Conservation and Production Act to assist low-income families reduce their energy consumption and costs as well as reduce dependence on foreign oil by cutting energy use. Many state Low Income Home Energy Assistance (LIHEAP) programmes work side by side with WAP to provide both immediate and long-term solutions for tackling energy poverty. Under the American Recovery and Reinvestment Act (ARRA) of 2009, the WAP will distribute \$5 billion to the states in an effort to scale up the programme from 175,000 new units annually (using all funding sources) to more than 300,000 per year.



### Green effects

- So far 6.2 million homes have been weatherized, saving more than 9 million MWh of energy each year.
- Most homes which the Weatherization Programme serves are heated with natural gas. After weatherization, a house uses 32% less gas and saves 1.62 Mt CO2 annually.
- For families, benefits often relate to advantages other than energy bill relief, such as comfort, aesthetics, noise reduction, health and safety, and convenience.

6

### Economic effects

- Estimates are that weatherization returns \$2.69 for each dollar spent on the programme, achieved through energy and non-energy benefits.
- On average, weatherization reduces heating bills by 32%. Families whose homes are weatherized are expected to save about \$350 (based on previous energy bills). By reducing the energy bills of low-income families instead of offering aid, weatherization reduces dependency and liberates these funds for spending on more pressing family issues. The spending spurs low-income communities towards job growth and economic development.

4.8

### Outreach

- The measure could easily be implemented in many other countries.

3

### Implementation

- Under the sponsorship of the US Department of Energy, the programme is implemented by state and local agencies and is in operation in all 50 states and the District of Columbia. Measures include adding thermal insulation to the residential building envelope, shading sun-exposed windows, implementing air leak control measures, testing, tuning and maintaining heating and cooling equipment, reducing duct leakage, installing low-flow showerheads and other energy conservation improvements as identified by the home energy auditor.
- In 2009: \$5 billion was allocated to the programme. WAP goes exclusively to low-income families (less than 200% of the income defined as the poverty level). Each home may receive up to \$6,500 in assistance for energy retrofits. WAP directs funds to states, which allocate their share of funding to local governments and jurisdictions.

### Success factors

- Direct benefit to participating families through lower energy bills.
- Energy audits increase awareness and identify best energy saving options.

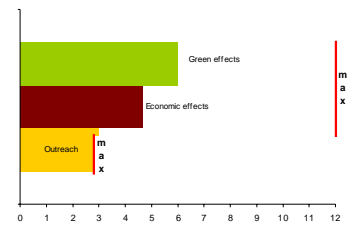
### Potential improvements

- The programme should be further extended, both in terms of overall funds and eligibility.
- Energy audits (excluding plan implementations and material costs) should be free of charge for all families nation-wide.



The Renewable Energy Production Tax Credit (PTC) currently provides a 2.1 cent per kWh benefit to companies producing energy from wind, solar, geothermal, and bio-energy generation. The PTC generally applies to the first 10 years of a renewable energy facility's operation. The Investment Tax Credit (ITC) is applicable to other eligible renewable energy technologies ('open-loop' biomass, incremental hydropower, small irrigation systems, landfill gas, and MSW) which each receive a tax credit of 1.0 cent per kWh. Businesses and individuals who buy solar energy systems have been eligible to receive an ITC of 30% since its inception. This policy is supported by additional federal incentives for renewable energy and various state level incentives such as renewable portfolio standards.

Score 13.7



#### Green effects

- Since the implementation of these policies there has been a great increase in the use of renewable energy. Not only companies but also private investors are getting strongly involved.
- 10 Mt CO<sub>2</sub> per year emission avoided, equivalent to taking 1.8 million cars off the road.

6

#### Economic effects

- Since the implementation of the policies, there has been a substantial increase in the use of renewable energy.
- The wind industry benefitted most of the implementation of the PTC and between 2003 and 2008 the US wind power industry added 20 GW to its capacity. This is also reflected by growth rates in wind energy capacity of 47% between 2001 and 2005 and with continuous growth in the following years. .
- Wind farms built in 2007 that were supported by the PTC have an estimated net present value to the US Treasury of \$250 million.
- Studies estimate that the PTC more than pays for itself through tax revenue generated by the wind projects themselves and the industry that builds and operates them.
- The 'on-again/off-again' status that has historically been associated with the PTC and ITC creates a 'boom-bust cycle' of short-term planning, near annual job layoffs and higher cost that plague the renewable industries.

4.7

#### Outreach

- The measure could easily be implemented in many other countries.

3

#### Implementation

- The PTC was originally enacted as part of the Energy Policy Act of 1992 and then targeted to support just wind and certain bio-energy resources. Since its establishment, it has undergone a series of short-term extensions, and has been allowed to lapse in three years: 1999, 2001 and 2003.
- The ITC was first introduced as part of the Energy Tax Act of 1978. The solar ITC was strengthened by the Energy Policy Act of 2005. Most recently, the PTC and ITC were extended as part of the Emergency Economic Stabilization Act of 2008 signed by President Bush on 3 October 2008, and by the American Recovery and Reinvestment Act (ARRA) of 2009 signed into law by President Obama on 17 February 2009.

#### Success factors

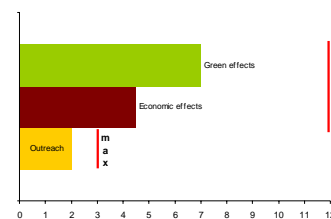
- State and local government have played a key role in renewable energy development by providing different types of support in addition to the federal support. These include support for Research and Development regulatory tools such as renewable portfolio standards, revenue bonds, and investment tax credits.

#### Potential improvements

- Provide a stable, reliable long-term policy framework to allow long-term planning, provide job security and create a stable, US-wide market for capital investment.
- The credits should be extended for longer-term cycles or substituted by feed-in tariffs or a federal renewable energy standard (RES) providing planning security long into the future and thus creating a stable, US-wide market for capital investment.

Brazil's Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAM) was implemented in 2003. The goal is to reduce deforestation of the Brazilian Amazon Forest. The five pillars of implementation are protected areas (APA programme), land tenure, monitoring, sustainable forest management, and command & control.

## Score 13.5



### Green effects

- Creation of 148 new protected areas covering 640,000 km<sup>2</sup> from 2003-2008.
- Between 2004 and 2007 deforestation fell by about 59% from 27,000 km<sup>2</sup> to 11,200 km<sup>2</sup>.
- While deforestation rates in the basin as a whole increased over the year, preliminary analysis indicates that they declined 7% in the 36 high-deforestation counties that were the object of Decree 6321.
- More research is needed to analyse the positive benefits for standing forests and effects on agriculture.

7

### Economic effects

- Strengthened law enforcement in the frontier zone with joint Federal Police, Armed Forces and environmental agency operations jailing over 700 people, including government employees, for illegal land-use practices.
- Government agriculture credit cut off to 36 highest-deforestation municipalities in 2008 to address the upturn in deforestation and penalties established for buyers of beef and soy based on illegal deforestation.

4.5

### Outreach

- As the largest-scale and most effective national deforestation reduction programme in a country with an active, expanding, agricultural frontier, Brazil's Action Plan provides important lessons on the institutional and political conditions for reducing deforestation.
- At state level, deforestation plans must be developed to access funding coming through the Amazon fund.

2

### Implementation

- The Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAM), which was launched in 2003, is coordinated by the Presidential staff (*Casa Civil*), and involves 13 ministries as well as the Federal Police, Federal Highway Police and Armed Forces.
- In addition, December 2007 Federal Decree 6321/07 was approved and went into effect in March 2008. The decree allowed government to focus priority actions on deforestation hotspots, with 36 municipalities accounting for 50% of deforestation in 2007.
- The PPCDAM is linked to the National Climate Plan, which defines targets for deforestation for the legal Amazon. It is also linked to the Amazon Fund created in 2008, which covers the implementation of the financial elements of the PPCDAM.
- Rural landholders in the 36 counties were required to present current descriptions of their holdings and land use, including GPS-mapped geographical coordinates, to the National Institute for Colonization and Agrarian Reform (INCRA).
- It includes a resolution requiring proof of compliance with environmental regulations for access to official credit.
- It requires state and federal environmental agencies to embargo illegally deforested landholdings, prohibiting the sale or purchase of goods produced on embargoed lands.

**Success factors**

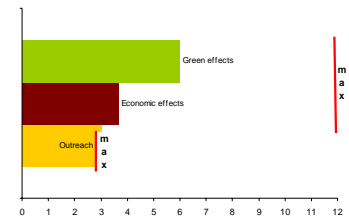
- Accurate, transparent deforestation monitoring.
- High-level political support.
- Understanding the drivers of deforestation.
- Professional, relatively politically neutral police force (and/or Armed Forces).
- Adaptability.

**Potential improvements**

- A comprehensive evaluation of the effects of the policy.
- Expand the monitoring system to cover the whole country.
- Include other ecosystems and coordinate this with the national effort.
- Secure and continue funding for implementation and maintenance to ensure long-term effects.
- Monitoring upscaling to the whole country and technical improvements.
- Ensure coordination between those engaged in agriculture and environmental policy development, financing and implementation to ensure coherence among the various policies and to address the drivers of deforestation in a consistent manner.
- Establish a coordinated budget for agriculture and the environment (in the legal Amazon) to create a coherent package that will ensure environmental safeguards.

## Score 12.7

Spain requires mandatory solar thermal installations in new residential and tertiary buildings as well as solar PV installations in tertiary buildings. These activities are supported by national and regional public subsidies, low-interest loans, as well as national, regional and municipal taxes.



### Green effects

- In 2008, 466,000 m<sup>2</sup> of solar systems were installed, reducing emissions by 349,500 t CO<sub>2</sub> annually.
- Solar thermal: one household (a family home with 2 m<sup>2</sup> of solar panels) can avoid 1.5 t of CO<sub>2</sub> emissions per year (substitution of electricity used). A hotel with 400 beds (580 m<sup>2</sup> of solar panels) can avoid 128 t CO<sub>2</sub> per year.
- Solar PV: 1 kWh of PV can avoid from 0.4 to 1 t CO<sub>2</sub> annually. Households can save 2.68 t CO<sub>2</sub> per year (compared to natural gas). Larger installations of 100 kW avoid 53.62 t CO<sub>2</sub> per year.
- With an operational lifetime for solar thermal and PV systems of 25 years, the long-term potential is substantial.

6

### Economic effects

- Investments in renewable energy created additional technical jobs in the solar industry in 2008, (approx. 8,000 direct jobs were created).
- In 2008, the regional governments spent €27.93 million on direct subsidies.
- The law may help to restore some of the traditional bio-climatic architecture, a tradition which has been largely lost in the building boom of the last 40 years.

3.7

### Outreach

- The measure could easily be implemented in many other countries. Obligations to use renewable energy are implemented by some municipalities and national governments in other countries.

3

### Implementation

- When implementing the Energy Performance of Buildings Directive, Spain included solar thermal and photovoltaic requirements in the technical building code. The CTE (Building Technical Code), which is part of the law (Royal Decree 314/2006), came into force in March 2006.
- The minimum solar contribution to sanitary hot water requires between 30% and 70% of the building's hot water needs. This depends on the climatic zone where the building is located and the anticipated daily demand for hot water.
- For PV the legislation defines a minimum of installed power depending on the climatic zone, built surface (in m<sup>2</sup>), and the type and use of building (especially for tertiary buildings such as hospitals, hotels and supermarkets).
- In May 2009, the requirements for noise protection in buildings were integrated.

### Success factors

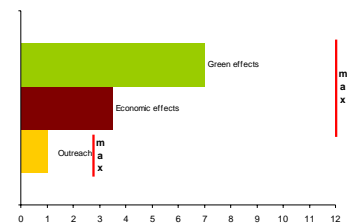
- Including renewable energy as an obligation requires owners of building to investigate which measures will be most cost-effective in the long run.

### Potential improvements

- Extend the solar requirements to existing buildings and to other sectors (not just the tertiary sector).
- Homogenize the implementation of the law across the country: it currently depends strongly on the regional and municipal governments (17 regional administrations and many different municipal local directives).
- Simplify the bureaucratic processes, especially for PV solar systems.

## Score 11.5

The Top Runner Programme was introduced to improve the energy efficiency of machinery and equipment, including the residential, commercial and transportation sector. It is a standard in which energy efficiency performance targets for categories of machinery and equipment, including vehicles that are both domestically manufactured and imported, is set. The standard is reviewed regularly to raise the level to that of the most energy-efficient products on the market. .



### Green effects

- Since the policy was implemented energy efficiency in the various categories has improved significantly, ranging from 21.1% for diesel freight vehicles to 99.1% for computers.
- Energy savings from the measure in 2005 are estimated to be 6 GWh in the residential sector and 3 GWh in the transport sector.

7

### Economic effects

- The programme drives domestic efficiency, but also stimulates international gains, given Japan's position as a major exporter of electronics and vehicles.
- The net abatement costs, which vary substantially, have been estimated for the household sector in Japan. These range from -36.541 Yen per t CO<sub>2</sub> per year (lighting) to 209.462 Yen per t CO<sub>2</sub> (microwave ovens).

3.5

### Outreach

- This measure could easily be implemented in many other countries. Different energy efficiency standards are already implemented in various countries. However, they are not usually set up in a dynamic way using the top performing equipment as the basis. Examples include:
  - Australia: Minimum Energy Performance Standards (MEPS)
  - Brazil: Energy performance standards for electric motors
  - Canada: Labelling and energy performance standards for many energy using appliances
  - EU: Directive for establishing eco-design requirements for energy-using products
  - India: Efficiency labelling for electricity appliances
  - Mexico: Energy efficiency standards for electrical appliances, gas boilers and thermal insulation
  - US: The Energy Star programme

1

### Implementation

- The Top Runner Programme is part of the 'Law Concerning the Rational Use of Energy'. Japan's energy conservation policies are developed by the 'Advisory Committee for Natural Resources and Energy.' Several committees are involved in setting standards and implementation.

### Success factors

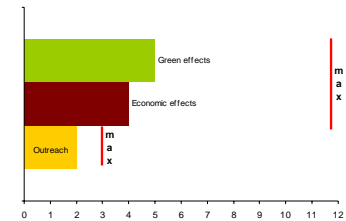
- Coverage of a large product base including more than 20 categories
- An ambitious and dynamic efficiency standard that rewards the company that develops the most efficient product.
- In-depth consultation with the industry, good relationships with ministries, which is important for implementation.

### Potential improvements

- Expand the product coverage.
- Upgrade and tighten the standards.
- Increase outreach to consumers to make people aware of the energy efficiency of the products they buy.
- Reduce the number of efficiency categories in areas where they are counter-productive for creating change. For example, the passenger car categories are based on weight, which reduces incentives to change to smaller cars and also does not provide manufacturers with incentives to change. Eliminate the differentiation between fuel types (LPG and diesel) to provide incentives to move to low-carbon fuels.
- Improve and reduce administrative processes.

## Score 11.0

The requirement to use CNG fuel for commercial vehicles such as small trucks and medium-sized buses started in 2001 in Delhi. In order to support the requirement, the City Government provides subsidies to the Transport Department for shift to a CNG fleet and tax benefits for private operators for implementing CNG. To date it has been implemented in nine metropolitan cities in India including Delhi, Kolkata, Mumbai, Hyderabad and Chennai.



### Environmental effects

- Since implementing the requirement in Delhi the government bus fleet has grown to more than 3,500 low-floor CNG-fuelled buses with an additional 3,500 planned up to 2010 (the aim is to phase out the current diesel-fuelled Blue Line fleet). In addition there are 12,000 taxis, 65,000 auto rickshaws and 5,000 minibuses running on CNG.
- Carbon emissions were reduced by 72% between 2000 and 2008.
- SO<sub>2</sub> emissions were reduced by 57% between 2000 and 2008.
- There have been significant improvements in air quality through the shift from highly polluting diesel and kerosene oil used in transport vehicles.
- There have been some negative land use effects as a result of creating additional infrastructure for CNG distribution.

5

### Economic effects

- Health benefits through improved air quality.
- Close to 10,000 CNG stations have been established since implementing the requirement, requiring building as well as operational services.
- Employment has been generated throughout the chain of manufacturing and servicing the CNG kits.

4

### Outreach

- The approach is scalable and this is already happening within India as well as in several countries in Europe including Germany and Italy.
- It can also easily be implemented in neighbouring countries such as Bangladesh, where there are abundant reserves of natural gas.
- The main bottleneck is the high capital investment needed to establish a CNG station infrastructure.

2

### Implementation

- The project was carried out by the Municipal Government of Dehli.
- The government has given direct subsidies to the Transport Department (DTC) for the shift to a CNG-based fleet and tax benefits for private operators for implementing CNG.
- A Compressed Natural Gas distribution infrastructure has been established and this is being expanded to other cities, creating an extensive network of low-emission infrastructure. In Delhi, this is now being supported by the introduction of Bus Rapid Transport (BRT), thus creating an additional low-emission infrastructure.

### Keys to success

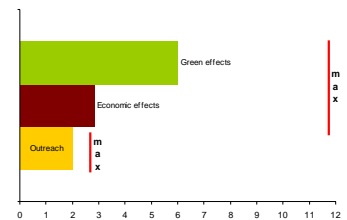
- Providing an infrastructure of CNG stations.
- Ensuring the availability of substantial capital investment in the infrastructure.

### Possible improvements

- Accelerate building of CNG stations by providing short-term financial support.

## Score 10.8

The energy efficiency commitment (EEC) obliges large energy suppliers operating in Great Britain to achieve targets for improving home energy efficiency. To meet these targets, suppliers create schemes to promote and deliver a range of services which significantly reduce the cost of installing energy-efficiency measures (insulation, appliances, heating, lighting). Customers can accept offers from any energy company, regardless of which supplies their gas and electricity.



### Green effects

- Energy saved during implementation (phase 1& 2) is estimated as 274 TWh.
- Emissions saved during implementation (phase 1) are calculated to be 1.5 Mt CO<sub>2</sub> per year.
- Given that the first two phases have both exceeded their targets considerably, the impact has been substantial. Phase 1 exceeded its targets by 40%. Surplus from Phase 1 can be taken into Phase 2 (up to 10% of Phase 2 target). Phase 2 also exceeded its target by 44%, including the carry-over from Phase 1.

6

### Economic effects

- In Phase 1 around 10 million households benefited from energy-saving measures under EEC, leading to substantial savings on energy bills. In the first phase 48.5% of low-income households benefitted from the programme; in Phase 2 this figure was 63%.
- Around £35 million was spent per year by the energy suppliers. It is highly likely that the costs will be put on customers' bills.
- For many people large initial investments and insufficient information are barriers to energy-efficient home-improvements. The scheme has removed both of these barriers.

2.8

### Outreach

- Depending on how the energy suppliers market is organized this system should be rather easy to implement in other countries.

2

### Implementation

- Under the Electricity Act 1989 and the Gas Act 1986 the Secretary of State has the power to set targets for suppliers to achieve improvements in energy efficiency. The Electricity and Gas Order 2001 sets the legal basis for the EEC. The regulator Ofgem was required to administer the programme.
- The measure consists of three implementation phases (phase 1&2 have been implemented and analysed here):
- Phase 1 (2002 to March 2005 April) applied to suppliers with 15,000 gas or electricity domestic consumers or more, with an overall target of 62 TWh of fuel-standardized, lifetime discounted energy benefits by 2005, of which at least 50% should come from low-income / benefit-dependant households.
- Phase 2 (2005 to March 2008) applies to suppliers with 50,000 clients or more, raising the target to 130 TWh by 2008.

### Success factors

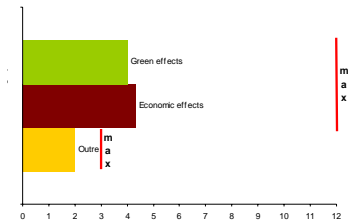
- Placing the obligation to make energy efficiency improvements on companies, not consumers.

### Potential improvements

- Move away from a focus on energy-efficiency activities towards limiting overall supply, thus providing a framework for encouraging companies to shift to a new business model based on providing energy services rather than units of energy. This could be based on the EU Energy Services Directive.

The European Emission Trading System (EU-ETS) limits GHG emissions (mostly CO<sub>2</sub>) with a total cap for all installations. EU Allowances (EUAs) to emit one ton of CO<sub>2</sub>eq are given to the installations for free or sold/ auctioned on the market by Member States. The installations and companies must cover their annual emissions with freely given or bought EUAs. Surplus EUAs can be sold to other participants using a market mechanism. Participants with cheap reduction options will reduce more emissions and make a profit by selling surplus emissions to participants with higher reduction costs. Overall reduction costs are minimized and incentives for reduction technology development are created.

Score 10.3



**Green effects**

- Although the policy has considerable potential to achieve emission reductions in the long term, the short-term implementation of the system led to little reductions so far. After this learning-by-doing phase, it seems likely to be much more effective in the long run.
- Low environmental impact in first phase due to oversized emission caps and too generous free allocation for installations, especially in new Member States.
- Offsets through non-additional CDM projects jeopardize the environmental integrity of the measure.
- Some impact on investment decisions, but lack of confidence in a sustained high carbon price and changes to fossil fuel prices, and weak implementation (as above), has failed to prevent plans for a new generation of unabated coal-fired power stations in many EU Member States.

4

**Economic effects**

- Windfall profits for power producers and other sectors that include the price of EUAs received for free in product prices, potential competition distortions between companies in various countries and sectors, because of differences in implementation of the system.
- There are inconclusive results regarding employment effects, but most were very small (between +1% and -1%, as a rough indication)
- Cost savings to achieve the Kyoto target with EU-ETS are between €2.9-3.7 billion, without the EU-ETS it would be €6.8 billion

4.3

**Outreach**

- The EU-ETS was the first of its kind. There are other initiatives at the sub-national level but no other national schemes have yet been established.

2

**Implementation**

- The EU-ETS was introduced in 2005. It has three trading phases: 2005 to 2007; 2008-2012; 2013-2020.
- The requirement is implemented on a national level. Installations must prepare annual emission reports, which are verified by independent external auditors paid by the installations. The reports are sent to governmental institutions, which are organized differently in each Member States, for approval. The approved emission amounts are listed in national electronic registries that also list allocation and allowances per installation. These national registries are connected to the EU's Community Independent Transaction Log (CITL). Compliance, enforcement, as well as accreditation of verifiers and the annual distribution of the allowances takes place at the national level.

**Success factors**

- A highly flexible system which allows individual reduction strategies for the companies covered.

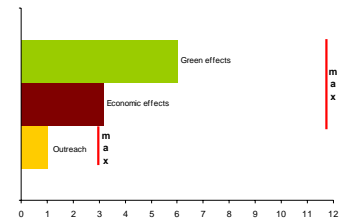


### **Potential improvements**

- Additional improvements to the third phase could include:
- Harmonization of implementation issues between EU member states.
- A wider scope (aviation from 2012 onwards, shipping is being discussed).
- A higher share of auctioning.
- Links to other equally ambitious systems to reduce carbon leakage to non-regulated countries.
- Binding rules to invest the auctioning revenues of Member States in emission reduction measures.
- There is considerable potential, since almost half of the EU's emissions are covered (about 50 mt of CO<sub>2</sub> equivalents) and high emission reduction ambitions (8%, 20%, 30%), yet the exact caps for each period depend on the volumes of emissions avoided.
- Stricter numerical limits on the use of imported offset credits and the introduction of quality criteria to favour emission reduction activities that provide better climate and sustainable development benefits.
- Reinforcement through supporting policies and measures, especially to avoid high-carbon lock in and to decarbonize the strategically important power sector. Options include stronger measures to promote renewable electricity, such as feed-in tariffs, and a plant-based emissions performance standard for new (and over time) existing, power stations.

The 1000 enterprise programme aims to reduce energy consumption at China's 1000 most energy-intensive industrial companies to achieve its 20% energy-intensity reduction goal. The government requires these companies to reform their energy performance through better allocation of responsibilities, energy management and auditing, and technology innovation. In return, the government provides incentives for the amount of energy saved.

## Score 10.2



### Green effects

- Technology transformation, establishment of energy management system and regular energy auditing will contribute to long-term emission reduction.
- The programme aims to save 100 million tce (2.9 EJ), reduce 250 Mt CO<sub>2</sub> emission during the 11th Five Year Plan (2006-2010). The final energy consumption in the 1000 companies of 9 energy-intensive sectors accounts for 33% of national energy consumption and 47% of industrial energy consumption.
- Emissions saved in 2006 and 2007 are estimated to be approx. 48 Mt CO<sub>2</sub>

6

### Economic effects

- Some jobs are lost due to the closure of small, inefficient plants. On the other hand new jobs are created in energy management and in the industries supplying energy-efficiency technology.
- Over 8000 energy-efficient technology transformation projects with over 50 billion RMB invested in them were carried out in 2007.
- Around 7 billion RMB of incremental funding (out of 23.5 billion for all energy conservation and emission reduction funding) was allocated by central government to support technology transformation in 2007.

3.2

### Outreach

- Similar but voluntary contracts/agreements between the industry and government can already be found in Europe and North America.
- Similar programmes have been conducted at provincial levels of China (the so-called Provincial 200 Programmes with local incentives from provincial governments).
- The 1000 enterprise programme can be extended to other sectors/developing countries, but would require strong management by the government, as well as financial and technological support from both the public and the private sector.

1

### Implementation

- The programme was initiated by the National Development and Reform Commission (NDRC), together with the Office of National Energy Leading Group, the National Bureau of Statistics (NBS), the State-owned Assets Supervision and Administration Commission (SASAC), and Administration of Quality Supervision, Inspection and Quarantine (AQSIQ). It came into effect on 7 April 2006 and will continue until 2010.
- Provincial and municipal governments are obliged to provide guidance and extra incentives, as well as oversee programme progress.
- Companies usually reach agreement with provincial governments (with approval from NDRC) for setting annual targets; the status of target completion will be evaluated on a regular basis.

### Success factors

- Stringent efficiency targets based on technical potentials and supported by incentive schemes to break down barriers. Strong administrative and enforcement capacity at government level, assisted by capacity building for the industry.

### Potential improvements

- Energy auditing capacity needs to be improved.
- The existing information dissemination system (for monitoring and verification) has room for improvement.
- The Chinese government could formulate a plan and outline implementation steps for the 'Top 10,000 SMEs Energy Efficiency Programme' during the next Five Year Plan, with an emphasis on providing incentives for SMEs to save energy.

## 4 Worst policy scorecards

## Local coal mining subsidies

Many countries have direct subsidies for the production of coal, support for R&D, tax exemptions or reductions.

The reasons for these measures vary with the national circumstances. The main drivers are usually:

- Providing cheap fuel for national consumption or export.
- Securing jobs in the mining industry.



### Green effects

- The subsidy provides a comparative advantage to coal as a fuel. This leads to increased use of coal in relation to other fuels. As a result, both GHG and non-GHG-emissions are higher than if there were no subsidy.
- Coal mining causes destruction of landscapes and water pollution.
- Intensive coal use has direct negative effects on health especially in the case of direct use in households. The low price prevents the large-scale deployment of cleaner fuel solutions.

### Economic effects

- The subsidies create a distortion in the fuel market, thus hampering structural change, innovation and reductions in energy consumption.
- The low price of coal creates an economic barrier for a shift towards renewable energy sources.
- The net effects on employment are marginal, since jobs saved in the coal mining industry could be replaced by jobs in renewable industries and energy-efficient technology sectors.
- The subsidy helps provide low energy prices for the population and keeps industry competitive, especially in developing countries

### Outreach

Many countries make use of coal mining subsidies. In Australia subsidies for fuel for coal power is estimated to amount to between 4.5 million AUS\$ and 1.1 billion AUS\$ per year with more than 3 million AUS\$ per year for research and development with around 3.5 million AUS\$ per year. Some countries, such as Germany, have already decided to phase them out (direct subsidies will be phased out by 2018). However, indirect subsidies e.g. for re-establishing nature in mined areas are still in place.

### Alternatives

Supply side subsidies for energy (not specifically coal) for poor parts of the population and particularly threatened industries would achieve the same effects while allowing for energy efficiency activities and fuel switch. The necessary structural change needs to be supported by capacity building and supporting programs to minimize social consequences from cutting the subsidies.

## Preferential treatment of energy-intensive industries

In many countries energy-intensive industries are exempt or receive reductions from energy taxes. The intent is to keep production cost low and to retain competitiveness of the industry. Depending on the product it can also intend to keep consumer prices at a low level.



### Green effects

- The price signal from energy-related taxes is distorted. Intended behavioural changes and developments in energy efficiency are therefore not triggered.

### Economic effects

- Necessary structural change towards low-carbon industry is hampered.
- Jobs in the energy-intensive industries are conserved.
- A lot of money, which should be used for structural change, is wasted.

### Outreach

Many countries have implemented some form of preferential treatment for energy-intensive industries. We mention just a few examples here for purposes of illustration.

- Germany: there are a variety of tax exemptions and reductions from the 'eco tax', which is levied on all fuels, and from paying the incremental cost for the feed-in tariff on renewable energy.
- Australia: the aluminium smelting industry is widely believed to receive electricity at prices well below the standard industry rates for electricity users of a similar size. This subsidy has been estimated at \$200-360 AU\$ per year.
- The Netherlands: energy-intensive industries, including greenhouses, are excluded or receive reductions from a climate tax levied on natural gas, the main fuel used in the Netherlands.

### Alternatives

Governments must critically review whether the preferential treatment of specific industries is necessary or whether the same resources could be spent on climate-friendly activities, securing an equal amount of jobs. Coordinated action by many countries can ensure the competitiveness of the whole industry.

## Subsidies for nuclear power production

Government support to nuclear power producers takes many forms, from supporting research and development – both for generation technology as well as for storage – to tax exemptions and direct subsidies.

The rationale for supporting nuclear energy was originally the interest of governments in providing a cheap, stable national energy supply. Today the fact that nuclear energy is produced without GHG emissions is also an important consideration for some countries.



### Green effects

- It could be argued that nuclear power production saves GHG emissions in the short term, given the fact that such production in many countries would replace fossil fuel generation facilities.
- In the mid to long term investments in nuclear generation capacity divert investment away from renewable energy sources. E.g. the recent agreement to prolong the lifetime of nuclear power stations in Germany will most likely have a negative effect on the investment in offshore wind parks.
- Electricity production is connected to substantial non-GHG, i.e. radioactive emissions, with a high risk of leakage both during the production phase and during final storage of waste. The issues connected to the final storage of radioactive waste have so far not been solved and the negative effects in the future cannot therefore be estimated.
- Cheap electricity from nuclear generation supports a high electrification rate, using electricity for uses where other applications that use fuel directly would be more energy efficient. Since nuclear generation units can only provide base load electricity this can lead to the need for emission-intensive peak load facilities.

### Economic effects

- Investment is diverted from renewable energy sources and energy efficiency measures.
- Profits from nuclear power productions are privatized and accrue to large utilities, while the environmental costs are socialized.

### Outreach

Most countries using nuclear power, for example France, Japan and Germany, support this sector.

### Alternatives

Many countries have agreed to phase out the use of nuclear energy.

## Lack of comprehensive water management in arid and semi-arid regions

In most arid and semi-arid regions irrigation of agricultural land and the provision of water for consumption is an urgent priority. A comprehensive water management system should be the standard for these countries to ensure a long-term stable water supply. However, there is often a lack of an integrated approach and only short-term measures, focusing on ensuring a cheap supply of water for target sectors.



### Green effects

- The lack of an integrated water management system promotes the excessive use of water, which can lead to serious detrimental mid to long-term effects for arid regions.
- In order to provide a cheap water supply inefficient, electricity-based desalination technology is often used, which is supported by the lack of an integrated approach. This leads to extensive energy use and subsequently to increased emissions.
- Without careful comprehensive planning, extensive desalination can lead to salinisation of whole areas through brine from distillation.
- risks to protected areas (wildlife)
- increases in the area of irrigated agricultural land (and therefore further water shortages)

### Economic effects

- Jobs in agricultural and touristic industries are preserved
- High negative external effects
- Increased food and water prices

### Outreach

A third of the world is facing water shortages due to poor management of water resources and soaring water use, driven mainly by agriculture

### Alternatives

- The development of a well-coordinated global water management system.
- Water prices that reflect the real costs.
- Better Environmental Impact studies. Better schedules of implementation.
- Better location of desalination plants in order to minimize their environmental impact.
- Incorporation of Renewable Energies in the design of desalination plants.

## Subsidies in the transport sector

Subsidies in the transport sector come in various forms, for example as VAT exceptions for international aviation, business car tax relief and commuter tax reliefs. The reasons for these subsidies differ but they include:

- Securing jobs in certain industries
- Ensuring that people can accept jobs further away from their home and
- Supporting trade.



### Green effects

- The subsidies lead to a distortion of the transport market and increase the attractiveness of more emission-intensive transport modes. Cheap flights lead to an increase in air transport and therefore more emissions, which are 2-5 times more damaging than on the ground.
- Business car subsidies and commuter tax relief lead to more traffic and therefore to more emissions.
- Business car subsidies do not provide an incentive to buy more efficient cars, which also leads to more emissions.

### Economic effects

- The aviation and car industries increase their revenue at the expense of their climate friendly competitors.
- Jobs in the aviation and car industry are conserved.
- Taxation is not harmonized between train traffic and aviation, since international train traffic is not excluded from VAT.
- The subsidies create a barrier to innovation in more climate-friendly transport sectors.

### Outreach

- International aviation is excluded from VAT in most countries.
- Subsidies for business cars, for example in:
  - Germany: for commercial use of business cars there is a full tax reduction, for private use of business cars the user has to pay a tax of 1% of the initial price of the car (the car is treated as a monetary benefit).
- Many countries have some type of commuter tax relief, yet they differ considerably in their scope. Some examples:
  - France: costs can be refunded either as travel costs for a distance up to 40km or as an income-related expenses lump sum
  - Germany: workers get a €0.30 tax reduction for each km travelled to work once a certain threshold is exceeded
  - Japan: travel cost reduction if a fixed expenditure lump-sum is exceeded

### Alternatives

- Exempting international aviation from VAT could be removed or the internal part of the flight could be taxed.
- Tax for private use of business car could be adjusted to match the efficiency of the car (target rate: an average of 1.5% of the initial price of the car).
- Commuter tax relief could be organized as in the Netherlands, where the refund starts at 10km and applies only to public transportation or as in Sweden where it applies once the value exceeds 7,000 SEK and applies only for public transportation or for cars if the journey by car is two hours shorter than when using public transport.



## 5 Technical appendix

### 5.1 The methodology in detail

#### *Scope*

This analysis focuses covers Argentina, Australia, Brazil, Canada, China, EU, France, Germany, India, Indonesia, Italy, Japan, Mexico, Netherlands, Russia, Saudi Arabia, Spain, South Africa, South Korea, Turkey, the UK and the USA. We recognize that there may be excellent policies and measures in other countries. We have concentrated on these countries as they are the world's largest economies where massive action is required if we want to mitigate climate change and the warming of the atmosphere.

All of the policies and measures are taken at national government level. They are either directly implemented at the national level, as with tax incentives and feed-in tariffs, or supported by central government funds, like the Bus Rapid Transit system in Mexico City. This approach may exclude useful interesting measures at the state, provincial or local level. However, given the required broad scope of action, the national focus seemed to be most appropriate.

#### *Indicators*

The evaluation was carried out using the following categories:

- Climate-related effects
- Economy-related effects
- Outreach capacity

These categories were split into subcategories (see Table 5 - 1, which also provides an overview of the maximum possible rating in each subcategory and each category). From this overview it is clear that the 'outreach' category has a lower weight than green and economic effects, reflecting just 1/9<sup>th</sup> of the overall score.

Table 5 - 1 Subcategories: maximum scores

	Maximum score
<b>Green effects</b>	<b>12</b>
Short-term effect on emissions	3
Long-term effect on emissions	3
Lock-in effect (positive/negative)	3
Other significant environmental effects	3
<b>Economic effects</b>	<b>12</b>
Financial benefits and costs to society	3
Employment effects	3
Barrier (removal / enhancement)	3
Triggering innovation	3
<b>Outreach</b>	<b>3</b>
Applicability in other countries / scalability	3
<b>Total</b>	<b>27</b>

The subcategories are then broken down into a limited set of relevant indicators. These are shown in Table 5 - 2. A questionnaire was based these indicators, providing additional information and, where available, numbers that support the assessment.

Table 5 - 2 Indicators for detailed analysis

Green effects	Detailed questions	Examples / explanations	Score -3 to +3
<b>Short term effect on emissions</b>			
	Are emissions in some sectors reduced?	1-4 years Positive if emissions reduced	0
	Are emissions in some sectors increased?	Negative if emissions increased	
<b>Long term effect on emissions</b>			
	Are emissions in some sectors reduced?	5-100 years Positive if emissions reduced	0
	Are emissions in some sectors increased?	Negative if emissions increased	
<b>Lock in effect</b>			
	Positive lock-in effects	Long-term investment in low emission infrastructure or supporting infrastructure (e.g. smart grid) Positive if positive lock-in	
	Negative lock in-effects	Lock-in of emission intensive technology / practices Negative if negative lock-in	
<b>Significant other environmental effects</b>			
	Positive co-benefits of measures	e.g. improved air quality	0
	Negative environmental effects	e.g. radioactive waste, wildlife	
<b>Score green effects</b>			<b>0</b>
<b>Economic effects</b>			
<b>Financial benefits and costs to society</b>			
	Short-term financial benefits	Positive is investment is triggered (leverage effect), tax benefits	
	Long-term financial benefits		
	Short-term financial cost	Negative are direct cost to the public from the measure, e.g. amount of subsidy, cost for creating and implementing policies and/or necessary public institutions	
	Long-term financial cost		
<b>Employment effects</b>			
	Short-term	1-4 years	
	Long-term	5-100 years	
	Structural change?	Is structural change triggered through the measure, are there significant social problems associated?	
<b>Barrier (removal / enhancement)</b>			
	Are barriers removed?	Positive if barrier removal	0
	Are barriers created or enhanced?	negative if barrier enhancement	
	Increase of planning reliability		
<b>Triggering innovation</b>			
	Sustainable innovation triggered or blocked through the measure?	Positive is triggered innovation	0
<b>Score economic effects</b>			<b>0</b>
<b>Outreach</b>			
<b>Applicability in other countries / scalability</b>			
	Technical and political ease of implementation	Positive is ease of implementation	0
<b>Score Outreach</b>			<b>0</b>
<b>Score Total</b>			<b>0,0</b>

The overall score for each measure is arrived at by adding the scores for the three main categories. The score for each subcategory is derived by adding and weighing the scores for each indicator, taking into account the fact that that in cases where there can be positive and negative effects this is reflected in the positive / negative score.

### Phase 1: Initial scoping

The work was carried out in two phases. First an initial scoping was conducted to get an overview of the policies and measures that were worthy of consideration. From this overview a short list of measures was selected for a more detailed analysis.

Measures were collected via desk research and interviews with country experts. This resulted in an overview list of measures. These measures were then evaluated roughly at the subcategory level as shown in Table 5 - 3. The full list of measures with the initial scoring is included in section 5.2 of this appendix.

Table 5 - 3 Matrix for initial assessment

Country	Measure	Green effects					Economic effects					Outreach		Total	Comments
		Short term effect on emissions	Long term effect on emissions	Lock in effect	Other environmental effects	Score	Financial benefits and costs to society	Employment effects	Barrier: removal / enhancement	Triggering innovation	Score	Applicability in other countries / scalability	Score		

Based on this evaluation, 14 'best' and 5 'worst' policy measures were identified for the detailed analysis carried out in phase 2. Since it was not clear how the detailed evaluation would change the original rating, more than 10 'best' measures were selected for the detailed analysis.

### Phase 2: Detailed analysis

For this part of the analysis we used the detailed questionnaire and the indicators in Table 5 - 2. Selected country experts filled in the questionnaire for each measure, supported by the available literature.

In addition to the scoring we asked for quantitative information where available from either official or preferably independent sources, to be used as additional information. The quantitative information is not directly part of the ranking, but it influenced the scoring and was used for illustration in the scorecard.

The result of this analysis is summarized in Table 5 - 4:

Table 5 - 4 Overview of results for 'best policy' measures

Country	Measure	Green effects	Economic effects	Outreach	Total
Germany	Efficiency in buildings	9	6,2	2	17,2
Germany	Feed-in tariff	7	6,0	2	15,0
Mexico	Bus rapid transit	10	2,2	2	14,2
USA	Weatherization	6	4,8	3	13,8
USA	Tax incentive for renewables	6	4,7	3	13,7
Brazil	Reducing emissions from deforestation	7	4,5	2	13,5
Spain	Solar Thermal Obligation	6	3,7	3	12,7
Japan	Top Runner standards	7	3,5	1	11,5
India	CNG fuel obligation	5	4,0	2	11,0
UK	Energy Efficiency Commitment	6	2,8	2	10,8
EU	EU Emission Trading System	4	4,3	2	10,3
China	1000 Enterprise Program	6	3,2	1	10,2

Two measures that were analysed in detail, the obligatory energy management system in Japan and the climate change levy in the UK, scored below 10 and were therefore not included as 'best policy' measures.

## 5.2 List of all policies and measures

The following list includes all policies and measure evaluated during the scoping phase. The scores provided may therefore differ from the scorecard results. Based on these results, the in-depth analysis was carried out. Measures shown in grey were not analysed in detail, because a similar measure is implemented in a different country with a higher score.

Country	Measure	Total score
USA	Weatherization	17
Spain	Solar Thermal Obligation	17
Germany	Feed in tariff (EEG)	16
Germany	Implementation of EU directive. Energy efficiency in buildings	16
Brazil	Reducing emissions from deforestation degradation	15
France	Feed in tariff	14
Mexico	Bus rapid transit system	13
Japan	Top runner for vehicles and fuel economy labels for household appliances and energy saving labels	13
Turkey	Feed in tariff	12
USA	Tax incentive for renewable energy	11
Spain	Feed in tariff	11
Netherlands	Feed-in tariff (SDE)	11
Japan	Energy Management system	11
India	CNG fuel obligation	11
UK	Climate change levy and climate change levy exemption for renewables	11
UK	Energy Efficiency Commitment	10
EU	Directive for establishing eco-design requirements for energy-using products	10
China	1000 Enterprise Program	10
EU	EU Emission Trading System	10
Italy	Energy manager for large energy intensive industry	9
Germany	Ecotax	9
Germany	Regional concepts for the regional public train traffic	9
USA	Energy star program	9
UK	VAT rate for "green" products (5% instead of 15%)	9
China	Renewable energy quotas for the five largest utility companies	8
Netherlands	Tax reduction for "green" company cars	8
Netherlands	Voluntary long term agreements with industry on an energy efficiency	7
Mexico	Payment for environmental services	7
Turkey	Geothermal energy law	7
Mexico	Energy efficiency standards for electrical appliances, gas boilers and thermal insulation	7
Italy	Tax rebate for high efficiency motors and invertors	7
France	Tax reduction for vehicles and other appliances	7
China	Obligation of closing of inefficient plants with opening new plants	7
Brazil	Support of ethanol as substitute for petrol	7
South Korea	Energy efficiency labelling program	7
South Africa	Efficiency labelling for electricity appliances	7
France	White certificate system	7
Netherlands	Bench marking convenent (MAG)	6
Italy	White certificate system	6
Indonesia	Blue sky program	6
Australia	Fiscal incentives for RE	6
Argentina	Reforestation and timber management programmes	6
USA	Clean air act	6
South Korea	Building standards (insulation, efficiency), green building certification program	6

Country	Measure	Total score
South Korea	Transport mode sharing program	6
Netherlands	Eco-driving	5
Indonesia	Tax incentives for energy conservation compliance buildings	5
Canada	Labelling and energy performance standards for many energy using appliances	5
Brazil	Energy performance standards for electric motors	5
Australia	'Energy Efficiency Opportunities' for industries	5
Australia	Bio fuels capital grants, tax exemption for bio fuels	5
Australia	Minimum energy performance standards for buildings and appliances	5
South Africa	Compact fluorescent light program	4
South Africa	Carbon tax component in new vehicle sales	4
Saudi Arabia	Promotion of public transportation to ease congestion in cities	4
Indonesia	Mandatory audits for industry and commercial sectors	4
India	Obligation for industries to report energy efficiency improvements in order to find existing potential	4
India	Demonstration project for Integration of generation based incentives for RE	4
India	Efficiency labelling for electricity appliances	4
Canada	Tax incentives for efficient or renewable energy production	4
Brazil	Tax reduction for efficient light bulbs	4
Australia	Solar flagship program	4
France	Tendering system for PV facilities and biomass	3
Saudi Arabia	Desertification reduction program	3
South Africa	Gas Act: replacement of coal based fuel by natural gas	2
Saudi Arabia	Switch to gas (electricity)	2
Brazil	Voluntary labelling for electric appliances	2
USA	Cash for clunkers	2
China	Efficiency standards for vehicles	2
Argentina	LNG in passenger cars and light vehicles	1
Argentina	Petrol and diesel must contain 5% bio ethanol in 2010	1
Argentina	Coal mine emissions reductions fund	1
UK	Regional governments were not allowed to go above national commitments in their "Regional Spatial Plan"	-4
China	Tax incentives for buying cars	-6
Turkey	Biodiesel has special taxes on the prices of biodiesel	-7
Netherlands	Exemption of green houses for energy tax	-7
Australia	Subsidies for supply of electricity to the aluminium industry	-7
South Korea	Nuclear energy	-8
Japan	Nuclear energy	-8
France	Nuclear energy	-8
Germany	Subsidy based on distance travelled to work	-10
Canada	Tar sand	-10
Germany	Business cars subsidies	-11
Spain	Water management	-12
Spain	Coal subsidy	-13
Germany	Coal subsidy	-13

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