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**Opportunity in a Time of Crisis:
Stimulus Packages and the Green New Deal**

Patricia Reid

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When the financial crisis and the ensuing recession struck in 2008, some felt that environmental protection measures should be put on hold in order to better address the economic slump. Others, however, have portrayed the economic crisis as an excellent opportunity to kill two birds with one stone by integrating environmental and economic stimulus measures. As it became necessary for governments to inject money into their economies in the form of fiscal spending, it has been suggested that using part of that money to fund green initiatives would have positive effects on both the environment and the economy.

This policy brief looks to examine the extent to which North American and European countries have used the opportunity offered by the economic crisis in order to introduce measures to combat climate change and to promote a “Green New Deal.” In particular, it will break down the stimulus packages of Canada, France, Germany, the United Kingdom (UK) and the United States of America (USA) in order to determine which measures can be considered green and whether or not these measures can be considered a Green New Deal.

The brief is structured as follows: first, an overview of the concept of a Green New Deal and the associated measures is introduced; secondly, the actual stimulus packages of the five countries are examined; finally, a conclusion is reached as to the extent to which these stimulus packages represent a Green New Deal. While the packages brought into effect by the five countries differ in their size and composition, it will be argued that none of these packages really constitute a Green New Deal. However, several of these packages represent a step in the right direction and the countries in question could learn from each other in terms of measures to reduce greenhouse gas (GHG) emissions and reach their climate change goals.

Using Stimulus Packages to Create a Green New Deal

Climate change caused by excessive GHG emissions is now being acknowledged as a major global problem. Recent studies, especially the influential Stern Review (Stern et al, 2006), have outlined the potentially disastrous environmental and economic effects of climate change. The Stern Review advises a 25% reduction in global GHG emissions by 2050 in order to prevent the worst effects. With this in mind, and given the current economic crisis, several agencies have

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called for a “Green New Deal,” based on American President Roosevelt’s promotion of an overarching program of reforms called the New Deal during the Great Depression. This Green New Deal, as outlined by the United Nations Environment Programme (UNEP, 2009), should stimulate the economy, promote sustainable development and growth, and reduce carbon dependency. These three goals may be seen as forming a magic triangle, in that it is difficult to reconcile all three parts. The UNEP proposed an investment of 1% of global GDP, or approximately US\$750 billion, in the Green New Deal. This represents only a quarter of the total proposed international fiscal stimulus packages. The Grantham Institute of the London School of Economics suggested that environmental measures should compose about 20% of all stimulus packages, with higher percentages in countries that had more potential for reducing carbon emissions and lower percentages in those countries that had already made significant improvements along this vein (Bowen et al, 2009). While a stimulus package is no replacement for an integrated emissions reduction plan, stimulus package measures can kick start change and provide a foundation for a sustainable future.

Green initiatives have the potential for short-term economic benefits, including job creation. The Center for American Progress and the Political Economy Research Institute, for instance, estimated that a US\$100 billion green recovery plan in the USA could create about two million jobs, compared to 1.7 million jobs for a recovery plan that concentrated only on household consumption or only 542,000 jobs for a recovery plan focusing on the oil industry (Pollin et al, 2008).¹ Models by Houser et al (2009) showed that for every US\$1 billion in government spending, green stimulus measures created on average 30,100 jobs per year, compared to 25,200 for traditional infrastructure investments. These studies suggest that a green recovery plan is able to create relatively more jobs because environmental initiatives are more labour intensive, they rely more on domestic products and services rather than imports, and they offer jobs with relatively good pay levels and better career paths. In addition, the money saved through energy efficiency improvements can then be reinvested, creating more jobs with what is called the “respending effect” (French et al, 2009). Investing in green initiatives now could also put countries in a better economic position in the future. As climate change will continue to be a relevant issue and other countries are likely to invest in green initiatives, failure to take advantage of this opportunity would cause some countries to fall behind, making them less able to compete in the green economy of the future (Sustainable Prosperity, 2009). A green financial stimulus package, then, has the potential to give the economy a needed boost while also promoting environmental protection.

¹ These types of estimates are not without some criticism. For an example of this criticism, see Morriss et al, 2009. For responses, see http://www.peri.umass.edu/green_economics/.

While green stimulus measures do appear to have great potential, they are not the most popular policy choice. In choosing their stimulus measures, politicians must consider both the economic situation and the viewpoint of their voters. Governments are looking for projects that deliver results in areas in which the average citizen is affected. Green investments may seem too far away from what the average voter finds important; tax cuts and investments in health care or infrastructure can be seen as affecting residents more directly and are therefore more of a priority. The speed of green investments is also an issue. Tax cuts can be quickly implemented and previously planned road or infrastructure projects can be moved up relatively easily when money becomes available. New green investments, however, may take longer to bring into motion. The act of greening economies has a longer timeframe and therefore be less appealing than quick fixes during a crisis. In a time of economic instability, investing in untested technologies may also seem too risky, making green technology investments appear less secure than other more traditional stimulus measures. Finally, environmental measures often encounter opposition from some of the major industries, such as oil, automotive, and power generation industries, which are powerful economic actors. Successful lobbying on the part of those industries may lead to less environmentally-friendly measures. In short, despite their potential, green stimulus measures may be less appealing for politicians to implement.

Potential Green Stimulus Measures

For countries that are able to find support for green measures, there are a number of options. Many different green initiatives have been suggested, but some investments are seen as being more positive than others. In particular, the experts emphasize the need to invest in the following:

Energy Efficient Buildings. Building renovations have the highest potential for both improved energy efficiency and job creation (UNEP, 2009). They can use existing technologies and could begin immediately. Fiscal spending could be channelled into the renovation of government buildings as well as public buildings such as hospitals and schools. Energy efficiency improvements would pay for themselves over time through lowered energy bills, eventually leading to savings for those public institutions (Pollin et al, 2008). To promote the renovation of private buildings, governments could also offer tax incentives or loan guarantees.

Transportation. The construction of transportation infrastructure such as public transit and passenger and freight rail leads to a short-term increase in emissions and is therefore not normally seen as entirely green. However, by reducing vehicle traffic and congestion, public transport can reduce carbon emissions in the long run. Priority could also be given to low-carbon and energy-efficient mobility projects. While larger projects may take a long time to get started, the funding of existing shovel-ready projects would create immediate economic benefits.

Renewable Energy. Clean energies like solar, wind, and biomass could be encouraged either through direct government investment, subsidies, tax cuts or loan guarantees. Such initiatives could also be integrated into building renovations. Renewable energy promotion will not be the same in all countries. For less-developed countries, UNEP (2009) suggests the promotion of small-scale off-grid technologies. Given the great deal of existing support for renewable energies in Europe, additional investment may not have as great an effect there as in other countries.

Energy Grid. The improvement of energy infrastructure, especially the introduction of “smart grids,” has a number of potential benefits. First of all, a more efficient energy infrastructure would reduce energy loss over large distances. Secondly, improvements in the energy grid would facilitate the integration of renewable energy sources. Thirdly, a smart grid would allow for better measurement of energy flows, resulting in more awareness on the part of the consumer as well as permitting more precise taxation. Smart grids could additionally detect problems, balance supply and demand, and plug unused energy back into the system. Unfortunately, as with the bigger transportation infrastructure projects, investments in smart grids would likely require a significant amount of time before work could commence.

Energy Efficient Vehicles. The use of environmentally friendly vehicles can be encouraged in several ways. Car scrapping premiums that give money back to consumers who trade in their older cars for newer cars would boost short-term demand in an industry that has fallen upon tough times. While scrapping older cars will likely have environmental benefits, these will not be maximized unless the new cars are significantly lower in carbon. The effectiveness of premiums in promoting environmental protection thus depends on the particular criteria demanded. From the supply side, conditions regarding the future development of energy efficient vehicles could be written into agreements to bail out troubled automakers. Regulations such as fuel efficiency or emissions requirements for new cars or emissions, fuel, or road use taxation could be applied in conjunction with the stimulus measures to provide additional incentives.

Research and Development. While not explicitly on UNEP’s list, research and development into new technologies is tied into the other investments and features prominently in other international and national plans. Several areas of interest include research into carbon capture and storage (CCS), vehicle efficiency and alternative energy sources. Investing in research and development creates jobs now and the potential for important energy- and money-saving innovations later. Research and development could also result in first-mover advantages according to the Porter hypothesis.

It's Not Easy Being Green

Some studies, such as the one conducted by Germanwatch and Ecofys (Höhne et al, 2009), have weighted stimulus package measures based on their positive or negative environmental impacts. Although some investments in carbon-intensive industries could set a country on an

environmentally negative long-term path by encouraging carbon-intensive activities, it does not seem fitting to say that these investments counteract the green initiatives. Investments in coal and oil are admittedly not environmentally friendly, but other infrastructure projects are not entirely negative. For instance, roads built using stimulus funds can be used equally well by low-carbon vehicles and public transportation as by gas guzzlers. More importantly, many of these negative infrastructure projects were already planned and would likely have been implemented in the near future in any case, while many green measures would probably not have been implemented without the opportunity offered by the stimulus packages. It is not a matter of balance between environmentally positive and negative measures, but rather the chance for a relative increase in positive measures. The focus, then, should be on the extent to which countries are capitalizing on this opportunity for change. Thus this policy brief will concentrate only on the positive environmental measures rather than comparing the positive and the negative.

That being said, it is important that other stimulus package contents conflict with the green measures as little as possible. In particular, there is a risk that new and existing perverse subsidies could limit the success of a proposed green stimulus packages. For instance, subsidies that are intended to make traditional power affordable to consumers create a disadvantage for alternative energy sources. Either perverse subsidies should be eliminated altogether in order to level the playing field and give consumers a clearer idea of the actual cost of energy, or renewable energies should be subsidized in the same fashion as other sources of energy. Pollin et al stress that “production tax credits for all types of renewable energy should last long enough so that businesses can make sound investment decisions” (2008:16). It is important that people be assured that these new green initiatives are part of a long-term change in order to encourage cooperation and investment.

As can be seen, the selection of stimulus measures and the subsequent analysis of those measures are confronted with both informational and methodological obstacles. Greening economies is a complex process that often requires a longer time horizon than other forms of government spending. However, it is worth the effort to determine what different measures various countries are putting in place to stimulate development that is both economically and environmentally sustainable.

Actual Stimulus Packages

Both the size and the content of stimulus packages brought into force vary greatly from country to country. The USA has produced the biggest stimulus, devoting a total US\$972 billion to its two packages. The next biggest packages are from China (US\$586.1 billion) and Japan (US\$485.9 billion). In terms of GDP, the American package is still the biggest at 4.8%, with China at 4.4% and Germany being the third highest at 3.4% (IMF, 2009).

Robins et al (2009) analyzed over 20 economic recovery plans to determine the extent of green content. The proportion of green stimulus measures ranged from 0% for Chile and India to 80.5% for South Korea. Overall, they estimate that green stimulus measures account for about 15.6% of the total international stimulus packages. This is a good start, but still quite far from the recommended 20-25%.

Countries also differed in their choice of green stimuli. With a green fund of US\$221.3 billion, representing 37.8% of its total package, China stands out in terms of the money being put into green initiatives. However, almost half of those green funds are earmarked for rail projects. Rail may be less polluting than some other methods of transportation, but it still emits a significant amount of carbon. In comparison, renewable energy or energy efficiency investments lead to greater reductions in carbon emissions for every dollar spent. In terms of emissions reduction per billion dollars spent, the US and the EU are getting more for their money (Klepper et al, 2009).

The Five Case Studies

The next sections will consider the stimulus packages of Canada, France, Germany, the UK, and the USA in more detail. These five countries have been selected in order to make a transatlantic comparison of stimulus packages in North America and Europe.

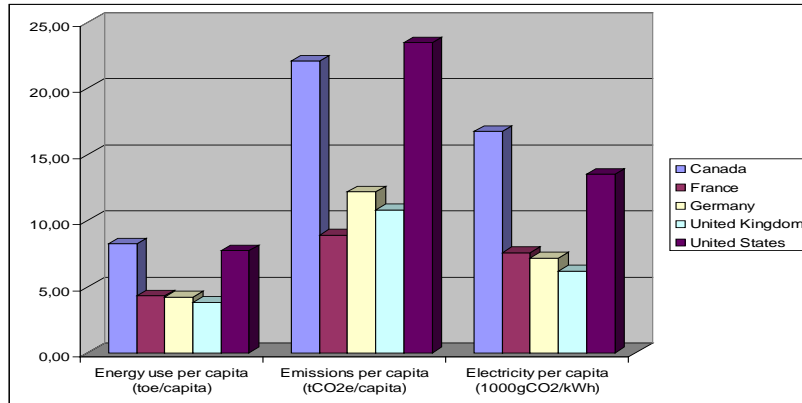
The five countries in question are acting under different circumstances. First of all, their economies have been differently affected by the financial crisis. For instance, automatic fiscal stabilizers in Europe reduced the need for large stimulus plans, while the well-regulated banking sector in Canada lessened the effects of the crisis on financial stability. Secondly, the green measures adopted by the different countries depended on their starting points in terms of environmental protection. This will be investigated further in the individual country analyses.

Graph 1, which gives energy and emissions statistics per capita, shows a clear division between North America and Europe. Canadians and Americans use more energy and more electricity and thus produce more emissions per capita than their European equivalents.

The five countries also differ in terms of the composition of their energy portfolios (Graph 2). In particular, France focuses a great deal more on nuclear energy and uses considerably less coal. While nuclear energy can be seen as positive because it does not produce GHG emissions, it is not seen as environmentally friendly due to safety and pollution concerns. Canada is also noteworthy due to its much higher hydroelectric energy production. In all countries, however, the traditional “dirty” energy sources (oil, coal, and gas) constitute over half of the energy supply.

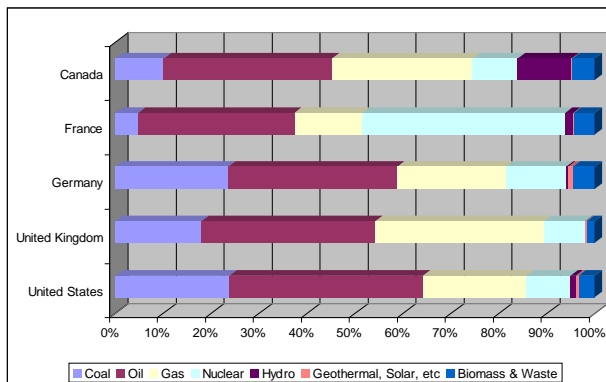
Also apparent is the fact that very little energy is being produced from renewable energy sources such as geothermal or solar power.²

Graph 1: Energy, Electricity and Emissions



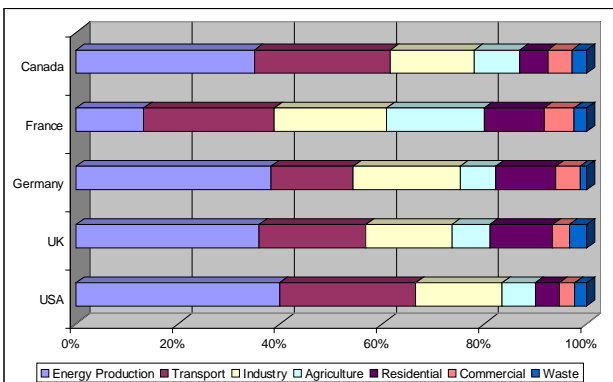
Sources: 2006 data from UNFCCC, World Bank and IEA

Graph 2: Breakdown of Energy Sources



Source: IEA data for 2006

Graph 3: Emissions by Sector



Source: UNFCCC country data for 2006

The five countries are similar in terms of their emissions breakdown (Graph 3). For all but France, over a third of emissions come from the energy industry. Due to its dependence on nuclear energy, France's energy industry produces less GHG. It should be noted that the electricity used by the residential and commercial sectors is included in energy production. Transport and industry are the next two biggest emitters.

² The statistics used in Graph 2 are from 2006 and were chosen because IEA's statistics are comparable across countries. More recent national statistics may show higher levels of renewable energy sources. It is also important to differentiate between renewable energy sources as a proportion of overall energy use as opposed to renewable energy sources as a proportion of electricity generation; the latter is usually significantly higher.

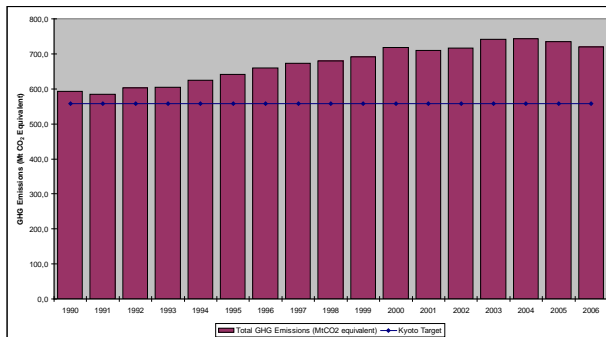
While the United States and Canada do have a longer way to go in terms of reducing emissions and energy use, it is apparent that all five countries could make improvements, especially with regard to energy production.

Case 1: Canada - Falling Further Behind

Canada has faced recent criticism by the WWF for being the G8 country with the worst climate change performance (Höhne et al, 2009). Despite, or perhaps due to, having an extremely resource-rich environment, Canada is lacking in environmental preservation measures. As shown in Graph 1, Canadians consume a great deal of energy and have very high GHG emission rates. Canada also seems to be lacking the political will to change, having abandoned its Kyoto commitment and allowing its emissions to increase to 25% above 1990 levels (Graph 4). After dismissing its Kyoto target, the Canadian government set a new goal of reducing GHG emissions by 20% of their 2006 levels by 2020. At the July 2009 meeting of the G8, where it was decided that the industrialized nations should cut GHG emissions by 80% by 2050, Canada opted for a much easier baseline of 2006 emissions rather than the ambitious 1990 baseline supported by environmentalists and the European nations (The Globe and Mail, 2009). It must be noted, however, that some of the provinces in Canada have taken on a more active role in climate change policy than the federal government, and so both policy and results vary across the country.

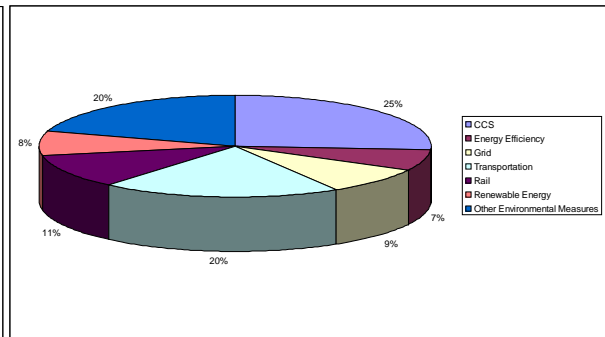
Given its strong energy dependency and its high emissions from energy production despite its use of hydroelectric power, great improvements could be made in Canada to reduce GHG emissions. In particular, energy efficiency and clean energy sources should be promoted.

Graph 4: Canada's GHG Emissions



Source: UNFCCC

Graph 5: Green Stimulus Measures in Canada



The Canadian Economic Action Plan passed by Parliament in 2009 included almost CDN\$40 billion in federal stimulus funding, representing expenditures of 1.5% of GDP in 2009 and 1.1% of GDP in 2010 (Government of Canada, 2009). Of this stimulus package, CDN\$4.581 billion

can be considered green measures (see Appendix A for a full list and Graph 5 for an overview). This constitutes 11.5% of the stimulus package and 0.29% of GDP³.

The green portion of Canada's stimulus plan provides support for green energy in the form of the Green Infrastructure Fund and the Clean Energy Fund, each of which is valued at CDN\$1 billion over the next five years. The Green Infrastructure Fund will support job-creating investments in green infrastructure, including projects for clean energy generation and transmission, waste and water management, and CCS. The Clean Energy Fund will support up to CDN\$150 million in clean energy research and up to CDN\$850 million in clean energy demonstration, including CDN\$650 million for CCS. Additionally, the Canadian plan will invest CDN\$351 million in atomic energy.

Energy efficiency has only been addressed through the CDN\$300 million ecoENERGY retrofit program. This program is expected to support an estimated 200,000 home retrofits. No money has been put aside for energy efficiency improvements to federal or public buildings.

In terms of transportation infrastructure, Canada has used the stimulus package to invest in both local and intercity rail. CDN\$350 million will be used to develop a new rapid transit line in Metro Vancouver and CDN\$550 million will be devoted to public transportation in Toronto. Budget 2009 has also set aside close to CDN\$500 million for intercity rail projects over the next five years, including investment in VIA Rail, railway safety and two First Nations railway projects.

Other environmental measures introduced in the budget are CDN\$100 million for reforestation measures in Quebec, CDN\$165 million for First Nations water and wastewater projects and CDN\$245 million to clean up contaminated federal sites.

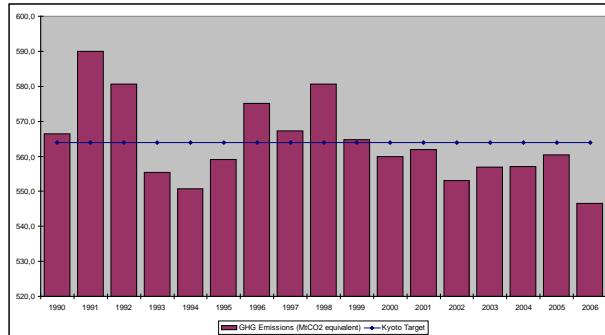
Overall, the Canadian package is disappointing in both its size and composition. Although clean energy, especially CCS, is being promoted, measures to promote energy efficiency are sadly lacking. Given Canadians' high electricity use, this seems to be a missed opportunity to lead by example by renovating government and public buildings. Also lacking are measures to promote vehicle energy efficiency, although Canada has since voiced the intention to follow the USA in regulating GHG emissions from automobiles. Canada is already lagging behind the other countries in the fight against climate change, and missing this opportunity to invest in greener infrastructure could leave it permanently in catch-up mode.

³ Calculated using the 2008 gross domestic product at current market prices of CDN\$1 600.081 billion from Statistics Canada.

Case 2: France - Focusing on the Tried and True

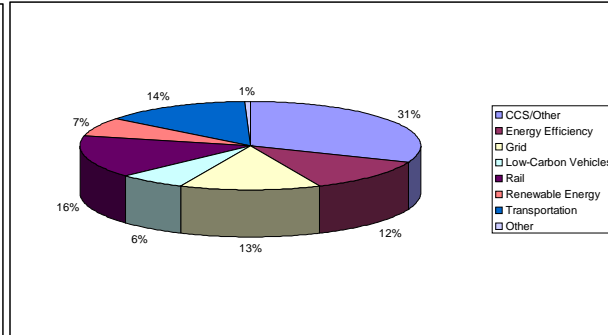
In comparison to Canada, France is doing quite well at meeting its climate change goals. It has already met its Kyoto target of reducing emissions back to their 1990 levels (Graph 6). By 2020, France aims to reduce its emissions by 20% of 1990 levels and to increase its share of renewable energy sources from 10.3% to 23%. In addition, it has committed to quartering its emissions (“factor four”) by 2050. Part of France’s success in reducing emissions has to do with its use of nuclear power, which is, unfortunately, debatable in terms of environmental friendliness.

Graph 6: France’s GHG Emissions



Source: UNFCCC

Graph 7: Green Stimulus Measures in France



President Sarkozy of France announced his country’s €26 billion Plan de relance in December 2008. After slight changes through the Senate and Assemblée nationale, the package eventually amounted to just over €26.5 billion, including approximately €1.4 billion in tax cuts favouring businesses, €1.1 billion in direct state interventions, and €4.15 in investments by state-run enterprises. This stimulus plan represents 1.4% of GDP⁴.

Green or partly green stimulus measures account for almost 17% of the French stimulus package and 0.23% of GDP. It is interesting to note that these green measures are entirely in the form of direct investments by the state or public enterprises; no green tax measures were introduced. For a complete list of measures, see Appendix B.

As can be seen in Graph 7, over a third of the green measures in France involve energy production. This is due to a commitment on the part of Électricité de France (EDF) to commit an additional €2.5 billion to investments as part of the stimulus package. EDF has long focused on minimizing CO₂ emissions by concentrating on nuclear power generation. The €2.5 billion increase in investment by EDF includes €600 million for grid infrastructure, €300 million for renewable energy, €300 million for new methods of production, €800 million for maintenance of and improvements in the current production park, and €200 million for international nuclear energy projects. Not included in the estimates of green measures here are almost €200 million for diesel motors involved in energy production for France’s island territories and €200 million for improvements in gas transport and distribution for Gaz de France Suez. The portion of the

⁴ Calculated using the 2008 gross domestic product at market prices of €1 950.085 billion from Eurostat.

energy-related stimulus devoted to renewable energy seems very small compared to the support for continued use of nuclear energy, given France's goal of doubling its use of renewable energy sources.

Transportation and rail have received increased support in the French stimulus package both from the state itself and from the public enterprises. For rail, the government has invested €300 million in the regeneration of rail and the acceleration of current projects, while the Société nationale des chemins de fer français (SNCF) has also committed to increasing its investments by €400 million. The Régie autonome des transports Parisiens (RATP) is setting aside an extra €450 million for investments in public transportation in Paris, which includes buses, metro, trams, and commuter trains. Ports and waterways are also receiving €70 million in national support.

In terms of energy efficiency, stimulus measures have targeted government buildings, public enterprises, and homes. A €200 million *État exemplaire* (literally, the state as an example) program will promote the energy-efficient renovation of public buildings. The post office has earmarked €120 million for sustainable development and the Ministry of Defence has committed €10 million to energy efficiency. Another €200 million is flowing into grants for housing renovation with a focus on energy efficiency. Even agriculture is going greener in France, with a €30 million program devoted to increasing energy efficiency and the use of renewable energy. This is appropriate, given the relatively high proportion of emissions from agriculture in France.

The stimulus program also strengthened the cash for clunkers program in France, offering customers €1000 for scrapping a vehicle over 10 years old when a new vehicle that emits less than 160g CO₂/km is bought. While this does attach some measure of environmental conscience to the scrapping bonus, 160 g CO₂/km represents an average CO₂ emission for a new car in Europe and thus does not constitute a strong emissions restriction.

Other environmental measures include cleaning up former industrial sites (€20 million) and Ministry of Defence sites (€10 million).

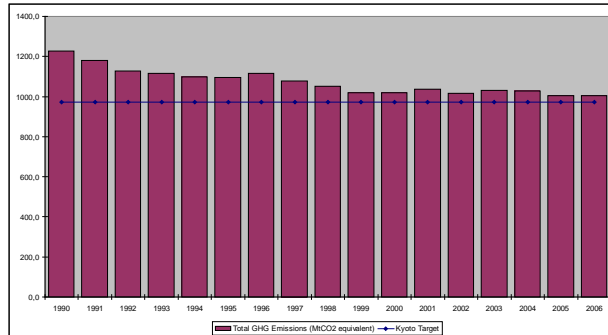
The French stimulus package has been lauded as being the most green in Europe. The plan does, indeed, address the most important areas stressed by environmentalists in terms of a green new deal. However, the French stimulus builds on areas in which France was already strong and in which projects could be brought forward, namely transportation and nuclear energy. France missed the opportunities to invest in renewable energy rather than nuclear and to promote lower-carbon vehicles through a stricter vehicle scrapping program.

Case 3: Germany - Strong Position, Weak Support

Germany ranks first among the G8 nations for climate change action, according to the WWF (Höhne et al, 2009). While part of Germany's success in reducing emissions can be attributed to the collapse of East German industry after reunification, it is also due to Germany's strong national measures. Germany is on course to reach its Kyoto target of a 21% reduction from 1990

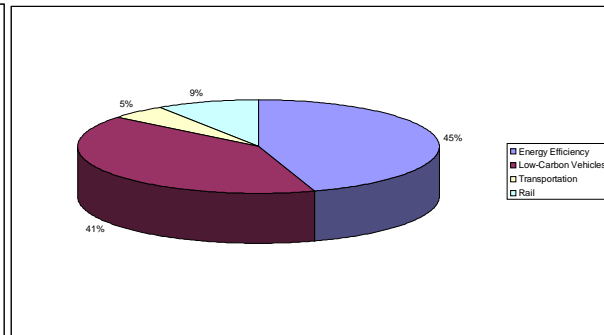
levels (Graph 8) and aims to reduce emissions by 40% of 1990 levels by 2020. Germany is also well-known for its support of renewable energy.

Graph 8: Germany's GHG Emissions



Source: UNFCCC

Graph 9: Green Stimulus Measures in Germany



The German stimulus package consists of two separate plans brought into action in Fall 2008 and Winter 2009. Before the first stimulus plan was agreed upon, however, the German government had also introduced over €20 billion in tax relief, mostly for families. These tax measures are not generally considered as part of the stimulus package, but it should be noted that these measures also account for the fact that the two actual stimulus plans do not have as many tax measures as could otherwise be expected. Together, the two German plans provide €81 billion in stimulus to the German economy, representing 3.2% of GDP⁵.

The German cash for clunkers program proposed in the second stimulus package has been extended from €1.5 billion to €5 billion due to popular demand. This extra €3.5 billion will be considered in this analysis, making the total package worth €4.5 billion.

In addition to the direct stimulus, the German government has also provided €15 billion in low-interest and interest-free loans and credits through the Kreditanstalt für Wiederaufbau (KfW)⁶, the investment bank owned by the German federal and state governments. €20.8 billion of these low-cost loans are included as part of the cost of the first stimulus package and will thus be included in this analysis; the rest, being mostly unspecified and not directly included in either stimulus package, will not be considered.

In total, an estimated €15.53 billion in green stimulus measures have been provided through the German package, representing 18.4% of the total package and 0.62% of GDP. This is a very generous estimate, including certain measures for motor vehicles that are arguably not as green as they could be. The list of green measures can be found in Appendix C.

⁵ Calculated using the 2008 gross domestic product at market prices of € 495.800 billion from Eurostat.

⁶ For an overview of the contributions to KfW, see KfW Bankengruppe (2009).

As can be seen in Graph 9, the green measures in the German stimulus package heavily favour energy efficiency and low-carbon vehicles. The lack of renewable energy measures in the stimulus package can be explained by the fact that renewable energy was already receiving a great deal of support in Germany before the economic crisis.

Energy efficiency improvements in Germany are encouraged partly through grants and loans and partly through direct government investment. In the first stimulus package, €3 billion were set aside for energy-efficient building renovations: €200 million in support for the federal “Programme to Reduce CO₂ Emissions from Buildings,” €300 million for a special KfW program for loans to promote energy efficiency in small and medium-sized enterprises, and a further €2.5 billion in KfW grants and loans for energy-efficient building renovations. In the second package, €4 billion were earmarked for investments in public infrastructure, of which €750 million were to be directly invested in energy efficiency upgrades. An additional €3.3 billion were set aside for investments in public infrastructure in the Länder and municipalities, including €6.5 billion for investments in educational institutions with an emphasis on energy efficiency. Feedback from the Bundesländer and municipalities about the need for renovations unrelated to energy efficiency, however, prompted the State Secretary of the German Ministry of Finance to clarify that not all investments in educational institutions had to involve energy efficiency (Gatzer, 2009), although energy efficiency should still be an important goal. For the purposes of this analysis, then, we assume that approximately half, or €3.25 billion, are actually used for energy efficiency projects.

Motor vehicles are a second area of concentration in the German stimulus package although, as mentioned above, these measures can be seen as boosting the ailing automobile sector far more than they support the environment. In the first stimulus package, to encourage the purchase of new vehicles, the government lifted motor vehicles taxes on new vehicles for one year, and for two years for those that met the more stringent emission standards of Euro-5 or Euro-6. In the second package, a further change to the motor vehicle tax was proposed, in that the tax should consider carbon emissions in the future in order to reward those who had more environmentally-friendly automobiles. It has been argued, however, that this new tax does not provide a strong enough incentive to actually change customer behaviour (Schmidt et al, 2009). A cash for clunkers program called the “Environment Premium” was also introduced. It offers €2500 to anyone who scraps a car over nine years old in order to buy a new car. This program was originally only intended to cost €1.5 billion but was increased to a fund of €3 billion due to high demand. As the program only specifies the age of the car to be scrapped and nothing about the new car, it is possible that people may be scrapping perfectly serviceable older cars to buy new cars that may not really be any better in terms of emissions. The only truly green stimulus package measure in terms of automobiles is the €500 million invested in research on low-carbon vehicles. The other measures, in encouraging the use of personal automobiles without providing strong enough incentives to buy more energy-efficient motor vehicles, are not as green as could be desired.

The last green portion of the German stimulus package is transportation. In all, €4 billion were invested in transportation, but almost half of this investment was directed toward roads and

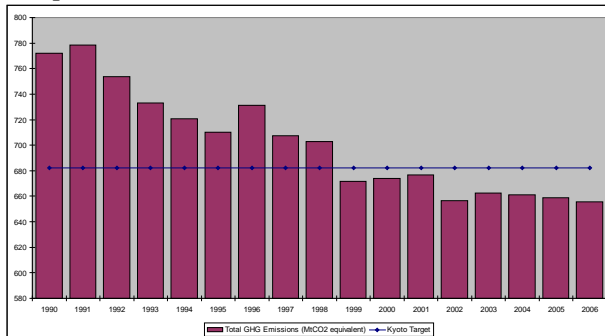
highways. Rail received a boost of €1.320 billion, transportation in the form of waterways was given €780 million, and multimodal transportation received a further €100 million.

Overall, it seems that the green measures in the German stimulus are watered down. While the investments into energy efficiency are generous, the measures to promote the purchase of new automobiles are not linked to emissions reduction strongly enough and the €13.3 billion in infrastructure investments have little emphasis on energy efficiency. The package also has no measures to promote public transportation. The German stimulus is good, but it could be better.

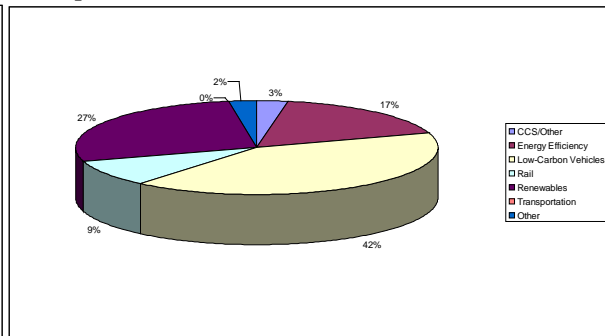
Case 4: United Kingdom - Uneven Performance

The UK, like France, has already reached its Kyoto target of a 12.5% reduction below 1995 levels (Graph 10). As the UK’s emissions decreased rather than increased between 1990 and 1995, this was a more ambitious goal than if they had used 1990 as a baseline. With the Climate Change Act, the UK has legally committed to reducing its emissions by 80% from 1990 levels, with a 26% reduction by 2020. The UK is also obliged to increase its share of renewable energy from 1.3% to 15% by 2020, which will require a great deal of investment.

Graph 10: the UK’s GHG Emissions



Graph 11: Green Stimulus Measures in the UK



Source: UNFCCC

The UK launched its first stimulus package in the form of a Pre-Budget Report in November 2008. This £20 billion stimulus package included a disappointingly small £535 million green stimulus plan, consisting mostly of rail investments and money brought forward to fund energy efficiency programs. Later, however, the UK introduced two new stimulus measures: a £2.3 billion support package for the automobile industry in January 2009 (of which £1.3 billion were actually loans from the European Investment Bank (EIB) and are thus not included here) and a £1.4 billion low-carbon investment programme announced in their 2009 budget in April. Overall, the three stimulus packages amount to £22.735 billion, or 1.5% of GDP⁷. The green portion of the stimulus packages is £3.305 billion, equivalent to 14.5% of the total stimulus and 0.22% of GDP. For a list of all green measures, see Appendix D.

⁷ Calculated using the 2008 gross domestic product at current market prices of £1 471.255 billion from the Office for National Statistics.

When the automotive stimulus package from January 2009 is considered, the UK stimulus plan seems quite heavily weighted toward low-carbon vehicles (see Graph 11). The other two packages divided their stimulus measures between renewable energy, infrastructure, and energy efficiency.

In all, over £1.3 billion are devoted to low-carbon vehicles. The most important measures are the £2.3 billion Automotive Assistance Plan (AAP) from January 2009 and the £300 million car scrapping scheme. The UK's cash for clunkers program offers a scrapping discount of £2000 for cars over ten years old when a new car is bought, but includes no restrictions on the carbon emissions for the new car and is thus unlikely to have a strong impact on carbon emissions. The AAP, on the other hand, offers £1.3 billion in EIB loans and £1 billion in other loans for low-carbon initiatives in the automotive sector, which is an impressive amount of financing for a program with a direct environmental impact. Though not a stimulus measure, the 2009 budget also announced an increase in fuel taxes, which could indirectly motivate the purchase of more environmentally friendly vehicles.

Renewable energy, representing 27% of the green stimulus, is entirely supported by the April 2009 budget measures, which set aside funds for offshore wind projects (£525 million) and decentralized small-scale (£45 million) and community (£25 million) low-carbon energy production. The extent of these investments is appropriate given the UK's ambitious renewable energy goals. The April 2009 budget also created the £405 million Low Carbon Investment Fund, which is meant to support the development of low-carbon and advanced green manufacturing. So far, £180 million of those funds have been earmarked for renewable energy (£120 million for wind and £60 million for wave and tidal). In line with its purpose of supporting advanced green manufacturing, the fund has also supported £6 million in construction with renewable materials, £14.5 million in renewable chemicals, and £4 million in low-carbon manufacturing. These measures are unique in that they target the manufacturing sector directly, which stimulus measures from the other countries have not attempted. The Low Carbon Investment Fund has also set aside small amounts for ultra-low carbon vehicles and nuclear energy, while approximately £175 million of the funds remain unassigned. Carbon capture and storage is also being encouraged with £60 million for CCS demonstration projects.

Energy efficiency is being supported by multiple initiatives in the UK and is being made accessible to all groups. The Warm Front program, which offers grants for heating and insulation improvements, was allocated an extra £150 million. For social housing, £160 million has been set aside for improvements in energy efficiency through the Decent Homes program, while an additional £100 million will be used for the construction of new social housing with higher energy efficiency. Public buildings (£65) and small and medium businesses (£100) are also eligible for low-cost loans to install energy efficiency measures.

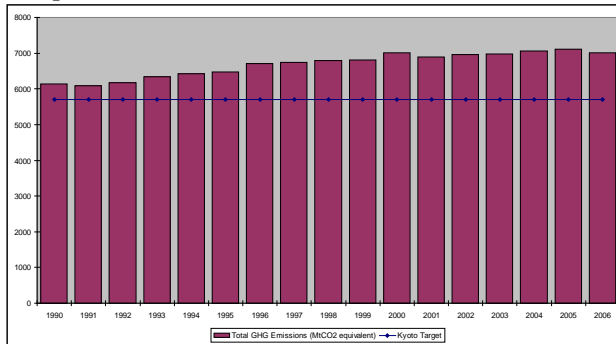
In some areas, the UK's stimulus package is either lamentably small or missing entirely. Despite the emphasis on renewable energy, no financial support is being provided for the integration of that energy into the electricity grid. There will be a £300 million investment in rail, but the only other public transportation receiving support is British Waterways, which has only been allocated £5 million.

The UK's initial stimulus package was lacking in green measures. In its subsequent packages, perhaps as a response to the greener packages of other nations and to public opinion, the UK introduced more environmentally-friendly measures. Positive aspects of the plan include its strong focus on renewable energy, which is in line with the UK's goals, and its programs to deliver energy efficiency improvements to all parts of society. The small size of the stimulus package limits the size and number of green stimulus measures. The measures that are included are good, but more progress could be made in environmentally-friendly infrastructure in the form of grid and public transportation investments.

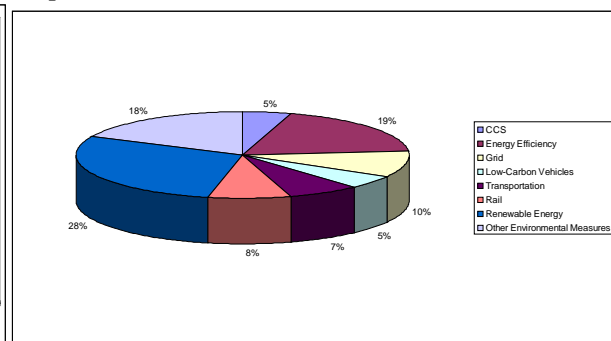
Case 5: United States of America - A Step in the Right Direction

Traditionally the worst of the G8 countries in terms of climate change action, the USA has recently shown some promise for change with the new Obama administration. The USA did not ratify the Kyoto Protocol and its emissions have been steadily rising (Graph 11). At the recent G8 summit, the USA agreed that industrialized nations should decrease their emissions by 80% by 2050, but opted for a more achievable 2005 baseline. Planned shorter term goals include a 17% GHG emissions reduction from 2005 levels by 2020 and 25% of energy from renewable sources by 2025. The USA also plans to introduce reductions on vehicle emissions and a scrapping bonus for older cars.⁸ It has a long way to go, but if the USA were to seriously commit to fighting climate change, its large economy and political influence could make a real difference globally. In order to achieve its goals, though, the USA will have to invest a significant amount of money and achieve a complete paradigm shift.

Graph 11: The USA's GHG Emissions⁹



Graph 12: Green Stimulus Measures in the USA



Source: UNFCCC

The USA's economic stimulus package actually consists of two separate plans. The Emergency Economic Stabilization Act, which was approved in October 2008, consisted of US\$185 billion

⁸ The research for this paper was completed before the American Cash for Clunkers program was introduced. Its US\$3 billion fund was therefore not included in this analysis.

⁹ Though the USA did not ratify the Kyoto Protocol, its target was 7% below 1990 levels.

in tax cuts and credits. The second plan, the American Recovery and Reinvestment Act of February 2009, incorporated an additional US\$295 billion in tax measures as well as US\$492 billion in government spending. The entire US stimulus plan amounts to US\$972 billion, or about 6.7% of GDP¹⁰.

The green measures used by the US stimulus package are both numerous and varied. For an overview of the different measures, see Appendix E. In all, almost US\$125 billion has been put aside for green projects. This amount represents 12.8% of the total stimulus package and .86% of US GDP. While this still does not meet the ambitious targets of the UNEP or the Grantham Institute, it exceeds the US\$100 billion plan proposed by the Center for American Progress.

While containing a variety of measures, the American stimulus package has a strong focus on renewable energy and energy efficiency (Graph 12). Robins et al (2009) estimate these renewable energy and energy efficiency measures could reduce CO₂ emissions by 65mt, or approximately 1% of the total CO₂ emissions of the US in 2007.

Renewable energy in the United States is being supported primarily by tax measures. Tax credits, especially the extension and modification of the Renewable Energy Production Tax credit, provide about US\$26.6 billion in incentives for the renewable energy industry. In addition, the ARRA set aside US\$6 billion for loan guarantees for renewable energy projects and over US\$3 billion for renewable energy research through the Department of Energy. The USA has also provided a significant amount for the demonstration of carbon capture and sequestration methods. Tax measures in the EESA provide credits for CCS demonstration projects as well as credits per metric ton of carbon captured and transported. An additional US\$3.4 billion has been given to the US Department of Energy for CCS research. In order to better integrate renewable energies as well as improve the transportation of energy in general, US\$11.9 billion have also been allocated to improving the electricity grid and supporting smart grid technology.

In contrast to renewable energy, energy efficiency is being supported mostly by fiscal spending. The USA government is leading by example with US\$4.5 billion invested in the Federal Buildings High Performance Green Building Fund to make federal buildings more energy efficient, and an additional US\$6.3 billion set aside for state and local governments to do the same. Low-income households are also being given the opportunity to make energy efficiency improvements; US\$5 billion has been allocated to a weatherization assistance program for low-income homes and the department of Housing and Urban Development has also put aside US\$850 million for green retrofits to public housing. For those who prefer to do the work themselves, the EESA and ARRA have established over US\$3 billion in tax credits for energy-efficient improvements to existing homes, including buying energy-efficient appliances. The American stimulus package thus makes energy efficiency an achievable goal for a wide range of residents and businesses.

¹⁰ Calculated using the 2008 gross domestic product at current market prices of US\$14 441.4 billion from the Bureau of Economic Analysis.

It is interesting to note that the theme of energy conservation pervades the ARRA, even for programs that are not explicitly green. The most obvious example is that of construction and maintenance projects, most of which take into account energy efficiency improvements and/or the use of renewable energy in their project plans. These projects have not been included in the overall analysis for the USA, but should be mentioned. For instance, the US Fish and Wildlife Service estimates that over US\$136 million of their construction fund will be going into renewable energy and energy efficiency technology projects, leading to an estimated annual energy savings of nearly 22.5 million kilowatt hours (US Fish & Wildlife Service, 2009). Other agencies and departments that have included estimates of their energy efficiency improvements and use of renewable energy in their construction plans include the National Park Service (US\$91 million), the Bureau of Land Management (US\$41 million) and the Department of Commerce (US\$31 million). The Department of Housing and Urban Development is also aiming to use about a third of its US\$13.6 billion recovery plan fund to promote the greening of public housing.

Transportation has also received attention in the American stimulus package. The Department of Transportation has set aside US\$8.4 billion for the maintenance and construction of public transit. Intercity rail is being supported through a US\$8 billion capital assistance fund and a US\$1.3 billion investment in Amtrak, a major railway.

In terms of personal transportation, the federal government is again leading by example, having allocated US\$300 million for the renewal of the federal fleet with an emphasis on energy-efficient vehicles. To encourage citizens to follow suit, US\$2.76 billion in tax credits are available for plug-in electric drive vehicles. In addition, US\$2 billion has been invested in battery manufacturing and US\$400 million in transportation electrification research.

Other major environmental measures adopted by the ARRA include habitat restoration, clean up projects including US\$6 billion for former nuclear sites and almost US\$14 billion in projects involving water resources. Of particular interest is a US\$500 million Department of Labor program to train workers in green jobs, which seems to indicate an acknowledgement that green jobs will be important in the future.

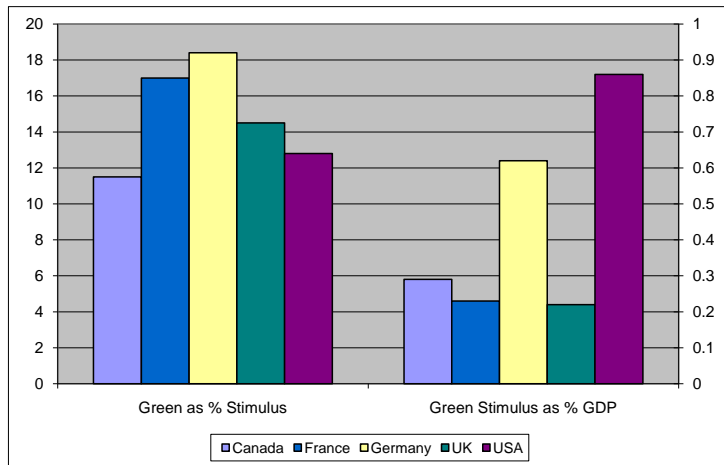
While the actual green proportion of the American stimulus package is relatively small, it is the largest green package in terms of total size and as a percent of GDP. The larger overall size of the American package allows the promotion of a wider range of stimulus measures, including all of the important green investments. Three points in particular set the American package apart: first, the government's willingness to lead by example; secondly, the way that measures are aimed at all levels of society; and finally, the integration of green measures into projects where they were not explicitly required. The American stimulus package represents a significant change in approach toward climate change. But, while it is a step in the right direction, it is certainly not sufficient on its own to allow the USA to reach its new climate change goals.

Shades of Green

The above analyses show that the five countries have taken environmental issues, especially climate change, into consideration when creating their stimulus packages. The analyses also make clear, however, that the stimulus packages presented by these countries do not represent a Green New Deal. The green stimulus measures are not big enough or thoroughly integrated enough to qualify as a new deal in the same sense as Roosevelt's Great Depression-era New Deal.

A Green New Deal would imply a large enough investment through the stimulus packages to start the ball rolling. The suggestion has been made that an investment of 1% of GDP or 20-25% of the stimulus packages would be appropriate. It has also been argued that the G8 countries, having more money to spend and having caused a disproportionate share of emissions in the past, should invest more to take the burden off of developing countries. As the above analyses and Graph 13 show, none of the five countries here achieved, much less exceeded, these targets for green stimulus measures, although some come closer than others. The actual monetary investments by these countries, then, are insufficient to be deemed a Green New Deal.

Graph 13: A Comparison of Green Stimulus Packages



Roosevelt's New Deal was remarkable in that it produced overarching reforms of every possible sector. Accordingly, a Green New Deal would integrate environmental measures into every possible sector. The above analyses have shown that many potential opportunities for incorporating environmental measures into investments and infrastructure have been missed. While the governments have made an attempt to fund more climate-friendly research, create more environmentally-friendly infrastructure, and promote energy efficiency, these measures have for the most part been separate from other stimulus measures rather than integrated into them. In terms of the incorporation of environmental measures, then, these stimulus packages cannot be considered part of a Green New Deal.

In short, the stimulus packages here do not represent a Green New Deal. It is perhaps unreasonable, however, to expect such an overarching Green New Deal, given the political and

economic climate. The countries in question did all invest a significant amount into green measures. The green stimulus measures that have been introduced do represent an increase in government awareness of environmental concerns and more willingness to support more environmentally-friendly initiatives.

Stimulus packages are only one small piece of an overall picture; they can complement, but not replace, environmental policy. It remains to be seen how these countries will follow up their stimulus packages with further initiatives and policies in the future.

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Appendix A: Summary of Green Stimulus Measures in Canada's Economic Action Plan

Measure	Cost (million CDN\$)
CCS	1201
Clean Energy Fund - CCS Demonstration	650
Atomic Energy	351
Green Infrastructure Fund – CCS*	200
Energy Efficiency	300
ecoENERGY retrofit program	300
Grid	400
Clean Energy Fund - Grid Demonstration	200
Green Infrastructure Fund – Grid*	200
Transportation	900
Rapid transit - Metro Vancouver	350
Public transit - Toronto	550
Rail	500
Intercity Rail	500
Renewable Energy	350
Clean Energy Fund - R&D	150
Green Infrastructure Fund - Renewable Energy*	200
Other Environmental Measures	930
Green Infrastructure Fund - Water and Waste*	400
Reforestation - Quebec	100
First Nations water infrastructure	165
Cleanup of contaminated federal sites	265
TOTAL	4581

* Assumes an even division between CCS, grid, renewable energy, water, and waste infrastructure investments.

Source: Government of Canada (2009).

Appendix B: Summary of Green Stimulus Measures in the French Plan de Relance

Measure	Cost (€million)
CCS/Other	1400
EDF - Atomic and other*	1400
Energy Efficiency	545
Sustainable agriculture - energy efficiency**	15
Department of Defense energy efficiency	10
Renovation of public buildings	200
Energy efficient housing through ANAH	200
La Poste - sustainable development	120
Grid	600
EDF - transport	300
EDF - distribution	300
Low-Carbon Vehicles	280
Scrapping bonus	220
Police and army vehicles***	60
Rail	700
Regeneration and acceleration of rail	300
SNCF	400
Renewable Energy	315
Sustainable agriculture - renewable energy**	15
EDF - renewables	300
Transportation	620
Ports and waterways	170
RATP	450
Other	30
Cleaning up former industrial sites	20
Department of Defense cleanup	10
TOTAL	4490

*Includes €800m in improvements for production parks, €300m in new methods of production, €200m in international nuclear projects. Does not include almost €200m in diesel motors in Saint-Nazaire or €200m in gas infrastructure

**Assumes an even split between energy efficiency and renewable energy investments

***Based on the projection that 60% of the vehicles bought will be carbon-efficient.

Sources: Compiled from www.relance.gouv.fr, Assemblée nationale (2008), and Comité interministériel d'aménagement et de compétitivité des territoires (2009).

Appendix C: Summary of Green Stimulus Measures in Germany's Stimulus Packages

Measure	Cost (€million)
Energy Efficiency	7000
Support for the Programme to Reduce CO ₂ Emissions from Buildings	200
Low-interest loans and credits through the KfW for energy-efficient renovations of buildings including private residences, schools and sports centres	2800
Investments in school infrastructure, with a focus on energy efficiency*	3250
Direct investment in energy-efficient retrofits in public buildings	750
Low-Carbon Vehicles	6330
Short-term exemptions from motor vehicle tax for new vehicles	570
Change in the motor vehicle taxation to reflect carbon emissions	260
Support of research into low-carbon vehicles	500
Cash for clunkers (Umweltprämie)	5000
Public Transport	780
Water transport - Package 1	430
Water transport - Package 2	350
Rail	1420
Rail - Package 1	620
Rail - Package 2	700
Multimodal Transport - Package 2	100
TOTAL	15 530

*Assuming that half of the money provided will be used for energy efficiency purposes.

Sources: Compiled from Bundesregierung (2008), Bundesregierung (2009), Bundesministerium der Finanzen (2009), und Bundesministerium für Wirtschaft und Technologie & Bundesministerium der Finanzen (2008).

Appendix D: Summary of Green Stimulus Measures in the UK's Stimulus Packages

Measure	Cost (£ million)
CCS/Other	90
CCS research	60
Low Carbon Investment Fund – Nuclear*	30
Energy Efficiency	575
Insulation in social housing through Decent Homes (April 2009)	100
Construction of new social housing with high EE	100
Low-cost loans for energy efficiency in small and medium businesses	100
Loans to install energy efficiency measures in public buildings	65
Decent Home Programme (November 2008)	60
Warm Front	150
Low-Carbon Vehicles	1355
Low Carbon Investment Fund - Ultra-low Carbon Vehicles*	20
Loans and guarantees for low-carbon vehicles	1000
Train to Gain for automotive industry	35
Scrappage scheme	300
Rail	300
Rail investments	300
Renewables	900
Low Carbon Investment Fund – Renewables*	305
Offshore wind	525
Decentralized small-scale and community low-carbon energy	70
Transportation	5
British Waterways	5
Other	80
Flood Defenses	20
Low Carbon Investment Fund – Manufacturing*	50
Waste infrastructure	10
TOTAL	3305

Sources: Compiled from Department for Business, Innovation and Skills (2009), HM Treasury (2008), HM Treasury (2009), and HM Government (2009).

* Assumes a breakdown of the remaining budget of the Low Carbon Investment Fund similar to that of the current projects as described in the UK Low Carbon Industrial Strategy found at <http://www.berr.gov.uk/files/file52002.pdf>

Appendix E: Summary of Green Stimulus Measures in the USA's EESA and ARRA

Table E1: Tax Measures from the Emergency Economic Stabilization Act

Measure	Cost (million US\$)
Carbon Capture and Sequestration	2543
Carbon Capture and Sequestration (CCS) Demonstration Projects	1424
CO ₂ Capture Credit	1119
Energy Efficiency	2422
Qualified Energy Conservation Bonds	276
Extension and Modification of Credit for Energy Efficiency Improvements to Existing Homes	827
Extension of Energy-Efficient Buildings Deduction	891
Extension of Credit for Energy Efficiency Improvements to New Homes	61
Modification and Extension of Energy-Efficient Appliance Credit	322
Extension and Modification of Qualified Green Building and Sustainable Design Green Project Bond	45
Grid	915
Accelerated Depreciation for Smart Meters and Smart Grid Systems	915
Low Carbon Vehicles	853
Plug-in Electric Drive Vehicle Credit	758
Incentives for Idling Reduction Units and Advanced Insulation for Heavy Trucks	95
Rail	331
50% Tax Credit for Certain Expenditures for Maintaining Railroad Tracks	331
Renewable Energy	10 038
Extension and Modification of Production Tax Credit	5817
Long-term Extension of Energy Credit	1942
Long-term Extension and Modification of the Residential Energy-Efficient Property Credit	1294
New Clean Renewable Energy Bonds	267
Extension of Biodiesel Production Tax Credit; Extension and Modification of Renewable Diesel Tax Credit	451
Extension and Modification of Alternative Fuels Credit	61
Extension and Expansion of the Alternative Refueling Stations Credit	87
Publicly Traded Partnership Income Treatment of Alternative Fuels	119
Other Environmental Measures	519
Investments in Recycling	162
Expensing of "Brownfields" environmental remediation costs	357
TOTAL	17 526

Source: United States Senate Committee on Finance (2008)

Table E2: American Recovery and Reinvestment Act Green Programs

Measure	Department/Agency	Cost (million US\$)
Carbon Capture and Sequestration		3400
Fossil Energy	Department of Energy	3400
Energy Efficiency		21 192
Energy Conservation Investment	Department of Defense	120
Near-Term Energy-Efficient Technologies*	Department of Defense	150
Advanced Research Projects Agency - Energy Recovery Plan	Department of Energy	400
Energy Efficiency and Renewable Energy - EE**	Department of Energy	12335
Federal Buildings Fund - High Performance Green Building	General Services Administration	4500
Tax credits - EE	Department of the Treasury	2837
Project-Based Energy and Green Retrofit Grant Program	Department of Housing and Urban Development	250
Public Housing Capital Fund Competitive Program - Green Retrofits	Department of Housing and Urban Development	600
Grid		11 000
Bonneville Power Administration, Borrowing Authority	Department of Energy	3250
Electricity Delivery and Energy Reliability	Department of Energy	4500
Western Area Power Administration, Borrowing Authority	Department of Energy	3250
Low-Carbon Vehicles		5519
Energy Efficiency and Renewable Energy - Vehicles**	Department of Energy	2917
Energy-Efficient Federal Motor Vehicle Fleet Procurement	General Services Administration	300
Tax credits - Vehicles	Department of the Treasury	2002
Diesel Emission Reduction Act Grants	Environmental Protection Agency	300
Public Transportation		8584.5
Capital Investment Grants	Department of Transportation	750
Fixed Guideway Infrastructure Investment	Department of Transportation	742,5
Transit Capital Assistance	Department of Transportation	6900
Tax credits – Public Transportation	Department of Treasury	192
Rail		9588
Capital Assistance for High Speed Rail Corridors and Intercity Passenger Rail Service	Department of Transportation	8000
Capital Grants to the National Railroad Passenger Corporation	Department of Transportation	1300

Tax credits - Rail	Department of the Treasury	288
Renewable Energy		25 882
Near-Term Energy-Efficient Technologies*	Department of Defense	150
Energy Efficiency and Renewable Energy - Renewables**	Department of Energy	1548
Office of Science	Department of Energy	1600
Innovative Technology Loan Guarantee Program	Department of Energy	6000
Tax credits - Renewables	Department of the Treasury	16584
Other Environmental Measures		21 812,1
Defense and Non-Defense Environmental Cleanup	Department of Energy	6000
Hazardous Substance Superfund	Environmental Protection Agency	600
Leaking Underground Storage Tanks	Environmental Protection Agency	200
Brownfields Projects	Environmental Protection Agency	100
Green Jobs Training	Department of Labor	500
Civil Works Projects	US Army Corps of Engineers	4600
International Boundary and Water Commission	Department of State	220
National Oceanic and Atmospheric Administration Operations, Research, and Facilities	Department of Commerce	230
Watershed Rehabilitation	Department of Agriculture	50
Watershed Operations and Flood Prevention	Department of Agriculture	290
Rural Water and Waste Disposal	Department of Agriculture	1380
Water and Related Resources	Department of Interior	1000
Clean Water State Revolving Funds	Environmental Protection Agency	4000
Drinking Water State Revolving Funds	Environmental Protection Agency	2000
Wildland Fire Management	Department of Agriculture	500
Wildland Fire Management	Department of the Interior	15
Central Utah Project	Department of the Interior	50
Fish and Wildlife Service Habitat Restoration	Department of the Interior	40,1
Bureau of Land Management Habitat Restoration	Department of the Interior	37
TOTAL		106 977.6

*Assumes an even split between EE and Renewables

**Split up according to projects defined at www.energy.gov/recovery/documents/Energy_Efficiency_and_Renewable_Energy_Program_Plan.pdf and assuming unassigned R&D money is assigned in the same proportions

Sources: Compiled from the American Reinvestment and Recovery Act of 2009, www.recovery.gov, US House of Representatives Committee on Appropriations (2009), and Department and Agency Recovery websites.

Table E3: Tax Measures from the American Recovery and Reinvestment Act

Measure	Cost (million US\$)
Energy Efficiency	2837
Qualified Energy Conservation Bonds	803
Tax Credits for Energy-Efficient Improvements to Existing Homes	2034
Low-Carbon Vehicles	2002
Plug-in Electric Drive Vehicle Credit	2002
Public Transportation	192
Parity for Transit Benefits	192
Rail	288
Modify Speed Requirement for High-Speed Rail Exempt Facility Bonds	288
Renewable Energy	16584
Advanced Energy Investment Credit	1647
Long-term Extension and Modification of Renewable Energy Production Tax Credit	13143
Temporary Election to Claim the Investment Tax Credit in Lieu of the Production Tax Credit	285
Removal of Dollar Limitations on Certain Energy Credits	872
Clean Renewable Energy Bonds	578
Tax Credits for Alternative Refueling Property	54
Treasury Department Energy Grants in Lieu of Tax Credits	5
TOTAL	21 615

Source: United States Senate Committee on Finance, 2009

Table E4: Breakdown of the Energy Efficiency and Renewable Energy (EERE) Program Plan

Project	Cost (million US\$)	Category
Modify Integrated Biorefinery Solicitation Program for Pilot and Demonstration Scale Biorefineries	480	Biomass
Commercial Scale Biorefinery Projects	177	Biomass
Fundamental Research in Key Program Areas	110	Biomass
Investigation of Intermediate Ethanol Blends, Optimization of E-85 Engines, and Development of Transportation Infrastructure	20	Biomass
Battery Manufacturing	2000	Vehicle
Transportation Electrification	400	Vehicle
Clean Cities Alternative Fuel Vehicle (AFV) Grant Program	300	Vehicle
Fuel Cells: Enabling Market Transformation and Manufacturing	43	Fuel cells
Energy Efficiency and Conservation Block Grants (EECBG) - Formula Portion	2744	OWIP
EECBG - Competitive Portion	456	OWIP
Weatherization Assistance Program	5000	OWIP
State Energy Program	3100	OWIP
Appliance Rebate Program	300	OWIP
Geothermal Demonstrations	140	Geothermal
EGS Technology Research and Development	80	Geothermal
Validation of Innovative Exploration Technologies	100	Geothermal
National Geothermal Database Resource Assessment and Classification	30	Geothermal
Ground Source Heat Pumps	50	Geothermal
Wind Turbine Drivetrain R&D and Testing	45	Wind
Large Wind Turbine Blade Testing Facility	25	Wind
DOE Wind University R&D Consortium	24	Wind
Wind Energy Technology Partnerships	14	Wind
Integrated Biorefinery Research Expansion	14	Facilities
Renewable Energy and Supporting Site Infrastructure	87	Facilities
NWTC Upgrades	10	Facilities
Recovery Program Direction and Support	50	Program Management
EERE R&D Projects Under Review	1001	Unallocated
TOTAL	16 800	

Source: Department of Energy, 2009