

# A Climate for Recovery

The colour of stimulus goes green

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## Disclaimer & Disclosures

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- ▶ **Around the world, governments have allocated more than USD430bn in fiscal stimulus to key climate change investment themes. China and the US lead the way**
- ▶ **Key beneficiaries include rail transportation, water infrastructure, grid expansion and improved building efficiency. Renewable energy has received limited support to date, except in the USA**
- ▶ **We believe that these commitments are but the first instalment of further efforts by governments to use low-carbon growth as a key lever for economic recovery, as part of both the G-20 recovery talks and the Copenhagen climate negotiations**

As governments struggle to revive their economies, they are also seeking to lay the foundations for the next phase of growth. Increasingly this is being linked with the climate change agenda, with a sizeable slice of fiscal stimulus plans allocated to launching a low-carbon recovery.

We have analysed more than 20 economic recovery plans and categorised the spending and tax-cutting measures according to the 18 investment themes identified in the HSBC Climate Change Index. This reveals that around 15% of the USD2.8trn in fiscal measures can be associated with investments consistent with stabilising and then cutting global emissions of greenhouse gases.

We have identified five key questions that need to be answered: is the green stimulus large enough, when will it materialise, is it really green, how many jobs will be created and how effective will it be in mobilising private investment?. We believe that the momentum behind this agenda will grow through 2009 and expect further green stimulus initiatives linked to the G-20 economic recovery summit in April and the Copenhagen conference in December, particularly in Japan, the UK and the USA.

# Summary

- ▶ We have identified over USD430bn in fiscal stimulus for key climate change themes, with China and the USA in the lead
- ▶ We believe the construction and capital goods sectors will be primary beneficiaries as governments expand green infrastructure
- ▶ We expect the emphasis on a low-carbon recovery to intensify as part of the G-20 process and Copenhagen negotiations

## Money on the table

Governments are facing a triple crisis of economic downturn, energy insecurity and climate change. Across the world, they are responding by allocating a sizeable proportion of their fiscal stimulus packages to investments consistent with a low-carbon economy.

We estimate more than USD430bn out of nearly USD2.8trn in tax cuts, credits and extra spending are aligned with the key investment themes contained in the HSBC Climate Change Index.

### A Climate of Recovery? The climate change investment dimension of economic stimulus plans

Country	Fund USDbn	Period Years	Green Fund USDbn	% Green Fund	Low-Carbon Power		Energy Efficiency (EE)			Water/Waste	
					Renewable	CCS/Other	Building	EE	Lo C Vech+		Rail
<b>Asia Pacific</b>											
Australia	26.7	2009-12	2.5	9.3%	-	-	2.48	-	-	-	-
China	586.1	2009-10	221.3	37.8%	-	-	-	1.50	98.65	70.00	51.15
India	13.7	2009	0.0	0.0%	-	-	-	-	-	-	-
Japan	485.9	2009 onwards	12.4	2.6%	-	-	12.43	-	-	-	-
South Korea	38.1	2009-12	30.7	80.5%	1.80	-	6.19	1.80	7.01	-	13.89
Thailand	3.3	2009	0.0	0.0%	-	-	-	-	-	-	-
<b>Sub-total Asia Pacific</b>	<b>1,153.8</b>	<b>0.0</b>	<b>266.9</b>	<b>23.1%</b>	<b>1.8</b>	<b>0.0</b>	<b>21.1</b>	<b>3.3</b>	<b>105.7</b>	<b>70.0</b>	<b>65.0</b>
<b>Europe</b>											
European Union	38.8*	2009-10	22.8	58.7%	0.65	12.49	2.85	1.94	-	4.85	-
Germany	104.8	2009-10	13.8	13.2%	-	-	10.39	0.69	2.75	-	-
France	33.7	2009-10	7.1	21.2%	0.87	-	0.83	-	1.31	4.13	-
Italy	103.5	2009 onwards	1.3	1.3%	-	-	-	-	1.32	-	-
Spain	14.2	2009	0.8	5.8%	-	-	-	-	-	-	0.83
United Kingdom	30.4	2009-12	2.1	6.9%	-	-	0.29	1.38	0.41	-	0.03
Other EU states	308.7	2009	6.2	2.0%	1.9	-	0.4	3.9	-	-	-
<b>Sub-total Europe</b>	<b>325.5</b>	<b>0</b>	<b>54.2</b>	<b>16.7%</b>	<b>3.5</b>	<b>12.5</b>	<b>14.7</b>	<b>7.9</b>	<b>5.8</b>	<b>9.0</b>	<b>0.9</b>
<b>Americas</b>											
Canada	31.8	2009-13	2.6	8.3%	-	1.08	0.24	-	0.39	0.79	0.13
Chile	4.0	2009	0.0	0.0%	-	-	-	-	-	-	-
US EESA	185.0**	10 Years	18.2	9.8%	10.25	2.60	3.34	0.76	0.33	0.92	-
US ARRA	787.0	10 Years	94.1	12.0%	22.53	3.95	27.40	4.00	9.59	11.00	15.58
<b>Sub-total Americas</b>	<b>1,007.8</b>		<b>114.9</b>	<b>11.4%</b>	<b>32.8</b>	<b>7.6</b>	<b>31.0</b>	<b>4.8</b>	<b>10.3</b>	<b>12.7</b>	<b>15.7</b>
<b>Total</b>	<b>2,796</b>		<b>436</b>	<b>15.6%</b>	<b>38.0</b>	<b>20.1</b>	<b>66.8</b>	<b>15.9</b>	<b>121.8</b>	<b>91.7</b>	<b>81.6</b>

(\*Only EUR30bn from direct EU contribution considered for calculation as the rest (EUR170bn) is contributed by member states; \*\*USD700bn under TARP not considered for calculation as the fund is mainly for bank bailouts not for fiscal stimulus) + Low Carbon Vehicles  
Source: HSBC estimates

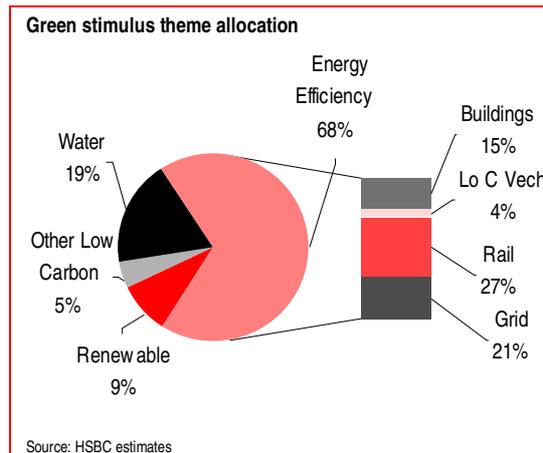
According to HSBC’s latest economic forecast, global economic activity is expected to fall 1.4% in 2009, a worse outcome by far than any other post-war recession. Among our economists, there is some hope that the pace of deterioration will slow and, perhaps, that activity will pick up later in the year as a result of the various stimulus packages (Stephen King and Stuart Green, *Over the edge*, 23 February 2009).

## China and the USA in the lead

China and the USA dominate the landscape in terms of both the size of their overall stimulus plans as well as the extent of the green dimension. With sizeable financial reserves and a tradition of long-term planning, in November 2008, China launched its RMB4,000bn (USD584bn) package. Almost 40% of this is allocated to “green” themes, most notably rail, grids and water infrastructure, along with dedicated spending on environmental improvement. Elsewhere in Asia, South Korea has introduced a dedicated Green New Deal, with more than 80% allocated to environmental themes.

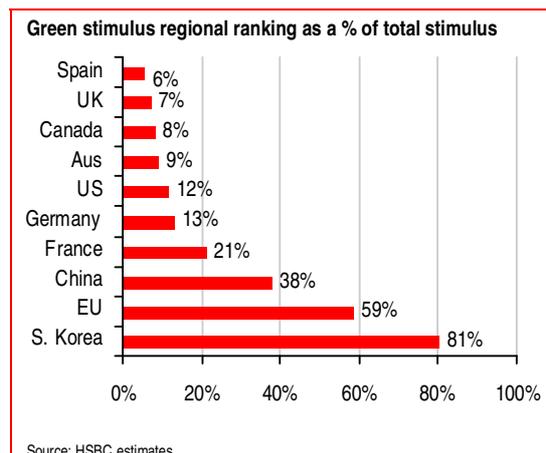
The new American Recovery and Reinvestment Plan commits USD787bn to kick-start the economy, with USD94bn for renewables, building efficiency, low-carbon vehicles, mass transit, grids and water. Although the green component is smaller than China’s, it is more broadly based, and the only plan with a real boost to renewables. The existence of substantial automatic fiscal

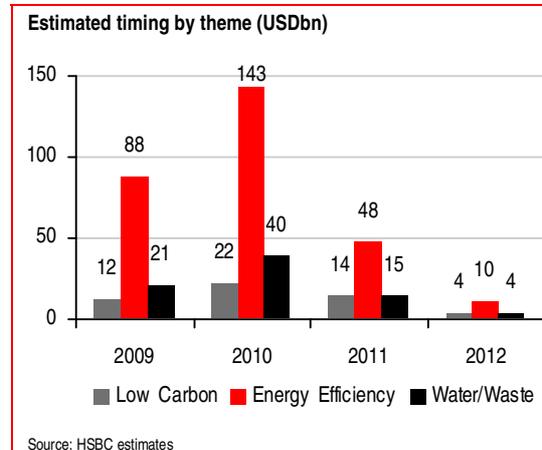
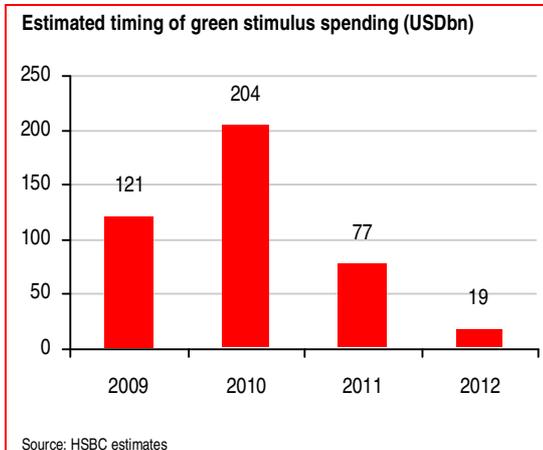
stabilisers in Europe has meant that the EU stimulus is so far smaller in size. However, the climate change dimension is greater than in the USA, due to a focus on low-carbon investment in France, Germany and at the EU level.



## Boosting green infrastructure

Laying the foundations to underpin future growth is a core element of most stimulus plans, and the bulk of climate dimension is allocated to a suite of green infrastructure options, notably buildings, grids, rail and water. The construction and capital goods sectors are therefore likely to be the major beneficiaries, along with an indirect effect for power, rail and water utilities.





## Timing the delivery

We expect the impact to be muted in the first half of 2009 – except perhaps in China – with a pick-up in the second half. As a result, we estimate that three-quarters of green stimulus spending will be disbursed in 2009 and 2010, with the bulk impacting the economy in 2010. However, this timetable could slip in the implementation phase.

## Multiplying the impact

Typically, the range of multipliers for government spending varies from less than one to more than four, depending on the economic assumptions chosen, the type of fiscal policy and the country concerned. Multipliers also depend on the type of instruments used, the level of trade openness, borrowing constraints, the response of monetary policy and long-term sustainability.

### Multiplier effects of fiscal stimulus

Measures	Range	
	Lower	Upper
Tax cuts	0.3	0.6
Infrastructure investment	0.5	1.8
Other*	0.3	1

Source: IMF 2009, Group of Twenty Meeting of the Deputies Feb 2009; (\* Transfers to state govt, assistance to small and medium-sized enterprises and housing markets)

We have used these estimates from the IMF to analyse the green stimulus, and estimated an average multiplier of just over 1 for the total green component of the global stimulus package. This results in a multiplier of USD460bn in the next two years, resulting in a total level of spending of some USD890bn.

## The next instalment?

This year, 2009, will not be a normal one either for the global economy or for climate change. Designing a low-carbon recovery will be on the agenda of the forthcoming G-20 summit in April en route to the pivotal climate negotiations this December in Copenhagen. At the national level, we expect further action in Japan with the launch of its own Green New Deal, a federal Renewable Portfolio Standard in the USA and a Low Carbon Manufacturing strategy in the UK.

Note: In the analysis that follows, we draw on the latest economic forecasts published by Stephen King and Stuart Green in their note, *Over the Edge* (23 February 2009). We also provide a climate change profile for each country. Emission data for industrialised countries is cited in GHG terms (mtCO<sub>2</sub>e) controlled under the Kyoto Protocol, whilst for emerging economies we quote only emissions of carbon dioxide primarily from energy and cement manufacturing (mtCO<sub>2</sub>).

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		<i>We gratefully acknowledge the assistance of D Saravanan, S Goel and R Chaturvedi from the HSBC Climate Change Centre of Excellence in the preparation of this report.</i>	

# The green deal gets real

- ▶ Policymakers are increasingly favouring a strong climate component in economic recovery plans
- ▶ This could help frontload the investment required to slow, stabilise and then reduce greenhouse gas emissions
- ▶ Questions remain over size, timing, environmental effectiveness, job creation potential and multiplier effects

## From margin to mainstream

Over the past six months, the deepening global economic downturn has propelled ideas that were once on the margins of economic policy into the heart of decision-making: bank nationalisation, quantitative easing and, the focus of this report, low-carbon recovery. In July 2008, a group of far-sighted pioneers in the UK proposed a “Green New Deal” as a way of reviving demand, creating jobs and accelerating the transition to an economy consistent with the need to dramatically reduce greenhouse gas (GHGs) emissions over the coming decades<sup>1</sup>.

Advocates of a low-carbon stimulus now exist at the highest levels in government and business across the globe. The reasons for this shift are five-fold:

- ▶ Policymakers realise there are powerful symmetries between the systemic failures of risk management that have led to the current financial crisis and those that threaten dangerous climate change if GHG emissions are left unchecked.

- ▶ The recent sharp rise in energy prices – and their subsequent collapse – has provided a strategic warning of the importance of reinforcing energy security, notably through a substantial improvement in the efficiency with which energy is used in homes, businesses and transport, and through the mobilisation of free, inexhaustible renewable energy resources.
- ▶ The low-carbon economy can also be a job-rich economy at a time of soaring unemployment, particularly through enhancing building efficiency, either via retrofit or new construction, and improving mass transit.
- ▶ There is growing acceptance that the next wave of productivity and innovation could well come from smart technologies that enable a growing world economy to thrive in the context of deepening carbon as well as other natural resource constraints, most notably water.
- ▶ There is the importance of protecting the climate itself, which all major world leaders accept as a global imperative. The science is secure, impacts are already present and negotiations are underway for a new global climate treaty, scheduled to be completed this December in Copenhagen.

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<sup>1</sup> *New Economics Foundation, A Green New Deal, July 2008*

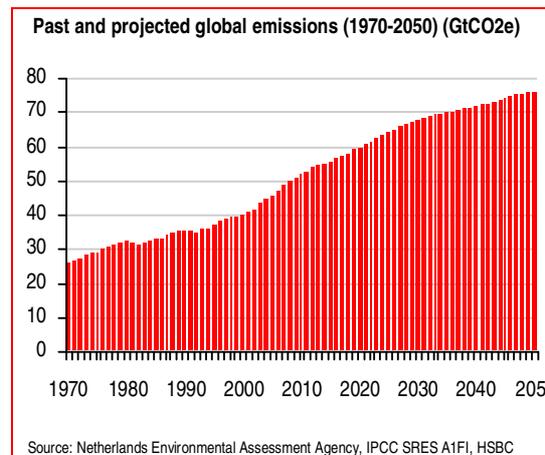
This agenda is by no means uncontested. Commercial and political concerns that environmental action in a recession is an unaffordable luxury certainly remain. Indeed, the European Union's Climate Package was the target of a sustained assault to reduce the cost of carbon curbs in December 2008. Yet, in spite of pressures to water down its climate commitments, the package came through largely intact. What has changed is the content of the climate investment narrative, moving away from an emphasis on the costs of confronting global warming change to a focus on clean-growth opportunities.

### Targeted, timely, temporary...

Governments are currently preoccupied with confronting the twin crises of financial collapse and economic slowdown, and are responding with interest rate cuts, bank rescue plans and an array of fiscal measures to get demand moving again. More than 20 governments have introduced emergency economic stimulus packages to cut taxes and increase spending. Most of these efforts are inward-looking, focusing on expanding the domestic economy. But there is growing awareness of the need for international coordination through the Group of 20 leading economies.

The International Monetary Fund has recommended that 'the optimal fiscal package should be timely, large, lasting, diversified, contingent, collective and sustainable'<sup>2</sup>. Others have shortened the list to a simpler trinity of 'targeted, timely and temporary' measures, highlighting the importance that government action should be seen as a passing phase in policy, which does not result in the build-up of unbearable levels of debt that would constrain medium-term prospects. When the IMF underscores the importance of the package being

'sustainable', it is not using the term in the environmental sense. Nevertheless, it does spotlight the value of 'a few high profile programmes, with a good long-run justification and strong externalities (for example, for environmental purposes) can also help, directly and through expectations'.



### ...and transformative

The long-run justification for determined action on climate change is clear. The globe's leading scientists concluded in 2007 that global GHGs – most notably carbon dioxide – would need to fall by 50-85% by 2050 from 1990 levels if the world was to stand a reasonable chance of avoiding dangerous and irreversible impacts in the form of storms, floods, droughts, heat waves and sea-level rise<sup>3</sup>.

The 2008 G-8 summit in Hokkaido committed the world's leading countries to hitting the lower end of this range. With Barack Obama now in the White House, the USA has pledged to cut its emissions by 80% by mid-century, reflecting the disproportionate share that the industrialised world must take as a result of their historic emissions and greater capacity to act.

<sup>2</sup> Antonio Spilimbergo, Steve Symansky, Oliver Blanchard and Carlo Cottarelli, *Fiscal Policy for the Crisis, IMF Staff Position Note, December 2008*

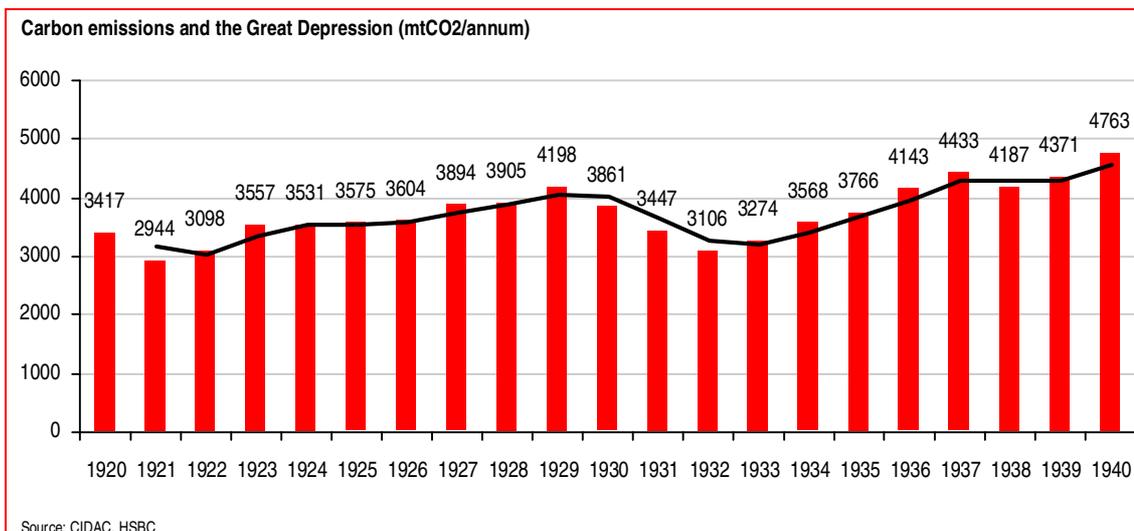
<sup>3</sup> IPCC, *Fourth Assessment Review, 2007*

Hitting these targets is made all the more difficult by the fact that emissions of GHGs are heading in precisely the wrong direction. The UN Framework Convention on Climate Change (UNFCCC) was agreed in June 1992, and bolstered in 1997 with the Kyoto Protocol, which set binding targets on the industrialised world to cut its emissions by 5% by 2008-12 from 1990 levels. But rather than stabilising and then falling, emissions have actually accelerated through a combination of a rapidly expanding world economy and increasing carbon intensity as coal plays an ever-larger role in the global energy mix, rising from 24% in 2002 to 29% in 2007.

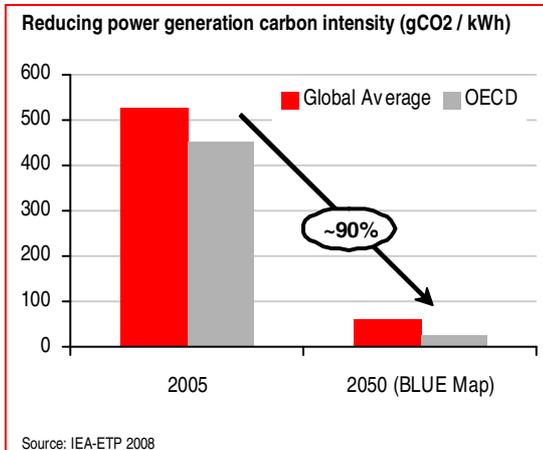
The economic downturn is certainly set to slow this growth in emissions in 2009 and 2010 – a reality reflected in the precipitous fall in the European carbon price from EUR21 in February 2008 to just EUR8.4 today. But as evidence from the Great Depression shows, emissions will rise once again when the economy recovers, unless structural action is taken in the meantime to change the content of growth.

Changing course on climate change will require a transformation in the global economy, a transformation that is certainly unprecedented but one that is both highly achievable and comes with a suite of spin-off benefits in terms of security, innovation and growth. The International Energy Agency (IEA) has concluded that an ‘energy revolution’ is needed to halve emissions by 2050 through a mix of measures that cut the energy intensity of growth as well as the carbon intensity of energy<sup>4</sup>.

To take one example, in the global power generation sector, the average carbon intensity of energy needs to fall by nearly 90% by 2050 from around 500gCO<sub>2</sub>/kWh to just 60gCO<sub>2</sub>/kWh. In the UK, which has recently committed itself to an 80% emission cut by 2050, the consequences are even more profound. By 2035, emissions from power generation will need to fall from 560gCO<sub>2</sub>/kWh to 52gCO<sub>2</sub>/kWh, requiring a substantial boost to renewable power and heat as well as the roll-out of pivotal technologies such as carbon capture and storage (CCS).



<sup>4</sup> IEA, *Energy Technology Perspectives*, June 2008



- ▶ Tighter standards for the energy efficiency of buildings, vehicles and appliances.
- ▶ Preventive investments to adapt to the impacts of climate change, particularly in developing countries.
- ▶ Policies to expand natural carbon sinks as well as reduce emissions from deforestation and degradation (REDD), especially in the tropics.
- ▶ Scaled-up financial support for developing, transferring and deploying clean technologies in emerging economies.

Globally, the IEA estimates that annual investments in clean energy systems for electric power, heat and cooling, industry and transport need to surge 18 times from current levels to an average of USD1.3trn between 2005 and 2050. IEA also estimates that these investments will yield net fuel savings over the same period of USD5trn. The fear of energy policymakers, however, is that the current slowing of capital investments risks an energy supply crunch when growth rebounds. The IEA estimates that if growth is restored on its carbon-intensive *status quo ante* then emissions would resume their upward path, reaching levels 45% higher than in 2006 by 2030.

The timing of climate investments is just as important as their scale and allocation. Scientists at the IPCC have indicated that global emissions need to peak by 2015, making action in the next few years vital to change the emission trajectory. This is the focus of the forthcoming Copenhagen climate summit, which aims to achieve an international consensus on the actions over the medium term to 2020 and long term to 2050. Key elements of a global climate strategy include:

- ▶ An effective price on carbon, for example, through emission trading and green taxes.
- ▶ Incentives for the expansion of low-carbon energy power such as renewables and CCS.

The UN estimates that more than 80% of required investments will normally come from the private sector such as consumers and business<sup>5</sup>. However, in the extraordinary circumstances of the current crisis, a higher proportion could well come from the state. Allocating extra public spending to green recovery plans should not be seen as a substitute for taking tough decisions about strategic policy frameworks. But this extra public spending can play a critical function in first ensuring that the positive momentum in climate investments is not lost in the recession, and second in ‘building the foundations for sound, sustainable and strong growth in the future’.<sup>6</sup> The result could be akin to killing a flock of birds with one or two stones.

## Climate categorisation

In the pages that follow, we analyse the “green” or climate change components of 20 national and regional recovery plans. We go into greater depth and refine the initial analysis contained in our January report, *Green Rebound*. To structure our analysis, we have used the 18 climate change investing themes identified by the HSBC Climate

<sup>5</sup> UNFCCC, *Investment and Financial Flows to Address Climate Change, 2007*.

<sup>6</sup> Alex Bowen, Sam Fankhauser, Nicholas Stern and Dimitri Zenghelis, *An outline of the case for a ‘green stimulus’*, Grantham Institute on Climate Change and the Environment, February 2009.

Change Index and classified relevant expenditures accordingly (see Joaquim de Lima and Vijay Sumon, *Climate Change December 2008* for the latest analysis of the Index).

The HSBC Climate Change Index identifies four main clusters of investment opportunity:

- ▶ Low-carbon energy production, including renewable sources such as geothermal, hydro, wind and solar, along with nuclear power.
- ▶ Energy efficiency & energy management, including goods and services that enhance building, industrial and transport efficiency (such as fuel-efficient vehicles and modal shift) as well as energy storage.
- ▶ Water, waste and pollution control, including water conservation, treatment and supply.
- ▶ Carbon finance, most notably associated with carbon markets.

We have found considerable diversity in the plans that been issued to date. Many of the plans have crucial details over timing and allocation still to be finalised. We have therefore attempted to be conservative in our analysis, and have produced a provisional set of estimates for the climate change dimension. We believe that these estimates will change as greater precision is given over the direction of the stimulus plans – and as the plans themselves are updated or superseded.

In our analysis, we have found a number of themes emerging as major beneficiaries. These include sub-themes such as rail infrastructure, which is part of the broader transport efficiency theme, as well as grid infrastructure, which is included in the Index's industrial efficiency theme. We have also identified areas of spending currently outside the Index, most significantly around carbon capture and storage (CCS). CCS is clearly a potentially pivotal technology, but is currently not included in the Index as it is not

investable – in other words it is not yet at commercial scale and therefore is not associated with sufficient revenue generation. Finally, we have found no fiscal allocations at present to carbon finance.

## Five questions for green deals

Overall, more than USD430bn, or approximately 15% of the total stimulus package (USD2.8trn), is allocated to climate change investment themes. For business, investors and taxpayers, five key questions need to be asked about the relationship between the current crop of economic recovery plans and climate change, for which we only have preliminary answers at present:

- ▶ Are plans allocating enough resource to the green stimulus? There is no magic proportion that should be targeted to climate change. The Grantham Institute in the UK has suggested a 20% benchmark, resulting in 'a "ball-park" figure of USD400bn of extra public spending on "green measures" over the next year or so'. A report commissioned for the UN Green Economy Initiative has proposed that the G-20 should spend 1% of GDP on reducing carbon recovery over the next two years, equivalent to USD460bn.<sup>7</sup> These numbers are also in line with recommendations of the IEA's *2008 World Energy Outlook*, which estimates that clean energy investments of USD465bn per year need to be made from 2010-30.
- ▶ When is the green stimulus likely to materialise? Much is made of the need to focus on "shovel-ready" projects in a stimulus plan, and for investors, asset valuations of potentially affected sectors will depend on the precise timing of these measures taking effect. One concern is that fine-sounding plans could fail to have the desired impact in the implementation phase.

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<sup>7</sup> Edward Barbier, *A Global Green New Deal*, UNEP, February 2009

This makes it imperative that governments are crystal clear about the administration of delivery.

- ▶ How green is the Green New Deal? At this stage, our assessment has focused on scoping out the many contours of the global green stimulus. However, there is no necessary reason why a policy that is badged green will actually result in progress towards a low-carbon economy. Indeed, there is a risk of “green camouflage” with extra subsidies being targeted to industrial favourites without any real pressure for carbon transformation. Equally, it is important that climate factors are integrated throughout economic recovery plans to ensure that good “green” measures are not blotted out by carbon-intensive spending elsewhere.
- ▶ How many jobs will be created in the short and medium term? Money invested in clean energy is estimated to create twice as many jobs per dollar invested compared with traditional fossil fuel-based energy<sup>8</sup>. What is important here is not just the job creation potential of “green” public works projects, which by nature will come to an end, but the degree to which the stimulus actually builds the base for sustained employment in low-carbon industries in the upturn<sup>9</sup>.

- ▶ How effective is the green stimulus at mobilising private investment? Estimates vary of multiplier effects of government expenditure in the wider economy. The IMF cites existing studies that suggest a range of fiscal multipliers from less than one to more than four, depending on assumptions, type of policy and country. Germany’s first stimulus package, for example, includes generous amortisation rules for companies and incentives for climate-friendly home renovation. Together, these will cost EUR12bn over two years and are expected to trigger EUR50bn in private investment, according to the IMF, implying a multiplier effect of four times. Across the globe, our estimates suggest an average multiplier for the green stimulus of just over 1, yielding USD460bn in extra spending.

All five of these questions point to the need for the vast sums now being allocated to stimulus plans, green or otherwise, to be made to work hard for the economy, jobs and the environment. This requires attention to detail as well as transparency – all of which is especially important as we believe that what has emerged to date is only the first instalment of plans for green economic stimulus through 2009 and 2010.

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<sup>8</sup> Center for American Progress, *Green Recovery*, September 2008

<sup>9</sup> UNEP, ILO, IOE, ITUC - *Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World*, 2008

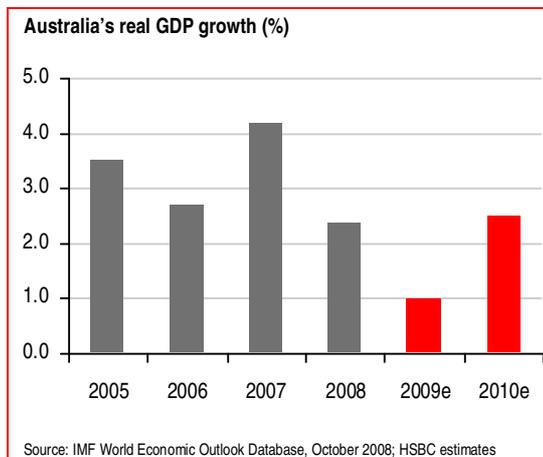
# Regional Analysis

## ASIA PACIFIC

### Australia

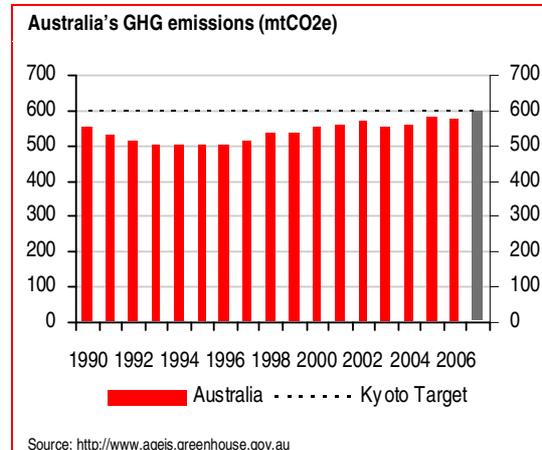
#### Economic backdrop

Australia's economy has slowed considerably, yet HSBC forecasts a moderate 1.0% GDP growth in 2009 and a rebound in 2010.



#### Climate change profile

Australia has recently rejoined the international consensus on climate change. As part of the 1997 Kyoto Protocol, the Federal government successfully negotiated a 108% emission target from 1990 levels to 2008-12. However, Australia then refused to ratify the Protocol, a position that was reversed in December 2007 when the new Rudd Administration came into office. The lack of assertive policy frameworks over the past decade has meant that Australia's emissions grew by approximately 35% between 1990 and 2004 and are projected to rise 50% above 1990 levels by 2010<sup>10</sup>. Australia has now set itself a long-term target to reduce GHGs by 60% from 2000 levels by 2050, with a medium-term target to reduce emissions by between 5% and 15% below 2000 levels by the end of 2020.



Australia is also planning to introduce the Carbon Pollution Reduction Scheme on 1 July 2010, a "cap and trade" system similar to EU ETS. The scheme will be Australia's primary policy tool to drive reductions in emissions of greenhouse gases<sup>11</sup>. The scheme will cover around 75% of Australia's emissions and involve mandatory obligations for around 1,000 entities. As part of the Mandatory Renewable Energy Target (MRET), Australia committed in 2007 to sourcing 20% of electricity supply from renewable energy by 2020.

#### Troubled stimulus

In February 2009, the Australian government unveiled its AUD42bn (USD27bn) Nation Building and Jobs Plan. Initially rejected in the Senate, the revised plan will create a cAUD22.5bn deficit in the year ending 30 June, the first shortfall in seven years. The stimulus package plans to distribute AUD12.7bn in cash to families and low-income earners and spend AUD28.8bn on schools, roads, hospitals and energy efficiency. However, the package does not allocate spending to lower carbon power or water management

<sup>10</sup> Australian Government, *Analysis and recent trends of greenhouse indicators 1990-2004*

<sup>11</sup> <http://www.climatechange.gov.au/whitepaper/summary/index.html>

## Energy efficiency

About 9% of the package is dedicated to building efficiency through the provision of free ceiling insulation to around 2.7 million Australian homes, cutting average fuel bills by AUD200 per year. In turn, this measure could cut GHGs by around 49.4tCO<sub>2</sub>e by 2020, equivalent to taking more than 1 million cars off the road<sup>12</sup>.

The plan has been welcomed by an innovative coalition of environmental, business and labour groups that includes the Australian Institute of Superannuation Trustees, the Australian Green Infrastructure Council and the Property Council of Australia, along with the Australian Conservation Foundation and the Australian Council of Trade Unions. In a statement issued in December, the group highlighted, 'Super funds stand ready to partner with Government on this agenda, and can provide a significant contribution to the funding requirements around sustainable infrastructure'<sup>13</sup>. Following the government's package, the group has called for 'further green economic stimulus measures at a scale and scope that is comparable to the investments being made in both the USA and China.'<sup>14</sup>

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<sup>12</sup> <http://www.treasurer.gov.au/DisplayDocs.aspx?doc=pressreleases/2009/008.htm>

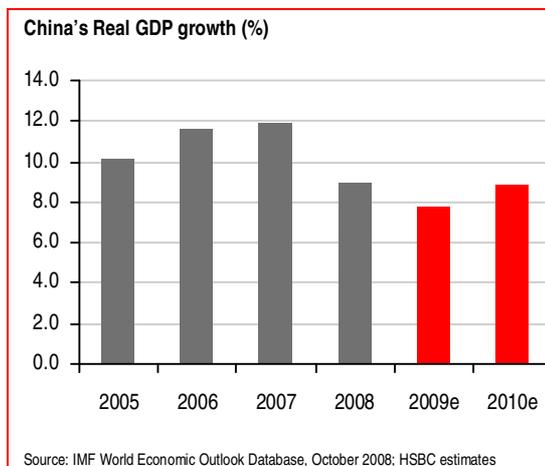
<sup>13</sup> [http://www.unep.org/greeneconomy/docs/Green\\_New\\_Deal\\_statement\\_20081202.pdf](http://www.unep.org/greeneconomy/docs/Green_New_Deal_statement_20081202.pdf)

<sup>14</sup> [http://www.aist.asn.au/Pages/PolResAdv/SubPage\\_Media/documents/SCCCPlus\\_EconomicStimulus9Feb09.pdf](http://www.aist.asn.au/Pages/PolResAdv/SubPage_Media/documents/SCCCPlus_EconomicStimulus9Feb09.pdf)

## China

### Economic backdrop

China's Q4 2008 GDP dropped sharply to a seven-year low of 6.8% y-o-y from 9% y-o-y in Q3 2008. HSBC expects growth to slow to 7.8% in 2009 — the lowest in nine years — before bouncing back to around 9% in 2010.

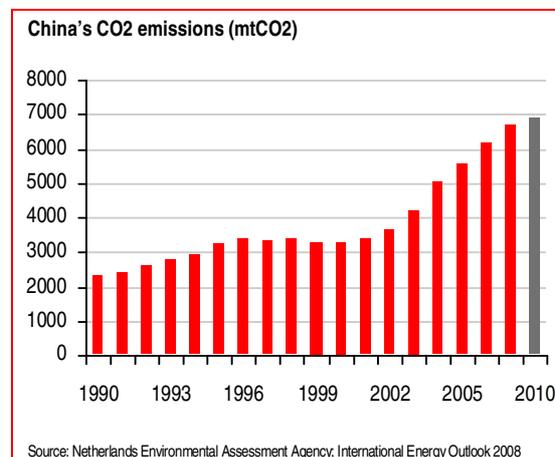


### Climate change profile

China has demonstrated a rapidly growing commitment to climate change. In 2007, it published its National Climate Change Programme (CNCCP), followed in October 2008 with its first White Paper. Improving energy efficiency remains at the core. The target within the current 11<sup>th</sup> Five Year Plan is to cut energy use per unit of GDP by 20% from 2005 levels by 2010. China has already reduced energy intensity by 1.6% in 2006 and 3.7% in 2007 and is expected by the US Energy Information Agency to hit the 20% target on schedule. China is also expanding its renewable sector rapidly. In 2008, China doubled its installed wind capacity, making it the world's second-largest market for new wind installations after the USA. We expect China to be the world's biggest market for wind in 2009.

China's policy position rests on growing awareness of the country's vulnerability to the mounting impacts of global warming and the

realisation that it has recently overtaken the USA as the world's largest emitter of greenhouse gases. Although China's contribution remains low by historical and per capita stands, its emissions' trajectory remains on an upward curve. The IEA estimates that China's energy-related CO<sub>2</sub> emissions rose by more than 250% between 1990 and 2006 to 5.65GtCO<sub>2</sub><sup>15</sup>. Under the IEA's "business as usual" scenario, China's emissions may double again by 2030 to 11.71GtCO<sub>2</sub>, which would be twice the level of the USA.



China's emerging "high-growth, low-carbon" strategy is underscored by recent policy decisions:

- ▶ China lifted export tax rebates on labour-intensive and high value-added products four times in H2 2008 but kept export rebates on energy-intensive and polluting products unchanged.
- ▶ China raised fuel consumption tax on gasoline five-fold to RMB1 from RMB0.2 per litre and the tax on diesel eight-fold to RMB0.8 from RMB0.1 per litre.
- ▶ China has initiated not just the largest stimulus package to date, but also the plan with the largest amount dedicated to climate change themes.

<sup>15</sup> IEA, World Energy Outlook 2008

## China's stimulus package

China's tradition of long-term planning enabled it to respond rapidly to the worsening economic climate by bringing forward construction work on planned projects. Launched on 9 November 2008, China's stimulus package of RMB4trn (USD586bn) over two years is equivalent to 13.4% of 2008e nominal GDP. Since then, provincial governments have been racing to produce their own investment plans that together total over RMB10trn. Not all of the planned investment will be new spending, but HSBC estimates that at least 30-40% of the central government's RMB4trn plan will be new money, implying an annual stimulus of 2-4% of GDP in 2009 and 2010.

The plan is focused on boosting investment in railways, roads, public housing and rural infrastructure as well as environmental protection. Beijing also promised to increase subsidies for farmers and cut taxes. Winter is normally a slow season for construction and we expect the bulk of the new spending to filter through starting in Q2 2009 (see Qu Hongbin, *China's New Deal*, December 2008). The priorities of the plan are also aligned to the long-term development of a low-carbon economy, most notably for rail.

### Low-carbon power

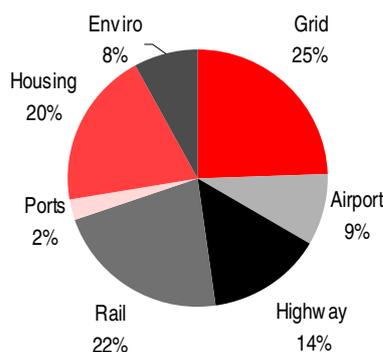
Currently, there is limited visibility over how the plan will underpin further expansion of low-

carbon power such as renewables. Industry sources expect the wind sector to 'nearly double again' in 2009, according to the Chinese Renewable Energy Industry Association<sup>16</sup>.

### Energy efficiency & energy management

- ▶ *Low-carbon vehicles:* Apart from the RMB4trn stimulus package, China also issued a plan for its auto sector in January 2009. This included a cut in the sales tax from 10% to 5% for cars with engines smaller than 1.6 litres. In addition, the package promises RMB10bn (USD1.5bn) in subsidies over the next three years for automakers to develop alternative-energy vehicles as Beijing wishes to promote the mass production of electric cars for urban areas.
- ▶ *Rail:* China is aiming to spend RMB1trn on expanding inter-province trunk railway lines. RMB50bn was spent in December 2008, with a target of completing RMB600bn of investments by the end of 2009. Between 2009 and 2010, the aim is to complete the construction of 16,000km of lines, covering mainly passenger services. This extra investment builds on the upward curve of rail investment from RMB252bn in 2007 to RMB350bn in 2008. Overall investment in railways by 2020 is set at RMB5trn, a big jump from the last target set in 2005 of only RMB1.5trn (see Ken Ho, Elaine Lam and Khushbu Agarwal, *China Infrastructure Construction*, 22 January 2009).
- ▶ *Grids:* More flexible and sophisticated grid infrastructure enables greater use of renewable energy sources and helps cut transmission losses. China has committed RMB1.1trn to expand power lines and build out transmission over 2009-11, of which we expect RMB0.5trn in 2009-10.<sup>17</sup>

Stimulus package breakdown (RMB4trn)



Source: HSBC, various ministry websites

<sup>16</sup> GWEC, *US and China in race to the top of the global wind industry*, 2 February 2009

<sup>17</sup> WRI, *Green Lining China's Economic Stimulus Plans*, 2008

### Waste, water and pollution control

As part of the stimulus plan, China has pledged RMB350bn (or USD50bn)<sup>18</sup> for biological conservation and environmental protection. Although the broad investment contours are yet to emerge, China's Ministry of Environmental Protection has stated that the stimulus will 'not be spent in the energy and resource-intensive industries or high-pollution industries'. Improved sewage treatment is one of the focal areas of the ports and waterways component of the plan.

Two batches of central government stimulus funds worth RMB230bn had been released by the end of January 2009. We estimate approximately 10% of the first and second batches will be spent on environmental projects. As the implementation of the plan develops, this could mean important allocations to renewables and energy saving in buildings.

### Signs of recovery

According to HSBC's latest economic outlook, the signs are already emerging that the stimulus is working (see *HSBC, China Economic Spotlight*, 22 January 2009). Not only have banks begun to respond positively to the monetary easing, but local governments have also commenced construction of their infrastructure projects. As a result, HSBC estimates that the bulk of the stimulus will filter through starting in Q2, lifting GDP growth to over 8% in H2 2009. The multiplier effect of the stimulus package is likely to be well above 1, probably around 1.5-2 times that of the government-sponsored spending.

Looking forward, we believe that the potential for green innovation in China's economic stimulus package far exceeds what has been announced to date. For example, the RMB900bn allocated to low-income housing could be allocated in ways that conserve energy use, thereby contributing to the country's long-term energy efficiency goals.

Encouraging signs are emerging, with the Ministry of Environmental Protection announcing in January<sup>19</sup> that it has granted approval to 153 projects worth RMB470bn as part of the stimulus package, including water conservation. The national environmental watchdog has also rejected 11 energy-intensive and polluting projects worth RMB43.8bn. However, there is also likely to be pressure from many fronts to cast aside environmental controls, and there are reports<sup>20</sup> that environmental impact assessments in China are being hurried through.

On 5 March, the National People's Congress will meet, at which the fiscal package could be expanded further.

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<sup>18</sup> [http://www.chinadaily.com.cn/bizchina/2008-11/27/content\\_7246713.htm](http://www.chinadaily.com.cn/bizchina/2008-11/27/content_7246713.htm)

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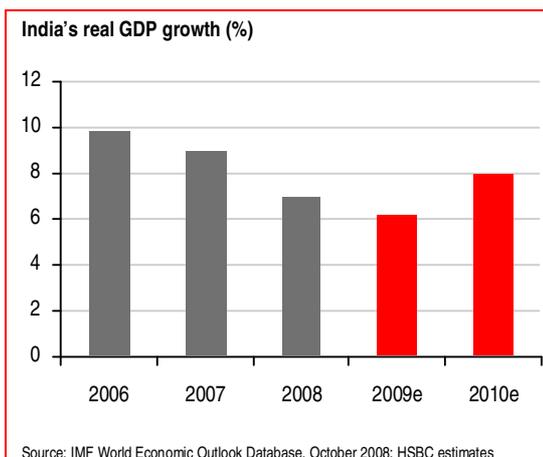
<sup>19</sup> [http://english.mep.gov.cn/News\\_service/media\\_news/200901/t20090112\\_133477.htm](http://english.mep.gov.cn/News_service/media_news/200901/t20090112_133477.htm)

<sup>20</sup> <http://www.chinadialogue.net/article/show/single/en/2696-Sticking-to-a-truly-green-stimulus>

## India

### Economic backdrop

India's GDP growth fell to 6.6% in Q3 2008/09, and the economy is set to slow further to 6.2% in 2009, before recovering to 8% in 2010.

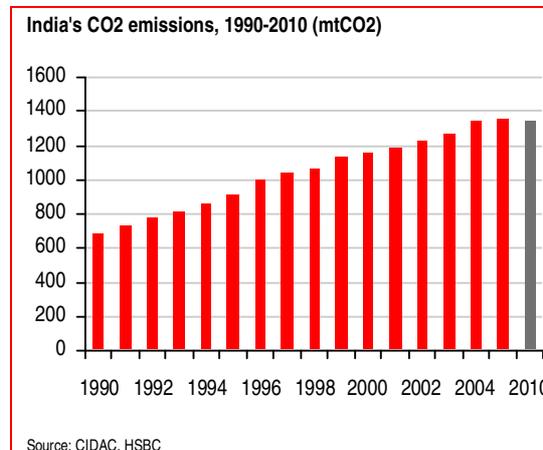


### Climate change profile

India is a low-carbon economy, with per capita emissions among the lowest in the world. Nevertheless, absolute emissions are rising, and in 2008, the government issued its National Action Plan on Climate Change (NAPCC) (see *HSBC, Wide Spectrum of Choices*, 27 November 2008). This identified eight priority areas for the country, including improving energy efficiency and boosting solar power.

### Economic stimulus

India has announced two general stimulus packages so far, both with a very limited climate dimension. In December, the Central Bank cut interest rates and the government eased its fiscal policy. HSBC estimates the measures to be worth a maximum of INR400bn (0.7% of GDP), of which around INR300bn (0.5% of GDP) will show up in the budget deficit. The second package to boost liquidity and economic activity was released in January, with further rate cuts, reinforcing liquidity measures and providing modest support to the export, auto and real estate sectors.



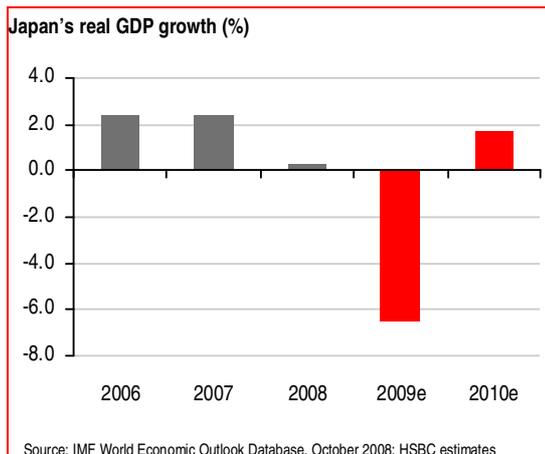
One aspect of potential interest is the provision for the Indian Infrastructure Finance Company (IIFCL) to borrow INR300bn (0.6% of GDP) via tax-free bonds. This is three times the amount provided for in the 7 December package. The entire sum would be leveraged to provide about INR1trn of low-cost resources to projects, mainly in ports, roads and railways. Further details are required to identify the potential for boosting mass transit and other rail systems.

An interim budget was released by the UPA government in February, which faces national elections by May 2009.

## Japan

### Economic backdrop

Japan's economy slowed dramatically in Q4 2008, and we expect growth to decline by 6.5% in 2009, before staging a modest recovery in 2010.

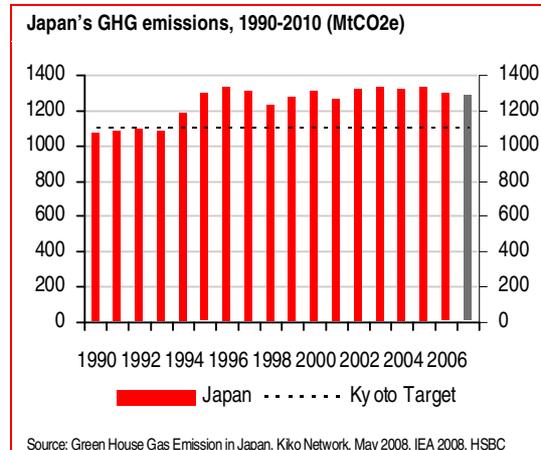


### Climate change profile

Home to the Kyoto Protocol, Japan has historically had an energy-efficient and low-carbon economy. However, the country has found it difficult to curb its GHGs over the past decade. Recently, the extended shutdown of some nuclear plants meant that Japan's GHG emissions rose 2.3% to hit a record high in the year ended March 2008, 8.7% above the country's Kyoto base year.

In June 2008, Japan presented its proposals for a Low Carbon Economy, indicating a commitment to a global cap of 50% by 2050, with Japan itself reducing emissions by 60-80%. The country's climate advisory panel has recently published six scenarios for cutting GHGs in the medium term by 2020, with a final proposal expected in April.

Initially a pioneer on solar energy, new PV installations peaked in 2005, when subsidies were removed. The country remains committed, however, to a 10-fold expansion of solar PV by 2020 and a 40-fold expansion by 2030. In the current financial year, the government has earmarked just JPY9bn (USD92m) for installing solar panels for households up to March 2009.



Japan's Ministry of Economy aims to expand this to JPY24bn in FY2009.

### A green stimulus in the making?

In December 2008, the Japanese government announced its JPY43trn (cUSD486bn) package of Measures to Support People's Daily Lives. The package focuses mainly on creating jobs and stabilising financial markets, with very limited stimulus for climate-related investments. Tax cuts of JPY1.1trn (USD12.2bn) include the immediate depreciation of investment in energy-saving and new energy equipment, but the actual proportion remains unclear<sup>21</sup>.

The Japan Ministry of the Environment is, however, in the process of formulating a "Green Economy and Social Reform" plan, which would, in effect, be the country's dedicated Green New Deal.

The plan is scheduled for release in March, and is likely to focus on:

- ▶ Solar PV
- ▶ Hybrid vehicles
- ▶ Energy-efficient appliances

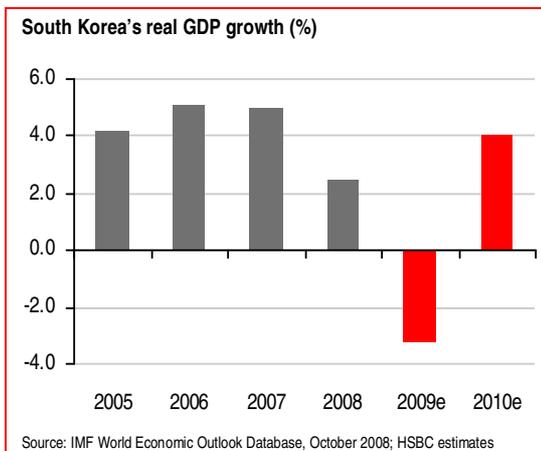
However, political uncertainty and a possible dissolution of the Diet (Japanese parliament) in April could interrupt the schedule; a general election is required at the latest by September.

<sup>21</sup> <http://www5.cao.go.jp/keizai1/2008/081224summary-english.pdf>

## South Korea

### Economic backdrop

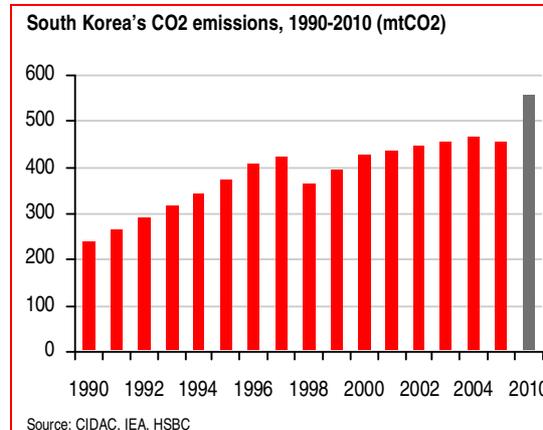
Korea suffered its second-biggest contraction on record in Q4 2008, pushing the economy towards its first recession since the Asian financial crisis. HSBC forecasts that growth will decline by 3.2% in 2009 before rebounding to 4% in 2010.



### Climate change profile

South Korea is the world's 10<sup>th</sup> largest emitter of GHGs. But under the rules of the UNFCCC, it is still classified as a developing country and so does not yet have binding emission caps. Nonetheless, the Ministry of the Environment has tabled plans to cap emissions at 2005 levels over the first Kyoto period (2008-12). South Korea also piloted the world's first system for labelling carbon through the product lifecycle in 2008. The government is planning to pass a Climate Change Act this year which will include a plan for reducing emissions by 3.2% from 2005 levels by 2012. Korea also plans to announce a medium-term carbon target for 2020 this year.<sup>22</sup>

The government also plans to expand usage of renewable energy from 2.3% in 2006 to 5% in 2011 and 11% in 2030<sup>23</sup>, which includes specific targets for various renewable energy technologies like solar, wind and biodiesel.



### The greenest new deal?

On 19 January 2009, South Korea launched its Green New Job Creation Plan, a KRW50trn (USD36bn) package to be spent over the next four years. The plan essentially combines and streamlines a range of projects across different ministries, and aims to create 960,000 jobs, of which 149,000 jobs will be realised in 2009, mainly in construction. The plan has nine core projects organised in four main themes:

- ▶ Conservation: green cars, clean energy and recycling
- ▶ Quality of life: green neighbourhoods and housing
- ▶ Environmental protection: revitalising four major rivers and securing water resources
- ▶ Preparing for the future: IT infrastructure and green transport networks

We estimate that more than 80% of the plan is allocated to climate-related investment themes.

We estimate, the proposed spending in 2009 (KRW6.2trn) under this Green New Deal would be would cost less than 1% of Korea's GDP in 2009 and the total stimulus is expected to amount to 3.5% of 2009 GDP.

### Low-carbon power

South Korea has committed to achieve 5% of energy from renewables by 2011. To move

<sup>22</sup> [www.eng.me.go.kr/docs/news/hotissue/hotissue\\_view.html?seq=48](http://www.eng.me.go.kr/docs/news/hotissue/hotissue_view.html?seq=48)

<sup>23</sup> [www.iea.org/textbase/pm/?mode=cc&id=4189&action=detail](http://www.iea.org/textbase/pm/?mode=cc&id=4189&action=detail)

towards implementation, the government plans to spend USD1.8bn in the next four years. However, details of the projects or sectors in which the fund would be invested have not been revealed.

### Energy efficiency

Energy efficiency clearly emerges as the winner in the South Korean Green New Deal.

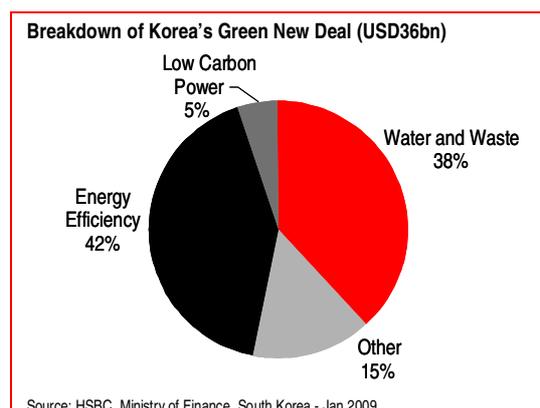
- ▶ Building efficiency: the package allocates cUSD6bn for improving energy conservation in villages and schools and also in domestic households. The plan includes the construction of 2 million green homes and the installation of LED lighting in public facilities.
- ▶ Low-carbon vehicles: the package allocates cUSD1.8bn for fuel-efficient vehicles.
- ▶ Modal shift: around USD7bn will be invested to promote low-carbon railways, as well as bicycle tracks and other public transport systems.

### Water and waste water

River and forest restoration as well as the construction of medium-sized dams is a major component of the plan, amounting to USD14bn, or 38% of the total.

## Impacts and reactions

The Green New Deal is a high-profile initiative, both domestically and internationally – with clear linkages being made with UN General Secretary Ban-ki Moon’s own support for a global green stimulus. It has also attracted its fair share of criticism about the nature of the jobs that will be created, its financing and the potential negative environmental impacts of such large-scale construction, which the government has countered<sup>24</sup>. In addition to the Green New Deal, the South Korean government has also announced that it plans to establish a USD72.2m renewable energy fund to attract private investment in solar, wind and hydroelectric power projects.



### South Korea's Green New Deal

Project	Employment	USDm
<b>Energy efficiency</b>		
Energy conservation (villages and schools)	170,702	5,841
Fuel-efficient vehicles	9,348	1800
Environmentally friendly living space	10,789	351
Mass transit and railroads	138,067	7,005
<i>EE – Sub-total</i>	<i>328,906</i>	<i>14,997</i>
<b>Low-carbon power (clean energy)</b>		
	4674	1800
<b>Water and waste management</b>		
River restoration	199,960	10,505
Forest restoration	133,630	1,754
Water resource management (small and medium-sized dams)	16,132	684
Resource recycling (including fuel from waste)	16,196	675
National green information (GIS) infrastructure	3,120	270
<i>Water sub-total</i>	<i>369,038</i>	<i>13,888</i>
<b>Total for the nine major projects</b>	<b>702,618</b>	<b>30,685</b>
<b>Total for the Green New Deal</b>	<b>960,000</b>	<b>36,280</b>

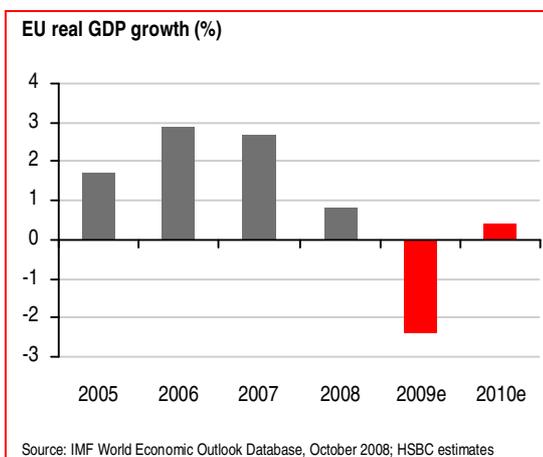
Source: South Korea Ministry of Finance, HSBC

<sup>24</sup> [http://english.mof.go.kr/news/pressrelease\\_view.php?sect=news\\_press&sn=6170](http://english.mof.go.kr/news/pressrelease_view.php?sect=news_press&sn=6170)

## EUROPEAN UNION

### Economic backdrop

The EU economy entered recession in Q3 2008. HSBC expects the decline to continue in the first two quarters of 2009, pulling the annual GDP outturn to a negative 2.4% before returning to modest growth in 2010.

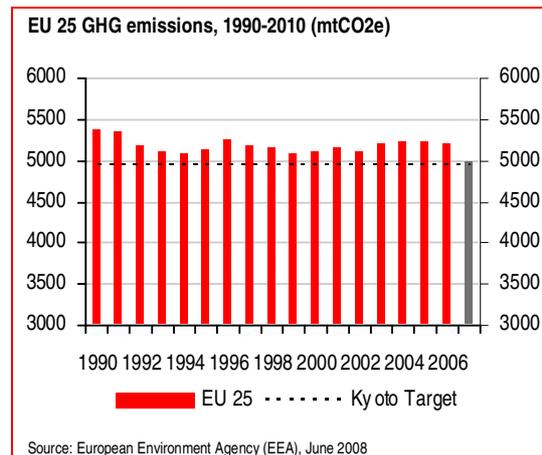


### Climate change profile

With agreement of its Climate Package in December, the EU has confirmed its position as a world leader in the drive to a low-carbon economy. The Union's 20:20:20 plan was confirmed, cutting GHGs by 20%, achieving 20% of primary energy from renewables and improving energy efficiency by 20%, all by 2020. The cap on carbon as part of the Emissions Trading System (ETS) will tighten by 1.7% a year from 2013, and 60% of allowances will be auctioned compared with just 3% in the current phase. Following heavy political pressure, major exemptions from auctioning were agreed for key industry sectors and power generation in Eastern Europe. The onset of the recession has, however, driven down the price of carbon in the EU ETS from EUR21 in February 2008 to EUR8.4 in February 2009. Carbon capture and storage also received a boost through the allocation of 300m extra allowances from the new entrants reserve. The challenge is now to translate the EU's high-

level targets for renewables into real investment at the national level, which will invariably require a re-examination of permitting rules which slow the pace of development.

The EU's sustained focus on climate change paid dividends in the 1990s, with emissions falling from the 1990 level by 5% in 2006. The European Environment Agency (EEA) estimates that emissions will fall further to 8.5% by 2010, enabling the Union to meet its Kyoto target of an 8% reduction from the 1990 level by 2012.



The EU's Second Strategic Energy Review sets clear objectives for 2050 with a roadmap for nuclear power, cutting overall GHGs by 80%, improving energy efficiency by 35% and bringing the share of renewable energies in power generation to 60%.

The Commission is currently preparing its climate change policies for the period after 2012, with the focus on carbon capture and storage, inclusion of the transport sector into the ETS and adaptation policies. The Commission has also set out its initial ideas for a global climate agreement at Copenhagen, calling for industrialised countries to cut emissions by 20% by 2020 and 80% by 2050, matched by cuts in advanced developing countries of 15-30% below business-as-usual (BAU) levels by 2020.

## Greening the recovery plan

In November 2008, the Commission tabled its European Economic Recovery Plan, proposing a comprehensive package of measures at the EU and national levels, amounting to EUR200bn or 1.5% of EU GDP. The plan contains a mix of measures to boost immediate demand along with “smart investments” to gain from the low-carbon markets of the future. Most of the money – equivalent to EUR170bn or 1.2% of the EU’s GDP – will be spent by the 27 Member States, with the balance of EUR30bn coming from the EU’s own budget and the European Investment Bank (EIB).

The impact of the measures announced so far amounts to 1% of GDP in 2009 and 0.5% in 2010<sup>25</sup>. Automatic stabilisers such as unemployment and other welfare measures could take the overall fiscal stimulus to around 4% of GDP, spread over 2009 and 2010.<sup>25</sup> The plan was endorsed by EU Heads of State in December.

### Low-carbon power

At the European level, the EIB will boost annual investments for energy and climate change-related infrastructure by up to EUR6bn per year for the next two years. A new 2020 Fund for Energy, Climate Change and Infrastructure will also be created, which would co-invest alongside institutional investors.

In addition, EUR3.5bn will be invested from the EU budget in energy infrastructure, including EUR1.75bn for gas and electricity interconnectors. We have counted towards the green stimulus total EUR1.25bn for sustainable power generation from fossil fuels, involving 11 projects related to CCS. In addition, the plan recognises the strategic importance of wind, allocating EUR500m to offshore wind generation and grid connection.<sup>26</sup> The European Wind

Energy Association (EWEA) has stated that this subsidy will provide incentives for larger volumes of wind-generated electricity to be integrated quickly into the existing grid and gives new R&D opportunities to make the power sector more efficient and less expensive.

### Energy efficiency

The plan calls for the 27 Member States to set demanding targets for energy efficiency in public buildings and make them subject to energy certification on a regular basis. To achieve this target, the plan proposes to introduce a reduced property tax for energy-efficient buildings and reduced VAT rates for green products and services, aimed at improving in particular the energy efficiency of buildings. Ultimate decisions on these proposals will, however, be taken at the national level.

The plan also proposes three priorities for clean tech innovation:

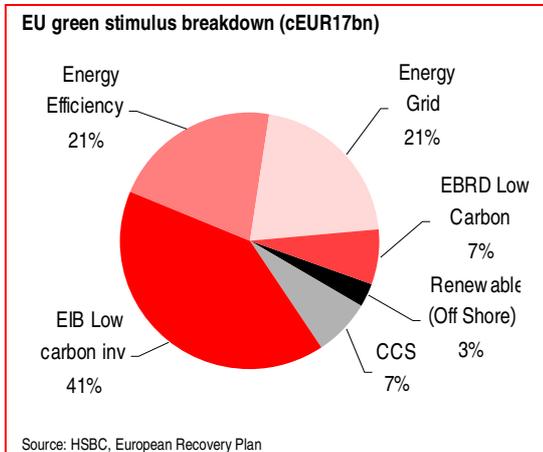
- ▶ A “European green cars initiative” to achieve a breakthrough in the use of renewable and non-polluting energy sources. The EIB and Member States would contribute together EUR5bn in research.
- ▶ A “European energy-efficient buildings” initiative to promote green technologies, valued at EUR1bn.
- ▶ A “factories of the future” initiative with a proposed EUR1.2bn.

Finally, the EBRD will double its efforts for energy efficiency, climate change mitigation and financing for municipalities and other infrastructure services, which could lead to the mobilisation of private sector financing to EUR5bn investments<sup>27</sup>.

<sup>25</sup> European Commission, *Interim Forecast January 2009*

<sup>26</sup> <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/36>

<sup>27</sup> EU communication on European Recovery Plan, November 2008



Assessing the precise allocation of EU spending to climate change themes is a complex business, not least because there is no clear timeline, and further detail is required on how the costs for many of the proposals will be split between the European and national levels. We have taken a conservative position, basing our assessment on the analysis conducted by the Bruegel Centre.<sup>28</sup> Our provisional estimate is that in 2009-10, there will be some EUR30bn in stimulus at the Union level, of which EUR17bn can be classified as “green”, more than 50% of the total. We expect both the absolute amount and the share to rise, with greater clarity available following the EU Summit in Brussels on 19-20 March, which will finalise the European Recovery Plan.

<sup>28</sup> Bruegel, *Estimating the size of the European stimulus packages for 2009*, January 2009

## Germany

### Economic backdrop

Europe's biggest economy, Germany, officially slipped into recession in the second half of 2008. HSBC estimates that German GDP will contract by 3.8% in 2009 but will then rebound to 0.9% in 2010.

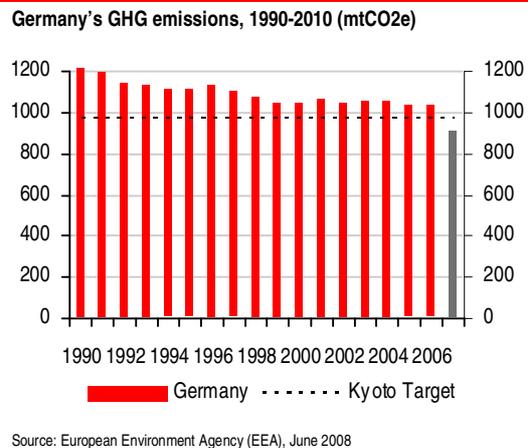


### Climate change profile

Germany has set the pace in the drive to a low-carbon economy, with the largest share in the global market of environmental goods and services.

As part of the Kyoto Protocol, Germany adopted a stringent 21% cut in GHGs by 2012. Germany is on course to meet this target through a combination of reunification and aggressive clean-energy and efficiency programmes. It is now aiming to cut emissions by 40% by 2020, with a view to an 80% cut by 2050.

Underpinning its climate strategy is a policy of Ecological Tax Reform (ETR) to shift the fiscal burden onto polluting activities. In addition, the country has been at the vanguard of renewable energy policy, based on generous feed-in tariffs. This has made Germany a world leader in both solar and wind installations, generating 250,000 jobs in renewable energy. In 2005, 6% of the country's primary energy was delivered from renewable sources, which needs to rise to 18% by 2020 as part of the EU Renewable Energy Directive.



### The twin stimulus package

Germany has announced two successive stimulus packages, the first in November 2008 and the other in January 2009. Together the stimulus amounts to EUR80bn, equivalent to 1.5% of GDP in 2009e and 2% of GDP in 2010e. The spending combines tax cuts with infrastructure investments, with a focus on climate protection and energy efficiency. To date, the stimulus measures have been silent on renewables, largely because the sector is already seen to benefit from favourable feed-in tariffs.

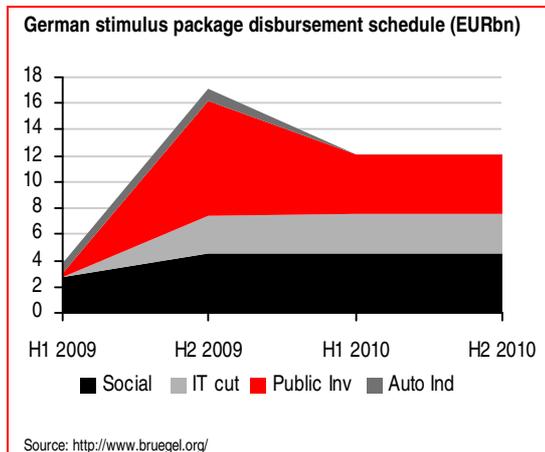
#### Energy efficiency

The stimulus gives energy efficiency a major thrust.

- ▶ *Building efficiency:* The package gives EUR3bn in subsidies for household repairs, especially for enhancing energy efficiency under the CO<sub>2</sub> building renovation programme.
- ▶ *Low-carbon vehicles:* The package gives a "scrappage" bonus of EUR2,500 for replacing cars that are more than nine years old with new cars that meet EURO4 emission standards. To support the development of new low-carbon engines, the government will provide EUR0.5bn in loans over the next two years. The government is also planning to introduce emission-based vehicle taxation from July 2009 for older vehicles and for new vehicles from 2013.

- ▶ *Modal shift:* The package will also invest EUR2bn in public transport systems over 2009 and 2010.

Germany's twin packages make up the biggest fiscal recovery programme in Europe, contributing at least 37% of the overall EU-27 stimulus. The government expects 70% of the stimulus to be disbursed before the first half of 2010. The onset of federal elections in September 2009 is also likely to be an additional incentive to disburse the package.

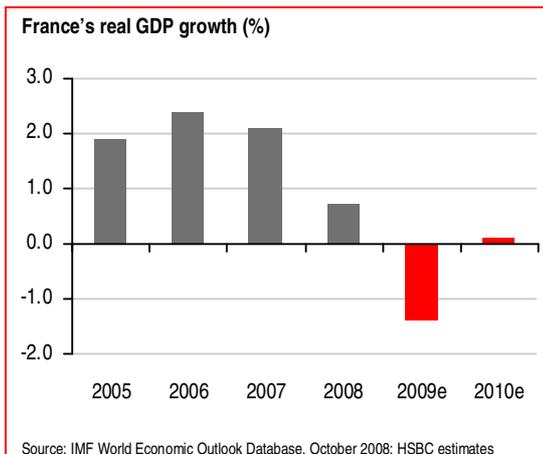


The government projects that these measures will trigger, directly and indirectly, additional investment and consumer spending of around EUR50bn over the next two years.

## France

### Economic backdrop

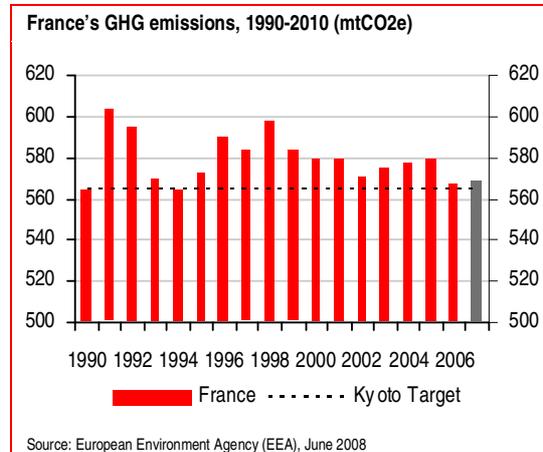
France narrowly escaped recession in 2008, but the economy is expected to shrink by 1.4% in 2009, with a resumption of anaemic growth in 2010.



### Climate change profile

With a large proportion of its electricity derived from nuclear power, France has the advantage of a low-carbon power base. However, the country is still expected to exceed its Kyoto GHG target by 10% in 2010, due to increasing emissions from buildings and transport<sup>29</sup>.

As part of the ambitious *Grenelle de l'environnement* process, France has committed to a “factor four” reduction in GHGs by 2050. Key measures to implement this goal include a “bonus malus” tax system for CO<sub>2</sub> emissions from cars. In terms of renewable energy, France has to double its renewable energy capacity from 10.3% in 2005 to 23% by 2020 under the EU Renewable Energy Directive.



### Revival plan

In December 2008, the French government announced its EUR26bn economic revival plan, costing the equivalent of 1.3% of gross GDP in 2009e. The package consists of:

- ▶ EUR11bn to boost business cash flows through the reimbursement of taxes.
- ▶ EUR11bn for direct state investment.
- ▶ EUR4bn from public companies to improve rail infrastructure, the postal service and energy services.

The package also included help for the ailing auto industry, with incentives to scrap older vehicles and buy new, more environmentally friendly models. The climate-relevant portions of the plan amount to more than 20%, the highest in the EU.

### Low-carbon power

As part of the expansion of public sector investment, EDF will spend EUR300m on new renewables and a further EUR300m on hydro power. Apart from this, the government is also planning to spend EUR30m on sustainable agriculture and for the modernisation of farms, particularly to develop renewable energy.

### Energy efficiency

Improving energy efficiency takes centre stage in the revitalisation plan.

<sup>29</sup> <http://www.minefe.gouv.fr/>

- ▶ *Building efficiency*: EUR200m is being allocated to housing renovation in 2009 and 2010. In addition, public buildings such as post offices will be upgraded at a cost of EUR600m, with EUR160m as additional funding to improve existing public structures. For new housing development in 2009-10, EUR1.5bn will be invested.
- ▶ *Low-carbon vehicles*: The package announced plans to promote low-carbon cars through a premium of EUR1,000 for vehicles emitting less than 160g of CO<sub>2</sub>. In total, EUR500m will be allocated to “scrappage” and the “bonus malus” scheme in 2009.
- ▶ *Rail*: To help shift travel away from carbon-intensive aviation, additional high-speed railway lines will be constructed at a cost of EUR0.95bn.

The package is projected to create 80,000-110,000 new jobs compared with a possible loss of some 90,000 jobs in 2009. This is based on the estimate that 75% of the EUR26bn package will be used in 2009. In February, the government announced that roughly EUR10bn out of the EUR26bn stimulus package will be immediately injected into 1,000 projects, mainly in infrastructure development such as railway networks and water management projects<sup>30</sup>.

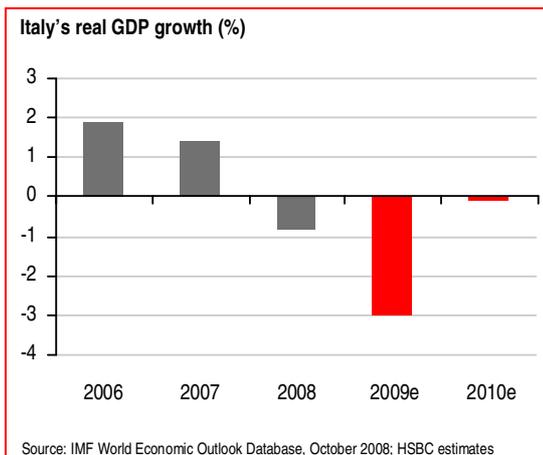
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<sup>30</sup> [http://www.premier-ministre.gouv.fr/en/information/latest\\_news\\_97/stimulus\\_package\\_1\\_000\\_62594.html](http://www.premier-ministre.gouv.fr/en/information/latest_news_97/stimulus_package_1_000_62594.html)

## Italy

### Economic backdrop

Italy slipped into recession in Q3 2008 and HSBC forecasts that GDP will contract by 3.0% in 2009, marking the fourth recession in seven years.

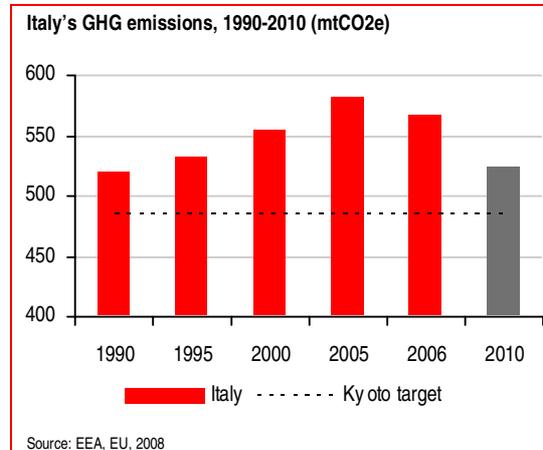


### Climate change profile

Italy is set to breach its Kyoto target of cutting emissions by 6.5% by 2008-12. In 2006, Italy's emissions were 10% higher than the base-year of 1990. According to the EEA, even additional measures may not help the country hit the target. Italy does, however, have considerable renewable energy potential, particularly in terms of solar, where it has a high level of insolation and attractive feed-in tariffs. The government is targeting 3GWp in solar power by 2016. Last year, the country had a total of 280MWp installed, and the government aims to install a further 250MWp in 2009.

### Emergency spending

Italy's EUR80bn Emergency Package announced on 28 November only contained around EUR5bn in new spending. To supplement this, in February the government launched a Car Stimulus Package, worth EUR2bn, of which EUR1.3bn is directed at the promotion of more fuel-efficient vehicles.



### Modal shift: rail

A fraction of the Emergency Package will underwrite bonds to finance rail investments of EUR0.96bn (USD1.03bn).

### Low-carbon vehicles

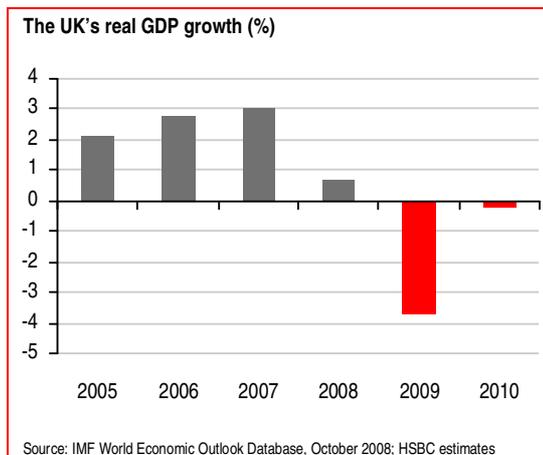
The Car Stimulus Package includes a "scrappage" payment of up to EUR1,500 for trading in an old car to buy a new, more-efficient vehicle.

Italy's ability to stimulate the economy, green or otherwise, is hampered by a public debt of well over 100% of GDP.

## United Kingdom

### Economic backdrop

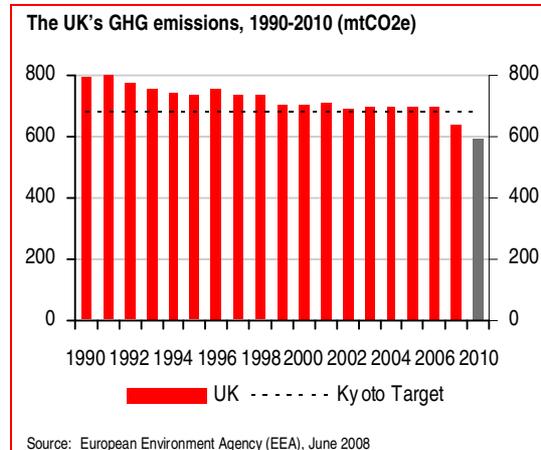
Growth in the UK fell to 0.7% in 2008 as the economy contracted in the second half. HSBC estimates that GDP will fall by 3.7% in 2009 and by a further 0.2% in 2010.



### Climate change profile

The UK has a longstanding commitment to climate change and is on track to meet its Kyoto target of a 12.5% cut from 1990 levels by 2008-12. However, it is highly unlikely that it will meet the government's own target of reducing emissions of CO<sub>2</sub> by 20% from 1990 levels by 2010.

In November 2008, the UK passed the landmark Climate Change Act, which legally binds the country to cut emissions by 80% by 2050, with an interim target of at least 26% by 2020, against a 1990 baseline. The UK has, however, made far less progress on clean energy, with only 1.6% of its energy mix in 2006 from renewable sources. This has to rise to 15% by 2020, as part of the implementation of the EU's Renewable Energy Directive. Closing this gap will require a significant expansion of renewable electricity (notably from wind) as well as renewable heat (such as bio-gas) along with accelerated energy conservation. The 2008 Energy Act could help to streamline the



planning process to enable accelerated construction of low-carbon power sources.

### Green stimulus

The UK government launched its GBP20bn recovery plan as part of the November Pre-Budget report, equivalent to 1.4% of GDP in 2009e. The package included a modest GBP535m "green stimulus", as well as other environmental spending commitments.

#### Low-carbon power

The "green stimulus" did not allocate any additional public spending to renewables or other low-carbon power sources but extended the Renewable Obligation from 2027 to 2037.

#### Energy efficiency

Energy efficiency emerges as the major focus of the stimulus package.

- ▶ **Building efficiency:** The package allocates GBP100m on the Warm Front scheme to improve insulation and heating systems. Under the Decent Home programme, GBP60m will be spent to provide the latest energy efficiency measures. Energy-saving technologies will also benefit pro rata from the 2.5% cut in VAT. Finally, a GBP350m Community Energy Saving Programme is also being launched in 2009.

- ▶ *Modal shift*: GBP300m will be spent to accelerate the delivery of 200 new carriages and GBP5m on British Waterways' network infrastructure.
- ▶ *Low-carbon vehicles*: In January 2009, the government introduced an additional support package for the automotive industry, guaranteeing to unlock loans of up to GBP1.3bn from the EIB – part of the EIB's EUR6bn carbon funding – matched by a further GBP1bn for lower-carbon initiatives.

### **Water**

The package also addresses adaptation to climate change by spending GBP20m on flood defences.

According to UK government estimates, the “green stimulus” will help to sustain and expand the estimated 350,000 jobs in the low-carbon sector. Taking the Pre-Budget and Car Industry packages together, the green dimension amounts to around 6.9% of the total outlay of the budgeted USD30bn. As with other European plans, what is notable is the absence to date of specific plans to support the renewable energy sector.

We expect that further plans for stimulating the growth of clean technologies will be announced shortly with the launch of the government's low-carbon manufacturing strategy. Additional measures could also be included in the 2009 Budget, scheduled for 22 April, although the government's room for manoeuvre is constrained by the rising public sector deficit, expected to be around 10% of GDP in financial year 2009/10.<sup>31</sup>

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<sup>31</sup> European Commission Directorate-General for Economic and Financial Affairs – Interim Forecast Jan 2009

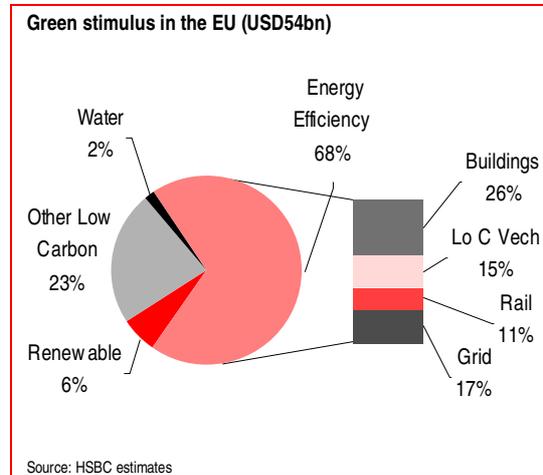
## Europe: summary

In all, we estimate that the EU and its Member States have allocated USD54bn to climate-relevant investment themes. This includes the programmes of the smaller Member States, detailed in the table below.

Building efficiency is the most favoured theme, followed by low-carbon vehicles, where a number of countries are directing aid to the struggling auto industry via support for more energy-efficient models. Sweden has also allocated EUR3bn for auto sector R&D to promote low-carbon vehicles.

One surprise is that renewable energy has only been allocated 6% of the climate spend – although this share could increase as general “climate change investment” such as the enhanced EIB lending facility is earmarked for specific projects.

In terms of country rankings, France appears to have allocated the largest share of its stimulus plans to climate themes although Germany has dedicated the largest absolute amount.



### Green stimulus allocations in other EU zone members (all in EURbn)

Other European States	Total	Low-carbon power	Energy efficiency	Water/waste
Belgium	3.4	-	0.15	-
Denmark	-	-	-	-
Ireland	-	-	-	-
Greece	23.0	-	-	-
Spain	66.6	-	-	-
Netherlands	3.2	-	-	-
Austria	6.4	-	0.16	-
Poland	28.3	1.50	-	-
Sweden	107.6	-	3	-
<b>Total</b>	<b>238.48</b>	<b>1.50</b>	<b>3.31</b>	<b>-</b>

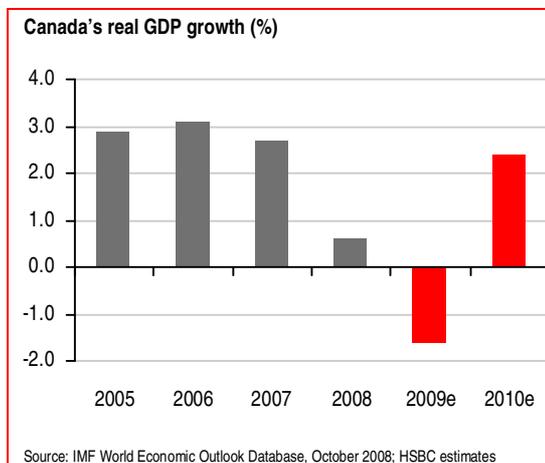
Source: HSBC, Bruegel

## THE AMERICAS

### Canada

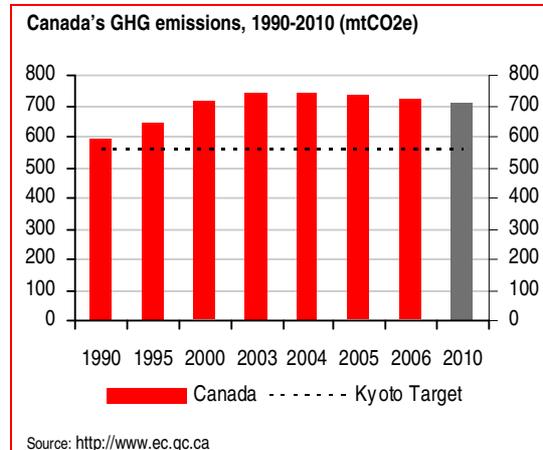
#### Economic backdrop

Canada's economy has moved in line with its southern neighbour, slowing substantially in the second half of 2008. HSBC expects GDP to decline by 1.6% in 2009 before moving back into positive territory in 2010.



#### Climate change profile

Canada's resource-based economy and close links with the USA have meant that its GHG emissions are well above its Kyoto target of a 6% reduction in emissions from the 1990 level by 2008-12. In April 2007, the Canadian government announced its "Turning the Corner" climate plan, which introduces a new target of cutting GHGs by 20% by 2020, but from a 2006 baseline. This would require the industrial sectors covered by the plan to reduce their emission intensity from 2006 levels by 18% by 2010, with a 2% continuous improvement every year thereafter<sup>32</sup>. The system is expected to be up and running from 1 January 2010. Canada also has a suite of renewable energy policies at the federal and provincial levels, such as ecoENERGY, which is similar to the US ITC and PTC.



#### Budget stimulus

Canada announced its Economic Action Plan along with the 2009 Budget in January. This will provide almost CAD40bn over the next two years, equivalent to c1.5% of GDP in 2009e and c1.1% in 2010e. In 2009 alone, the spending will be CAD30bn, or 1.9% of GDP. The spending will target "shovel-ready" projects that can start in the upcoming construction season, such as roads, bridges, public transit, clean-energy, broadband internet access, electronic health records, laboratories and border crossings.

#### Low-carbon power

The plan will invest CAD150m over five years on low-carbon research, of which CAD0.85bn would be invested on CCS demonstration. In addition, Canada will invest CAD351m in Atomic Energy of Canada Limited over two years to finance the Advanced CANDU reactor, making it the only country so far to include nuclear in a stimulus package.

#### Energy efficiency

To promote energy efficiency in the domestic building sector, the package provides CAD300m over two years under the ecoENERGY Retrofit programme to support c200,000 additional home retrofits. The package also provides CAD1bn over five years for the Green Infrastructure Fund to support the modernisation of energy transmission lines, increasing grid connectivity for renewable

<sup>32</sup> [http://www.ec.gc.ca/doc/virage-corner/2008-03/541\\_eng.htm](http://www.ec.gc.ca/doc/virage-corner/2008-03/541_eng.htm)

Canada's economic action plan (CADm)

Stimulus areas	2009	2010	Total
Action to help Canadians and stimulate spending	5,880	6,945	12,825
Action to stimulate housing construction	5,365	2,395	7,760
<i>Housing leverage</i>	725	750	1,475
Immediate action to build infrastructure	6,224	5,605	11,829
<i>Infrastructure leverage</i>	4,532	4,365	8,897
Action to support businesses and communities	5,272	2,255	7,527
<i>Sectoral leverage</i>	1,300	-	1,300
<b>Total federal stimulus</b>	<b>22,742</b>	<b>17,200</b>	<b>39,942</b>
<b>Total stimulus (with leverage)</b>	<b>29,298</b>	<b>22,316</b>	<b>51,613</b>
<b>As a share of GDP (%)</b>			
Total federal stimulus	1.5	1.1	2.5
Total stimulus (with leverage)	1.9	1.4	3.2

Source: Budget Report 2009

energy as well as the efficient transfer of generated electricity. Finally, CAD0.5bn will be invested over five years to promote inter-city passenger rail.

**Water and waste**

Over the next two years, CAD165m will be spent on drinking water and waste water infrastructure projects.

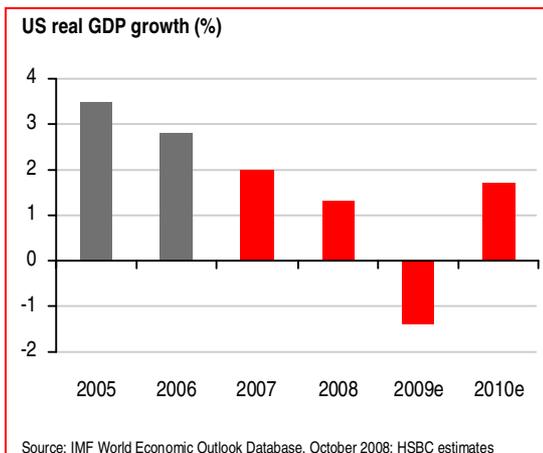
According to Canadian government estimates, the Economic Action Plan will generate a leverage of USD9.3bn in investments over the next two years. Moreover, it estimates that investments to boost clean energy could leverage at least CAD2.5bn over the next five years. In addition, the government believes some 407,000 jobs could be created.<sup>33</sup>

<sup>33</sup> [www.canada.com/topics/news/national/story.html?id=1145083](http://www.canada.com/topics/news/national/story.html?id=1145083)

## USA

### Economic backdrop

The fall in US GDP of 3.8% in Q4 2008 was the largest quarterly decline since Q1 1982. HSBC forecasts negative growth of 1.4% in 2009, with the economy bouncing back with 1.7% growth in 2010.



### Climate change profile

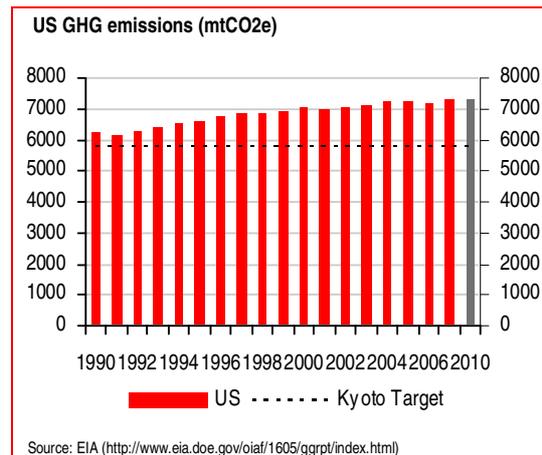
The US has the largest historical share of global GHGs and retains one of the highest levels of per capita emissions, twice that of the EU and three times the global average. The US played an active role in negotiating the Kyoto Protocol, receiving a target to cut emissions by 7% by 2008-12.

However, the Bush Administration refused to ratify the Protocol, citing competitiveness concerns. The absence of federal-level climate and clean-energy policies has meant that US emissions are well above the Kyoto target.

The new Obama Administration has committed to bringing emissions back to 1990 levels by 2020, en route to an 80% cut by 2050. In addition, it has pledged to spend at least USD150bn over the next decade on clean energy, doubling renewable energy over the next three years, as well as introducing a “cap and trade” system similar to the EU ETS.

Within a week of taking office, President Obama signalled the importance of improving vehicle fuel economy by requesting the Environmental

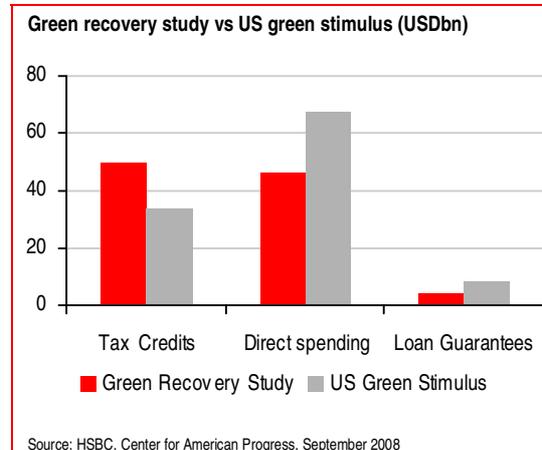
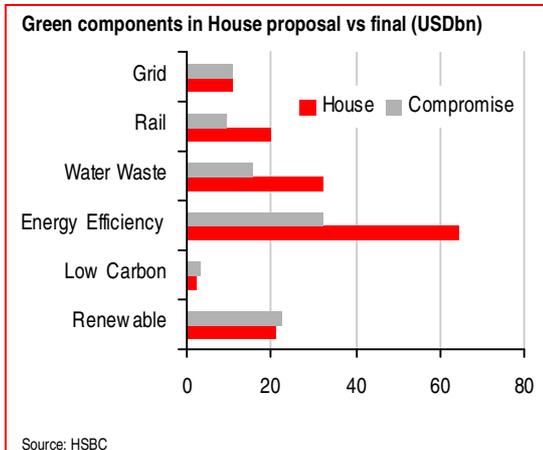
Protection Agency reconsiders its decision to deny California a waiver under the Clean Air Act, which would have enabled California and 17 other states to impose stricter-than-federal limits on automobile GHGs.



Climate change is fully integrated into the new Administration’s plans to transform the US energy system so that the US reduces its dependence on imported oil from the Middle East and Venezuela within 10 years, creates at least 5 million “green collar” jobs and stimulates clean-tech innovation. This strategy was integral to the USD787bn American Recovery and Reinvestment Act (ARRA), signed into law in February, which built on the modest boost to clean energy contained in the Bush Administration’s emergency package in October 2008.

### Round 1: EESA

In October 2008, US Congress approved the Emergency Economic Stabilization Act, the centrepiece of which was the USD700bn rescue package for the financial sector. Alongside the Troubled Assets Relief Program (TARP), the Act contained USD185bn of tax cuts and credits, including USD18.2bn for clean energy.



At the last moment, the Production Tax Credit (PTC) for wind and the Investment Tax Credit (ITC) for solar were extended to a value of USD9.45bn. In addition, government support of USD2bn was allocated to carbon capture and storage (CCS). Please refer to our 6 October 2008 flashnote *Global Wind and Solar* for details.

## Round 2: ARRA

The American Recovery and Reinvestment Act was originally designed to bring about a USD825bn stimulus package, but this was slimmed down to ensure passage through both houses of Congress. A number of “green” features were cut as part of this, most notably in measures to boost building efficiency and expand rail infrastructure, reducing the “green” spend from an estimated USD151bn to USD94bn.

The final USD787bn package contains USD295bn in tax cuts for individuals and businesses, along with USD492bn in new spending over the next two years. According to the Congressional Budget Office, at least 70% of the money – or more than USD585bn – is expected to be spent in the next 18 months.

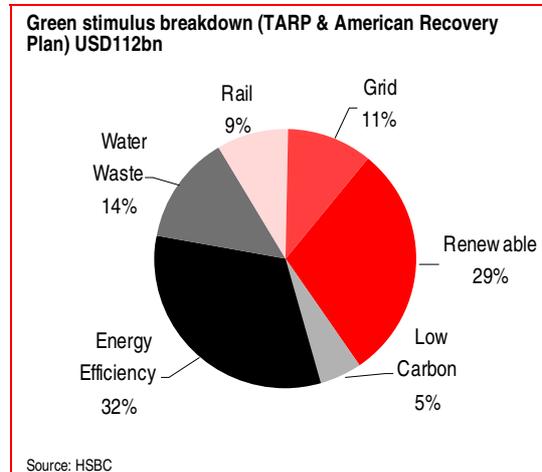
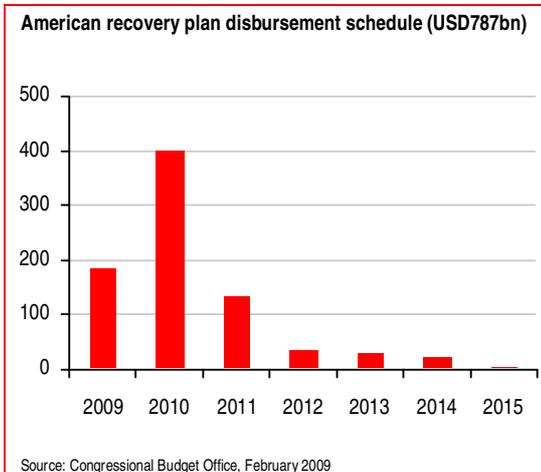
The Obama Administration came into office recognising that the launching of a stimulus package in its first 100 days was its chief priority. From the beginning, clean energy was an integral component, drawing on ideas developed in the run-

up to the Presidential election. For example, the influential Center for American Progress published a wide-ranging study in September 2008, setting out a USD100bn Green Recovery programme, focusing on building retrofit, mass transit, smart grids and renewable energy.<sup>34</sup> The same themes also feature in the final ARRA, along with extra investment in water infrastructure.

### Low-carbon power

- **Renewables:** ARRA provides a better-than-expected boost to the US renewable energy sector. Please refer to our flashnote *US Stimulus Package – Implications for Renewables*, 16 February 2009, for detailed commentary. In brief, ARRA extends the PTC for the sectors under TARP (notably wind, biomass and geothermal) for three years, allows developers to swap this for the ITC’s 30% capital subsidy during 2009/10 and provides an extension of the 50% bonus depreciation in 2009. Crucially, developers may opt to receive cash grants from the Treasury in lieu of the ITC, benefiting those without sufficient taxable profits to offset. Furthermore, the package provides USD6bn of DoE loan guarantees and introduces a new “build in America” manufacturing ITC, providing a 30% capital subsidy for

<sup>34</sup> Center for American Progress, *Green Recovery*, September 2008



companies wishing to construct new plant in the US. In all, we estimate that ARRA provides USD22.5bn of incentives for the renewable energy sector.

- ▶ **CCS:** ARRA extends America's commitment to carbon capture and storage demonstration projects, with incentives worth USD3.4bn.

### Energy efficiency

ARRA allocates unprecedented resources to upgrade the energy efficiency of the US economy, which we estimate at USD52bn for buildings, low-carbon vehicles, modal shift to rails and for modernising the electricity grid.

ARRA will provide USD25bn in finance to enable state and local governments to invest, including building and home energy conservation programmes, energy audits, fuel conservation programmes, building retrofits, along with "smart growth" planning and zoning. It also encourages states to update energy-efficient building codes and regulatory policies to promote demand-side management programmes by energy utilities. Tax credits for energy-efficiency improvements – such as insulation and windows – are increased from 10% to 30%.

A further USD10bn will be spent on mass transit and rail along with USD11bn on grid

infrastructure<sup>35</sup>. In terms of low-carbon vehicles, ARRA provides USD2bn for advanced batteries along with USD2bn in credits for plug-in hybrids.

### Water and waste

The plan proposes to invest USD16bn in environmental restoration, flood protection and navigation infrastructure as well as providing clean, reliable drinking water to rural areas, in the process creating more than 375,000 jobs.

### Impacts and implications

If we combine EESA and ARRA then USD112bn of public incentives are being mobilised for climate change investments, over three times what was spent on these programmes in 2008 or provisionally appropriated for 2009.

### Creating green jobs

The original ARRA was also estimated to create 3 million jobs by the end of 2010 with infrastructure (road, rail and water) providing 48%, followed by the IT sector at 30% and the energy sector with 16%.<sup>35</sup> The final compromise could cut the job creation potential by between 430,000 and 538,000.<sup>36</sup>

Research suggests that energy-efficiency improvements and green power investments have

<sup>35</sup> <http://www.speaker.gov/newsroom/legislation?id=0273>

<sup>36</sup> <http://www.americanprogress.org>

lasting employment benefits. While the jobs created by tax cuts and traditional infrastructure investment end once the money is spent, programmes that reduce energy lead to net employment gains well into the future. On average, WRI estimates every USD1bn spend by government would yield 30,100 jobs<sup>37</sup>. The Solar Energy Industries Association (SEIA) estimates that renewable incentives will create 60,000 jobs in 2009 and 110,000 over two years.<sup>38</sup>

### Driving green investment

In the renewable energy sector, the World Resources Institute (WRI) estimates that every USD1bn spent on tax credits<sup>37</sup> could result in additional renewable capacity of some 1466MW, so that the aggregate investment of 30,000MW could be achieved in the next three years. This would mobilise USD100bn of private investment, delivering a leverage ratio of 3:1. The renewable power added would be around 20% of existing capacity, which stood at 8.4% of total power generation in 2007. For solar alone, the SEIA projects that the measures could prompt 1GW of new installations in 2009 and 2GW in 2010.

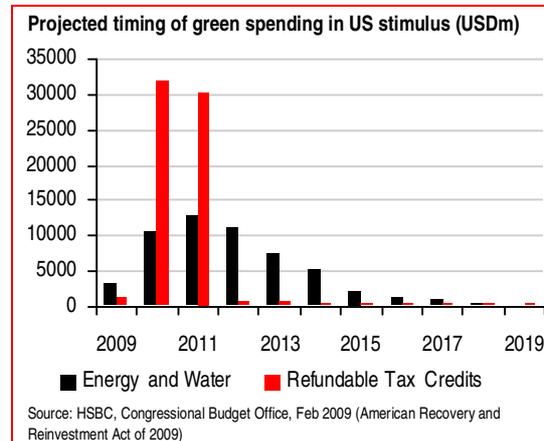
### Cutting carbon

We estimate that the renewable and energy-efficiency measures (excluding rail) could avoid 65mt of CO<sub>2</sub> emissions, around 1% of total US CO<sub>2</sub> emissions in 2007. WRI has concluded that the package could produce an annual CO<sub>2</sub> emission reduction of 592,600 tons between 2012 and 2020 for every USD1bn, delivering an overall reduction of 50mtCO<sub>2</sub>. This emission reduction equates to a carbon cost of USD170 per ton if the reductions persist for one decade and USD85 per ton if they persist for two decade, much higher than the prospective cap and trade programme in the US.<sup>37</sup>

### Timing and delivery

Drawing on Congressional Budget Office estimates, we estimate that 70% of the green

stimulus will be spent over the next four years, with at least USD40bn during 2010-11.



### Buy American?

The stimulus bill still retains controversial “buy American” language, mandating the use of US-made iron, steel and manufactured goods. But the provisions appear to have been watered down through the insertion of qualifying language, including a stipulation that it must meet WTO requirements.

Looking ahead, two further policy initiatives are planned for 2009.

- ▶ Legislation to introduce a federal Renewable Portfolio Standard will be introduced, potentially mandating 25% of power generation by 2025, providing a key long-term boost for the sector. This could also be the occasion for further spending on the necessary energy infrastructure.
- ▶ Legislation to establish a comprehensive “cap and trade” framework for reducing emissions by 80% by 2050 will also be proposed by the summer.

These two pieces of legislation could be combined. However, the complexity of “cap and trade” could mean that it would be unlikely to be passed in Congress this year, favouring a twin-track approach.

<sup>37</sup> A Green Global Recovery? – WRI, February 2009

<sup>38</sup> [http://seia.org/cs/news\\_detail?pressrelease.id=345](http://seia.org/cs/news_detail?pressrelease.id=345)

## Global

Efforts to introduce a “green stimulus” at national and regional levels are not happening in isolation, but are part of a gathering momentum for a low-carbon recovery in the G20 and the Copenhagen climate negotiations.

### Group of 20

On 2 April, leaders from the Group of 20 advanced and emerging economies will meet at summit level in London. Before them will be the challenge of coordinating efforts to revive the global economy, avoiding protectionism and reforming the financial system. Infrastructure spending to speed the transition to a low-carbon economy is likely to feature on the agenda – ‘building tomorrow today’ in the words of the summit’s host, UK Prime Minister Gordon Brown.<sup>39</sup> Prime Minister Brown has also called for at least 10% of a proposed USD100bn World Bank stimulus package for the developing world to be dedicated to climate change.

### UNFCCC – the road to Copenhagen

Finance lies at the heart of the current round of UN negotiations to agree a new climate treaty at Copenhagen this December. This is designed to succeed the Kyoto Protocol, whose first phase expires at the end of 2012. In Poznan at the UNFCCC’s 14<sup>th</sup> Conference of the Parties (COP14), a range of proposals were placed on the table to finance the necessary leapfrogging to a low-carbon growth path in the developing world.

From the side of the developing countries, China and the rest of the Group of 77 are arguing that the OECD should allocate 1% of GDP to climate assistance for reducing emissions and adaptation. Other countries, such as Mexico and Norway, have

focused more on the mechanisms for raising these resources without proposing an amount.

After Poznan, the UNFCCC has entered full negotiating mode, with the first round of talks scheduled for late March in Bonn. Before then, governments are expected to submit their proposals on finance, technology, mitigation and adaptation. The schedule then requires a draft agreement to be reached at the June meeting, with a view to finalisation in December. This is a tough timetable, particularly at a time of deep economic crisis and when a new administration has just entered the White House, with elections forthcoming in Germany, India and Japan.

To get the ball rolling, the European Commission has put some of its cards on the table.<sup>40</sup> Globally, the EC estimates that EUR175bn in additional annual investments will be needed to drive low-carbon growth by 2020. An earlier draft of the Commission’s proposals had suggested that EUR30bn in annual climate assistance would be needed by 2020, with the EU contributing its “fair share” of around EUR12bn per annum.

The task ahead is to ensure that the G-20 delivers results in sufficient confidence-building measures in terms of international climate finance, which can provide both short-term visibility for investors and also build a momentum for a strategic agreement at Copenhagen.

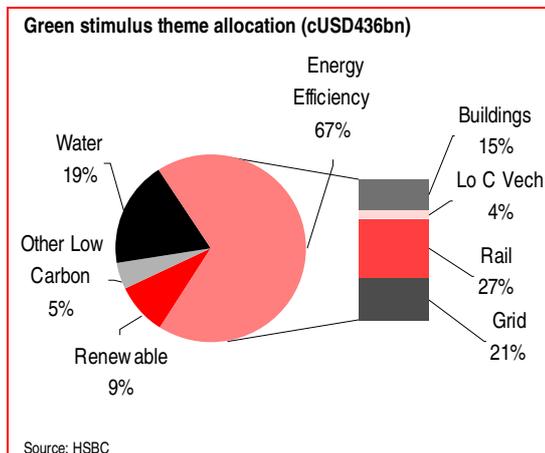
<sup>39</sup> <http://www.londonsummit.gov.uk/resources/en/PDF/road-to-london-summit>.

<sup>40</sup> European Commission, *Towards a comprehensive climate change agreement in Copenhagen, January 2008*

# Theme analysis

## Allocating the stimulus

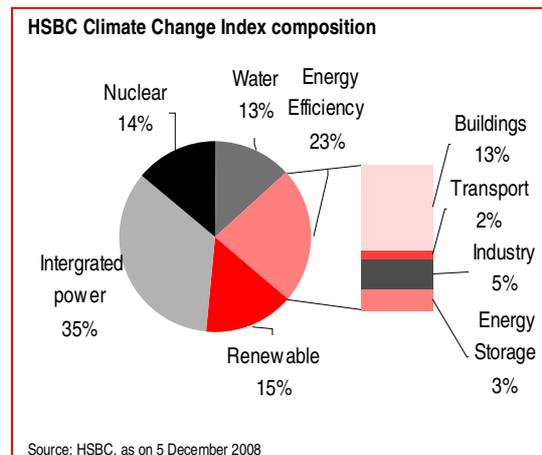
Across the economic stimulus plans that we have evaluated, there is considerable variation in the allocations towards different climate change themes. Taken together, the broad energy-efficiency theme accounts for two-thirds of the total, with the largest shares comprised of rail and grid. This is fully in line with the global climate change policy consensus that ‘energy efficiency improvements are by far the single most important action until 2020’.<sup>41</sup>



Comparing this allocation with the composition of the HSBC Climate Change Index yields some interesting insights. The Index reflects current revenues earned by listed companies across the 18 climate change themes, and thus provides a snapshot of existing business opportunities. The green components of the stimulus packages, by contrast, indicate where government policy is driving the future evolution in the climate economy. Significant differences between the two include:

- ▶ *Low-carbon power*: there is a larger proportion of renewables in the Index, and considerably more nuclear, than in the stimulus plans.

- ▶ *Energy efficiency*: there is significantly less emphasis on transport efficiency in the Index, largely due to the major allocation to rail in China’s revival plan.
- ▶ *Water and waste*: there is less emphasis on water and waste in the Index than in the stimulus plans.



Another way of evaluating the recovery plans is to rank their potential for driving a low carbon recovery. The Grantham Institute at the London School of Economics has published a rating methodology of the “green stimulus potential” of different options. The LSE team has selected five criteria: timeliness, long-term social returns, positive lock-in effects, job-creation potential, focus on economic slack and the extent to which spending is temporary. We have compared allocations to date with this methodology, with some revealing findings:

- ▶ *Rail*, which is the largest share of the stimulus, is rated relatively poorly in terms of “green stimulus” potential.
- ▶ *Building efficiency*, which is rated as top in terms of “green stimulus” potential, is third in terms of the amounts spent on low-carbon options to date, and fourth if water infrastructure is included.

<sup>41</sup> EC, *Towards a comprehensive climate change agreement*, Commission Working Paper, January 2009

**Effectiveness of green stimulus (1 = worst; 3 = best)**

Green stimulus areas	Investment approach	Stimulus fund* (USDbn)	Timeliness ("shovel-ready")	Long-term social return	Positive lock-in effects	Domestic multiplier/job creation	Targeting areas with slack	Time-limited/reversibility	Rank
Buildings efficiency	Mixed public / private	66.8	3	3	2	3	3	3	1
Renewables	Private	38.0	2	3	2	2	2	2	2
Low-carbon vehicles	Private with incentives	15.9	2	3	3	2	2	2	3
Rail	Mixed public / private	121.8	1	3	3	2	2	2	4
Other low carbon	Mixed public / private	20.1	2	3	3	3	1	2	5
Grid/smart metering	Public with clawback tariffs	91.7	2	3	3	2	1	2	6

\*Under the Green Stimulus we have analysed for 20 countries  
Source: An outline of the case for Green Stimulus, Feb 2009; HSBC

- ▶ Renewables, ranked second in terms of “green stimulus” potential, lags in the current recovery plans.

Interestingly, the green priorities of new US ARRA score well against this rating methodology, with building efficiency first, followed by renewables.

The initial findings from this analysis indicate where governments could focus their attention in any subsequent stimulus updates.

## Low-carbon power

### Renewables

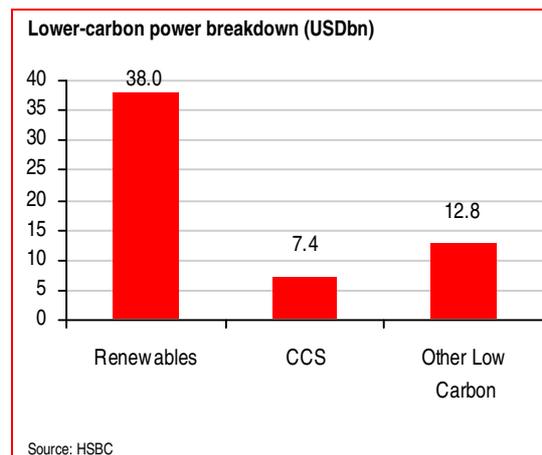
Only three countries, namely France, South Korea and the USA, along with the European Union targeted renewable energy – to the tune of USD36bn, or 8% of the total green package. Of this, the US accounts for USD32bn, comprising USD10bn in last October’s EESA and USD22bn in the ARRA.

### CCS and others

CCS pilot and demonstration plants have been assigned USD7.4bn, a major boost towards commercialisation. Again, the USA contributes the largest share, spending USD3.4bn on R&D and also giving a credit of USD10/tCO<sub>2</sub> that is captured.

The EU recovery plan provides EUR1.25bn (USD1.62bn) for five countries to support projects on 11 coal fired plants. Even with this subsidy, there will be still an “economic gap” to make CCS projects viable.

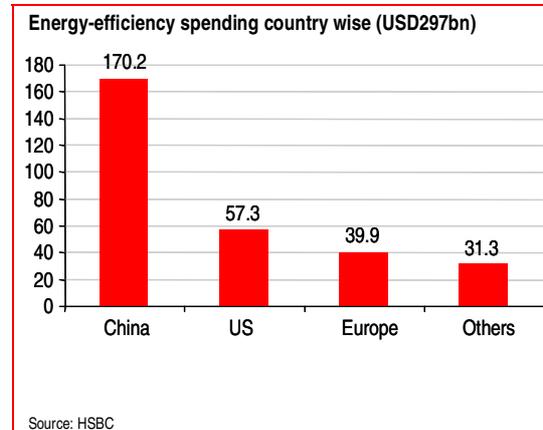
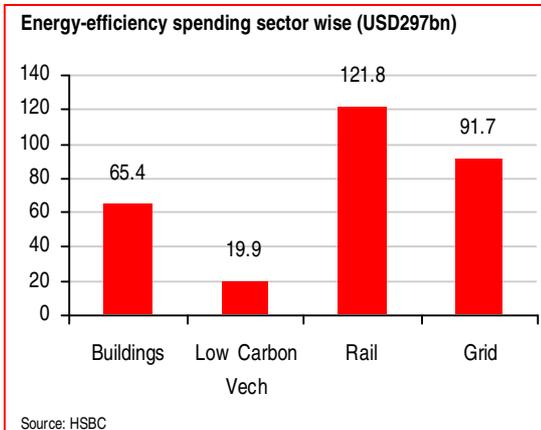
In terms of nuclear power, Canada is the only country to date to provide support for nuclear power under its stimulus package.



## Energy efficiency

The energy-efficiency portion of the stimulus packages has plenty of interesting elements covering a wide range of energy-efficiency measures like improving building efficiency, promoting low-carbon vehicles, modal shift and advanced grid development with smart meters.

The bulk of the energy-efficiency spending goes towards infrastructure development on modal shift, towards high-speed rail, as well as grid network development. Grid infrastructure development includes funds to upgrade electricity metering, which will enable users to better control energy costs, and the construction of high-voltage transmission lines to allow for greater renewable energy penetration.



The stimulus packages also provide cUSD65bn in home energy-efficiency improvement projects, ranging from tax incentives to spending support. The measures include improving insulation, new windows and installing energy-efficient lights in residential dwellings and retrofits in public buildings. The package will help to make a reality of the growing spread of voluntary and mandatory green building norms. Estimates in the USA suggest that every dollar spent on building efficiency yields USD3 in electricity savings.

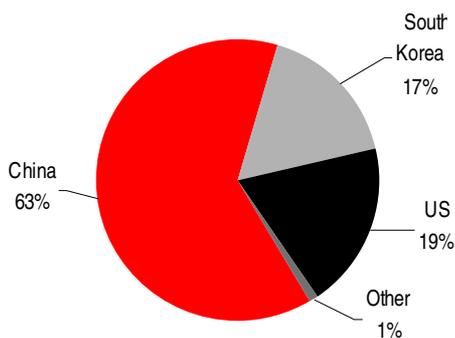
A significant portion is also accounted for by spend on the development of low-carbon vehicles like hybrid cars or low-carbon emitting fossil fuel vehicles. The fund is mostly spend on R&D for the development of low-weight batteries and plug-in hybrids and as well as “cash for clunker” schemes, giving tax credits or rebates on the purchase of new, low-emitting vehicles. France sets a limit of 160gCO<sub>2</sub>/km on new vehicles while Germany specifies that only cars more than nine years old can qualify. This is one of the areas where the environmental benefits of the stimulus spending could be weakest unless strict standards are introduced to favour the next generation of high-efficiency vehicles.

## Water, waste and pollution control

Our estimates suggest that, so far, USD81.6bn has been committed for the water, waste and pollution control sectors. We have included here the USD50bn that is assigned to general environmental improvement in China, which may well be reassigned to other themes as implementation progresses. China's allocations towards housing and rural infrastructure (USD94bn) may also have significant investments towards water projects. South Korea and the USA are the other major contributors and account for 19% and 17% of the stimulus, respectively.

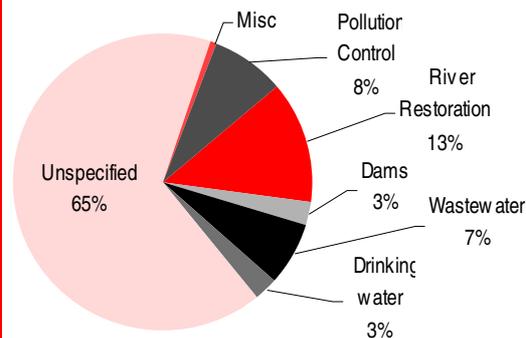
From a climate change perspective, it will be important that these investments promote water conservation, protect natural watersheds and prepare water infrastructure for the impacts of global warming in terms of disrupted precipitation, extreme events and sea-level rises. Expenditure explicitly for pollution control is mainly assigned to defence-related environmental projects in the USA.

Water investments by country (USD80bn)



Source: HSBC

Waste and waste spending by sub-theme (USD80bn)



Source: HSBC

A climate of recovery? The green dimension to economic stimulus plans

Country	Package	Announcement Date	Fund USDbn	Fund USDbn	Status	Period Years	Green Fund USDbn	% Green Fund	Low-Carbon Power		Energy Efficiency (EE)			Water/Waste	
									Renewable	CCS/Other	Building	EE	Lo C Vech+		Rail
<b>Asia Pacific</b>															
Australia	Nation Building and Jobs Plan	3-Feb-09	AUD42bn	26.7	Passed	2009-12	2.5	9.3%	-	-	2.48	-	-	-	-
China	NDRC Stimulus Package	9-Nov-08	RMB4,010bn	586.1	Passed	2009-10	221.3	37.8%	-	-	-	1.50	98.65	70.00	51.15
India	Stimulus Package	7-Dec-08	INR675bn	13.7	Passed	2009	0.0	0.0%	-	-	-	-	-	-	-
Japan	Package to Safeguard People's Daily Lives	19-Dec-08	JPY43trn	485.9	Passed	2009 onwards	12.4	2.6%	-	-	12.43	-	-	-	-
South Korea	Green New Deal	6-Jan-09	USD38.1bn	38.1	Passed	2009-12	30.7	80.5%	1.80	-	6.19	1.80	7.01	-	13.89
Thailand	Stimulus Package	13-Jan-09	THB115bn	3.3	Passed	2009	0.0	0.0%	-	-	-	-	-	-	-
<i>Sub-total Asia Pacific</i>				<i>1,153.8</i>			<i>266.9</i>	<i>23.1%</i>	<i>1.8</i>	<i>0.0</i>	<i>21.1</i>	<i>3.3</i>	<i>105.7</i>	<i>70.0</i>	<i>65.0</i>
<b>Europe</b>															
European Union	Economic Recovery Plan-Only EU	26-Nov-08	EUR200bn*	38.8	Passed	2009-10	22.8	58.7%	0.65	12.49	2.85	1.94	-	4.85	-
Germany	Stimulus Plan	5-Nov-08	EUR81bn	104.8	Passed	2009-10	13.8	13.2%	-	-	10.39	0.69	2.75	-	-
France	Revival Plan	10-Dec-08	EUR26bn	33.7	Passed	2009-10	7.1	21.2%	0.87	-	0.83	-	1.31	4.13	-
Italy	Emergency Package	28-Nov-08	EUR80bn	103.5	Passed	2009 onwards	1.3	1.3%	-	-	-	-	1.32	-	-
Spain	Stimulus Package	27-Nov-08	EUR11bn	14.2	Passed	2009	0.8	5.8%	-	-	-	-	-	-	0.83
United Kingdom	Green Stimulus with Loan for cars	Nov-08	GBP22.1bn	30.4	Pending	2009-12	2.1	6.9%	-	-	0.29	1.38	0.41	-	0.03
Other EU States	Stimulus Package	Jan-09	EUR238.5bn	308.7	Passed	2009	6.2	2.0%	1.9	-	0.4	3.9	-	-	-
<i>Sub-total Europe</i>				<i>325.5</i>			<i>54.2</i>	<i>16.7%</i>	<i>3.5</i>	<i>12.5</i>	<i>14.7</i>	<i>7.9</i>	<i>5.8</i>	<i>9.0</i>	<i>0.9</i>
<b>Americas</b>															
Canada	Economic Action Plan	27-Jan-09	CAD40bn	31.8	Pending	2009-13	2.6	8.3%	-	1.08	0.24	-	0.39	0.79	0.13
Chile	Anti-Crisis Stimulus Package	5-Jan-09	USD4bn	4.0	Pending	2009	0.0	0.0%	-	-	-	-	-	-	-
United States	Emergency Economic Stabilization Act	3-Oct-08	USD185bn**	185.0	Passed	10 Years	18.2	9.8%	10.25	2.60	3.34	0.76	0.33	0.92	-
	American Recovery and Reinvestment Plan	15-Jan-09	USD789bn	787.0	Passed	10 Years	94.1	12.0%	22.53	3.95	27.40	4.00	9.59	11.00	15.58
<i>Sub-total Americas</i>				<i>1,007.8</i>			<i>114.9</i>	<i>11.4%</i>	<i>32.8</i>	<i>7.6</i>	<i>31.0</i>	<i>4.8</i>	<i>10.3</i>	<i>12.7</i>	<i>15.7</i>
<b>Total</b>				<b>2,796</b>			<b>436</b>	<b>15.6%</b>	<b>38.0</b>	<b>20.1</b>	<b>66.8</b>	<b>15.9</b>	<b>121.8</b>	<b>91.7</b>	<b>81.6</b>

(\*Only EUR30bn from direct EU contribution considered for calculation as the rest (EUR170bn) is contributed by member states; \*\*USD700bn under TARP not considered for calculation as the fund is mainly for bank bailouts not for fiscal stimulus) + Low-carbon vehicles  
Source: HSBC estimates

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