



European Perspectives on the Challenges of Financing Low Carbon Investment: Germany

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1. Background

Germany is a Federal country, consisting of 16 states (Länder). It has a highly skilled labour force and is a leading exporter of machinery, vehicles, chemicals and household equipment. Strong regional identities, decentralised policy-making and banking systems have created a vibrant decentralised economy. Germany is famous for its 'Mittelstand', the small and medium-sized enterprises (SMEs) that are strong drivers of innovation and growth.

Germany was a founding member of the European Community in 1957 and has remained a politically dominant force ever since. Reunification of the German nation in 1990 made it the most populous Member State in the European Union (EU). While this process saw an estimated €1.3 trillion to flow from the West to rebuild the East¹, Germany has remained the EU's economic powerhouse. It has the fourth highest GDP in the world after the USA, China and Japan² and an above average GDP per capita at €28,367 in 2010 (125 percent of the EU average)³.

By 2008, Germany had already achieved a 22.2 percent reduction in greenhouse gas (GHG) emissions, exceeding its UNFCCC emission reduction target of 21.0 percent by 2012. This is largely attributable to more efficient thermal power and heating plants, a rising share of nuclear generation, and economic restructuring of new Länder following reunification, which has offset emissions increases resulting from manufacturing – particularly iron and steel.

In 2010 the German Government launched a new energy policy 'masterplan' – Energiekonzept⁴ – which includes a challenging new domestic target of a 40 percent GHG

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¹ IWH research institute cited by Reuters, 7 November 2009:

<http://www.reuters.com/article/2009/11/07/us-germany-wall-idUSTRE5A613B20091107>

² As measured by GDP. World Economic Outlook database, IMF, downloaded 26 October 2010

³ E3G analysis of World Economic Outlook Database, International Monetary Fund, April 2011

⁴ Energiekonzept (Energy Concept), 28 September 2010, Federal Ministry of Economics and Technology, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

reduction by 2020. In addition, it set out a national development path that would require a 55 percent reduction by 2030, and 70 percent by 2040 in order to achieve the EU goal of an 80 per cent to 95 percent reduction by 2050. Although Germany's domestic target is already higher than other Member States, its position on the EU moving to a 30 percent 2020 target is not clear.

Energy use per capita is 16 percent higher than the EU average⁵; similarly final electricity consumption is 14 percent higher than the EU average⁶. Germany's energy intensity is 90 percent of the European average⁷, and emissions per capita are the 9th largest in the EU at 11.65 tCO₂e⁸.

Germany had the third largest installed renewables capacity in the world in 2010 at 48.86 GW behind China (103.36 GW) and the USA (57.99 GW)⁹ and is a world leader in solar photovoltaic (PV) deployment¹⁰. It has the third largest wind power capacity – with 27 GW installed by the end of 2010, representing 14 percent of the world market¹¹. Somewhat surprisingly therefore, in 2008, renewables contributed only 8.9 percent of gross final energy consumption, below the EU average of 10.3 percent¹². However, preliminary estimates from the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) show that this had risen to 11 percent in 2010¹³. BMU estimates that the share of renewables in electricity generation rose to 17 percent in 2010 (from only 8.2 percent in 2007¹⁴), with solar power almost doubling its contribution to 2 percent of total electricity demand¹⁵. Indeed, initial estimates put the amount of solar PV installed in 2010 at 7–8 GW, taking installed capacity to 16–17 GW¹⁶. Offshore wind is also beginning to expand in Germany with capacity increasing from 82 MW in June 2010 to 157 MW by year end. Renewables also contributed 10 percent of final energy consumption for heat¹⁷. These achievements are all the more remarkable given that overall energy consumption rose due to cold weather and economic recovery.

⁵ German energy use per capita is 4.18 toe compared to an EU average of 3.62 toe

⁶ German final electricity consumption is 6,392 kWh per capita compared to an EU average of 5,738 kWh. From Energy, transport and environment indicators, Eurostat, 2010 edition, February 2011

⁷ The German average is 151 kgoe/1 000 EUR'00 compared to an EU average of 167 kgoe/1 000. From: Energy, transport and environment indicators, Eurostat, 2010 edition, February 2011

⁸ United Nations Statistical Division:

http://unstats.un.org/unsd/environment/air_greenhouse_emissions.htm, 2 March 2011

⁹ The Pew Charitable Trusts (2011) Who's Winning the Clean Energy Race? 2010 Edition

¹⁰ REN21 (2011) Renewables 2010 Global Status Report

¹¹ Global Wind Energy Council

http://www.gwec.net/fileadmin/images/Europe/2top10_cum_cap_dec2010.jpg

¹² Energy, transport and environment indicators, Eurostat, 2010 edition, February 2011

¹³ BMU Press release 16 March 2011:

http://www.bmu.de/english/current_press_releases/pm/47124.php

¹⁴ Energy, transport and environment indicators, Eurostat, 2010 edition, February 2011

¹⁵ BMU Press release 16 March 2011,

http://www.bmu.de/english/current_press_releases/pm/47124.php

¹⁶ Renewable energy country attractiveness indices, Ernst & Young, February 2011, Issue 28

¹⁷ BMU Press release 16 March 2011,

http://www.bmu.de/english/current_press_releases/pm/47124.php

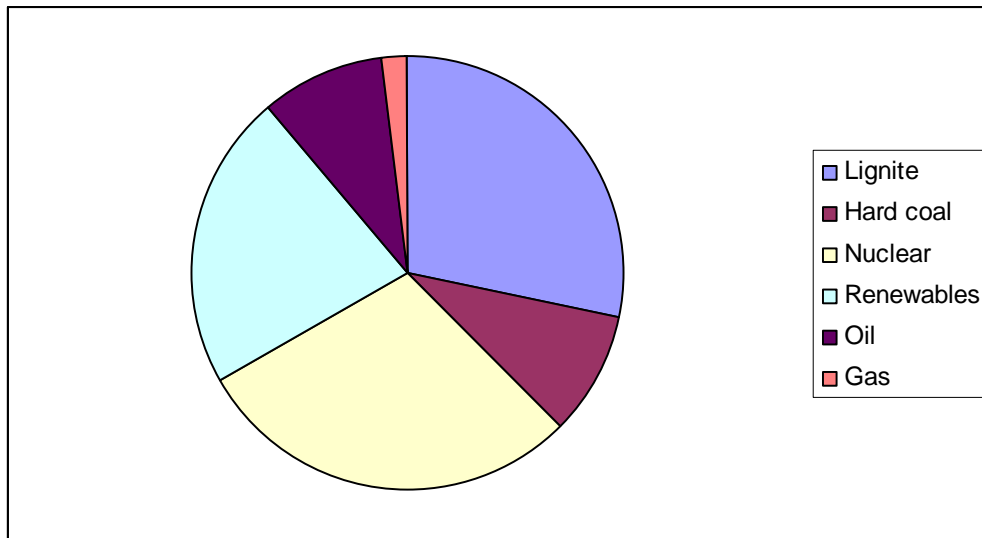
Under the *Energiekonzept*, the Government is aiming to continue this strong growth with targets for renewables to contribute 18 percent of gross final energy consumption in 2020; 30 percent by 2030; 45 percent by 2040; and 60 percent by 2050. Similarly, the target is for electricity from renewables to reach 35 percent of gross electricity consumption in 2020; 50 percent by 2030; 65 percent by 2040; and 80 percent by 2050. This picture has, however, become somewhat complicated by the announcement in June 2011 of plans for phasing out nuclear power. Nuclear phase out had been under discussion for several years, but final decisions were accelerated in the wake of the Fukushima nuclear disaster in Japan. The new plan foresees all of Germany's nuclear plants going offline by 2021, with one possible exception. If the transition to renewable energy does not go as quickly as planned, three of the plants will be allowed to continue operating until 2022, as a safety buffer against electricity shortfalls. The proposals effectively reverse the Government's previous decision, taken in 2010, to extend the operating lives of Germany's 17 nuclear power plants. This too was a reversal of the decision made by former Chancellor Gerhard Schröder's Social Democratic-Green administration to phase out nuclear power by around 2020¹⁸. The implications of these announcements are unclear – the *Energiekonzept* has been rechristened by some the 'Energiewende' (Energy U-turn). An even stronger focus on renewables (wind and solar energy) as well as energy efficiency deployment (a 10 percent cut in power use by 2020) is expected to fill the gap left by nuclear phase out, but the current Chancellor Angela Merkel has also said that there will be a role for new fossil fuel plant build¹⁹.

For the time-being primary energy production is however still heavily reliant on fossil fuels, despite the strong growth in renewables. In 2008, 37 percent came from coal (28 percent lignite, 9 percent hard coal); 29 percent nuclear; 22 percent renewables; 9 percent oil; and 2 percent gas (see Figure 1).

¹⁸ <http://www.spiegel.de/international/germany/0,1518,765594,00.html>

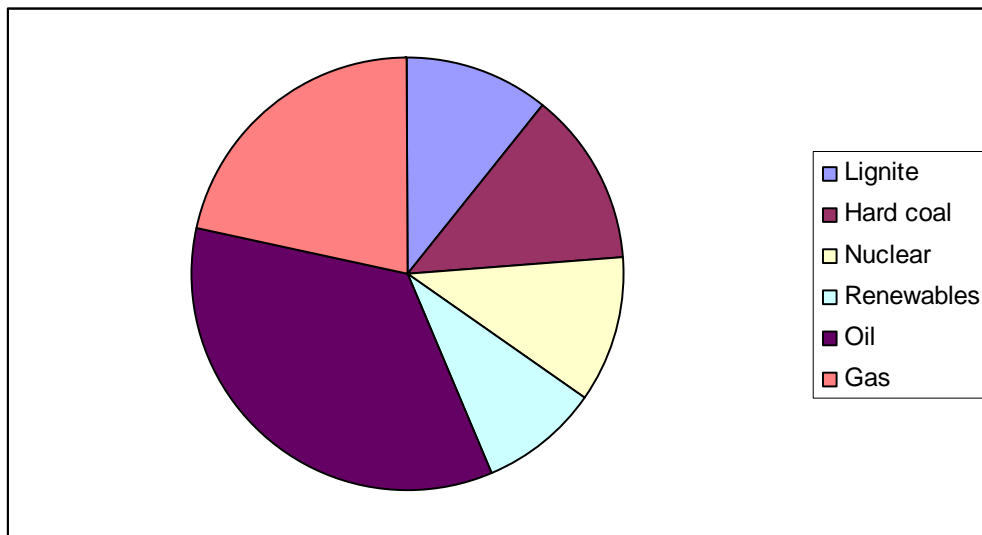
¹⁹ "Germany needs to build twice the number of new fossil-fuel power plants than the government previously had earmarked in order to secure energy security while exiting nuclear power, Chancellor Angela Merkel said Thursday, while sticking to ambitious emission-reduction goals." <http://online.wsj.com/article/SB10001424052702304259304576375154034042070.html>

Figure 1. Primary energy production in 2008.



Of gross inland consumption: 35 percent came from oil; 24 percent coal (13 percent hard coal, 11 percent lignite); 22 percent gas; 11 percent nuclear; and 9 percent renewables (see Figure 2).

Figure 2. Gross inland energy consumption in 2008.



Energy dependency was 60.9 percent in 2008 and had remained relatively constant over the previous 10 years, above the EU average of 54.8 percent. Oil dependency fell over this period from 99.1 percent to 95.5 percent, but this was offset by rising dependency on gas imports from 77.1 percent to 84.5 percent.

2. Financial overview

Ernst & Young currently ranks Germany as the top most attractive country in the EU for investment. According to a recent report by The Pew Charitable Trusts, clean energy investments in Germany increased by 100 percent in 2010 to \$41.2 billion (€29.1 billion) and as a result Germany overtook the USA to secure second place among the G20 countries for renewable energy deployment²⁰. It is the global leader in investment intensity (clean energy investment per \$GDP): at 1.4 percent it invests almost double that of Italy (which is in second place – at 0.79 percent). The recent boom in solar investment is a key factor in Germany's dominant position: Germany accounts for 45 percent of total G20 investment in the solar sector and is one of the largest solar panel producers in the world. This trend seems likely to continue – the German Government has estimated that around €20 billion of investment is needed per year to 2050 to meet the targets set out in the Energiekonzept²¹. Various channels are used by the Government to deploy public money to catalyse the private investment required to meet these targets.

Federal Government support

The Federal Government has ensured generous support for renewables investment in recent years. Alongside a supportive regulatory framework encompassing tax incentives, changes to planning and new standards, a system of feed-in-tariffs (FiTs) has been the primary driver of growth. FiT values decline over time so that the highest payments are received in the earliest days of the contract. This supports investment as it matches the debt profile which is highest in the early years after the up-front capital costs of construction and then reduces over time as lower variable maintenance costs predominate. FiTs currently cover wind (on and offshore); solar (PV and concentrated solar power (CSP)), biomass and geothermal technologies.

Delivery of renewables at scale has helped drive down technology costs to a point that renewable electricity is moving closer to grid parity; however it has simultaneously driven up the overall cost of FiTs which are borne by the customer through a charge on energy bills. As a consequence, the Federal Government attempted to bring costs down by increasing the rate of regression but the unprecedented record implementation levels of 2010 more than offset this. For 2011, the Government has proposed a new lower FiT system whereby rates will vary from July onwards depending on forecasts of installed capacity. Forecasts will be based on actual installations between March and May. Tariffs will then be reduced on a sliding scale up to 15 percent if >7.5 GW are forecast. For every GW forecast less than 7.5 GW, tariff reductions will be 3 percent less than the 15 percent. However, if <2.5 GW are installed the FiT will increase. Any decrease in tariff will be deducted from later reductions

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²⁰ The Pew Charitable Trusts (2011) Who's Winning the Clean Energy Race? 2010 Edition

²¹ Energiekonzept

<http://translate.google.co.uk/translate?hl=en&sl=de&u=http://www.bmwi.de/BMWi/Navigation/Service/publikationen,did%3D360808.html&ei=EIODTvbHHsa1hAfvyZ3mDQ&sa=X&oi=translate&ct=result&resnum=1&ved=0CDEQ7gEwAA&prev=/search%3Fq%3Denergiekonzept%26hl%3Den%26biw%3D1259%26bih%3D568%26prmd%3Divns>

planned in January 2012. The changes will not be introduced retroactively and existing contracts will be honoured through grandfathering²².

With the launch of Energiekonzept, the Government announced that a new Energy and Climate Fund would be established to provide ongoing support for its ambitious proposals. It will receive funding from a number of sources including charges on power plant operators; future EU emissions trading scheme (EU ETS) auction revenues, as well as allocations from the Federal Budget. This fund will combine with existing support such as the 'KfW Efficiency House' (CO₂ Building Rehabilitation Programme – discussed later), run by KfW, which was set up by the Federal Ministry of Transport, Building and Urban Development and has been providing low cost loans and subsidies for energy efficient household renovation worth over €31 billion since 2001²³. Conversely, subsidies for domestic hard coal will end no later than 31 December 2018²⁴.

The exact operation of the Fund is still being defined but on 6 June 2011 amendments were adopted to the Energy and Climate Fund legislation to ensure sustainable public financing for energy and climate measures. All revenues from auctions of EU ETS allowances will flow into the Fund – starting as early as 2012. A key focus of the Fund will be the target to increase the rate of building renovation to 2 percent a year to 2050 and a special energy efficiency sub-fund operated by the Federal Ministry of Economics and Technology (BMWi); BMU will be set up to support efficiency in households, SMEs, industry and local authorities, providing grants for technical assistance in putting together energy efficiency investments as well as low interest loans²⁵. The Fund will also support replacement of nuclear by new sources of power, primarily renewables. However, there will be a shortfall in the amount of capital flowing into the Fund: it was due to receive a substantial proportion of its funds from nuclear power operators but this revenue stream will be suspended along with the suspension of nuclear power.

Grid expansion is seen to be a high priority currently – in particular upgrading of existing grid networks, including a high voltage north-south transmission network to connect northern wind farms to demand in the south and interconnectors to the wider European grid. A fully upgraded, flexible grid that can balance intermittent renewables and support integration of electric vehicles is a prerequisite to meet the Government's ambitions, which include an aim to have 1 million electric vehicles (EVs) on the road by 2020, and a further 5 million by 2030²⁶. A recent study estimated that €9.7 billion of high voltage lines were needed to

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²² Ernst & Young (February 2011) Renewable energy country attractiveness indices. Issue 28

²³ This programme was renewed in March 2011 and now offers a choice of subsidised loans or a grant of 5 percent. This programme provides support for individual measures e.g. insulation, provided they achieve energy savings and sits alongside whole house renovation programmes.
http://www.kfw.de/kfw/en/kfw_Group/Press/PressArchiv/2011/20110104_48023.jsp

²⁴ Council Regulation (EC) No 1407/2002 of 23 July 2002 on State aid to the coal industry as amended (OJ L 205, 2.8.2002) as amended by Council decision 16229/1/10

²⁵ In addition, the Finance Ministry has drafted a bill that provides tax breaks for energy efficiency retrofits in residential buildings

²⁶ German Information Centre (16 May 2011) http://www.german-info.com/press_shownews.php?pid=3628

support future renewables development²⁷. The Federal Government is currently investigating how to amend the regulatory framework to ensure that the four companies that manage the transmission grid will receive sufficient investment return to justify investing in this expansion. It is also developing legislation that will accelerate the construction of grid infrastructure by limiting the options for legal challenge against build out²⁸.

In order to ensure that Germany remains at the forefront of renewables development, the Government is also establishing an Energy Research Programme. Lasting until 2020, it will include funding for research into renewables, energy efficiency and grid technologies as well as support for German companies taking part in the European R&D-based Strategic Energy Technology (SET) Plan.

EU funding

As the economic powerhouse of the EU, Germany is a net contributor to the EU budget. In line with all countries in the EU, it does receive a share of Cohesion Funds and has been allocated €26.4 billion for the period 2007–2013. Germany has translated this into 36 strategic priority programmes, including 18 regional programmes and 23 European Cooperation programmes. The main priorities include €3.7 billion for SMEs and €8 billion for education. €4.3 billion has been prioritised for the environment and climate change with the majority (€3 billion) going to environmentally friendly transport infrastructure. Renewables and energy efficiency are allocated only €480 million, as the main source of support derives from domestic programmes²⁹.

Public banks

Germany has a complex and intertwined banking system, which is at least partially due to a post-war aversion to autocracy, which led to the establishment of banks with a distributed basis of control. Germany – unlike countries such as the UK and France – is a Federal State with strong regional cultures and identities. Banking has historically been strong at a regional level, and given public support by local authorities and guarantees. However, in recent years these structures have undergone change.

The most numerous banks are the Sparkassen (savings banks). Established in the late 18th century, today there are over 400. Germany also had a unique group of regional state-owned banks known as the Landesbanken, which were established in the 19th century, and acted as de facto central banks for the savings banks in each German Land³⁰. The Landesbanken provided a wide range of wholesale and retail products and services,

²⁷ Study by the German Energy Agency (DENA) cited in Ernst & Young ibid

²⁸ Gesetz zur Beschleunigung des Ausbaus der Höchstspannungsnetze (21 August 2009)

²⁹ European Cohesion Policy in Germany, European Union

³⁰ <http://www.economist.com/node/11376661>

including finance for renewables. However, Government guarantees gave the Landesbanken an advantage over commercial banks because they could borrow at lower cost. As a result the commercial banks complained to the EU. This triggered the development of a set of agreements with the European Commission called Understanding on Anstaltslast and Gewährträgerhaftung ('Verständigung').

Verständigung I (agreed in July 2001) set terms for the phasing out of state guarantees for Landesbanken und Sparkassen (for both institutional and guarantor liabilities) by 2005³¹. In response to this some German states set up separate 'promotional' (development) banks ('Förderbanken'), which operate under the Verständigung II agreement³². The 2002 Verständigung II applied to all of Germany's promotional banks, both the state level Förderbanken – but also the federal promotional banks KfW Bankengruppe and Landwirtschaftliche Rentenbank³³. It set out terms under which these promotional banks could retain their state guarantees and continue their publicly mandated activities.

The remaining 'commercial Landesbanken' have found it difficult to operate in this new environment, having lost the guarantee that allowed them to raise finance cheaply, and also the removal of much of the service provision to the Sparkassen. The loss of savings deposits has forced them to raise money on the capital markets and, while many of the Landesbanken have been very active in the field of project finance for renewables (they make up four of the five top German lenders to date³⁴), many poor quality investments have also been made, for example in the foreign sub-prime market. As a consequence, many – including West LB and Bayern LB – faced severe difficulties as a result of the global financial crisis and had to be bailed out by the German Government. While the Landesbanken are acknowledged to be the weakest part of the German banking system, the Federal Government has limited power to reform them. The impact of the financial crisis and recent bail-outs, together with the impact of the new Basel III requirements, may provide it with an opportunity to force consolidation and restructuring as the banks continue to experience difficulties³⁵. The future is very uncertain.

A positive outcome of this process, however, is that most German states now have their own promotional banks, which work closely with the federal promotional bank KfW to onlend capital. Often this is done through 'Common Programmes'.

Collectively Germany's promotional banks have a public mandate to promote the economy and to assist the Government and municipalities in social and environmental projects. They

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<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/02/343&format=HTML&aged=1&language=EN&guiLanguage=en>

³² These were set up either as separate legal entities or as legally dependent but operationally independent units within the Landesbanken

³³ Landwirtschaftliche Rentenbank, because it focuses on agriculture, is not further discussed here

³⁴ To date HSH Nordbank has been the biggest lender in Germany, financing 136 projects valued at €11.3 billion; followed by UniCredit Bank (57 projects valued at €6.7 billion); WestLB (62 projects valued at €6.1 billion); Norddeutsche Landesbank Girozentrale (88 projects valued at €5.5 billion); and Bayerische Landesbank (50 projects valued at €3.7 billion). Data from Bloomberg New Energy Finance

³⁵ <http://www.ft.com/cms/s/0/a3158900-c026-11df-b77d-00144feab49a.html>

are an important part of the German banking system and account for 10 percent of total banking system assets at end-2010. While the state guarantee gives them a substantial funding advantage over commercial banks, the banks lend at subsidised rates and so revenue margins are thin³⁶.

Germany's two large federally mandated promotional banks are KfW Bankengruppe (with a balance sheet of ~€442 billion) and the smaller Landwirtschaftliche Rentenbank (with €78 billion) at the end of 2010. Germany has a further 18 promotional banks with assets worth €359 billion at the end of 2009 – they are largely active within their local states. The largest German state promotional bank is NRW.Bank, which had €157 billion of assets at end-2010; the second largest is L-Bank (€61 billion). The larger banks tend to operate by providing finance to commercial banks at subsidised rates to onlend to SMEs and sectors that the Federal Government wants to develop as well as social projects. Their role includes lending to the corporate sector in time of structural or cyclical challenges. Smaller banks tend to lend directly to customers³⁷.

The Verständigung agreements set out the sectors in which promotional banks can lend. These include: SMEs; housing and urban development; municipal and infrastructure finance; environmental protection; technology and innovation; and private individuals for the purposes of securing housing and education. This focus reflects a requirement to operate only where the private sector is not active or costs are prohibitively high. A large proportion of KfW's lending is for investment in developing countries, export and project finance; the smaller banks are predominantly active in the domestic economy. Almost half the €60 billion of subsidised loans and grants provided in 2009 by the development banks were related to the promotion of SMEs, followed by social housing³⁸.

Kreditanstalt für Wiederaufbau (KfW)

Overview of structure – The most powerful public bank arising from this background is the promotional bank Kreditanstalt für Wiederaufbau (KfW), which is 80 percent owned by the Federal Government and 20 percent by the Länder (German states) and is one of the largest financial institutions in Germany. It is also Europe's largest publicly-owned bank with a balance sheet even larger than the European Investment Bank (EIB). In 2010 Global Finance Magazine has ranked KfW Bankengruppe as the safest bank in the world³⁹. KfW is by far the strongest national public bank in the EU and the Government is heavily reliant on it for the implementation of infrastructure-related investment, including low carbon infrastructure.

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³⁶ Fitch (25 May 2011) German Development Banks: New challenges. Because of the low margins, earnings are often bolstered by income from securities investments, money market operations etc

³⁷ Fitch (25 May 2011) German Development Banks: New challenges

³⁸ Fitch (25 May 2011) German Development Banks: New challenges

³⁹ <http://www.gfmag.com/latest/features/10676-worlds-safest-banks-2010.html>

KfW was established in 1948⁴⁰ by the KfW Law of November 5, which has since been revised several times⁴¹. It began with equity of 1 million Deutschmarks and funds from the Marshall Plan with a mission to reconstruct Germany following the World War II. It focused initially on providing low-interest loans to rebuild the energy supply but soon focused on rebuilding the decimated housing sector (up to 90 percent of apartments were destroyed during the war.) By 1950, 12 percent of financing was for new homes. Housing rose to a similar level of importance again following reunification. From 1990–1997, 3.2 million (nearly half) the apartments from the former German Democratic Republic (East Germany) were modernised under the Home Construction and Modernisation Programme. At the same time, KfW focused on providing support to new SMEs in the east of the country. Now, 99 percent of all enterprises in eastern Germany are SMEs. The focus on SMEs continues today and the German Mittelstand is the key driver of innovation and growth.

Export finance was another key focus of KfW that began in the 1950s with reliable low interest loans for the export of industrial plant and equipment. In 2008, this activity together with other cross-border investment was transferred to a legally independent subsidiary KfW IPEX-Bank under an agreement with the European Commission. This was because IPEX was seen to be competing with private banks and contravening State Aid rules (see later). KfW began financing overseas development in the 1960s focusing on major infrastructure projects. More recently there has been an increasing emphasis on the provision of microfinance to help build livelihoods.

An environmental focus began after reunification when significant funds were provided by KfW to reverse the environmental damage from chemical and lignite mining in the east of the country. National and international environment and climate protection have both increased in importance – and now account for around 30 percent of KfW’s financing volume.

The Law on KfW mandates it to perform ‘promotional tasks’ especially relating to finance in support of policies or regulations assigned to it by the Federal Government or those from any of the Länder. Areas covered include SMEs, the liberal professions and business start-ups, risk capital, housing, environmental protection, infrastructure, technical progress and innovations, internationally agreed promotional programmes and development cooperation. KfW can also grant loans or similar to territorial authorities and special-purpose associations – and is mandated to provide support to the European Community. As such it provides co-financing with institutions such as the EIB, and export finance to the wider European Economic Area. KfW can also finance measures with a purely social/educational purpose⁴².

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⁴⁰ The history in this section is an abridged version of the history provided on the KfW website, see: http://www.kfw.de/EN_Home/KfW_Bankengruppe/Our_history_-_60_years_of_KfW.jsp

⁴¹ For the latest version see: http://www.kfw.de/DE_Home/Service/Download_Center/Die_Bank/KfW-Gesetz_und_Satzung/KfW_Gesetz_E.pdf

⁴² http://www.kfw.de/DE_Home/Service/Download_Center/Die_Bank/KfW-Gesetz_und_Satzung/KfW_Gesetz_E.pdf

In 2010, the majority of domestic financing was to SMEs (€28.5 billion of €64.3 billion). Environment was a major priority with energy efficiency accounting for €10.3 billion and renewables €9.6 billion. The other main priorities were housing, municipal investment and education⁴³.

KfW has around 60 representative offices worldwide. It has no branch network but uses the branches of banks through which it onlends⁴⁴. In 2010, KfW reorganised under three brands:

- > KfW-Privatkundenbank provides services to private individuals. Total promotional volume of €20.0 billion. Products relating to housing construction and modernisation, energy-efficient construction and refurbishment, accessibility to housing and education.
- > KfW-Mittelstandsbank focuses on enterprises and start-ups, especially SMEs. Total promotional volume is €28.5 billion. Products include medium/long-term loans, private equity/mezzanine finance for corporate finance, innovation and environment/climate protection.
- > KfW-Kommunalbank has €6.1 billion of €15.8 billion promotional volume and provides investment loans to public institutions for municipal and social infrastructure, environmental protection, energy efficiency and education. The other €9.7 billion is to towns, districts, municipally owned companies and non-profit organisations. Products include global loans to domestic and European commercial banks and the German state promotional banks.

A wide range of products are offered under the various brands, primarily loans, mezzanine and equity capital and financial consulting services.

KfW also owns 100 percent of its subsidiary KfW IPEX-Bank, which provides around €8.9 billion of commitments to large and medium-sized German and European companies in international markets. Products include medium/long-term loans for export and trade finance, infrastructure including transport, environment/climate protection, foreign investments of German companies and raw materials. IPEX-bank does not enjoy an explicit Government guarantee and has its own rating and rating based re-financing costs.

Finally, Deutsche Entwicklungsgesellschaft (DEG) and KfW-Entwicklungsbank focus on developing and transition countries. KfW Entwicklungsbank promotes reform and provides investment and advice to improve socio-economics, reduce poverty and support peace and climate/environment protection in partnership with national and local Government and state institutions. It is also one of the largest investors in renewable energy. DEG focuses on providing investment and long-term finance to the private sector and accounted for 1.7 percent of KfW's lending in 2008.

KfW is also involved in various European funds including the following:

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⁴³ KfW Annual Report 2010

⁴⁴ Presentation on 'Structure and Mission of KfW Bankengruppe', KfW Bankengruppe, October 2010

- > Marguerite Fund – a pan-European public-private infrastructure fund. KfW was one of the founders, contributing €100 million.
- > European Investment Fund (EIF) – KfW has a 2.3 percent holding⁴⁵.
- > EIB/KfW Carbon Programme II – 2nd tranche of the KfW Carbon Fund which purchases emissions credits under the CDM/JI mechanisms. It is a €100 million fund jointly launched with the EIB.
- > SME fund – EIB and KfW announced a new global climate protection fund tailored to SMEs in 2009.
- > JASPERS (Joint Assistance to Support Projects in European Regions) – a technical support facility for new Member States for large infrastructure schemes receiving finance from Structural and Cohesion Funds, launched by EIB, European Commission, European Bank of Reconstruction and Development and KfW.
- > Neighbourhood Investment Facility (NIF) Trust Fund – opened by the EIB to receive Member States’ bilateral contributions for the funding of very large infrastructure projects to the Union’s East and South. KfW sits on the Board running this fund.
- > European Fund for South-East Europe – which is a KfW initiative with EIB and EU as co-investors. It is the world’s biggest micro-investment fund.
- > Green for Growth Fund – initiated by KfW and EIB, including EU funds to promote energy efficiency and renewable energy in southeastern Europe.

KfW had a balance sheet of €441.8 billion in 2010. Total equity was €15.8 billion giving a leverage (equity/assets) of 1:28. KfW made a loss in 2008 due to its support of IKB Deutsche Industriebank AG, investment losses and derivatives hedging, but returned to a profit of €1.13 billion in 2009, which more than doubled to €2.63 billion in 2010⁴⁶. The Law on KfW states that there is to be no distribution of profits so net profits are allocated to reserves.

KfW raised €76.4 billion from the capital markets in 2010. 57 percent was raised from benchmark programmes (\$ and €), 35 percent from public transactions and 6 percent from private placements⁴⁷. Funds are also provided from the Federal and other public Budgets. The Federal Ministry of Transport, Building and Urban Affairs provided funds for the stimulus package.

Operation and role in the financial crisis – KfW mainly employs an onlending model, rather than making direct investments: i.e. it provides finance to intermediary banks which onlend to customers. This approach means it does not compete directly with commercial banks, but it also enables KfW to pass on risk to those banks, which must assume credit risk for the final customer. However, it will, in exceptional circumstances, make direct investments in support of specific programmes.

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⁴⁵ Presentation on ‘Structure and Mission of KfW Bankengruppe’, KfW Bankengruppe, October 2010

⁴⁶ KfW Annual Report 2010

⁴⁷ KfW Annual Report 2010

During the global financial crisis, KfW was mandated to increase lending under the ‘KfW Special Programme’. Around €52.5 billion was made available – around €40 billion of which was earmarked for commercial investments, with around another €1 billion for industrial environmental protection, €3 billion for infrastructure and €8.5 billion for energy efficient construction and renovation. KfW Mittelstandsbank made around 5,000 loans totalling €13.9 billion available under this Special Programme (including global loans to commercial banks) – 94 percent of which went to SMEs. KfW provided an exemption of risk liability for up to 90 percent for onlending banks. Direct loans were also made as part of a club deals with commercial banks, to a maximum of 50 percent of the deal value. The German Federal Government provided a full guarantee for these assumed credit risks.

KfW (unlike the state promotional banks) is exempt from the German Banking Act and not subject to capital or other regulatory guidelines. The Federal Ministry of Finance in consultation with the Federal Ministry for Economics and Technology is the supervisory authority. A Board of Managing Directors is responsible for day-to-day management overseen by a Board of Supervisory Directors. The Supervisory Board has 37 members including several ministers, seven representatives of the Bundestag; and representatives from the mortgage, savings, cooperative and commercial banks, industry, municipalities, agriculture, housing and other private sector organisations as well as four representatives from the trade unions appointed in consultation with the Federal Government⁴⁸. The Ministers of Finance, and Economics and Technology alternate as Chairman and Deputy Chairman. There is also an Advisory Council for Promotional Measures in Eastern Germany which advises the Board of Supervisory Directors and a Mittelstandsrat (SME Advisory Council) that advises the Executive⁴⁹.

KfW and climate change – KfW is also Germany’s most important promoter of renewables and of energy efficiency with global investments in energy efficiency totalling €11.6 billion and renewable energy totalling €11.4 billion. KfW Mittelstandsbank offers a Renewable Energies Programme with low interest loans for PV, wind, biomass/biogas and so on. A premium programme on behalf of BMU supports renewable heating and offers reduced repayments using Budget funds. Under the new Energiekonzept, offshore wind is a key priority for Germany – with a target of 25GW by 2030, requiring some €75 billion of funding. Due to the technology being relatively untested, KfW will initiate a special Offshore Wind Energy Programme in 2011 with a total credit volume of €5 billion at commercial rates of interest. KfW will make direct investments as part of this offshore wind financing programme, albeit on a ‘club deal’ basis with other banks. It will also offer refinancing facilities for operational plant.

Key programmes of KfW Privatkundenbank include the ‘Energy Efficiency Construction’ and ‘Energy Efficient Rehabilitation’ programmes for which €8.7 billion was made available in 2010. Residential and public buildings that achieve an energy saving standard known as the ‘KfW Efficiency House’ standard may also receive, in addition to a low cost loan, a bonus worth up to 12.5 percent of the loan value on completion. The exact amount depends on the

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⁴⁸ The Law on KfW

⁴⁹ Presentation on ‘Structure and Mission of KfW Bankengruppe’, KfW Bankengruppe, October 2010

level of energy savings achieved. Low interest loans from KfW resulted in energy efficiency improvements in over 1.5 million homes⁵⁰.

KfW Kommunalbank offers the 'Social Investment – Energy-Saving Building Rehabilitation' (for non-profits) and the 'Energy-Efficient Rehabilitation – Municipalities programmes (for local/municipal authorities). As part of the stimulus package, 'Investment Offensive Infrastructure' provided an additional €3 billion to municipalities to invest in infrastructure. Finally, global loans are also provided to 18 promotional institutions, in the Federal States, as well as certain commercial and Landesbanken to support the finance of infrastructure projects, housing, energy efficient refurbishment and SMEs.

European Investment Bank (EIB)

Given the predominance of the promotional public banking network in Germany, and its focus on promoting environmental investment, the EIB has not been heavily involved in providing large-scale finance for energy infrastructure in recent years. Overall, in 2010 the EIB provided loans in Germany worth €7.04 billion. The focus of its lending centred on industry, in particular R&D, climate action and alternative sources of energy, infrastructure, services and education. It promoted grid optimisation and maintenance of network efficiency by lending for a project comprising several thousands of independent, geographically dispersed schemes for reinforcing and modernising electricity transmission and distribution networks over a 3-year investment period (RWE Stromnetze, €496 million). Offshore wind also benefitted. Together with NRW.Bank (the state promotional Bank of North Rhine-Westphalia), at the end of 2010 the EIB provided over 85 percent of a €550.5 million project finance loan for Germany's largest offshore wind farm at Borkum West: 11 banks in total were involved in the consortium. This has been closely followed in early 2011, with a €80 million loan for the construction and operation of a commercial offshore wind farm with Energie Baden-Württemberg AG (EnBW) acting as promoter⁵¹. Urban transport projects (Nahverkehr Hamburg, €160 million; Kombilösung Karlsruhe, €196 million) and modernisation of large-scale social housing projects to improve energy efficiency (Soziale Stadterneuerung Hamburg, €200 million) also benefitted. In 2011 lending is expected to concentrate on energy, public transport, infrastructure and research and development.

Commercial banks

A large number of multinational commercial banks operate in Germany. Two of the most dominant commercial players in the German market are Deutsche Bank and Commerzbank. Deutsche Bank has been involved in renewable energy financing since 1999 and, according to Bloomberg New Energy Finance has made loans worth €3.7 billion to 19 projects to date.

⁵⁰ Stephen Tindale, Centre for European Reform, 12 October 2010
<http://centreforeuropeanreform.blogspot.com/2010/10/eu-should-be-much-bolder-on-energy.html>

⁵¹ The EIB in Germany 2010 and <http://www.eib.org/projects/loans/regions/european-union/de.htm?start=2006&end=2011§or=energy>

It is predominantly focused on wind power and solar (PV and CSP), but also biomass, biogas and small hydro. Deutsche Bank was one of the private banks involved in the consortium with the EIB to provide project finance to the Borkum West offshore wind farm in 2010⁵². Commerzbank has made loans worth around €4 billion to renewables energy projects to 2010: around 60 percent of loans were made to wind energy; 20 percent to solar energy; and the remaining 15 percent spread across bioenergy and water power. In terms of new business, wind energy and solar energy were roughly on a par. The installed capacity of the wind energy projects financed by Commerzbank up to and including 2009 in Germany is more than 5,000 MW or ~20 percent market share. But in 2010 Commerzbank provided €74.2 million in financing to the four turnkey solar parks in Bavaria funded under 'Solarparc Deutschland I' scheme, with an installed capacity totalling ~31 MW⁵³. In addition, Deutsche Bank, Commerzbank and other commercial banks partner with KfW to offer loans for the 'KfW Efficient House' programme.

3. Financial challenges

Germany is a world leader in low carbon investment and the leading country in the EU. This success is driven by a number of key factors. In particular, it has had a long tradition of developing a strong and coherent industrial policy in combination with its leading companies. There are also many interlinks between finance, industry and politicians with many crossovers in terms of representation on key committees and boards. This ensures that policy is well coordinated and often in the interests of industry. For example the EU ETS 'traded sector' heavy industries of steel, aluminium and cement manufacturing exerts a strong political influence. While there is some support in Germany for a move to 30 percent GHG reduction for example, industry representatives are cautious about how this will impact on the parts of the economy already included in the EU ETS. One suggestion is that greater emissions reductions should come from the 'non-traded' housing and transport sectors instead. This is to some extent reflected in a renewed focus on driving greater energy efficiency in the German economy.

Germany is also famous for its strong Mittelstand of SMEs. These have been key recipients of support during the financial crisis and for supportive measures often delivered through the promotional banking sector. As a result, Germany provides strong support for innovation and future growth which help it to remain ahead of EU rivals.

The Government's bold use of KfW to complement its policies, aided by the network of state level promotional banks, is a key factor in German success. It is one of the main channels by which the Government delivers its low carbon investment strategy. KfW provides an effective platform for coordinated and efficient delivery of policies and support measures that are combined with technical expertise and experience gained from the long-term

⁵² Deutsche Bank website <http://www.afl.globalbanking.db.com/en/content/1188.html>

⁵³ Commerzbank (2010) Corporate Social Responsibility Status Report https://www.commerzbank.com/media/konzern/engagement/Commerzbank_CR_Statusbericht_2010_en_pp.pdf

provision of this service. For example, when the Government made a strategic decision to generate more investment in offshore wind – it provided a guarantee to support KfW in the implementation of a €5 billion investment programme. This contrasts heavily for example with the UK Government which has provided only €3 billion in equity for low carbon infrastructure investments through its Green Investment Bank. This benchmark is a key marker that explains why Germany is so far ahead of the UK and other EU Member States in its low carbon investments.

Renewable energy – While Germany has been a European trailblazer for low carbon investment, it is beginning to suffer from the beginnings of a domestic backlash with respect to issues with planning and cost. For example Germany leads the world in solar PV deployment, but whilst PV is now 40 percent of the differential costs of the Renewables Energy Sources Act (EEG), it provides only 9 percent of energy. Increasingly, customers are beginning to question the cost of the FiT because of the additional cost it puts on energy bills. This is a particular issue for Germany, which has a high proportion of energy intensive industry compared other EU Member States. In addition, it tends to be the wealthier members of society that can afford PV – and so some have come to see the FiT as a ‘middle-class subsidy’ paid for in part by the poor. Furthermore, prominent politicians such as Oettinger – the EU Energy Commissioner – and former economics minister, Rainer Brüderle, are promoting wind at the expense of solar, forgetting the roots that this policy had in promoting a German solar industrial base⁵⁴. In a recent interview, Brüderle said “Solar power should be produced in countries with many hours of sunshine, not in countries like ours”, and added that wind energy made sense in a country like Germany with access to the North and Baltic Seas. He was keen to promote offshore wind parks and said the priority was to build the necessary grids⁵⁵.

It is in order to try and offset some of these concerns, that the Government introduced the faster regression rate and proposed revision of the tariff structure outlined previously as a means of controlling the future cost. Germany has a legal principle of ‘the protection of legitimate expectations’, which means that – unlike Spain and the Czech Republic – it cannot introduce the retroactive changes to FiTs that have so damaged investors confidence in those countries.

Despite the reduction in FiT levels, strong growth in PV deployment is likely to continue because the forward regulatory framework is stable and the subsidy is still attractive enough to incentivise investment. However, sales are unlikely to reach 2010 levels, which were

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⁵⁴ One justification for the additional energy cost imposed by the FiTs was the creation of jobs. BMU estimated recently that there were around 370,000 jobs in the renewables sector in 2010 – an 8 per cent increase on the year before. However, the German industrial base is increasingly under threat from Chinese exporters who are beginning to flood the German market with low cost solar panels. One victim has already been Q-Cells, a German company which until recently was the world market leader in solar panels. Chinese competition has been a contributing factor to a fall in its stock market value from €11 billion at the end of 2007 to €390m. From FT (18 January 2011) China and Germany: Reflected glory, Financial Times

⁵⁵ Platts, Berlin, 18 January 2011

<http://www.platts.com/RSSFeedDetailedNews/RSSFeed/ElectricPower/8421696>

driven in part by low cost equipment flooding the German market from Spain⁵⁶. With prices moving closer to grid parity, however, Germany may be the first market where solar technology matures to the extent of not requiring additional tariffs at all, which would herald a great success for the solar industry.

German wind energy is already a leader in Europe and offshore wind is seen as a key priority for development with the €5 billion for KfW to support early development. In order to support integration of 39 percent renewables to 2020 and especially the drive to become a leader in offshore wind, investment of €9.7 billion is needed on high voltage lines and is seen to be the highest priority⁵⁷. This expansion is also needed to support integration with the rest of Europe. However, the push to support early development of wind and expand the grid will put further pressure on utility bills. There are suggestions that offshore wind might benefit from 2x FiT prices to drive early development. Given that oil and gas prices are rising rapidly due to the political uncertainty in Africa and the Middle East, there is a danger of further backlash from consumers and energy intensive users over such additional cost.

Any expansion in wind power will require investment from the large utilities. But the Fukushima nuclear disaster in Japan has seen the share price of leading German energy companies such as E.On and RWE fall on account of their nuclear liabilities and plans for future nuclear expansion. In addition, Germany's power companies are now preparing to take legal action against the Government's decision to shut down their nuclear power plants. They say the new closure plan is too rigid and will prove more costly to them than the previous nuclear phase-out agreed by Schröder's government in 2000⁵⁸. The likelihood of success of such action is unclear – but this instability may create a near term investment hiatus.

Energy efficiency – The Federal Government has been strongly promoting energy efficiency in households since 2001 through the 'KfW Efficiency House' Programme (CO2 Building Rehabilitation Programme). Germany has the most ambitious household energy efficiency programme in the EU – and the 'KfW Efficiency House' model is attracting the attention across EU Member States⁵⁹. It works well for both owner-occupied and for rented properties, which is important because Germany has a high proportion of rental properties. Around 60 percent are rented in part because the rental market is heavily regulated with capped rates, so agreements tend to be longer term. This regulation has incorporated incentives for energy efficiency retrofits: for example landlords are allowed to raise rent by up to 11 percent after energy efficiency retrofits. The Social Democrats have recently started discussing the option for penalties for lack of energy efficiency retrofits – for example decreasing rentals if homes are very energy inefficient.

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⁵⁶ This in turn was due to the Spanish market declining because of the recession and uncertainty over FiT levels

⁵⁷ Renewable energy country attractiveness indices, Ernst & Young, February 2011, Issue 28

⁵⁸ <http://www.spiegel.de/international/business/0,1518,768201,00.html>

⁵⁹ A version of this model has been deployed in Estonia and it is also influencing UK thinking of the Green Deal energy efficiency programme

The Energiekonzept, and draft legislation published in June 2011, has the target of doubling the rate of building renovation to 2 percent a year to 2050, supported by public subsidies of €1.5 billion per year for the period 2012–2015, sourced for the Federal Budget and EU ETS auction revenues. More recently additional drivers have been added and include:

- > Tax exemptions for building retrofits with significant energy savings, worth €1.5 billion/year;
- > A refurbishment schedule aimed at bringing all 18 million buildings to ‘almost zero energy standard’ shall be developed (starting 2020);
- > Calls for a top runner for appliances on EU level;
- > Public procurement of products only with the highest efficiency rating;
- > Consideration of a ‘white certificates’ energy efficiency trading scheme.

Concerns about State Aid – Over the past few years, Germany’s use of public banks such as KfW and the Landesbanken to support the German economy has led the European Commission to clamp down heavily on Germany to ensure that State Aid rules are complied with. Although KfW has been effective in positioning itself as a partner – not a competitor – to private banks, its commercial activities especially in export and project finance did see it compete and led to complaints from the private sector. This resulted in IPEX being spun off as a commercial subsidiary, after the removal of the State guarantee – as happened with the Landesbanken. But while IPEX continues to operate effectively, some of the Landesbanken are in difficulties. WestLB had to be bailed out and the European Commission is heavily monitoring its restructuring plans to ensure State Aid rules are not contravened. Ensuring investment strategies are targeted at more innovative low carbon infrastructure investment that is struggling to obtain private finance could be one way to address State Aid requirements.

4. Conclusion

Germany has been extremely successful at catalysing high levels of investment in renewables and energy efficiency assets, to the point where it holds a leading position in Europe – and its policies and approaches are being emulated across Europe. It has achieved this through establishing a clear commitment to a low carbon economy through:

- > Creating ambitious overall domestic targets for GHG reduction;
- > Following these up with ambitious sectoral targets;
- > Supporting the achievement of sectoral targets through attractive levels of financial incentives, with costs passed on to consumers;
- > Using the public ‘promotional’ banking network to drive investment on a partnership basis with the private sector.

This in turn, to date, has created high levels of investor confidence in the German Government's plans and made it the most attractive country in the EU to invest in such assets. While there is now some uncertainty over how Germany will meet its challenging domestic targets, with the advent of nuclear phase out, there seems to be a 'quiet consensus' that if any country can achieve this, Germany can.

KfW as well as the state promotional banks have been critical elements of Germany's success. A recent report by REN21 stated that greatly increased investment from these promotional banks was a key factor in driving global renewables investment – and listed KfW as the largest national provider alongside multinational institutions such as the World Bank and Asian Development Bank⁶⁰. In 2009 KfW had a market share of 43 percent of new green power generation investments in Germany. There is a strong consensus that, through the promotional financing approach it takes, KfW is a partner not a competitor to the private sector – and that it has been a very effective agent for achieving the Federal Government's strategic aims. KfW's strong track record bodes well for the efficacy of the new Climate and Energy Fund in terms of its ability to leverage private sector investment and thereby achieve the Government's climate and energy policy objectives. However, it should be remembered that KfW primarily operates by onlending via intermediary public and private banks to the end customer. Under this model the risks of the exposure are borne by the intermediary not by KfW. This model therefore requires strong intermediaries to be effective because while KfW can provide liquidity, it may also increase the risk profile of these banks. This model may not therefore be an appropriate model in countries with weaker bank networks.

The German Government additionally excels in its industrial policy, this in part reflects the longstanding close links between banks, industry, unions and the Government which can smooth the way to effective outcomes. Linking climate and energy policy development to industrial policy and jobs has been a very successful strategy for getting industry and voter support for Germany's ambitious plans. Initial estimates from the BMU show that renewables brought around €26 billion of investment into Germany in 2010. The German people are also well educated and have high levels of awareness about environmental issues – which has also helped garner support for ambitious policies (demonstrations against nuclear power also played in a big role in the decision to phase out nuclear power). However a balancing act is always required; while the 'greens' are celebrating their win on the nuclear decision, industrialists prepare to sue the Government for loss of revenues. Similarly, the German car industry typically produces heavier more energy intensive vehicles than other producers. Yet while the Federal Government has supported EV penetration of the car fleet (with the aim that 1m vehicles will be on the roads by 2020) it has also successfully fought to delay the introduction of stringent efficiency targets for cars under the EU emissions regulations for new light duty vehicles (Regulation 715/2007 (Euro 5/6) because it was feared they would erode the competitive advantage of Germany's largest vehicle manufacturers. This balancing act between protecting wealth-creating industrial incumbents and creating opportunities for innovative new entrants will be an ongoing issue for Germany, in common with other European Member States.

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⁶⁰ REN21 (2010) Renewables 2010: Global Status Report

These issues aside, Germany has much to teach the rest of the EU on how to develop supportive conditions for low carbon investment – but it will not be without its own challenges going forward. The ongoing Eurozone crisis, rising concerns over the additional burden that FITs and other support measures add to already unprecedented energy prices and recent decisions over nuclear phase out could derail some of this momentum. However, rising dependency on imported gas and fossil fuel prices, combined with growing strength in the environment lobby⁶¹, are likely to prove an effective counterweight to this.

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⁶¹ In May 2011, Winfried Kretschmann, 62, became the new governor of Baden-Württemberg and the first-ever leader of a German state to come from the Green Party