

# Alternative Energy Generation Strategies for South Africa



International Review of Renewable Energy Generation Strategies – Implications for South Africa

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# We aren't so different...



- Much of the capital stock which will be in use in 2030 in the energy sector is already in place. Asset lives in the electricity industry are typically around 30 years or above—indeed, some coal generation [redacted] is up to 60 years old. And in the replacement cycle for the energy capital stock, the relevant decisions to change the marginal carbon intensity for 2030 (and even to a considerable extent for 2050) are likely to be made in the next decade, and these reflect a substantial bias towards coal- and gas-fired generation. [redacted] are [redacted] considering new coal-fired power stations.

– Helm, D., 2008: Climate-change policy: why has so little been achieved?, Oxford Review of Economic Policy, Volume 24, Number 2, 2008, pp.211–238

# Global trends



- Extension of policy support for RE
  - In 2008 new solar PV subsidy programs adopted in Australia, China, Japan, Luxembourg, the Netherlands, and the United States
  - New laws and policies in developing countries, including Brazil, Chile, Egypt, Mexico, the Philippines, Syria, and Uganda
  - New biofuels blending mandates or targets in at least 11 countries; including a new 20% target in India
  - China, Brazil, Germany and Spain adopted renewable energy and efficiency standards, feed-in tariffs, carbon reduction targets and/or financial incentives for investment and production.
  - Brazil has ambitious targets for ethanol fuel
  - China's targets for wind and solar power are mandatory
  - The US has a mixed policy framework including various state renewable energy standards and no carbon policy
  
- Increase in clean energy finance and investment over the last five years were: Turkey (178%), Brazil and China (148% each), the United Kingdom (127%) and Italy (111%).

# South Africa's comparative position



- South Africa ranks relatively low in comparison to major developing & G-20 countries and G-20 partners in terms of:
  - the share of renewable energy in the electricity generation mix
  - investment in the RE sector
  - investment intensity of the RE sector
  - strength of policies and targets.
  
- The importance of policies in the development of the renewable energy sector and the competitive position of nations is clear.
  - Brazil and China are developing nations in the group of countries including Germany, Spain and the UK, with strong domestic policies in place directed at the reduction of global warming pollution and renewable energy use.
  - they were also leaders of clean energy investment and have the strongest clean energy sectors relative to the size of their economies.
  
- G-20 countries with relatively weaker policy frameworks (for example USA, Japan, Australia and South Africa) are laggards in the clean energy 'race'

# Renewable Energy and Economic Stimulus

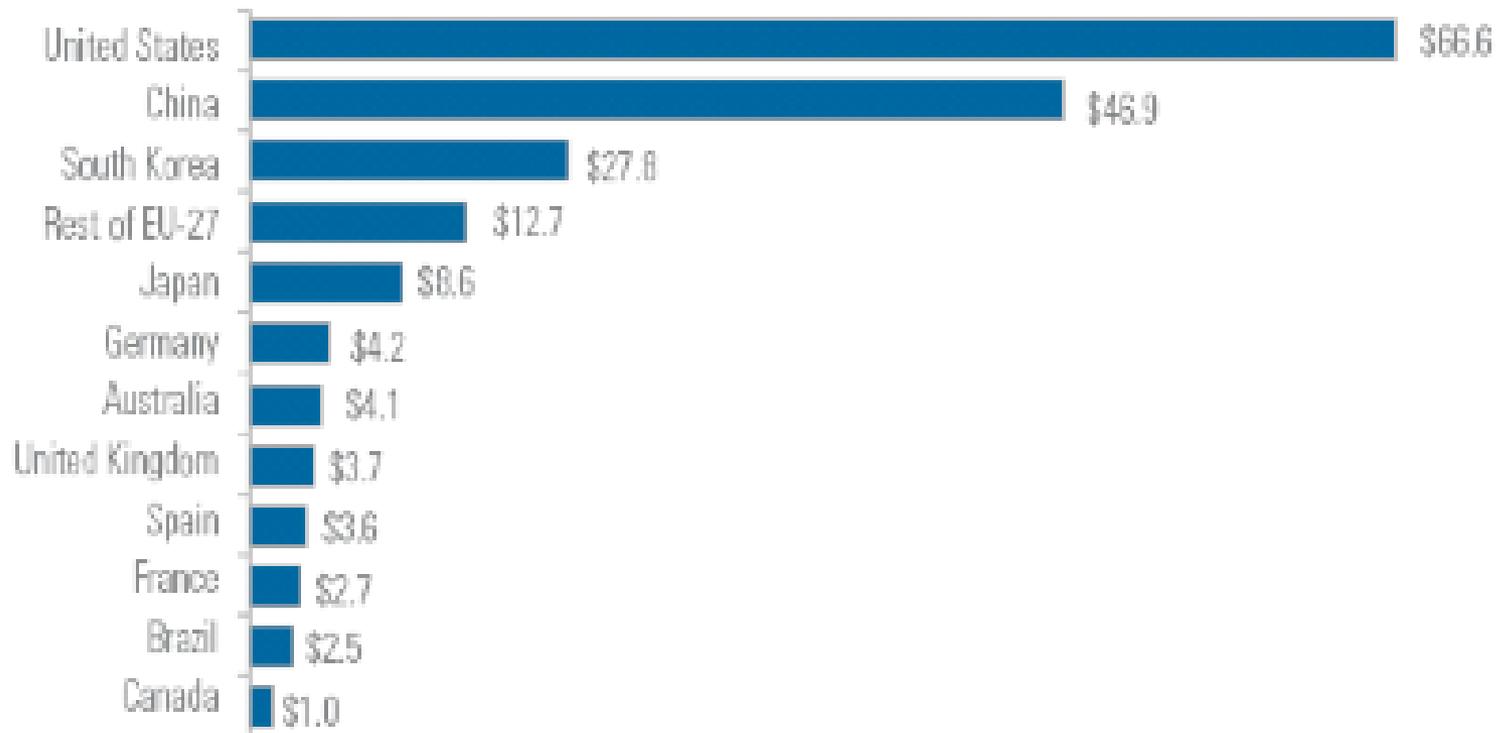


- Clean energy investment has taken priority within the economic recovery funding plans of many governments,
  - Public finance of renewable energy and other low-carbon or clean technologies directed at economic stimulus and job creation, with millions of new “green jobs” targeted.
  - \$184 billion (led by the United States (\$67 billion) and China (\$47 billion) was earmarked for clean energy by the various government stimulus packages announced in late 2008 and early 2009
  - The United States allocated stimulus funding for energy efficiency, renewable energy deployment, transportation and smart grid technology
  - China intends to spend \$46.9 billion in stimulus funding on energy efficiency, clean vehicles, grid infrastructure and other clean energy technology. Its “Golden Sun” initiative will grant up to 50 percent of the installation cost of photovoltaic power plants in China
  - Development assistance for renewables in developing countries reached about \$2 billion in 2008

# Economic stimulus funding



**Figure 1: 2008-09 Announced stimulus funding (US\$ billions) Source: G-20 Clean Energy Factbook, 2010**



# Despite the increase in RE support...



- Indeed, in the energy sector, the **key global shift in the fuel mix is adverse—towards coal**. With the increase in oil (and therefore gas) prices since 2000, and with growing concerns about security of supply as oil and gas production is increasingly concentrated in the hands of autocratic governments, the share of coal projected in the IEA reference scenario in total energy demand rises from 25 to 28 per cent. Most of this is in China and India—with China (currently with nearly 80 per cent coal-fired generation) adding about two large coal power stations per week at present, and projected to add perhaps 1,000 GW of new coal plant by 2030. (To put this into perspective, the total capacity of electricity generation in the UK (all fuels) is around 80 GW.) China's generation by 2030 will be equivalent to current levels of the USA and Europe combined.

– Helm, D., 2008: Climate-change policy: why has so little been achieved?, Oxford Review of Economic Policy, Volume 24, Number 2, 2008, pp.211–238

# Drivers for RE Investment



- There is general consensus that the growth of the clean energy sector would simultaneously address other energy sector or developmental goals (for example, reduced pollution, reduced oil-import dependence, increased employment in the rural sector)
  
- Strategic links between renewable energy and the industrial development strategies of major developing countries is not explicit in the literature reviewed thus far
  - Research ongoing
  
- Drivers include:
  - growth potential
  - export potential
  - employment potential
  - energy security
  - Environmental

... Drivers are not necessarily or primarily climate change mitigation

# Chinese Energy Policy



- .... In contrast to the Obama vision, the plan here **preserves a central role for coal** — the dirtiest fossil fuel in terms of emissions of greenhouse gases, but a mineral that China has in abundance. And while President Obama voiced goals of addressing climate change and improving national security at the same time, the **discussions in China have been focused almost entirely on security issues**, people inside and outside the government said. In other words, as China counts on more years of global leadership in economic growth, global warming remains a secondary concern. **Secure sources of energy to fuel that growth are what matter most**, whatever the implications for world energy markets and the global environment....”
- “The proposed law, which is expected to be adopted by early next year, says that **“energy supply should be where you can plant your foot on it,”** meaning that as much as possible should come from within China, said Li Junfeng, a senior energy policy maker and member of the interagency committee drafting the law. **That belief has underpinned China’s rapid expansion in renewable energy, because it tends to be made in China**, Mr. Li said. China has just emerged as the world’s largest manufacturer of wind turbines and solar panels, and plans to be the world’s biggest builder of nuclear power plants in the coming decade. It invested nearly twice as much as the United States last year in renewable energy”
  - (New York Times, 17 June 2010)

# Employment



- The promise of employment intensive investment is one of the drivers of clean energy support
  - For example: Deutsche Bank Group, 2008: “Economic Stimulus: The Case for “Green” Infrastructure, Energy Security and “Green” Jobs” highlights the employment estimates of various renewable energy technologies
  
- Data is difficult to interpret and there are many numbers thrown about which are difficult to compare
  - Studies in the US broadly agree that alternative energy creates more jobs than conventional sources do—in other words, a switch from oil, gas, or coal produces a net gain in employment (UNEP, 2008)
  - Analysis is ongoing
  
- Although RE does appear to be relatively employment intensive care should be taken about a RE ‘bubble’ mentality

# Lessons for Sustainable RE Investment



- The World Bank (2007) highlights lessons learned from solar photovoltaics (PV), energy efficiency, and hydropower as follows:
  - **Improve the policy and regulatory environment** to reduce energy price distortions, mitigate regulatory risks, streamline approval processes, and increase transparency in decision making
  - Adhere strictly to good environmental and social management principles and ensure that all parties—from consumers and affected communities, to energy suppliers and financiers—benefit
  - Although economic viability may be compelling, **financial viability, as well as market and consumer confidence, are sine qua non for project success and scale-up**. Pay heed to quality and meet consumer expectations in service and value
  - Increase access to pre-investment and investment financing, and introduce risk management and credit enhancement instruments. Benefit from new instruments, such as those offered by the carbon markets.
  - Introduce business models better suited to renewable energy and energy efficiency, including distributed generation. **Be adaptable and take advantage of innate capacities within each country.**
  - **Build capacity and increase knowledge** among the domestic financial sector, industry, utilities, engineering, policy makers, and consumers. Support **South–South knowledge exchanges**.
  - Facilitate access to improved technologies and strengthen the capacity to plan, design, construct, and integrate such technologies into the energy supply sectors

# Randomness plays a part....



- BP Oil Spill

..... Obama “called on Americans to **“seize the moment”** to **“end America’s century-long addiction to fossil fuels.”** **“The tragedy unfolding on our coast is the most painful and powerful reminder yet that the time to embrace a clean energy future is now,”** he said. **“Now is the moment for this generation to embark on a national mission to unleash America’s innovation and seize control of our own destiny.”**”

# Sobering analysis...



- But it is on renewables **where the costs of the policy have turned out to be orders of magnitude greater than indicated by the MARKAL modelling**. A study by the National Audit Office (NAO, 2005, p. 4) found that the Renewables Obligation ‘is several times more expensive than other measures currently being implemented by the government’. Compared with EU ETS carbon prices in the range £20–£30 per tonne of carbon, the UK renewables programme is staggeringly expensive. Perhaps only the Italian renewables programme looks more expensive.
  - Helm, D., 2008: Climate-change policy: why has so little been achieved?, Oxford Review of Economic Policy, Volume 24, Number 2, 2008, pp.211–238

Thank You

