Energy Policy and Climate Policy Must be Integrated

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In the interests of reducing policy uncertainty and of lowering the risk to investment in the energy industry, governments should no longer pursue energy policy and climate policy independently of each other – governments must integrate energy policy and climate policy into a coherent whole, whilst they continue to facilitate open energy markets.

The biggest obstacle to addressing the challenge of climate change continues to be an ongoing disparity of thinking about the appropriate policy responses. This has led to overlap and uncertainty in climate policies, both internationally and domestically.

It is apparent that climate policy uncertainty has not yet peaked, despite 17 years of international climate negotiations.[1] This is particularly problematic for the energy industry because policy uncertainty undoubtedly increases investment risk.[2]

The guiding principle that the parties to the United Nations Framework Convention on Climate Change (UNFCCC) agreed in Rio de Janeiro in 1992 was sound: the parties would work together to achieve a sustainable future, principally by stabilizing greenhouse gas emissions, recognising the principle of common but differentiated responsibilities.

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[1] It can be argued that the negotiations have actually been going on for 37 years, since the 1972 Stockholm Declaration on Human Environment which enunciated the principle that States have *"the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction"*.

[2] *"The principle by which policy uncertainty can be translated into investment risk is straightforward. Policy uncertainty creates an uncertain outcome in the cash flow of a project in which the company is proposing to invest",* IEA, "Climate Policy Uncertainty and Investment Risk", Paris, France, 2007, p 13.

The International Energy Agency (IEA) has estimated that, since the First Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) was completed in 1990, over 1000 policies have been introduced around the world to combat climate change.

How effective have these policies been? What benefits have resulted? And what costs have been incurred? There are many possible responses to these questions but perhaps the most telling response is that global emissions, despite all efforts to date, continue to rise.

What has happened to the shared vision that brought the treaty parties together in 1992? Unfortunately, the vision has become largely obscured by unproductive negotiations over quantified country emission limits. North-South differences have tended to fragment and polarise the climate negotiations. Parties to the UNFCCC have continued to debate a succession of moral, political and economic arguments over allocation of responsibilities that have resulted in a high level of policy overlap and uncertainty. Policies have become skewed towards specific countries and away from specific solutions.

The treaty parties need to refocus on their original purpose, remembering that this is a global rather than domestic problem. At the same time, as a recent World Energy Council (WEC) Task Force Report recommended, open energy markets must be maintained. [3]

The Centrality of Energy and the Centrality of Electric Power

Today 1.6 billion people (25% of the world's population) do not have access to electricity or the benefits that accompany electrification. Affordable, secure and reliable electricity supply enables economic development which is a prerequisite for poverty alleviation. Energy demand is projected to rise by 45% between 2006 and 2030. Almost 90% of this increased energy demand is driven by the needs of developing countries, bringing about economic growth and increased standards of living.

The world cannot function without energy; the solutions to the climate challenge must necessarily involve the energy industry. It is impossible for any individual country acting in isolation (or even a group of countries) to deal effectively with climate change unless changes are made to the global energy supply system.

WEC has repeatedly emphasised that *"energy is central both to the problem and to its resolution."* [4] Within the energy supply system itself, the central function is the conversion of primary energy into electric power and the reliable supply of grid-based electricity. This is the backbone of modern industrial society. With a likely future increase in electric-powered transportation, society's dependence on grid-based electricity is likely to increase.

However, as a result of fossil fuel combustion, energy-related emissions contribute over 80% of worldwide emissions of CO2, the main greenhouse gas. The barrier that industry and policymakers have to overcome is that the low-emission alternatives are much more expensive than the technologies used in current practice.

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[3] *" … governments must maintain open energy markets, seek ways to expand international cooperation and apply measures affecting energy trade, investments and movement of persons that are fully consistent with the rules set out in the General Agreement on Tariffs and Trade (GATT) and other parts of the World Trade Organization Agreement.",* WEC, "Task Force Report on Trade and Investment Rules for Energy," London, UK, June 2009, p 1.

[4] WEC, "Energy and Climate Change", London, UK, June 2007, p 6.

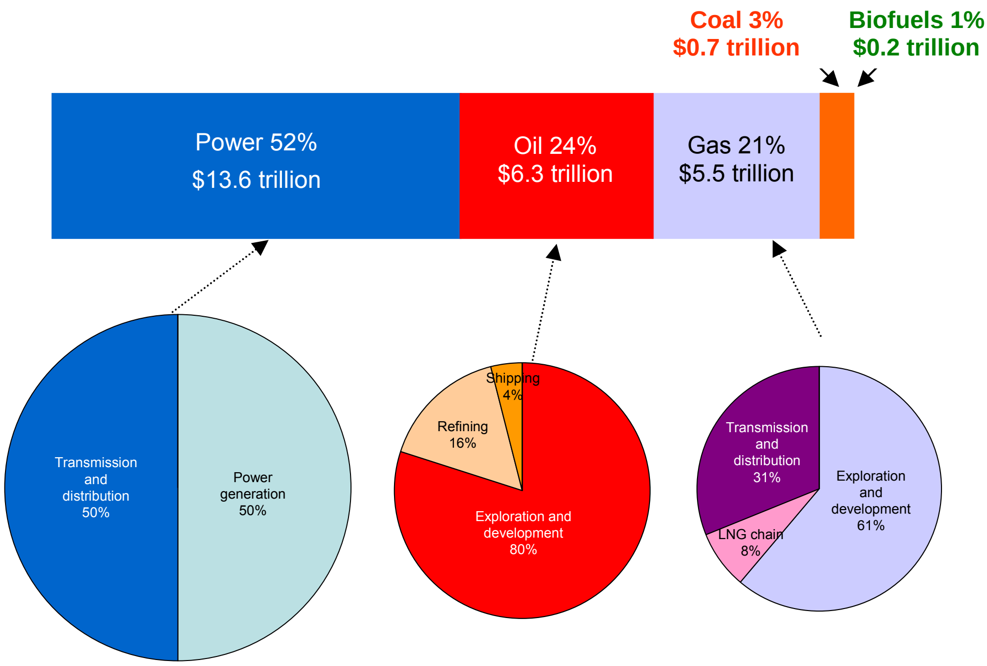
Massive Capital Requirements

The solutions to the climate challenge must be commercially viable. The entire energy sector is highly capital-intensive, although the production and supply of electricity requires over half of the capital of everything in the energy sector combined.

The IEA recently forecast a global low-carbon energy technology investment requirement through to 2030 of between US$380 – 540 billion per annum.[5]

This is in addition to a forecast global 'stand still' energy investment requirement through to 2030 of US$26.3 trillion, an average of around US$1.2 trillion per annum.[6] The breakdown of this forecast investment is depicted in figure 1 below.

Figure 1: Cumulative Energy Supply Investment in the IEA Reference Scenario, 2007-2030 (in US dollars)



Total global investment: US$26.3 trillion (in year 2007 dollars)

In this figure, power generation includes both renewable and fossil fuel generation

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[5] IEA, "Ensuring Green Growth in a Time of Economic Crisis: The Role of Energy Technology", Paris, France, April 2009.

[6] IEA, "World Energy Outlook 2008", Paris, France, 2008, p 88. The IEA's 'stand still' forecast does not include the investments required to significantly reduce the number of people without access to electricity below today's level of an estimated 1.6 billion people.

The global financial crisis has increased the level of difficulty of investing in energy sector. WEC has expressed concerns about this difficulty:

> *"The illiquidity of global financial markets has meant that companies find it much more difficult to access capital, even for high-return projects. This particularly affects small companies in the renewables sector. Such funding shortages are hindering the consolidation of the energy sector in certain areas and raising concerns about the short-term feasibility of the capital-intensive investment required in the energy sector."*[7]

The IEA has also expressed concerns about falling energy investment, calling for government action to increase fourfold the level of new investment in low-carbon investments. [8]

Reduction of Policy Uncertainty and the Role of a Carbon Price Signal

The onus is on governments to reduce policy uncertainty, to reduce investment risk and to provide public funding for low-emission technology demonstrations. The onus is on the energy industry to make the investments in low-emission technologies. Government policies must accelerate the normal commercialisation process, not hinder it.

There is little doubt that a clear and globally consistent price signal for carbon would significantly reduce investment uncertainty and would accelerate investment in low-emission energy technologies. However it is apparent that a nominal carbon price is insufficient. High carbon prices, several times higher than currently evident in Europe and higher than projected anywhere in the next decade or two, may be necessary to support the massive capital investment in low-emission energy technologies that are necessary to reduce emissions to a significant extent.

Governments must implement policies that overcome the commercial barriers to low-emission energy technology development and deployment, allowing the private sector to invest today on commercially acceptable terms, in addition to pricing carbon emissions which may support such investments in future decades. These policies must include public funding of low-emission technology demonstrations to balance the risk/return relationship and to attract private investment.

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[7] WEC, "WEC Statement 2009: Building the New World Energy Order", London, UK, 2009.

[8] *"Energy investment worldwide is plunging in the face of a tougher financing environment, weakening final demand for energy and falling cash flows – the result, primarily, of the global financial crisis and the worst recession since the Second World War. … Falling energy investment will have far-reaching and, depending on how governments respond, potentially grave effects on energy security, climate change and energy poverty … These concerns justify government action to support investment in energy efficiency and clean energy. … But much more needs to be done. The investment needed to put the world onto an energy path consistent with limiting the rise in global temperature to around $2^{0}C$ far exceeds the additional investments that are expected to occur as a result of the stimulus packages so far announced. … governments should be looking to increase the level of new funds they commit to energy efficiency and low-carbon energy policies by a factor of around four",* International Energy Agency, "The Impact of the Financial and Economic Crisis on Global Energy Investment", OECD / IEA, Paris, France, May 2009, pp 3-5.

Global Policy Alignment

WEC has advocated that the common aim must be to achieve global policy alignment.[9] This cannot however be achieved if the divisive process of bargaining over country emission limits continues and if climate policy continues to be negotiated independently of energy policy.

The Kyoto Protocol seeks to reduce emissions mainly by quantifiable commitments at country level, leaving it to domestic governments to take whatever action they like to meet these country-level commitments. This is a little like stabbing in the dark. It contributes to policy fragmentation. There is no link between the desired goal (the reduction of global emissions), the steps required to achieve it, the know-how and tools that may be required and the conditions that may be necessary to attract the necessary investments. The present approach is based on an unsure foundation of knowledge and is not completely rational.

Within individual countries, communities, industries and individuals have their own interests that they will generally seek to protect. This is illustrated by the furore involved in the introduction of domestic emissions trading schemes, which have created strong divisions over who should bear the costs.[10] The UK is showing the way towards an integrated policy approach following the establishment in October 2008 of its Department of Energy and Climate Change.

The challenge, fundamentally expressed, is to reduce global greenhouse gas emissions as fast as the world can afford to do so. For the energy industry, this requires two basic strategies: the first is to reduce the amount of energy that is wasted. The second is to reduce the amount of emissions associated with energy use. This can be achieved by progressively substituting zero or low-emitting forms of energy and by progressively reducing emissions from the combustion of fossil fuels but it will require investments of unprecedented magnitude.

The immediate challenge for climate negotiators is to negotiate an agreement that is environmentally effective, equitable and politically sustainable. Politicians must be able to convince their local constituencies that the agreement is in their self-interest to ensure policy longevity. Mitigating emissions will require appropriate policy settings in perpetuity and is possibly the paramount example of an issue that demands policy longevity. It also requires that the development of climate policy and energy policy be integrated.

International energy and climate policy development may be founded on the shared vision of a sustainable future that first brought the UNFCCC parties together in 1992. However, global emission reduction targets must be integrated with a low-emission technology strategy. Put simply, international agreements must not only set targets: they must initiate a strategy to deliver the abatement required by the targets. Furthermore, the targets themselves should be informed by a rigorous and objective analysis of the technology development and commercialisation pathway to ensure that the targets are achievable at acceptable cost. Then international agreements must be equitable in order to have the necessary longevity.

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[9] WEC, footnote 4, p 125.

[10] For example, the fractious debate triggered in Australia by its proposed Carbon Solution Reduction Scheme.

WEC has suggested that, if there is to be any serious prospect of achieving a global agreement any time soon, that the reduction of emissions intensity per unit of GDP may be the most equitable common denominator for a global agreement.[11]

Technological Solutions

Reducing emissions will require a revolution in the way the world produces and uses energy.

A portfolio of zero and low-emission energy technologies, including nuclear, renewables, LNG and carbon capture and storage (CCS), will be needed to achieve this. The IPCC has emphasised that *"no single mitigation measure will be adequate to achieve a stable concentration of CO_2".*[12] This is also in line with WEC's view.[13]

In 2008, the IEA updated its work on energy technologies and identified global roadmaps for 17 key technologies that it considered were needed to achieve the global energy technology revolution.[14] These are listed in table 1 below. A mix of these 17 technologies, and some others, will be required.[15]

Table 1: The 17 Technology Roadmaps in the IEA's 2008 Study

Supply side technologies (9)	Demand side technologies (8)
■ CCS fossil-fuel power generation	■ Energy efficiency in buildings and appliances
■ Nuclear power plants	■ Heat pumps
■ Onshore and offshore wind	■ Solar space and water heating
■ Biomass integrated-gasification combined-cycle and co-combustion	■ Energy efficiency in transport
■ Photovoltaic systems	■ Electric and plug-in vehicles
■ Concentrating solar power	■ H_2 fuel cell vehicles
■ Coal: integrated-gasification combined-cycle	■ CCS in industry, H2 and fuel transformation
■ Coal: ultra-supercritical	■ Industrial motor systems
■ Second-generation biofuels	

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[11] WEC, footnote 4, p.122.

[12] Intergovernmental Panel on Climate Change, "IPCC Special Report on Carbon Dioxide Capture and Storage", Cambridge University Press, Cambridge, UK, 2005, p 352.

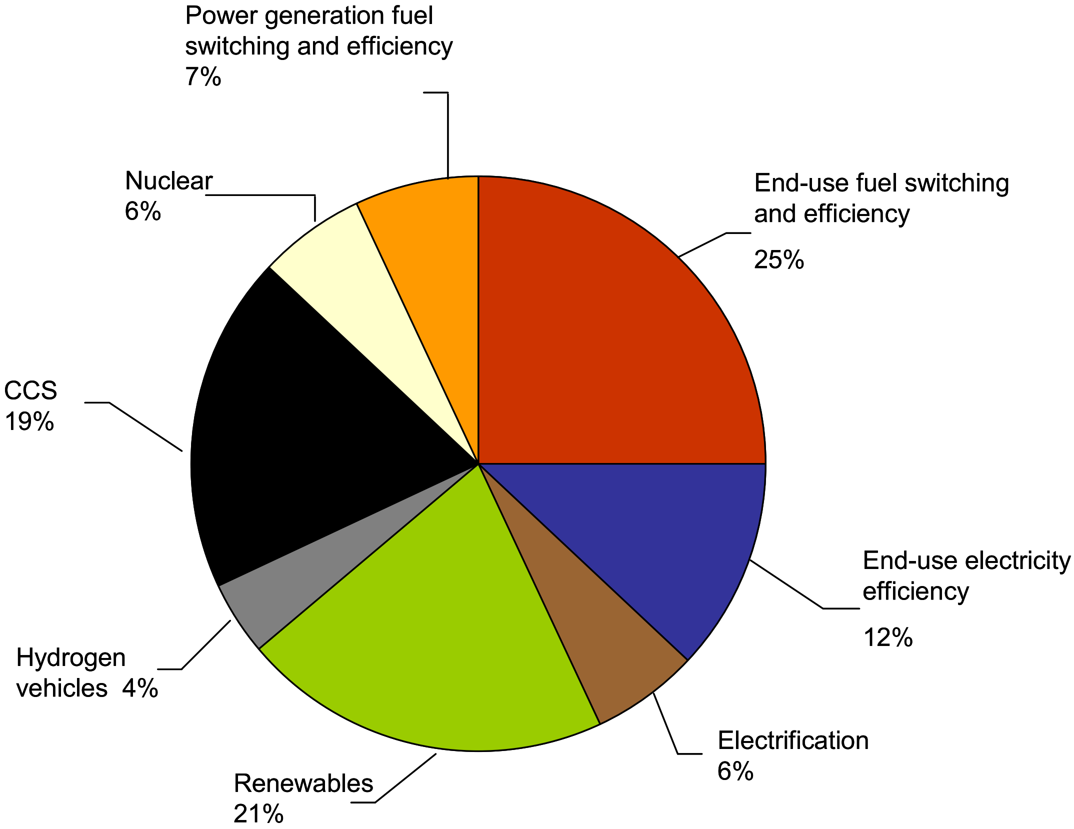
[13] The main conclusion of the 19th World Energy Congress in Sydney in September 2004 was: *"All energy options must be kept open and no technology should be idolised or demonised. These include the conventional options of coal, oil, gas, nuclear and hydro (whether large or small), and the new renewable energy sources, combined of course with increased energy efficiency. Each is subject to uncertainties, we cannot afford to jettison any one of them. Energy source diversity is the bedrock of a robust system, even if the optimum mix will vary according to local circumstances".*

[14] International Energy Agency, "Energy Technology Perspectives: Scenarios and Strategies to 2050", Paris, France, 2008, p 46.

[15] Other key existing technologies include geothermal energy and distributed generation. It is also widely believed that some "break-through" technologies will emerge as more R and D is undertaken.

Many barrows are being pushed by advocates of particular technologies but no-one knows at this time exactly where the future emission reductions will eventually be made. The relative contribution of the technologies that the IEA considers might be capable of reducing emissions to 450 ppm by 2050 is depicted in figure 2 below.

Figure 2: Projected Reduction in CO2 Emissions by Technology 2050



Source: IEA, "Energy Technology Perspectives", Paris, France 2008

The IEA has identified CCS as *"the most important single new technology".*[16] This may be so, assuming it is properly described as a technology, although the IPCC considers that *"… once the full cost of the complete CCS system has been accounted for, CCS systems are unlikely to deploy on a large scale in the absence of an explicit policy or regulatory regime that substantially limits greenhouse gas emissions to the atmosphere"*.[17] The WEC found that *"Although there is considerable optimism and enthusiasm for CCS, it remains a complex technology system that is, at present, unproven in terms of its potential contribution to* CO_2 *emission control before 2050, under the current pace and scope of development."*[18]

IEA analysis shows that the cost of capture is the largest cost component of CCS (usually greater than 80%) with considerable variability across technology choice, CO_2 purity and site-specific factors.

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[16] IEA footnote 14 p 41.

[17] IPCC, footnote 12, p 356. A regulatory regime to limit emissions is to be distinguished from a regime to allow storage of emissions underground.

[18] WEC, footnote 4, p 117.

The fuller deployment of CCS may require a global long-term value of carbon of around US$52 per tonne.[19]

In the short-to-medium term, the accelerated deployment of existing technologies, such as nuclear, renewables and LNG, would reduce global emissions faster than at present. Natural gas would also provide the crucial standby capacity that electricity supply systems require in order to make greater use of renewable energy sources (with their greater intermittency).[20]

Conclusion

Most people have come to accept that climate change is a global environmental problem that transcends political boundaries.

The time has come for governments to align, rather than fragment, their climate change policies and to make intensive efforts to integrate energy policy and climate policy into a coherent whole in order to give more confidence to investors.

August 2009

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** The Energy Alliance of Australia is the Australian Member Committee of the World Energy Council.

[19] IEA, footnote 14, p 280. In the short-term, the price of carbon will need to be considerably higher than US$52 per tonne to induce technology switching. The Global CCS Institute has recently been established in Australia to accelerate the commercial deployment of CCS projects.

[20] According to WWF International, "WWF Climate Solutions Report", Gland, Switzerland, 2007: *"In the short term, an increase in the use of natural gas as a "transition fuel" can play a significant part in avoiding the locking in of higher emissions from coal, thereby buying more development time for other energy solutions to grow. While this is more applicable in some countries than others, gas should be scaled up in the short term (where it can avoid coal use), without bringing any harmful biodiversity impacts. The even lower carbon emissions for gas used with carbon capture and storage technology are also taken into account. WWF therefore sees natural gas as a bridging fuel with important applications, provided that energy security issues can be resolved. The scenario includes a provision of natural gas displacing coal which peaks in supply at about 52EJ in 2023. It is assumed that this can then become sequestered within the CCS wedge as technology comes on line."*