Stemming the Flow: A New Direction for Climate Change Governance

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Abstract

In order to stabilise the concentration of atmospheric carbon dioxide at a level that avoids dangerous human interference with the climate system, it is estimated that the prudent upper limit on the remaining fossil fuel carbon that humanity can burn is of the order 0.5 trillion tons. The energy that this will generate is needed to sustain society for the interim, whilst powering the transformation to a low carbon sources of energy production. Sustaining society includes providing access to an affordable and reliable supply of energy to the 1.3 billion currently lacking such access.

Climate change governance is thus inseparable from energy governance. However, the two regimes have different historical origins, guiding principles, key actors, overall goals, scope, mechanisms and interfaces with non-energy systems. Hence, the problem of decarbonising the global energy supply is complex and fraught. Here we explore the sources of difficulty, the emerging linkages between both regimes, tensions arising therein, and ways in which they could be combined to become mutually reinforcing. We argue that a more integrated approach is essential to avoid conflicting agendas and also offers potential synergies that could accelerate policy making. In this context, a complex, multi-level and multi-arena regime is unavoidable.

However, policies are only as good as their real-world outcomes. In this regard, the nature of the innovation system upon which the delivery of low carbon technology relies strongly influences the nature and rate of transition achievable. Past practice, based on simplistic assumptions about the need to correct market failures is insufficient, as demonstrated by the differing success of wind energy development in different nations.

1. The Carbon Budget Problem

- There is a broad consensus that "safe" CO2 concentration limit is 450ppm $CO_{2\ equ}$ - though some say less - limiting to 0.5 trillion tonnes the carbon left to burn (unless Carbon Capture and Storage rapidly becomes effective and widespread)
- But carbon emissions continue to show strong growth (+6% in 2011 regardless of the economic crisis) and the forecast is for 33% increase in world energy demand by 2035 the major part of which is projected to be delivered by fossil fuels
- So without very strong and rapid action the 450ppm limit is likely to be breached
- However, increasing climate-related societal impacts and damages, as well as issues of energy security are likely to maintain and even accelerate actions to achieve a low-carbon world
- So climate governance and energy governance are inseparable, and need as a matter of urgency to be aligned so as to be mutually reinforcing
- To do so requires as a starting point an understanding of the current features and linkages of the two governance regimes:

2. Climate Change Governance

- Characterised as multi-level, multi-scalar, multi-modal and multi-arena, highly exploratory, non-hierarchical, inclusive and diverse
- Mitigation goals negotiated under auspices of UNFCCC recently began to diverge from hard compliance regime towards voluntary pledges but reverted at COP17 (though at much delayed timescale) with a commitment to a universal legal agreement not later than 2015 to come into force in 2020
- 35 nations also agreed on a second commitment period of the Kyoto protocol, (though a number of key nations will default on the first period)
- Some scholars have sought to identify alternative fora to achieve greater progress, but in order to achieve global collective action UN seems to be essential
- Hence nation states have key role to play, but democracies suffer from inherent flaws such as short-termism, influence of pressure groups, other perceived priorities and constraints
- Reflecting these difficulties, much action has taken place at local and regional levels, and in private sector, but central coordination is necessary to achieve necessary scale of action

3. Energy Governance

- Dominant focus is on securing sustained national energy supply
- Hence no global energy governance, despite some globalised elements such as oil and gas markets
- This is despite existence of numerous institutions such as International Energy Agency, OPEC, Energy Charter Treaty, IRENA and WTO, each competent to deal with certain aspects of energy sectors, each with different but often overlapping memberships
- There is nothing comparable to UNFCCC and the Kyoto Protocol
- Move towards open and competitive international markets overtaken by recent trend towards renationalisation in reaction to fears about security of supply
- Is related to enormous and sustained economic growth dependent on securing access to ever greater volumes of natural resources including energy, resulting in "new resource politics" paradigm

4. Linkages

- Energy and climate change governance regimes often work at cross-purposes
- Guaranteeing security of energy supply, and generating wealth, are widely pursued regardless of climate risks; e.g. race to develop tar sands and shale gas, and for nations to export coal, oil and gas, often to non-Annex I countries without emissions reductions targets
- Nevertheless, many countries are placing enormous effort into promoting energy efficiency and Renewable Energy Sources (RES) domestically as a contribution to energy security
- Domestic focus is so strong that even in a highly integrated economic area such as EU there is no harmonisation of effort
- International markets for energy technologies are regarded as arenas for competition amongst states leading to new wave of protectionism within WTO
- Developed states see developing nations as important markets and hence may seek to link aid and low-carbon energy technology exports

5. Key features of Innovation System

- New energy technologies must be developed and diffused rapidly if climate targets are to be achieved, and this will rely on effective mechanisms for the governance of innovation in energy technologies
- Analysis of formative and growth stages of innovation system through to globalisation and transfer of mature technologies to new markets reveals it is insufficient simply to focus on correcting two key market failures – the carbon externality and the non-appropriability of R&D knowledge
- Evidence from comparison of development of wind energy in EU, USA and China indicates that policies need to extend beyond "market pull" and "technology push" and should take into account the institutional frameworks through which they are delivered
- Policies are more successful where they prioritise long-term-learning oriented deployment with emphasis on entrepreneurial experimentation and means to encourage a diversity of entrants rather than short-term efficiency
- Attention is required to avoid system failures at the technology transfer stage as well as during the formative and growth phases

6. Signposts for the Future

- Climate and energy governance regimes are increasingly unable to achieve their own goals; hence the attraction of combining efforts to become mutually reinforcing
- Achieving domestic energy security requires massive private sector investment; to achieve this will require strong, stable legal frameworks to assure investor confidence
- Analysis shows climate mitigation offers the optimum entry point to achieve the combined goals of climate change mitigation, energy security and air pollution at minimum cost
- The key missing link in most jurisdictions is long-term, binding targets upon which robust policy and secure investment can be founded; The UK Climate Change Act is notable in this respect since government actions fall under the scrutiny of law; other nations are considering similar legislation
- The role of Developing nations is crucial since they will contribute 90% of the forecast growth in energy demand – investors, private or state, will demand stable domestic legal frameworks robustly embedded in multi-level / scalar /modal / arena policy regime - This is arguably the most significant challenge to address
- Analysis, based on future scenarios, shows that effective governance is critical if "dangerous" climate change is to be averted (see figure)

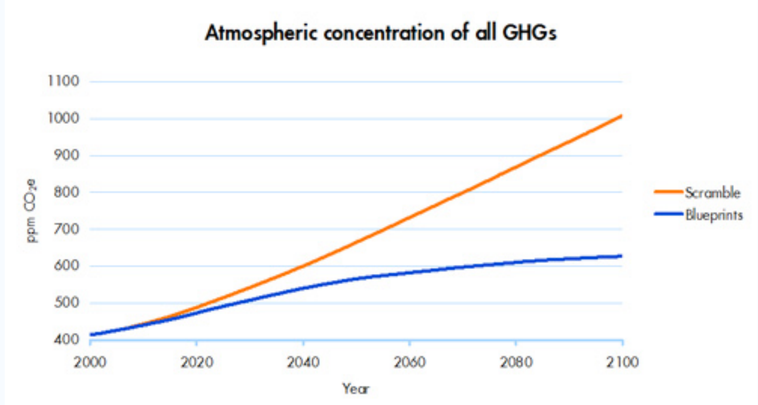

Figure: Projected atmospheric greenhouse gas (GHG) concentrations in CO_{2equ} under the Royal Dutch Shell scenarios "Blueprint" (blue line), in which actions outpace events, and "Scramble" (orange line), in which events outpace actions. The former case can be considered an example where climate change and energy governance are effective, the latter where it is not. Note that even under Blueprint the projected atmospheric concentrations of GHGs considerably exceed the 450ppm$CO_{2\ equ}$ target, indicating the scale of challenge ahead.

(adapted from Prinn, R., Paltsev, S., Sokolov, A., Sarofim, M., Reilly, J., and Jacoby, H., "Scenarios with MIT integrated global systems model: significant global warming regardless of different approaches", Climatic Change, 104, 515-537 (2011))

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De Cendra de Larragán, J., and Rapley, C., "Stemming the Flow: A New Direction for Climate Change Governance", (in preparation for submission to *Nature Climate Change*)