

The Energy Mix

Low-carbon pathways to 2050



The Energy Mix:

In its Vision 2050 project, the WBCSD envisages a world in 2050 that meets the needs of “9 billion people living well, within the limits of one planet”. This will require substantial changes in the global energy system, to meet the expected increase in demand (30% - 50% more than in 2010 depending on the size of energy efficiency improvements) while also reducing global greenhouse gas emissions to half of 2005 levels. These challenges imply a radical departure from historical energy pathways (Box 1) and will require government policy intervention at a level not seen in the past.

This document seeks to explore the development of the global energy system to date and seeks to develop a better understanding of the roles played by markets, technology, and policy in shaping the future.

There is a significant risk of lock-in of the GHG emissions trajectory

Today, the global energy mix is an aggregate of different regional mixes, that have been shaped by local resource availability, security of supply concerns, economic development, and technology (Box 4). Examples of this range from coal dependence in South Africa to high hydro-electricity and biomass use in Brazil (Box 10) and nuclear in France (Box 9).

Carbon dioxide emissions (CO₂) from the energy system are now a major issue. While the technologies to reduce emissions are well known and business is technically able to deploy them, commercial viability remains an obstacle in many instances. Investment in the energy sector is characterized by high capital cost and longevity of assets, which means that the case for deployment of an alternative energy technology set must be very robust in the face of the known status quo. Partly for this reason, large-scale change operates on a generational time scale (Box 7), meaning that the substantive change required to reduce global emissions must be supported by a very clear and long-term business case for action to manage the associated investment risk.

The financial crisis which started in 2008 has reduced the appetite for investment risk and therefore raised barriers to change. This will result in further lock-in of a high-emission energy system and may reduce the chance of meeting future goals.

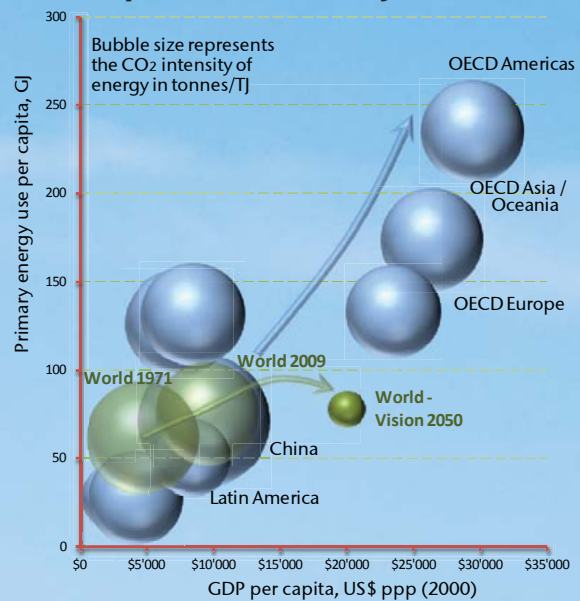
An energy policy framework is required to secure a pathway to vision 2050 outcome

A clear, unambiguous and well structured energy policy framework is required in all countries to shift the energy mix and deliver emission reductions faster than historical energy trends would otherwise dictate. Although governments are attempting to introduce such change, it is occurring slowly on a global level and the efforts are often fragmented and short-lived. More global action is needed and should start now.

Additional features of the current regulatory landscape include short-lived policies and surprise policy changes. These can lead to asset value destruction and stranded assets, thereby deterring future investment. Abrupt policy change can sometimes lead to a disruption of basic energy services, a consequence that no country or company will want.

Box 1

Regional & Global Development Pathways



National and regional energy use and development continues to follow a well worn pathway, albeit with the carbon intensity of the mix varying on the back of local resource availability (hydro in Latin America, coal in China). The pathway to a sustainable 2050 will need to be very different.

Although stability is needed, long-term approaches may still require fine-tuning over time and across geographies depending on progress, effectiveness and exogenous changes. The development of an energy and climate policy framework must:

- Be adequate during the up-coming transition period, while being aligned with the long-term framework objective (and not be for short-term political gain);
- Provide significant financial incentives and regulatory support (ensuring a level playing field) to investments in low-emission energy alternatives which are not currently commercially viable with an early goal of commercial-scale demonstration;
- Allow all technology options on the basis of their economic performance, environmental benefits and other relevant criteria;
- Deliver substantial improvements in energy efficiency (both supply and demand) through standards and incentives (“carrot and stick” combinations) and increase recycling rates of energy intensive materials;
- Balance supply security, affordability and environmental protection;
- Build public support for renewal and replacement of energy infrastructure.

The WBCSD supports actions at local, national, regional and international levels to implement policies to meet the aspirations of Vision 2050. WBCSD members will continue to act and engage pro-actively with continued actions in R&D and deployment, as well as through dialogue with policy-makers at all levels.