

## Energy as a Basic Human Need, Can We Do Without It?



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Major innovation trends in energy deal with its generation and saving reminding a centuries-old argument of who comes first a hen or an egg. Which sector scored more impressive results so far and why?

Which comes first is indeed a difficult question to answer. But the more important aspect of the relationship is that innovations in each beget innovations in the other. Better end-use technology allows energy to be used by more people for wider a variety of activities – this creates demand for more generation, and thus stronger incentives to invest in supply side technologies. Similarly, better, cheaper and more reliable energy supply spurs development of new uses as more people gain access to energy services.

From a global perspective, most people think there is a large amount of low cost untapped potential in end use savings, even negative cost opportunities. So we need increased emphasis on improving the efficiency of end use devices. In the long term, saving energy will not allow us to power the aspirations of 9 billion people. We will need new and improved generation technologies too.

Who or what institutions set targets for innovation in energy?

Most targets affecting the use and production of energy are set at the national level. Some international coordination occurs, for example via institutions like the International Energy Agency, the United Nations, and OPEC. But for the most part, binding targets are set by those institutions that can enforce them best, national governments.

In the last two decades international and national standards have been tightened dramatically. How did it affect national innovation strategies? Could you show some most eloquent examples?

There is plenty of evidence that targets and policies affect the rate and direction of innovation in energy. For example, regulations on air pollution encouraged the development of scrubbers to remove sulfur dioxide from coal power plants. This was international with important advances happening in Japan, Germany and the U.S. Similarly, automobile efficiency standards around the world have led to advances in transmissions, fuel injection and aerodynamics, as well as the use of new fuels like diesel and biofuels. Japan, the EU, and China lead on this today.

To what extent energy innovations can be regarded as integral part of national innovations systems?

Innovations in energy have been absolutely central to global economic growth over the past 200 years.

Perhaps the biggest accomplishment is that we mostly don't notice it; energy became nearly invisible for large periods of time. We often take it for granted as a basic infrastructure, such that it has become a basic human need for escaping poverty and subsistence.

Although it has often remained in the background, the 2 energy crisis in 1970s and increasing concern since around 2000, especially since mid-2000s make it clear that energy is a central issue, on which much else depends. The importance of innovation in energy is less broadly appreciated as a part of national strategy. But Nixon's Project Independence in 1974 had a very strong innovation component. You can see

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the emphasis on innovation in energy most clearly today in places like Denmark and China and also Brazil.

Taking energy as an example what are the proper roles for national governments and businesses to play in innovation?

The private sector has to dominate the effort at the development and commercialization of new energy technologies. That is where investment will come from. Firms are the ones that can best identify and anticipate the needs of consumers and match those needs to technological possibilities. This include big companies and start-ups and many different sectors, not just those we typically think of as energy companies. But even if the private sector ultimately plays the dominant role, government needs to actively promote innovation as well. There are too many incentives

to free ride on the investments of others especially in the early stages of a technologies development. Government needs to fund a wide swath of early stage projects and perhaps support initial niche markets for new technologies when they are still risky and unproven.

**In the age of globalization is it appropriate to say that a universal innovation system is in the offing?**

The energy system is truly global. We move electrons, oil, and gas across borders; the supply chain for

be much competition. That is mostly good since each country or firm raises the bar in terms of the performance of the best technology or practice exists. If competition raises investment in innovation that is generally a positive development; we can expect diversity to lead to good outcomes. Competition can also potentially lead to international conflicts over trade barriers and currencies. Fortunately the gains from investment in competing innovations are pretty obvious and so conflicts should be overcome with that in mind.

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many energy technologies is highly dispersed and international; we even move coal across oceans. Many big companies who will dominate investment in innovation are global. In theory they have access to a global pool of new technologies and ideas. Most important, the scientists and engineers who generate and develop new ideas move internationally and collaborate easily across borders.

Still, it's not one innovation system. The unique characteristics of domestic markets still matter. National capabilities matter and are different. Governments play a central role and have national interests in mind.

**To your opinion how Russia may effectively participate in it?**

Because it produces its own innovations and contributes to the global stock of knowledge, Russia has access to the innovations of the rest of the world. Like any other country, it keeps in mind its own capabilities, resources and potential sources of advantage in deciding which areas to pursue.

**How tough is international competition in the energy innovation market? What did it bring about and what may it introduce in practice?**

This is important, there appears to

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### *Russian Railways to hold international forum "Transportation Science: Innovative Solutions for Business"*

*Russian Railways is to hold the first international forum "Transportation Science: Innovative Solutions for Business" on 22 – 23 March 2011 in Moscow, which is being organized by Business Dialogue with Russian Railways support.*

*The main task of this scientific forum is to create the conditions for effective communication between the leaders in the rail business and representatives of the scientific and expert communities from different countries. As a result, they will be able to work together to identify priority areas for the development of scientific work.*

*Among the issues on the forum's agenda are global trends in innovative solutions for rail transport, the priorities for innovation, green transport, the environmental factors in competition on the transport market and improving energy efficiency. The forum will also bring together representatives from the CIS and Baltic countries, Germany, Finland, Britain and others.*

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