



Energy sustainability: the new rules

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What country leads the world in providing stable, affordable and clean energy? The answer is that no one does. And that's a problem.

Canada is a world leader in terms of supplying stable and affordable energy, though it doesn't rank in the top ten nations when it comes to clean energy, according to research conducted by the World Energy Council in collaboration with Oliver Wyman. Switzerland, a big user of nuclear and hydro power, is one of the top five in terms of delivering stable and clean energy. But it does not lead the pack when its energy is measured in terms of affordability. Brazil and Italy excel at providing energy that is both clean and reasonably priced. But no countries score well on all three measures.

One fundamental reason why countries are not leaders in terms of all three of these criteria is that no form of energy satisfies all of these requirements. As a result, energy policymakers, accustomed to operating in a relatively stable environment with a clear direction, are struggling to balance the often conflicting agendas of developing secure, affordable and clean energy. In the process, the worst thing possible for long-term energy investments is happening: Energy policy is becoming clouded by potentially paralysing uncertainty. The traditional model for energy policymaking is no longer working. Policymakers need to cut through the ambiguity these tensions are creating by rethinking their approach to energy sustainability – and soon.

The world needs more energy. Global demand for energy is expected to grow by 1.5 per cent every year from now until 2030, according to the International Energy Agency. That growth is already testing the limits of existing energy resources and infrastructure. New energy sources must be opened up, ageing infrastructure upgraded, and new plants

and networks developed – all in the context of ensuring that energy remains clean and affordable for consumers. The IEA estimates that countries need to invest an estimated US\$1.1 trillion, or 1.4 per cent of the world's GDP, each year to maintain and replace existing systems as well as to meet growing demand and environmental objectives.

And yet, while investment in energy overall is increasing, many crucial initiatives are being scratched or postponed worldwide. Changing market circumstances and national priorities are contributing to significant levels of variability in policymaking and in the quality of policy implementation. In July, for example, the Ontario government announced a dramatic cut in how much it will pay some producers of solar energy, creating uncertainty around potential future investments in its clean energy programmes.

The recession has underscored the dilemma that policymakers now face by making the trade-offs that exist between different energy criteria more contentious. Germany and Spain, some of the world's leaders in renewable energy, have been forced to reduce financial incentives this year for clean energy technologies to lessen the short-term burden on their nations. At the same time, in California, citizens have launched a ballot initiative to halt the enforcement of the state's law mandating greenhouse gas reductions until its unemployment rate improves.

Embracing complexity

The challenge for policymakers then is to figure out how to embrace this complexity. Energy policies need to be designed to fit agendas that are much broader and more fluid than they have been in the past. That means they must incorporate many options rather than be based on

fixed commitments to a single technology, type of energy, or strategy.

The first critical step to achieving this is for policymakers to conduct a much fuller cost benefit analysis that examines measures to improve both their energy supply and demand characteristics. If countries conduct this more comprehensive portfolio analysis and

Top five leaders measured by sustainability dimensions*

Energy security	Social equity	Environmental impact mitigation
1. Canada	1. United States	1. Switzerland
2. Switzerland	2. Japan	2. Sweden
3. Denmark	3. Germany	3. Norway
4. Finland	4. Canada	4. France
5. Japan	5. United Kingdom	5. Denmark

Source: World Energy Council/Oliver Wyman. Blue font indicates top five leaders in 2 dimensions
*WEC member countries with GDP/capita > US\$33,500.



Clean energy sources such as wind are becoming an increasingly important part of the global energy mix

use it to frame their policy choices, they may take different courses of action.

Diversifying resources

On the supply side, countries' energy policies need to reflect how drastically the world's energy mix is changing. Over the last two decades, the overall mix has remained relatively stable. But now, a wide range of alternatives are disrupting that natural order. That means countries need to commit large sums of money to long-range plans on which the final verdict will often be uncertain for many years to come. Renewable energy is becoming more popular in a number of countries. Natural gas has also become comparatively more attractive. And there is an expected 30 per cent increase in nuclear capacity worldwide by 2020. Fifty-two nuclear reactors are under construction worldwide, with a further 140 on order or planned and an additional 344 at the proposal stage, according to the World Nuclear Association.

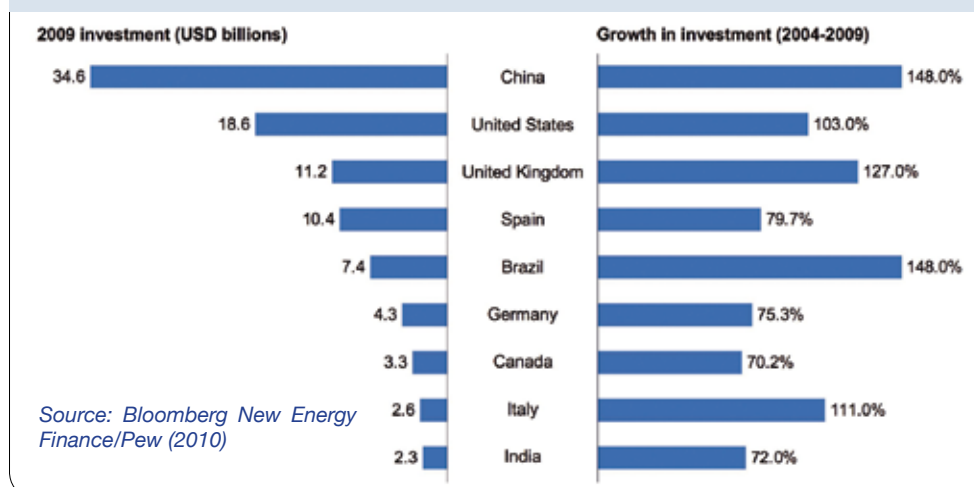
China's approach to supplying the energy necessary to keep up with its breakneck economic growth illustrates how more countries appear to recognise the need to develop a wide range of energy resources. It could have just developed

gas and coal resources which are inexpensive and expedient. But the country has also focused on developing cleaner types of energy such as nuclear, wind, biomass and solar energy.

As a result, China is becoming better positioned to provide energy on a sustainable basis no matter what the future may hold. In 2009, China invested US\$34.6 billion in clean energy – more than any other nation and pushing the United States into second place, according to research by the non profit The PEW Charitable Trusts.

More countries are also beginning to embrace international cooperation to cope with potential risks to their energy security. To reduce the risk of repeated supply disruption from Russia's disputes with the Ukraine and Belarus, Europe has made significant efforts to develop alternative supply routes. Germany's active sponsorship of the Nord Stream pipeline between Russia and Europe may make the country, which imports 86 per cent of its natural gas needs, a new hub for Russian supplies. At the same time, plans have been proposed to develop a "super-grid" to connect planned concentrated solar power generators in North Africa and the Middle East with European consumers. If this grid achieves the scale anticipated by its proponents, it could meet as much as 15 per cent of Europe's electricity demand

Top 10 countries in terms of clean energy investment in 2009



their consumption by 4-7 per cent. Based on these results, California decided to introduce smart meters on a permanent basis. Ontario, too, is in the midst of a large-scale smart grid initiative, installing smart meters in homes and small businesses across the province. By the end of 2010, the system will serve 1.3 million customers.

Policymakers should also develop decision frameworks that integrate a much broader range of factors than they have in the past. Effective efficiency programmes need to be based on the structural make up of a nation's entire economy and reflect its consumption patterns. To

by 2050 while powering desalination plants in North Africa.

The greater challenge for many policymakers seems to be managing energy demand. Policymakers should devote as many resources to managing their demand for energy as their supply. To date, most countries' programmes designed to reduce greenhouse gases focus on promoting renewable technologies. But energy efficiency programmes have been proven to be the cheapest, fastest, and cleanest way for utilities to meet customers' energy needs. Instead of incurring economic costs, nations gain immediate economic benefits and savings when businesses and individuals simply begin to conserve energy.

Conserving energy

California's energy efficiency programmes, for example, have provided hundreds of millions of dollars in savings to customers and reduced the annual global warming pollution equivalent to emissions from three million cars, according to the Natural Resources Defence Council. By focusing on energy efficiency, California has managed to cut its growth in demand for energy to one quarter of what it was projected to be.

To be effective, policies designed to conserve energy need to cut through layers of subsidies based on past priorities so that consumers can become aware of the true cost of their energy and make informed choices. One way to achieve this is by introducing so-called smart grids. When California tested smart meters several years ago, customers reduced

achieve that, policies need to be coordinated across sectors that have not traditionally been considered part of energy policies. Efficiency programmes require the coordination of everything from the impact of upgrades to heating systems to low emission vehicles to green appliances.

Rewarding efficiency

Finally, energy efficiency improvements should be rewarded equivalently to energy supply development to encourage strong public and private sector cooperation. Utilities need financial incentives for helping customers use less of their product. One way to do that would be to permit them to earn a small percentage of their efficiency programmes' net benefits. Policymakers should also play a role in encouraging manufacturers to make more 'intelligent' devices that will enable everything from a refrigerator to an elevator to use less energy.

In summary, today's energy agenda is being shaped by a wide range of competing policy interests. Policymakers need to strike the right balance across potentially conflicting objectives and chart a course to create an energy supply which is at the same time stable, affordable and clean. In doing so, they should develop incentive frameworks that both help diversify their country's energy sources and encourage energy efficiency. We are in a new age of uncertainty, with a wide range of possible outcomes. These steps should help position a country for success in whatever the future might bring. □