

## Read the Series



## SERIES ARTICLES

## ABOUT THE AUTHOR

**Michael Cleland** is Nexen Executive in Residence for the Canada West Foundation and has extensive experience in energy and environment policy.

## DISCLAIMER

The opinions expressed in this document are those of the authors only and are not necessarily those of Canada West Foundation's Board of Directors, advisors or funders. Any errors or omissions remain the responsibility of the authors.

## Innovation is primarily about people and organizations, not widgets

It hardly needs saying that the linchpin for responding to our energy challenges is innovation. But when people talk about innovation they normally mean technological innovation (i.e., research, development and demonstration). Unquestionably these are important, but the fruits of technological innovation, the potential to deploy innovative technologies and the ability to sustain a position of advantage in the face of continuing change derive from a culture of innovation. This is an area where Canada has work to do.

### It starts with how you think about energy

Energy is an industry, a generator of employment and wealth and, for Canada, a very large source of foreign exchange. In this sense it is much like forestry or automobiles. But the economic history landscape is littered with stories of industries or companies that failed to see the changing demand picture facing their industry. A Canadian energy strategy needs to proceed from a strong and forward looking sense of the domestic and international energy marketplace: the demand for energy; what drives it; how consumer expectations are shifting; and how the imperatives driving energy strategies will require slower demand growth and reduced environmental and social impacts irrespective of the source of supply.

Energy is an enabler of several services (simplistically: heat, light and mobility) and consumers will be presented with many ways of securing those services. Commodity producers and infrastructure providers can't simply assume demand. The production function underlying the energy service package has for many years been shifting away from commodities and toward capital, technology and know-how—and that shift will most likely accelerate. Canada will need new skills and new institutional and business models to respond to both the challenges and the opportunities presented by this new world.

### Innovation can take many forms

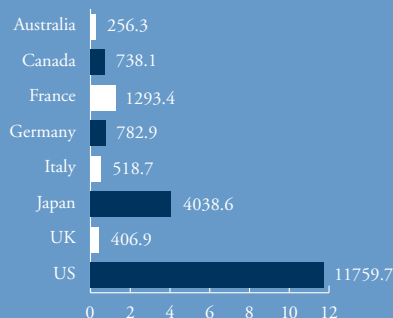
Canada's dependence on a single external market for our energy goods limits our options and makes us hostage to political whims in the US. Innovation can be about markets and securing the gateways for Canadian gas and oil to reach Pacific basin markets should be a national priority.

Canada's energy infrastructure providers—from pipelines and power lines to local distribution companies—will face pressure from numerous directions. In some cases, it will be due to declining volumes in absolute or per customer terms; in others, desired volumes and flow patterns will exceed the capacity of existing systems to cope and there will be great community resistance to new infrastructure. We need new business and regulatory models to manage these pressures.

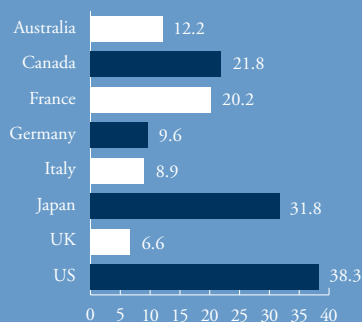


## Food For Thought

### ENERGY R&D INVESTMENT (US\$ MIL)



### ENERGY R&D (US\$ PER CAPITA)



Learn More: International Energy Agency ([www.iea.org](http://www.iea.org))

#### RECOMMENDED READING:

Report of the National Advisory Panel on Sustainable Science and Technology

([www.nrcan.gc.ca/eps/loerd-brdel/report-rapport/toc\\_e.htm](http://www.nrcan.gc.ca/eps/loerd-brdel/report-rapport/toc_e.htm))

The most troubled part of our energy systems is electric power and this is the part that is expected to do much of the heavy lifting on the road to sustainability. But in most parts of Canada we have an institutional model that is hobbled because electricity pricing and the building of power infrastructure are caught in a public service model rather than a market model. The political consequences of that are paralyzing. Much like the case of the health care sector, Canadians would benefit from more and more rapid innovation in the models through which electric power is delivered.

Much technological innovation is not about the widgets but rather how they are put together and how they are sold. Most energy technology *per se* is 100 years or more old and most energy innovation in the past twenty years has been founded on IT and communications technologies. Future innovation at the downstream end will be largely about systems integration and institutional innovation.

Most of the energy delivered to Canadians or to export markets moves in some part of the value chain through rate regulated utilities. Canada benefits from a highly successful model of independent regulators but this system is under pressure to reconcile the regulatory system with shifting markets, new technologies, environmental aspirations and consumer dissatisfaction about prices. We need to ensure that our regulatory infrastructure remains capable of the huge job that we ask it to do and we need to engage the regulators in the national debate.

And we do need to invest in new technology. The energy supply industry is a big user of technology and a highly capable adapter of technology to Canadian circumstances. But for the most part, like most commodity and utility businesses, energy companies invest very low percentages of their revenues in technological innovation. Canadian governments are relatively big investors in technology (including in the energy field) and we have many small scale niche technology companies. But we would all be pressed to name a major aspect of energy—either at the supply or demand end—where Canadians are at the leading edge. Our position in the world of energy is under threat if that doesn't change.

## The priority is putting more innovation in the conversation about innovation

If energy is set to undergo radical change over the next several decades—as it almost certainly has to in order to meet its multiple challenges—Canada needs to be thinking much more about how we engender a culture of innovation.

