

## 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.

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## Getting energy right means focusing on productivity

Several pressures in the coming decade will most likely make delivered energy more costly. One of these is the likelihood that we will depend increasingly on higher cost petroleum resources or even higher cost bio-fuel resources to fuel the transportation system. Another, probably more important, is the growing cost of tying energy resources to end use markets due to higher costs of transformation and transport and to account for increasing standards of environmental and social acceptability. The last, and probably the most important, are the costs of decarbonising the energy system. One can debate what this bill might add up to, but if the carbon cost alone is accounted for it would be at least a doubling compared to today's costs (based on analyses of what current GHG reduction commitments would entail).

Characteristically we think of energy efficiency as a means to reduce environmental impacts. But it is also a way of reducing costs provided it is driven by economically efficient measures. In short, a focus on productivity<sup>1</sup> has potential not only to address environmental issues but can also help to mitigate the coming cost crunch. In other words, it pays for itself in strict economic terms and environmental benefits are an extra dividend.

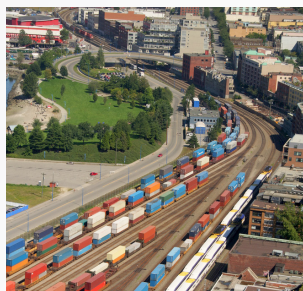
### It's about services not commodities

We habitually think of energy as commodities: oil, gas, electrons. But what consumers value, if not precisely what they pay for, is the service: mobility, warmth, light. That service is delivered through a complex mix of input factors including resources, capital, labour and a great deal of technology and know-how.

The big energy productivity challenge is how to optimize that mix—a total factor productivity view. But let's start with a somewhat narrower energy efficiency perspective.

The McKinsey Global Institute (MGI) puts the potential of increased energy productivity in perspective. In one article MGI makes the point that global energy demand growth could be cut by half to 2020 compared to business as usual through deployment of readily available existing technologies. The poster child for energy productivity (defined as \$GDP/BTU of energy) is Japan, whose energy productivity level is double that of the US (and Canada). There are many factors behind this difference and many reasons why what Japan has achieved may not be readily transferable to North America, but if only part of the potential were to be captured cost-effectively the economic and environmental payoff would be very large.

<sup>1</sup> Energy efficiency and productivity are not exactly equivalent. As McKinsey uses the term, energy productivity is the inverse of energy intensity, in other words higher energy productivity means reduced energy use per unit of economic output. Energy efficiency is the principal means through which higher productivity is achieved. Others, such as changes in economic structure or weather are normally not susceptible to policy.



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## RECOMMENDED READING:

Integrated Community Energy Solutions roundtable  
(<http://www.nrcan-rncan.gc.ca/com/consultation/creteo-eng.php>)  
convened after 2009 Energy and Mines Minister's Conference

*The End of Energy Obesity*  
(Peter Tertzakian and Keith Hollihan, 2009, John Wiley & Sons; available at fine bookstores nation-wide)

Specifically in a Canadian perspective, of the total primary energy entering the Canadian economy, well over half becomes waste (over 16% from the power system, 38% from other aspects of energy production and transportation and end use). In other words almost 55% of our energy resources do no useful work. If delivered energy commodity costs are likely to rise, as most observers of the energy economy expect, it would seem prudent to start planning on how to reduce that 55% waste proportion as a means to offset the cost crunch and reduce environmental impacts at the same time.

To do this we need to understand that reducing waste is more than a matter of changing light bulbs or turning down thermostats. As the QUEST collaborative points out (looking from the downstream or community end of the world) we need a system perspective. Canada needs an energy productivity strategy composed of several elements, among them:

- End use efficiency—this is the primary focus of the MGI work.
- Optimizing energy choice—ensuring (through price signals) that we use high quality energy such as electricity primarily in places that require it.
- Reducing system losses—from production, transformation and transmission to delivery and in particular, managing waste heat.

## And it needs to be put in a larger frame

A single minded fixation on energy efficiency or any other factor of production such as carbon can lead to misallocation of other resources—especially capital, if the total return on the investment falls short of some assumed social discount rate. (On the other hand, such investments can pay double dividends; high energy efficiency buildings often contribute to higher labour productivity.) One of the barriers to energy efficiency is that it entails the substitution of capital for energy commodities and what looks like “free” energy efficiency may, in fact, be very costly. This adds immensely to the complexity of the problem and it is a reason why the only reliable arbiter of all of this is proper prices, and, only sparingly, mandates, rules and regulations.

Broadening the frame even further, we need to take a larger view of the question of resource inputs. The environment is a resource in many senses, some parts of which are priced in open markets (such as energy commodities), other parts of which are implicitly priced through regulation of various sorts. What is missing is the value of the atmosphere as a repository where we place carbon and where neither adequate regulations nor prices are yet available to send signals to decision makers. In short, the energy productivity problem needs to encompass resource productivity in the broadest sense.

## But to do this right we need more entrepreneurs not more policemen.

The spectacular success of the western economies in the post-WWII era is mainly a productivity story. We got there largely because of open markets and price signals with private investment mediated by—but not driven by—rules and regulations. The energy productivity challenge needs to be met the same way.

