Industry Energy / Emissions Decline ... Again!

Energy use by the manufacturing industries (NAICS 31-33) rose in both 2010 and 2011 but, based on the most recent Industrial Consumption of Energy survey, it dropped by nearly 2% in 2012. Energy use is now 9% less than in 1990 and 18% below 2004 peak levels. This makes the trend line of energy use over the last four years fairly flat in spite of a continued increase in GDP over the same period. And, when energy use decreases, fuel-based GHG emissions also tend downward; they dropped 2% in 2012, about 7.5% higher than the low of 2009. Like energy, emissions are still 17% below 1990 levels. With a GDP growth of 1.6%, both energy and emissions intensities continue to decline.

While intensities are not at their lowest point (2006, see Fig. 1, next page), it has been quite flat since 2006. It took nearly 25% less energy to generate a dollar’s worth of goods in 2012 than it did in 1990.

We remind our readers that a lower intensity does not necessarily mean an improved level of energy efficiency. It may indicate that the mix of industries has changed; declines in pulp and paper or steel production and increases in the food preparation or transportation equipment industries can radically affect overall energy intensity levels.

In 2013, Statistics Canada updated their real GDP data from a 2002 base year to 2007. The online data only go back to 1997 so CIEEDAC updated the 1990 – 1996 data to create a continuous series.

Furthermore, the level of disaggregation of the GDP data also changed, leaving some of the industries on which CIEEDAC reports without a GDP production value. CIEEDAC used historic data to estimate what these GDP might have been for 2012.

Gross output data, historically provided by Informetrica Ltd., are not available this year because the company has ceased operations. While Stats Can does generate GO data, they are not available in time for CIEEDAC’s analysis.

Fuel mix changes

Figure 2 depicts fuel shares over the years. These fuel shifts affect both GHG emissions and the relative ratio of primary to secondary energy (i.e., electricity as an energy carrier is a "secondary" form of energy if made from "primary" fuel like coal, oil or natural gas).

The graph shows that electricity’s market share grew from the mid ’90s to 2005 and then leveled off. Once the dominant energy carrier, shares have declined since 2009 and, for the last two years, fell below that of natural gas.

What about shifts in the other fuels? Most have been quite steady in the last few years but we do see a decline in heavy fuel oils, declining since 2004, and an increase in light fuel oils. Neither play very important roles in industrial energy use and it is difficult to trace why these changes may be occurring.

Economic analyses tell us that energy prices play a role in fuel choice, especially...
in industries where fuel switching can happen very quickly. Continued low natural gas prices appear to have generated increased demand for NG and perhaps forced shifts from other fuels like HFO. But, without further analysis, we cannot determine if this relationship is coincidental or causal.

**Impact on GHG emissions**

With the decrease in the consumption of fossil fuels and shifts in their shares (see Fig. 2), GHG emissions from combustion in Canadian Manufacturing Industry as defined in the ICE data decreased nearly 2% from last year to a level 17.4% below 1990. These data should be considered preliminary; Environment Canada’s National Inventory Report for 2012 is not yet available.

If one were to include all process related emissions (which actually increased about 3% from 2011) and emissions from the metal and non-metal mining sectors, total emissions are nearly 24% below the level of emissions generated in 1990. These data do NOT include coal mining and upstream oil and gas (including bitumen) or indirect emissions from electricity. Specific data by sector are currently available on line from CIEEDAC.

**Stat Can’s Energy Statistics Framework**

Canada has been endowed with a natural abundance of renewable and non-renewable energy forms. As one of the few OECD countries able to supply energy to the global energy market, it is seen internationally as an important, if not major, energy player. Thus, it is imperative that comprehensive, high quality, useful statistics on Canada’s energy system be maintained.

**What's Going On?**

**Pet Ref Survey out**

CIEEDAC distributed its 20th annual survey to all petroleum refiners in Canada. CIEEDAC’s database on energy consumed in the refining industry is used by the industry in its publications and for CIPEC reports.

**All ICE data available on line**

Statistics Canada has released online its revised ICE data. CIEEDAC’s own database has been accordingly updated and is also posted online. The database, available at [www.cieedac.sfu.ca](http://www.cieedac.sfu.ca), contains energy, production and GHG emissions data for over 130 industry NAICS sectors up to 2012.

**District Energy data collected**

CIEEDAC personnel sent out its first district energy survey to about 106 district energy operations and received responses to at least 63 of them (59%). The data will be placed on line when assessments are complete and a report will be released by March 31, 2014.

Significant changes are occurring on the energy front: environmental / energy issues are addressed daily in the media, conventional fossil fuels are diminishing, unconventional fuels are becoming more and more “conventional” (perhaps these names need to be changed!), climate variation is enhancing alternatives such as biomass, wind, solar and other renewable forms of energy, efficiency improvements are important, infrastructure and transportation issues have an increasingly public dimension; the energy world is changing.

Statistics Canada, along with Natural Resources Canada, has commenced the development of an up-to-date and comprehensive Energy Statistics Framework (ESF) given the importance of energy to the Canadian economy and the changing face of the energy system. They have begun a series of workshops, the first of which was held in Ottawa on Jan 21, 22, to define and design an ESF in accord with the International Recommendations for Energy Statistics (IRES) as developed by the Oslo Group on Energy Statistics and the Inter-Secretariat Working Group on Energy Statistics. The IRES was adopted by the United Nations Statistical Commission in February, 2011.

As a primary user of energy data in Canada, CIEEDAC’s Dr. Nyboer was asked to participate with a number of other data users from the academic universe in this first of many workshops to address energy issues, gaps, next steps, environmental impacts, and other components of Canada’s current energy data system. Happy to participate in this event, he sees such progress as an important step forward in a world faced with an increasing demand for energy and confronted by environmental impacts that require action.