The Coal Question: Still Alive

By Raimund Bleischwitz, on 3 November 2015

This is a turbulent year for commodity markets, and yet, almost unnoticed it also marks the 150 years anniversary for one of the most important books ever written on the issue. William Stanley Jevons, a professor at UCL, published his book entitled '**The coal question** – an Inquiry Concerning the Progress of the Nation, and the Probable Exhaustion of Our Coal Mines' in 1865. His book should still serve as a useful reference for contemporary debates. So, why should such an old book be of relevance for us today? The straightforward answer is to consider it as wellspring of knowledge about the interface of geology and economics, i.e. resource economics, but I'd like to also offer three avenues worth exploring and derive some propositions for the future.

Exhaustion or abundance?

In the mid-19th century, industrialisation was in full swing in Great Britain or at least beginning to shape development pathways in many countries. With it, demand for coal was soaring in a way that many observers believed could soon lead to exhaustion of supplies. Jevons did a careful investigation arriving at balanced results considering risks for UK prosperity but opportunities coming from international coal trade, alternative energy systems and "literally inexhaustible" reserves; yet he also speaks about "natural limits" e.g. for agriculture. Probably more important, his book is considered to have **stimulated systematic assessment** of reserves done by geological surveys (USGS, BGS, BRGM, BGR, others) who nowadays tell us that the earth crust offers enough supply for energy fuels and other materials for a foreseeable future, with some debates even highlighting energy **abundancy** rather than limits or peaks, and others addressing the **nexus** between energy and other resources. Actually, prices on international energy and commodity markets have been, on average, downwards in the last three years – and there is little expectation for price increases in the future.

The 'Jevons Paradox'

Jevons has become famous for his discovery of unintended side-effects – energy efficiency and energy saving measures leading to higher demand, not a lower demand, for energy. This **paradox** arises through the price mechanism, as consumers respond to lower prices due to energy efficiency improvements with more desire to heat their homes, drive around, etc, or shift expenditures to other fancy goods often requiring more energy. While this phenomenon has been studied by a number of scholars as a relevant barrier, the international dimension should probably be considered worrisome too. Many suppliers of fossil fuels respond to current market conditions by either maintaining a high level of production (e.g. Saudi Arabia for oil), or even planning expansion (e.g. Australia for coal). The reasons for it are manifold, but the consequences are clear: low prices for energy fuels and, perhaps, other resources are likely to be with us for quite some time.

Unlocking the carbon-based industrial system

With both trends speaking in favour of cheap coal being abundantly **available** for all nations, tackling climate change is likely to become a huge challenge. Just to recall: societies have been urged to reduce energy-related CO_2 emissions by some 80 – 95% by the end of this century, and researchers calculate that to pursue a climate policy limiting global warming by 2°C will require to leave some 80% of proven reserves for coal **under the ground**. A real value of Jevons for today is his brilliant analysis of the processes at work in the first century of the fossil fuel age – the interlocking technical developments in coal mining, steam power, iron and steel production, and railway systems, that have made the Industrial Revolution next-to-inevitable.

So, here is the *coal question of today*: will markets and societies be able to grasp the opportunities for development resulting from affordable energy while environmental challenges require new ways of producing energy fuels and a new industrial model with less pressure on nature?

Lessons to be learned

Fortunately, there are lessons to be learned by re-reading Jevons and by endorsing a few promising trends. Jevons has wisely addressed the responsibility to maintain all forms of capital over time and to invest in future sustainability, he explored alternative energy sources and the energy return on energy investments (EROI), and reflected on issues of prosperity. Perhaps almost forgotten, Jevons suggested to use revenues from coal production for a reduction of national debts. One of his legacies, to look at commerce as “a means to an end” and spend our material wealth for raising the social and moral conditions of the people and reducing the burdens of future generations, is today as important as it was at his time.

It may come as a surprise that, historically, environmental sustainability has actually been facilitated and supported by the coal industry. **Hans Carl von Carlowitz** developed his now famous principles of a sustainable forestry in the early 18^{th} century while working closely with coal industry, which eagerly applied those principles in their quest to maintain a constant supply of construction wood for their mines. We could learn from it a lesson about collaborations and alliances, which may often follow different motivations as long as they pursue similar goals.

Today, the debates about **technological innovation systems**, the business of eco-innovation and resource efficiency can also be applied to coal and other resources: by selecting energy-rich fuels that emit less carbon and fewer other air pollutants; by maximizing the by-production of other useful materials; by improving the energy efficiency and water efficiency of extraction, and applying renewable energies and sustainable water supply to all energy-intensive processes; and, if feasible, by developing technologies for Carbon Capture and Storage (CCS) or even Carbon Capture and Re-Use (**C-Rec**) and deploying it in the second half of the century. The critical issue, probably, is the quest for strong innovation networks beyond energy able to **overcome** path dependencies.

Many coal companies are mining companies that could also expand the extraction of other materials necessary for green economies and for reaching the new UN Sustainable Development Goals (SDG), such as iron ore (for steel), copper (for electricity) and others. Mining companies could also explore new business areas such as urban mining, large-scale recovery of secondary materials, and an integration with refineries for a circular economy. In the long run, mining business might change into becoming providers of sustainable materials for green economies.

On the macro scale, significant financial sources could come from green sovereign funds in resource-rich countries, and from fiscal reforms with fewer subsidies on fossil fuels, step-by-step

increases of carbon taxes or extraction taxes when appropriate, and lower taxes on labour-intensive activities. After all, a systemic approach to **eco-innovation** will be needed.

And while this all may seem optimistic or even utopian, the main lesson from Jevons for tomorrow would be the alignment of social concerns and natural limits with proper business for long-term public goods, concepts that started to emerge in the height of capitalism during the late 19th century. Today, both the adoption of the SDGs and the Paris summit on climate change in late 2015 could trigger the launch of an international initiative for the mining sector towards sustainable development with stakeholders from all sides.

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