



Why do we persist to under-invest in energy R&D?

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Yes, we need better renewable energy technologies. Yes, free markets fail to provide appropriate incentives for radical energy R&D-projects. So yes, governments stepped in and created several incentive schemes. But no, most renewable energy technology companies do not seriously invest in R&D...



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Everyone is convinced that renewable energy technologies will play a pivotal role in the necessary energy transition of the coming decades. Current renewable energy technologies are however inadequate in producing reliable energy services with radical emission reductions at an acceptable cost for society. Despite the attractive subsidy regimes in developed economies, modern renewables such as wind and solar technologies so far still deliver less than 1% of the global energy production. Better technologies can radically increase the market share of modern renewables. As always, we have no other option than to innovate. Looks promising, but who is currently innovating and preparing the expected long green wave?

In 1980, OECD countries did spend 19 billion \$ on public en-

ergy RD&D (nuclear, renewable, fossil, efficiency, hydrogen, fuel cells,...). The share of energy RD&D in total R&D was close to 12% in 1980 but did melt away to some 3.5% in 2008. In 2008 or more than decade after the Kyoto Protocol, OECD countries did spend 12 billion \$ on energy RD&D or 7 billion \$ less than in 1980. Half of public energy RD&D relates to nuclear fission and fusion.

In 1980, governments invested 2.2 billion \$ in renewable RD&D. After 1980, interest in renewable RD&D declined to 911 million in 2000. Since then, renewable RD&D budgets recovered to 1.7 billion \$ in 2008. This is however still less than thirty years ago... All these figures are in nominal Dollars. Corrected for inflation, the reduction would be even more spectacular. But of course, compe-

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titition for public R&D-resources did increase strongly since the early 1980s and who would dare to argue that the friendly biotech, IT and pharma people are not creating value for money?

But how are private energy technology companies performing? As a matter of benchmark, engineering

companies on average spend around 7% of their sales revenues on R&D. There is of course some cyclical variation in R&D investments and some sectors operate in a very specific market environment. In most competitive sectors with short production cycles such as mobile phones or other trendy consumer goods, market leaders invest massively in R&D. Companies like Nokia and Samsung spend up to 12% of sales on R&D. In some years, major consumer electronics companies decide to radically reorient their business and this can lead to R&D-programs that consume up to 40% of revenues from sales.

Renewable energy technologies cannot be compared to mobile phones but obviously fit in the broad sector of engineering. Despite all the fuzz about green energy technology, the predicted take-

over of renewable technologies and the need for technological innovation, the largest solar technology companies spend between 0.5 and 4% of sales on R&D. In 2009, First Solar (US) invested 3.8% of sales in R&D, Suntech (China) 1.7%, Q-Cells (Germany) 2%, Yingli (China) 1%, JA Solar (China) 0.5%, Trina Solar (China) 0,6, SunPower (US) 2.1%, Gintech (China) 0.5%. Sharp (Japan) is the only exception with R&D in 2009 equal to 6.7% of sales.

For wind technology companies, we find a similar pattern. Vestas (Denmark) invested 1.4% of sales in R&D in 2009, Gamesa (Spain) 1.3%, Suzlon (India) 0.7%, Nordex (Germany) 1.5%, Acciona 1.6%, Repower (Germany) 2%. This list is not complete because major companies such as Siemens do not provide a detailed decomposition of their R&D-portfolio. Nevertheless, we can only conclude that the sector of renewable energy technologies is underperforming when it comes to innovation. In basic chemicals – a rather established business that is difficult to compare to the new business of renewables – major companies invest on average some 4% of sales in R&D.

Do fossil or other energy technology developers perform better? Not at all. Compared to ‘average engineering companies’ all

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energy technology developers seem to underinvest in R&D.

Apparently, energy technology companies do not surf on the popular wave of energy and climate alarmism. How can we explain this puzzle? Do companies underinvest in R&D because of human capital scarcity? You cannot upscale your R&D-

efforts without skilled engineers, scientists and technicians. But how convincing is this argument in a global job market that benefits from new armies of technically skilled Asian workers? Or do companies hesitate because they fear that the gains from R&D are not proportional to the financial risks? If that were the case, prospects for much better renewables should be scaled down. Or do energy technology companies operate in very pleasant markets with generous subsidy regimes that make it possible to earn big money with 'old' technologies? Do high subsidies take away the real need

to innovate? Anyway, this would however be a very temporary situation. The ability to sell technologies with lower investment costs will always push more expensive suppliers out of the market. As generous subsidies attract new competitors, incumbents have no other option than to prepare for tough competition.

To conclude, it is not so easy to explain low R&D levels at energy technology companies. More importantly, is it a (big) problem or not?

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Voor duurzame economische groei en sociale bescherming