The Environmentalists Struggle with Energy Security Or: If Maslow Were in Energy Politics

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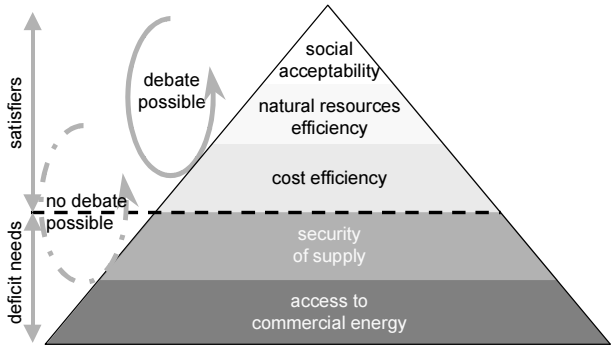
Abstract

History suggests that energy policy priorities can be stratified similarly to the way Maslow structured his famous pyramid of human needs. The essay below claims that access to energy, supply security, energy costs, environmental issues and social acceptance are not subject to trade-off, but to a hierarchy that underlies the importance of satisfying lower order needs before addressing the higher order ones. The following essay demonstrates the hierarchy with an "energy policy needs pyramid" based on historical evidence. The pyramid is used to analyse the viability of current items of the energy policy agenda. Conclusions indicate that the public understanding of the critical aspects regarding energy security is the foundation on which a robust and balanced energy policy can be built; that progress with respect to the mitigation of greenhouse gas emissions may be hampered by supply insecurity; that environmentalists should opt for a large international Energy Forum to control energy prices and facilitate the necessary investments, invest in R&D that would focus on simple energy solutions and systems rather than on sophisticated high-tech, promote trade rather than local production of biofuels and make the fight against energy poverty their first priority in order to achieve their overall goals.

"A person who is lacking food, safety, love and esteem would most probably hunger for food more strongly than for anything else," stated the American psychologist Abraham Maslow in 1943 while formulating a theory to explain the motivational structure of a healthy person. He distinguished different groups of needs and defined the hierarchy now known as Maslow's Pyramid. Could there be a model similar to Maslow's Pyramid stratifying different groups of needs and explaining the motivations that determine a country's decisions regarding energy policy dilemmas? Countries have been struggling for decades with setting priorities and continue to do so when confronted with dilemmas in the supply of energy to their people and economy. Is supply security the top priority? What determines the trade-off between evils: nuclear waste versus greenhouse gas emissions versus high costs of renewables? The mixture of spices is very much a creative approach – no recognized concept exists that helps getting priorities right. Surely, a country that lacks access to commercial energy, a secure energy supply, societal and international recognition for complying with environmental standards, would prioritize access to commercial energy before everything else.

The "Energy Policy Needs Pyramid"



Historical observation of national energy policies shows that once access to commercial energy is obtained, the first priority is supply security, followed by cost efficiency. At the end of the 1970s, industrialized countries began to consider natural resources efficiency (keyword: internalization of external costs) and then (in industrialized countries since the late 1980s) by social acceptability. The last three aspects – cost, natural resource efficiency and social acceptability – explicitly reflect the pillars of sustainable development that aimed at balancing, rather than stratifying, the efforts made on each of the relevant aspects. But, to what extent does political viability leave room for trade-offs or for balancing needs?

In Maslow's Pyramid, the hierarchy illustrates that only once the lower order needs of physical and emotional well-being are satisfied do we concern ourselves with the higher order needs of influence and personal development. Conversely, if the aspects that satisfy our lower order needs disappear, we are no longer concerned about the maintenance of our higher order needs. Can we observe similar patterns in historically observed energy policy priorities?

It seems obvious that the question of supply security only matters to people who already have access to commercial energy. Regarding the next higher level, the U.S. experience shows that supply security prevails over cost-efficiency, environmental and social issues. This is illustrated by the fact that concerns about decreasing supply security traditionally have won out over environmental issues, such as climate change and Alaskan wilderness preservation. Similarly, biofuels, which could be imported at half the cost from Brazil, are heavily subsidized if domestically produced. Such domestic production is not only more expensive, but also less environmentally sound than the Brazilian: sugar cane, the standard Brazilian crop, is still the most energy efficient feedstock for producing bioethanol and far better than the crops used in the U.S. As another example, the increased questioning of elec-

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tricity market liberalization (the promise of cost efficiency in energy supply) that followed the 2003 summer of blackouts again indicated that supply security took precedence over the low cost energy issue. A similar conclusion can be derived from the observation that China has set up for its automotive industry stringent and cost-intensive constraints regarding the per mileage consumption (as of 2005). The driver behind this is energy security (more than environmental) concerns in the context of a rapidly growing mobility market and a just as rapidly growing foreign energy (oil) dependency. Again, supply security ranks over (here: mobility) costs. A number of economists promote internalization of external costs (i.e., the idea that the polluter pays for his pollution), adopting the viewpoint that this would be economically efficient, while other economists promote market liberalization for precisely the same reason. Reality shows that only the latter is on most national policy agendas. This suggests that low cost issues prevail over economically justifiable environmental concerns. Likewise, President Putin illustrated this point with his statement (10/03) that the domestic fight against poverty was more urgent than the ratification of the Kyoto Protocol (while at the same time liberalizing the electricity industry). It is further interesting to analyze the attitude of Germany during the natural gas crisis between Ukraine and Russia, January 01-04, 2006. Ukraine's right to national self-determination is an important (socio-political) issue for the Europeans, but it ranks substantially below their own energy (-security) interests. When Gazprom stopped delivery to Ukraine and the Ukrainians siphoned natural gas bound for Europe, Moscow was betting that the Europeans – and particularly the Germans – would rapidly drop support for the Ukrainians. Mrs. Merkel kept a very low profile and made it clear that Germany's first interest is energy security. Finally, the nuclear waste problem or the esthetics of wind farms are debated much more in industrialized countries where the lower order needs are satisfied. Social acceptance and environmental issues are often closely related which indicates that the hierarchy among the top two issues is not very strong.

Besides confirming the historically grown "energy policy needs hierarchy", the previous set of examples suggests that balancing priorities may be politically feasible only to a limited extent and only among the higher order needs.

This simple model can describe the motivational structure determining a nation's policy that is concerned with supplying energy to its economy and people. The pyramid is based on observations and is, therefore, of a purely descriptive nature and it would be wrong to interpret it as a normative hierarchy. In other words, the statement that, for example, supply security issues would prevail over ecological concerns is based purely on observation – by no means does the pyramid morally justify this hierarchy. Further, by drawing a simple picture, we did not consider the nexus with other policy domains – constraints from security policy, finance policy, health policy, etc., which can have an important impact on energy policy, both on a national and international level. As an example, decisions related to "security of demand" in oil and gas exporting countries are driven by budget policy and are not necessarily part of the nation's policy that is concerned with supplying energy to its economy and people – but they clearly affect energy geopolitics and thereby the supply security of other countries.

That said, the pyramid reflects a certain reality. By learning from it we might avoid chasing illusions, desirable as they might be. Like a pianist, dreaming of Rachmaninov's third piano concerto – choosing to play one of his preludes instead, being realistic about the limits of his technique and finger ability, does not keep him from dreaming and slowly getting closer to his dream but prevents him from being frustrated from having spent his talent and time on a failed attempt that aimed a level too high.

So let us now extrapolate and behave as if the pyramid was to determine future energy policy priorities.

Using the Pyramid as a Crystal Ball

First of all, the pyramid tells us that understanding the supply security issue is crucial. We intentionally use the narrow term of supply security rather than the wider term of energy security. The former reflects a traditional focus on supply of crude oil and natural gas while the latter is broader and includes issues such as electricity blackouts, inadequacy of refining capacity, etc. We argue that after the 1973/79 oil shocks the former is anchored in people's minds as a powerful fear factor and that energy security is often reduced to supply security. We should bear in mind that security perception is based not only on facts but is, to a certain extent, a social phenomenon. This means that unless there is a clear public understanding and agreement on appropriate level of energy security, lobbies that may be questioned by higher order needs will use the "fear-tactic". In other words, they will insist that the existing level of supply security is inadequate, thereby sharpening the focus on pure supply/demand issues. This is simple and has demonstrated populist impact. Thus, the public understanding of the critical aspects regarding energy security is the foundation on which a robust and balanced energy policy can be built.

Mitigation of greenhouse gas emissions – hampered by supply insecurity? As long as supply security is a dominant issue for the international energy policy scene, the attempt to reach international agreements regarding higher order needs is seriously questioned. The Kyoto Protocol has until the late nineties been associated with an environmental agenda with a correspondingly low priority on the political agenda. This perception clearly has changed, not only in countries with clear exposure to flooding (such as, e.g., the Netherlands) and not only after the hurricanes Katrina and Rita in 2005. The issue is now much more associated with economic and even with (national) security agendas, which brings it to a "competitive" priority level with energy security. The recent priorities of the G8 agenda underline this point: While G8 leaders in 2005 and under Prime Minister Blair's leadership focused on climate change, they will, in 2006 and under President Putin's leadership address energy security. Clearly, an "environmental" issue can make it to the commanding heights, but only once it is perceived to be a security issue. However,

we also observe that energy security pushed climate change off the 2006 G8 agenda. Does this mean that the fear-tactic is being practiced again?

"Poor people desperately want energy, electricity particularly," commented Barbara Stocking, Executive Director, Oxfam GB (01/02). Today, around 1.6 billion people, or one-quarter of the world's population do not have access to electricity. This energy divide has many faces. The standard of living improves with access to commercial energy; electricity makes it possible to cool medical drugs or to pump water. According to the World Energy Investment Outlook published in 2003 by the International Energy Agency the cost of providing electricity access by 2030 to the then estimated 1.4 billion people without access is estimated at US$ 665 billion (compared to US$ 9,841 billion needed for overall electricity investments on a worldwide level over the same time period). According to the same source, total CO_2 emissions would increase by as little as 1.4%-1.6%. – Would you ask your co-citizen who has not enough to secure a meal and a bed to spend his time and money for fire brigade contributions? No doubt, there may be a fire and there is a common interest in having a fire brigade. Is your conclusion that society should pay for such a service while the worse-off should be exempted from any payment? What about the case where the potential fire is called climate change and co-citizens are co-nations, some of which with a majority of the people still without access to commercial energy? As long as countries have not secured a certain level of electricity supply at a reasonable cost they will not commit (intrinsically motivated) to an environmental agenda (although they may do it based on external pressure). Conversely, if coal is locally available and cheap, that is what will be used – full stop. Indira Gandhi captured this situation eloquently, referring to poverty as the ultimate pollutant (Stockholm, 1972). The pyramid would suggest that fighting energy poverty should rank top on the world's energy agenda before international agreements on higher order energy needs can be achieved. Should this make the fight against energy poverty an environmentalist's first priority?

Is OPEC good for the environment? We all know the rationale that OPEC helps preserving scarce resources by maintaining high prices – here we follow another track to find a similar conclusion. We could observe that OPEC has, during the Gulf crisis in 1990/91, during the Venezuela strike in 2002/03 and even in the beginning of the war in Iraq in 2003, contributed to maintain supply and demand balanced at a surprisingly stable price – OPEC has thereby acted as an important contributor to energy-geopolitical supply security. Even though this role seems to go beyond OPEC's capabilities since late 2003, when Chinese growth combined with continued instabilities in Iraq, Venezuela and Nigeria have driven oil prices close to historical heights, we can make the following observation. The cartel has managed to moderate the price spikes for some time (at the cost of increasing the average price). Such stability in turn made it possible for individual countries to continue to address higher order needs. The pyramid would suggest that this makes OPEC a facilitator of potential environmental policy measures in the countries that benefit from the improved supply security (at least as long as long-term investments are ensured even though the lack of clear price signals may keep markets from an appropriate anticipation). If we carry the same rationale a bit further we find that a shift to a cartel free, gas prevailed energy picture may question today's level of environmental policy. Should an environmentalist rather opt for a large international Energy Forum to control energy prices and facilitate the necessary investments? Clearly, this Forum would need to be more inclusive than the International Energy Agency (IEA) or the Organization of the Petroleum Exporting Countries (OPEC).

Should we learn to love expensive energy? This scenario certainly increases efforts towards energy efficiency and savings and is, as such, every environmentalist's hope. If we follow the logic that there is some elasticity between energy and capital, the scenario also encourages capital-intensive – high-tech? – solutions. Following the logic of the pyramid, social acceptance then loses its weight in the policy agenda, helping controversial technologies such as nuclear power or carbon sequestration to find their way (back) in the energy mix. As a further consequence, the high capital cost of advanced technologies would be likely to increase the divide between energy-poor and energy-rich countries, making the task of bridging the energy divide even more challenging. Should the quoted environmentalist in such a situation invest in R&D that would focus on simple energy solutions and systems rather than on sophisticated high-tech? The former can be locally produced and implemented also in energy-poor countries, based on locally available (or achievable, as, e.g., demonstrated by the Barefoot Solar Engineers electrifying rural villages in India) qualifications.

Does the pyramid advocate for the hydrogen economy? The hydrogen economy is a popular vision for the energy future. However, we are still decades away from the realization of this dream in which hydrogen as a secondary energy carrier used to fuel mobility would complement electricity for stationary uses. It typically takes 30-50 years before a technical breakthrough has economic viability. The development and maturing of the appropriate technology, the construction (and financing) of the needed fuel distribution infrastructure, and the required car park replacement time (of about 20 years) determine the time horizon for the introduction of such new technology. Last but not least, the question of the origin of the hydrogen itself needs a sustainable answer. Producing hydrogen from fossil energy would certainly solve neither the climate change problem nor the resource issues. This said, if hydrogen (or another secondary energy carrier) can be produced, stored and transported in large quantities from worldwide well-distributed resources (be it coal, nuclear, or renewable energy) the energy-geopolitical risk exposure could be significantly reduced compared to today. Today's known oil and natural gas reserves are geographically very much concentrated to a few (to a large extent considered "unstable") regions. OPEC controls 40% of production, 60% of exports and 80% of reserves. Non-OPEC oil supplies are expected to plateau by 2010 while the cartel's ample reserves will allow its production to gain a world market share of over 50% by 2030, according to IEA's 2002 World Energy Outlook. The

concentration of oil reserves in a small number of countries leaves increasingly less room for origin diversification. This, combined with elements such as geopolitical turmoil in the Middle East or unpredictable state interventions in the energy business as observed in Russia or Venezuela, increases concerns with respect to energy security. Even if expensive, the potential of increasing supply security could, as we are told by our pyramid, be an accelerating advocate for this vision – unless there are better alternatives.

What about the biofuel economy? Biofuels in many ways represent the same advantages as hydrogen. They have the potential to be climate and environmentally friendly as long as produced with best practices (i.e., sustained plantation without initial deforestation, energy efficient production based on sugar cane, etc.). With no or few changes in infrastructure and engine technology, bioethanol or biodiesel can directly substitute for parts of the fossil fuel demand: Bioethanol can be mixed up to 25 percent with conventional gasoline and used by existing engines; biodiesel can substitute diesel up to 30 percent; slightly modified flex-fuel vehicles can take 100 percent bioethanol. Geopolitically, these fuels could come from countries that are not traditional oil exporters (e.g., Brazil, Ukraine, Indonesia, India) and could thereby potentially contribute to the diversification effort. Production costs in some of these countries are several times lower than in industrialized nations and reach the competitive levels of international oil prices. This all sounds great, but why are they not more widely used and traded then? Clearly, competition with food agriculture and sustainable production schemes are potentially problematic. However, these cannot be the true obstacles, as they can be addressed, for example by a labeling approach similar as used with bio-food, wood (Forest Stewardship Council), fish (Marine Stewardship Council), etc. The true obstacles that have prevented the wide introduction and trade of biofuels are agricultural trade barriers, quota systems, state-controlled import monopolies and fuel legislation. As specific examples, the 2005 energy bill in the U.S. fosters biofuel and continues to highly subsidise the domestic production while the EU simply limits the bioethanol share in gasoline to 5%. The agricultural lobby in the countries are strong and they manage to make out of it an existential question – in other words, a question that is in competition with the very bottom of our pyramid! Would it help to overcome this deadlock if the environmentalist would take unconventional stands and promote trade rather than local production of biofuels?

Like many theories, Maslow's hasn't endured the test of time – it failed to explain the existence of poets. Poets would probably not exist if their first preoccupation was lower order needs such as the health of their bank balances. Yet, poets are a minority. They are just as much of a minority as countries that give equal priority to environmental concerns and supply security issues. We may challenge our priorities and values – and thereby the pyramids – with new visions; and then, perhaps, there will be more poets. We may however decide to focus on projects that are aligned with how today's world functions and, therefore, are feasible in the short-term; and then, hopefully, we will secure our energy future more sustainable.

Footnotes

[1] Maslow, Abraham Harold, A Theory of Human Motivation, 1943, Psychological Review, 50, 370-396.

[2] Here we use a definition whereby commercial energy includes, besides electricity, energy products such as candles or lamp-kerosene. Consequently, where other energy products are available to substitute electricity there is no access-void and substitution becomes an efficiency issue. Only for purposes where electricity cannot be substituted (e.g., in a hospital) it becomes an access issue (that may be solved by diesel generators if diesel is commercially available). Based on this definition it follows that supply security cannot be understood as a measure that is independent of a given energy-system: if the given system heavily relies on grid-distributed electricity (from diverse sources), supply security does as well. If the system relies on lamp-kerosene and decentral diesel generators, it is the availability of these energy products that determine the level of supply security.

[3] See e.g. The Future of Energy Policy, Timothy E. Wirth, C. Boyden Gray, John D. Podesta, Foreign Affairs, July/August 2003, Vol 82, Nr 4, p. 134: "Reducing this exposure [i.e., U.S. dependence on foreign oil] […] must be a primary goal of national energy policy."

[4] One could argue that Italy is an exception to the above-outlined rule – a country where the factual abandon of nuclear energy in 1987 without an appropriate replacement has lead to a situation where the security of today's electricity supply is questioned as the 2003 blackout has confirmed. Still, the decision of stopping nuclear energy may have been taken by the deciders (the people) without the full awareness and understanding of the problem of supply security and its consequences. It will be interesting to observe what Italians will do in reaction to the recent blackout.