

Energy and Territories: Towards an 'Energy 2.0' concept with local authorities

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Is there a future for centralised systems in the 21st century? The collapse of the soviet system, along with the gradual decline of the Catholic Church and the swift transformation of early computing all tend to prove the contrary. Has the quest for spirituality faded into oblivion? By no means! Never before has there been as much spiritual diversity or as many places of worship of all kinds as there are now. And those who think that information processing is a thing of the past could not be more wrong!

It is true to say that the erstwhile days of 'vertical' computing when *smart* mainframe computers drove *dumb* terminals are long gone, ousted by a 'horizontal' exchange model offering unlimited connectivity between information producers and consumers. This is the case for the new-born web which has already come of age and which has shed its 'top-down' design to become what is now known as the 'web 2.0', where information consumers are also information suppliers. The same applies to Facebook, Twitter and other 'social networks.'

There are countless other examples. Big private companies have turned their backs on pyramidal systems which have proven to be ineffective, adopting organisations built around standalone units operating in networks. The public services model has struggled to keep up with these trends and is now paying the price. In short, all aspects of organisational modes are changing or are in the course of doing so and, although the pace of change may vary, it is nonetheless here to stay.

Will the organisation of energy systems escape this universal trend? And if so, on the basis of which specific energy sector features? Or, conversely, has the energy sector already embarked on its transformation towards a '2.0' concept? Isn't the decentralised design of energy systems (and not only electricity systems) the keystone of a sustainable society, secure energy supply and, hence, a decisive factor in ensuring peace and democracy? Won't centralised systems, which were designed to be all-powerful, be undermined in the 21st century world, while decentralised systems, which are readily considered to be uncertain and unreliable, appear to provide a guarantee of stability and security (on condition that there are enough of them and that they work together)? It remains to be seen whether this vision is exaggerated or purely theoretical.

What is the contemporary history of energy, in the so-called 'industrialised' countries?

After the first industrial revolution which brought with it coal and steel, the steam engine and railways, our societies were able to free themselves of the constraints related to the scarcity of energy and development was no longer conditioned by the use of energy resources from immediate territorial surroundings. This was indeed the common lot of pre-industrial societies, and is still the case for part of the world today. The second industrial revolution, which brought oil, electricity grids, and then gas, largely accelerated this trend which, in turn, resulted in unprecedented economic growth. Our history and that of energy are intrinsically linked. The yawning development gap between North and South gave our countries the considerable advantage of being able to consume 75% of global energy production along with only 25% of

the world's population, while $\frac{3}{4}$ of the global population had to make do with the rest. Cynics might say that we were very lucky. Our plans and undertakings were guided by reliance on abundant energy resources which were believed to be unlimited, even if some heavy investments were required to harness, transform and transport such resources. However, the investments were well worth it when these resources cost (almost) nothing. With the end of global apartheid, this world is now coming to an end. But how did we let things go so far?

This period was characterised by a particular vision of progress. In practice, progress was measured by our ability to overcome the natural constraints (including energy constraints) of our environment by drawing on exogenous solutions. On the demand-side, we turned indiscriminately to energy sources which were themselves exogenous and which were often completely detached from final uses, paying little or no attention to locally available energy sources. Nor was any concern given to the emissions or waste resulting from the transformation of primary energy, except when this transformation generated local pollution. On the supply-side, and especially in countries like France which gave priority to centralised energy production, we produced electricity without any regard for the heat generated, which was considered to be an undesirable emission and never a by-product. Accordingly, the evacuation of 'useless' heat (i.e. around two-thirds of the primary energy all the same!) became a problem to be resolved rather than an opportunity to be seized. On this point, isn't it ironic that a thermal power station can be spotted thanks to ... its cooling towers? Moreover, there has never really been any policy on heat (not strategic enough from an industrial point of view and not prestigious enough for engineers), which accounts for 40% of needs, while there has long been a policy on electricity, which only accounts for 20% of needs, but which generally still over-determines the energy system in a given country.

This resulted from a centralised nationwide approach based on a single product and quantitative macro-energy needs, while a decentralised local and more qualitative approach would rely on simultaneous heating, cooling and specific electricity needs and the exploitation of local energy potential, including potential energy savings. Thinking in terms of "local resources" (wood, sunlight, wind, water, earth, biomass etc.) was considered tantamount to backward rebellion, even anti-modernist. Modernity was all about replacing wood-fired heating systems by fuel oil systems, and then by electric convector heaters. Even if, quite apart from considerations relating to the extraction of primary resources, behind the electric wall socket lurked an infernal cycle of steam production, energy transformation, transportation and distribution of electricity producing losses of 70%, all that just to heat an apartment to 20°C! However absurd it may seem, in the name of progress, few people have questioned the merits of this system, even in circles where energy decisions are actually taken.

This conception of progress has already shown its limitations on more than one occasion. From the resources standpoint, there was the first oil crisis in 1973 followed by that of 1979 and the repeated spikes in energy prices (notably in 2008) set against the backdrop of armed conflicts in resource-rich areas. The increasing reference to *Peak Oil* augurs for a difficult future. In its *World Energy Outlook 2010 (1)*, the International Energy Agency sounded the alarm. A recent report by the *Bundeswehr* published on the *Spiegelonline (2)* website showed to what extent the fight to control energy is fraught with a rise in various forms of nationalism and populism, a decline in democracy, reversals of strategic alliances and permanent military occupation. This topic is arousing growing collective anxiety, which rarely bodes well for the future.

In their time, Three Mile Island (1978) and then Chernobyl (1986) alerted the world to the issues surrounding nuclear power. The critical situation in Niger at the end of 2010 was another patent sign of a situation which is unsustainable and shed light on the *de facto* unacceptable paradox whereby a country in the throes of utter destitution supplies a product of the utmost strategic importance to wealthy countries, and particularly France.

The start of the 2000s was marked by a few power black-outs in Europe, thus showing the fragility of a system built around major electricity flows, to the detriment of more evenly distributed production systems. These black-outs always make headline news when storms wreak havoc with power lines, but when the storms quell, everything goes back to normal ...until the next one comes along.

The late nineteen-eighties, with the creation of the IPCC (1988), followed by the Rio Conference (1992) and the Kyoto Protocol (in 1997, which entered into force in 2005), showed the limitations of our energy systems in terms of the equilibrium of our planet, and even the survival of humanity. In 2009, COP 15 in Copenhagen stressed the responsibility for our mode of development and North-South relations. COP 16 in Cancun agreed to delay the adoption of a post-Kyoto agreement, despite the fact that everyone believes such an agreement to be urgent. There is a growing temptation to favour adaptation solutions over mitigation solutions and this has opened the way for dangerous reasoning such as "*Let's make the most of it while we can!*"

Deep down, how many citizens do not consider this situation to be unsustainable, that is to say a situation which *cannot last*. We might wonder whether the universal success encountered by the *sustainable development* terminology is not just a stylistic device which, thanks to the addition of a magic adjective, only perpetuates the illusion that things could carry on in the same way for some time to come. Energy specialists also play a role in this game and 'sustainable energy' terminology has been coined as a marketing catch phrase used by gas, electricity and oil producers alike, although it must be said that they weigh their words carefully since they are all too aware that they are on particularly shaky ground.

We are living in a time of great uncertainty with regard to energy.

Throughout this entire period, we have behaved like children left up to our own devices, without the slightest inkling of where our limits lie. We have played as if there was no tomorrow; we have become addicted to abundant, unlimited and cheap energy! We have built 'cooped-up' 'plug and play' societies, isolated from their environment. Like a herd of Holstein dairy cows feeding off soya and industrial plant waste wherever they are bred, our territories, at all levels have done the same - from single homes to estates, from neighbourhoods to villages and from cities to regions. What is true for territories also used to be true for industrial and agricultural production. Cars symbolise this period marked by claims to individual freedom and the refusal of constraints. Push-button society is an easy and comfortable society. It is a society where there is no need for regulation to enable it to follow what we imagine to be its 'natural' course. Abundant and cheap energy has led to an explosion in intercontinental transport, not only for passengers but also for industrial and food products. It has enabled a form of planetary Taylorism - the division of labour based on the theory of comparative advantage - to be pushed slightly further. Chemical (and therefore, energy) inputs and genetic manipulation have shaped a farming sector which is increasingly alien to the intrinsic potential of farmland, one patent example being the dramatic amount of water required to grow corn. This system is ailing; our development must become *responsible* (3).

This system has cut away the link between territories and their energy supply (4). The progressive separation between energy supply and demand, coupled with the ever increasing distance between energy consumption and production points, have rendered energy consumers unaccountable for the impact of their decisions on resources and emissions. Obviously, the same applies to all those who have a direct or indirect influence on this consumption, whether appliance manufacturers, architects or town planners, developers or local politicians: it is only recently that they have begun to consider the energy impact of their decisions and quite often, such considerations are still embryonic. The disappearance of the visible and comprehensible link between a natural resource and its use makes people short-sighted and short-sightedness produces irresponsibility: when water is scarce its use is optimised and yet when water is available in abundance it is readily wasted; a shrinking pile of wood in front of someone's home is much more likely to draw the occupant's attention to the need to use it rationally than an electricity meter which continues to revolve come what may or

a petrol pump which fills a tank with fuel that appears to spring from nowhere. If we use human- or animal-power to travel, then we are taught to use this energy sparingly and to limit the distance covered, while if we overcome natural energy constraints this results in a considerable increase in energy consumption and distances covered and, at local level, accelerates urban sprawl which advances uncontrollably. Nobody can deny that overcoming these constraints has been beneficial in many ways. However, as an indirect result, as is often the case, it has brought with it a certain level of indebtedness, for which we are beginning to pay the price.

During this period, towns and regions (territories) have shirked all responsibility for their energy supply, at least in countries where local authorities are powerless to this effect. They have abandoned all responsibility for a natural resource which is essential for survival and all human and economic activity, thus placing their fate within the hands of monopolistic companies, Arab oil states and gas suppliers, as well as centralised power plants where the slightest major accident would blow their technological certainties to smithereens.

So on the one hand there is freedom and on the other, dependency, and perhaps in future, vulnerability.

However, the situation is changing. Infra-national territories have an alarming lack of knowledge regarding the flows which cross through them. Although macro-energy and macro-climate data are available at national level and can be arranged in statistical categories – housing, tertiary, transport, industry, and agriculture – the situation is completely different at the town and regional level. The Regions have recently been endowed with statistics collection systems which constitute a first step forward, but as soon as things come down to a directly operational level, i.e. a city, a conurbation or a wider area, the availability of statistical breakdowns is patently insufficient to enable a shift from theory to action. Indeed, all financial accounting has ever done is report on a given situation and provide a few ratios. Only cost accounting allows examination of the required level of detail. There is still a shortfall in energy statistics at territorial level.

In these circumstances, how – or by what coincidence? – is it possible to implement local decisions, including town planning decisions, which have a positive impact on energy consumption and thus greenhouse gas emissions?

Through the Territorial Energy & Climate Plans (5) and the growing commitment of Cities in the framework of the Covenant of Mayors (6) some significant developments are coming to light, thus opening the way for greater access to this knowledge, despite the fact that the data acquisition process is sometimes difficult and costly. We are starting to see a broader movement claiming access to this knowledge and the power to act locally.

Restore links, their visibility and understanding. It is clear that these developments do not represent a return to the past. On the contrary, the aim is to enable stakeholders to reassume their responsibility and to seek solutions which are now possible thanks to the technology available today, so as to limit the energy vulnerability of households, businesses and territories at all levels in the mid- and long-term, while mitigating climate change. All reflection and proposals made in this field should be guided by the need to restore the link between energy consumption and its impact both upstream (on resources) and downstream (with the pollution generated) and the need to render such links visible, understandable for all and operational. Otherwise all the rhetoric about the awareness of citizens who are being encouraged to change their behaviour will be a waste of time. And what of the behaviour of those whose appetites and financial resources know no bounds and who continue to spend ostentatiously? Without the personal and professional involvement of all stakeholders, from citizens to their towns, regions, countries, continents etc., nothing much can be expected in terms of a change in energy and climate policy. Yet, it would seem that insufficient attention has been paid to this issue. In this respect, the myth of life-saving technology which will prevent us from having to change our behaviour in every decision that we take is counterproductive.

Energy and local economy: towards ‘energy subsidiarity’? Since the post-war years and the nationalisation of the electricity and gas sectors which rubber-stamped these energy sources with the hallmark of economic, social and national progress, the value chain for the energy sector in our developed countries has been designed mainly to the exclusion of infra-national territories (the national territory being the only territory taken into account even for the provision of a so-called universal supply service). The amount of money spent on energy in a territory leaves that territory for another distant and anonymous territory usually located outside the country of consumption and almost always outside the region of consumption. This represents a net loss for the local economy, a loss which is more often than not ignored.

We welcome the economic and tax ‘spin-offs’ of conventional electrical power stations located in a given territory. However, many are quick to rail against such and such metropolitan structures involved in a wind power project purported to be motivated solely by tax benefits and whose main concern is to earn revenues from this energy production. This shows that local territories do not yet have legitimacy in many countries, when energy plays a role in the local production of value. The situation is completely different in countries where the energy issue is devolved to local level. Yet, it is highly likely that energy activities (in the broadest sense) will contribute to creating more - and lasting – value in territories, whether through the insulation of buildings, the construction and upkeep of decentralised production installations or the production of renewable resources and so on. In actual fact, the aim is to replace the energy consumed unwittingly by intelligent uses and optimisation and to replace part of the energy ‘imported’ into that territory by energy produced, stored or harnessed on site.

In this context, we propose the concept of ‘energy subsidiarity’. Taken in its general sense, subsidiarity supposes that solutions are found as close as possible to the problems to be resolved. When applied specifically to the energy sector, subsidiarity means that available energy sources must be systematically harnessed and integrated in the following order of priority:

- The energy efficiency and saving potential of the territorial system,
- The decentralised and renewable energy resources available locally, and then,
- Concentrically, complementary exogenous supplies.

An approach such as this helps re-empower territories regarding their energy supply. It is an understatement to say that this approach is not yet the dominant trend (particularly in France). Obviously, there is no question of disputing the need for centralised forms of production or of creating the illusion of energy self-sufficient territories. The subsidiarity approach offers a different way forward, and it would be denying reality to ignore the emerging trends in this direction at various levels. Autonomy and solidarity must go hand in hand. We would be depriving ourselves of opportunities if we failed to take advantage of new practices.

When Växjö supplies 84 % of heat – and 57 % of heat and electricity combined – for the whole city from biomass, it is not because wood is new to Sweden, but because politicians have fixed a ‘zero fossil fuel’ objective and sought new solutions in earnest. Lake Geneva has existed for thousands of years, but it is only because Geneva has set ambitious targets for renewable energies that the international institutions are now cooled using water from the lake. When Heidelberg designed an entire new neighbourhood to the *passive* standard, it showed that what some people often consider as utopian is actually feasible. Being curious about exploring one’s potential can yield some unsuspected treasures. In the words of *Shauna Sowell*, vice-president of global structures at Texas Instruments: “*I think you do first have to set an impossible goal. Amazing things happen when people claim responsibility for the impossible.*”

At local level, cities have committed to the objectives of the European Union and have taken them even further. More and more cities are starting to think about energy from their territorial perspective by embarking on widespread thermal retrofitting programmes, drawing on renewable energy resources, producing locally, cogenerating heat and electricity, giving priority to soft modes of transport, favouring short supply circuits and including energy in their urban

projects. Just reflect on what the French *Grenelle de l'Environnement* round tables derived from the innovations of cities, particularly those in federal and Scandinavian countries, where legislation confers considerable legislative autonomy on local authorities and the energy issue is very much a municipal responsibility. It is to take the best advantage of these new practices, to give them meaning and to project our cities into the next generation and beyond that Energy Cities has launched the *Imagine (7)* initiative, which aims to give shape to the 'Low Energy Cities with a High Quality of Life for All' concept.(8)

Furthermore, national policies are gradually being implemented in line with this approach but these policies are still rather tentative and some States are still not in any hurry to share their energy policies with 'lower' levels (9).

At European level, the Lisbon Treaty integrated a new dimension which has now been added to social and economic cohesion: *territorial cohesion*. This concept will continue to be fleshed out as European Union policies are analysed from a territorial angle. As *Energy* has also entered the Treaty, albeit only partially, the temptation is to question the potential of a strong interrelationship between *Energy* and *Territorial Cohesion (10)* from a dual perspective:

- To what extent could territories take better advantage of an energy policy which gives more room to decentralised systems, the systematic exploitation of local potential and greater integration between energy supply and demand to ensure growth, boost economic activity, job creation and innovation?
- In order to ensure its renewal and adaptation to growing social demand, to what extent could energy policy take advantage of the enormous potential for innovation and the invention of new solutions and systems offered by territories, if free rein is given to the creative ability of the millions of stakeholders in the field?

The fact that Territorial Cohesion has now been placed on the table could also help develop certain approaches by studying the internal energy market, for example. For a Portuguese national is the be-all-and-end-all of an energy policy which is supposed to represent progress for citizens the ability to source electricity from Finland from 11am to 1pm and/or vice-versa, for a Finnish national, to source energy from Portugal later in the day? Or is it to construct local energy supply and energy efficiency sectors which provide a sustainable response to the expectations of territories in terms of employment, reduction in energy vulnerability and responsible local development for now and the future? Moreover, does the potential for innovation and job creation alike lie more with traditional energy suppliers or with the territories?

Accordingly, one of the challenges which we face is to encourage the emergence of a new energy paradigm which takes account of all of the following:

- The marked trends towards decentralised, grid-based systems in our societies,
- The growing determination of local and regional authorities to assume their share of responsibility with regard to energy and climate challenges,
- A diffuse perception of the energy insecurity and vulnerability which are inherent to major and anonymous centralised systems,
- The demand for energy democracy, at least the growing desire of citizens to play a greater role,
- New decentralised technologies, including information technologies, which open up considerable perspectives far beyond so-called 'smart' grids or meters.

In the industrial revolution which we are currently undergoing, it is essential to establish a link between the energy issue and miniaturisation technologies for energy systems, as well as communication and information technologies. In addition to these technologies, consideration must be given to the immaterial concepts which underpin them. In response to all of these issues, a '2.0' concept which is not limited to electricity but which covers a broader energy range built around needs and resources, is proposed.

Reflection on energy matters should be fuelled by the societal environment. Our concern should not be to protect ourselves against developments which would disrupt national or corporatist traditions, but to support these trends, to anticipate them, encourage them and even strive for them, so as to build and make the most of the new paradigm, rather than be subjected to it.

And what if, in the 21st century, progress were to be measured by the ability of our societies to reconcile themselves with the constraints and opportunities of their environment? And what if this century were to be the century of 'territorial revenge.' (11)?

BIOGRAPHY

Gérard MAGNIN is Energy Cities' Executive Director (www.energy-cities.eu). He is one of the original founders of this association established in 1990 and which now represents around one thousand cities from 30 European countries. Chaired by the City of Heidelberg (Germany), Energy Cities is run by a Board of Directors composed of eleven cities from eleven different countries. A staff of eighteen people, based in Besançon and Brussels, moderate the network.

Initially trained in electrical engineering, Gérard Magnin then studied economics and taught economic and social sciences for 8 years. In 1985, he became the first regional delegate to be appointed by the French Energy Management and Environment Agency, now known as Ademe, in the Franche-Comté region.

With Denis Clerc, Claude Chalon and Hervé Vouillot, he is co-author of "Pour un nouvel urbanisme", published by Editions Yves Michel in 2008.

NOTES

- (1) World Energy Outlook 2010, November 2010 www.iea.org
- (2) Reported by the French daily newspaper *Le Monde*, 11 September 2010.
- (3) Adding a nice-sounding adjective to a controversial name in an attempt to endow it with some virtue has become the new fashion. Development is now *sustainable*, growth *green* and all networks, meters and even cities are *smart*. But who really feels *responsible* for what?
- (4) For a more detailed presentation of the relationship between Energy and Territories, see “*Pour un nouvel urbanisme*” by Denis Clerc, Claude Chalon, Gérard Magnin and Hervé Vouillot (published by Editions Yves Michel, 2008).
- (5) Since the early 2000s, almost 200 French territories have committed to adopting *Territorial Climate and Energy Plans* (<http://www.pcet-ademe.fr/>) on a voluntary basis. This involves drawing up a baseline inventory of energy use and CO₂ emissions at territorial level. The so-called Grenelle 2 Act makes such Plans compulsory for French local authorities with over 50,000 inhabitants.
- (6) The *Covenant of Mayors* (www.eumayors.eu) is a voluntary movement of local authorities, aiming to exceed the EU energy and climate objectives. Local authorities commit to submitting an inventory of their emissions and an Action Plan within one year of signing the Covenant, as well as an executive report after two years. Over 2,000 cities - including 25 capital cities – as well as 100 Support Structures had signed the Covenant as of October 2010. With the support of the European Commission (DG ENER) and in partnership with other city networks, Energy Cities has been tasked with co-ordinating this European-wide initiative.
- (7) IMAGINE is an Energy Cities’ initiative shared with public, private and community players. It aims to rethink the city from the energy point of view within a time horizon of one generation. Its pivotal concept is that of a “*Low energy city with a high quality for life for all*”. <http://www.energy-cities.eu/IMAGINE,89>
- (8) See Gérard Magnin’s paper in *La Revue Durable*, no. 38, June 2010.
- (9) During the preparation of the Syrota report entitled “*Les perspectives énergétiques de la France à l’horizon 2020-2050*” (“*Energy prospects in France by 2020-2050*”) published in October 2007, it took the author several months to get the “territorial” level added to the only *levels of governance* deemed relevant, i.e. the global, European and national levels. http://www.strategie.gouv.fr/article.php3?id_article=675
- (10) Energy Cities published an opinion paper on the EU Energy Strategy for 2011-2020, entitled: “*Il est temps d’encourager une politique énergétique européenne bottom-up et basée sur la cohésion territoriale* » http://www.energy-cities.eu/IMG/pdf/Energy_EU_2020_Energy_Cities_position_paper_fr-2.pdf
- (11) Term borrowed from Pierre Calame, *Fondation pour le Progrès de l’Homme*.