What are *"Smart Cities"* really all about?

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Smart. Everything is or should be "Smart". There is virtually no energy or city conference that does not include at least one session entitled "Smart Grids" or "Smart Cities" or a combination of both. "Smart Grids - Smart Cities" has become a recurrent theme, thus acquiring a magical power that has turned the concept into a generally agreed opinion whose rightfulness is not usually questioned. The European Commission has launched an initiative entitled "Smart Cities and Communities". A number of large ICT companies are very involved in ''Smart'' issues. This article aims to shed some light on all this.

The "*Smart*" concept originally came from the integration of ICT (*Information & Communication Technologies*) in products and systems with the proclaimed aim of optimising their efficiency. "*Smart meters"* integrate additional metering functions: information, load management, load shedding, dynamic pricing, energy efficiency, etc. Complementary *"Smart Grids"* provide a flexible, bidirectional way of managing power grids by combining embedded power distribution and collection. The concept of *"Smart Cities"* aims to optimise urban systems, notably by metering, monitoring and managing energy, water, traffic, passenger, discharge, emission and effluent flows from urban activities. The above three *"Smart"* components are often combined in a package.

These technologies are welcome at the local level. Elected representatives and local authority managers are likely to be in favour of the marketing of new instruments designed to make things easier for them and their fellow citizens. It is no coincidence that these technologies were first developed and tested locally with the very active support, and sometimes at the initiative, of municipal energy or transport companies. This was the case for the smart meters developed for metering power, water, passengers, real-time public transport information for passengers, bus rights of way at crossroads and bike-rental systems. This process has been under way for many years and any new product designed to improve these systems is most welcome. A number of issues, however, have to be clarified in order to avoid any misunderstanding

The first issue concerns the analogy between technical artefacts and human beings. Putting *"Smart Grids" and "Smart Cities"* on the same level raises a point of ethics. A network is a technical *artefact* whose performance and functions can be improved by a well-chosen ICT combination. A city is first and foremost a *community of human beings* - citizens, social groups, elected representatives, community organisations, entrepreneurs, etc. – who develop both individual and collective technical solutions to improve their social life, dwellings, work, travelling, entertainment, heating, lighting, etc. All these stakeholders are endowed with intelligence. A city can benefit from the intelligence of the brains within its remit as well as their interaction in the form of collective intelligence. One could provocatively argue that talking of "smart cities" is pretentious as it places the intelligence of men and women in the background, true *intelligence* coming from the availability of ICT on the market rather than from citizens and local players. Is a smart city not a city that mobilises all intelligences? This raises the point of a more cautious use of words.

But this is not just a semantic issue. **Some form of technological "dictatorship" of minds is emerging.** It is often said that any European public policy in this field should aim to improve public acceptance of these technologies. It is sometimes said that the *Covenant of Mayors*[2] should serve this purpose. Do these *"Smart Technologies''* have so little appeal that they need to be *imposed*? When digital display units tell us in advance how much time we have to wait for our bus, we do not need to be forced to accept this remarkable and highly appreciated technology. The fact that our power meter gives us the possibility of instantly knowing our energy use so that we can take measures if need be is a much awaited innovation. And we, as PV power producers, can but be pleased on hearing that distribution grids are going to make things easier for PV power producers and encourage many others to follow suit. The same goes for other innovations aimed at optimising local embedded heat and power generation systems or systems for storing different forms of energy. We can but be pleased on hearing an energy distributor explain the virtues of such embedded concepts, provided that the same energy distributor accepts the use of the term *collection and distribution,* rather than just *distribution, networks* in order to differentiate from the former centralised concept.

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[1]This article reflects but the views of its author.
[2] http://www.eumayors.eu/index_en.html

Are citizens systematically reluctant to accept what has been designed for their *own good*? Or are they only lucid when they sense that something about it is suspicious. For example, when they realise that "*Smart Meters"* are used by distributors, above all, to manage the networks and obtain commercial data on consumers' behaviour and that they do not have direct access to information on their own consumption *in their own homes.* We are witnessing the same phenomenon as with any proprietary software: on the pretext of offering new services, consumers are placed in a situation of dependence, locked in a system with no feed-back and deprived of part of their ability to take action. Giving more power to customers and citizens should be the ultimate aim of any new technology, especially in a society that is bringing everything into question. The conflict raised by these meters in France is typical of the refusal to give consumers more power: unless a decision is urgently made to the contrary, consumers will have to pay for meters with no display of relevant information on the dwelling site, this being an additional service they will have to pay for. People suffering from fuel poverty will appreciate this ploy!

"Intelligent home automation" was very much in vogue at the end of the 1980s. This is an example of ICT applied to dwellings. The underlying idea is that dwellings can be managed intelligently with no (or a minimum of) human intervention, ICT being able to control everything. The press regularly publishes features on "*Smart Houses"*[3] but the concept has not (yet) been developed on a large scale. This is because, although some functions are of great interest, for example controlling temperatures or switching off devices on stand-by, the hyper-sophistication of others[4] seems irrelevant in view of the dwelling's low level of complexity in comparison with the capacities of the human brain.

This brings up a sensitive issue: to what extent can an individual or a family accept part of their daily life being dictated by technologies that are supposed to be more intelligent than they are? This is a subject for meditation, as a new wave of ICT is bound to accompany the new "zero energy" or "low energy" buildings to optimise their performances. The need to educate users is sometimes evoked via a "dwelling" licence based on the same principle as a "driving" license. Such an education is conceivable, if it does not hide some form of submission to these technologies. It will otherwise inevitably be a failure and inhabitants will be made responsible for not reaching the performances so well calculated by engineers. ITC-loaded tertiary buildings are often rejected, rather than supported, by part of the workforce. We need to listen to these signs whilst recognising the need to change when change brings a real "bonus point".

What is the situation at a higher level of complexity, let's say a city? Here we are reaching the "*Smart Cities"* realm. Urban systems are so complex they are far from having optimised their energy, material, water, waste, discharge and emission flows. Instantaneous or cumulated energy use and CO_2 emission metering per geographic and use sector is still in its infancy. Urban metabolism remains largely unknown and many energy sources are wasted: no temperate wastewater recovery, excess heat is lost, no or too few waste-to-energy schemes, excessive energy used to satisfy a given need, oversized network for only a few peak hours annually, etc. A city is not just a collection of objects (buildings, vehicles) whose intrinsic performances can be improved to make savings *de facto*. It is the result of intense interactions between urban objects and human beings living, working and thinking in the city.

We cannot change cities as we change bulbs. The drop in a vehicle's units of energy use does not produce results in cities *ipso facto*. These technological improvements must be accompanied by adequate organisation in terms of urban planning, mobility plans, road planning, rights of way, the place given to walking, cycling and public transport as well as changing habits. Optimising systems is much more complicated than optimising the objects that make up these systems. It requires human intelligence, open-mindedness as well as specific technologies, including ICT. Drawing an inventory of the territory's energy use and emissions, monitoring them and defining indicators are desirable functions for any municipality committed to reducing energy use and emissions as part of the *Covenant of Mayors and* ITC are indispensable tools.

Once again, we need to see further than a first impression. Some form of extreme technological rationality could put city governance by men and women living in cities - the essence of democracy - in the background. Democracy sometimes takes paths that diverge from rationality and always benefits from well-informed decision-makers who are aware of the reality of facts and of the potential consequences of their decisions. All that can contribute to this objective is welcome but we cannot ignore the necessary

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[3] A *smart house* is a house that has highly advanced automatic systems for lighting, temperature control, multi-media, security, window and door operations, and many other functions. A smart home appears "intelligent" because its computer systems can monitor so many aspects of daily living. (Source http://architecture.about.com/od/buildyourhous1/g/smarthouse.htm).
[4] For example, the refrigerator may be able to inventory its contents, suggest menus, recommend healthy alternatives, and order groceries. The smart home systems might even take care of cleaning the cat's litter box and watering the plants.*Op. cit.*

democratic decision-making even when digital management would be more "rational". A few months ago, a British politician wrote that "*city councils should only meet once a year to sign contracts with service providers*". Our democracy in Europe is too weak to pass such irresponsible whims. We must remain vigilant.

All large companies specialised in ICT are promoting the *"Smart City"* concept, taking great care to use the term *governance*. They are right to do so, provided that it is not just a marketing argument, as governance is an essential component. One may fear the following reasoning. Companies prepare products and compete with each other, which is the natural way of things. Commercial products are based on a concept and a technical system that are specific to the company so as to secure a market for its technology and to be able to sell related services for as long as possible. As long as this concerns a limited area (e.g. air quality measuring) and that the local authority keeps control of the process, can modify it or change operators and change its mind if need be, the added-value is obvious. For instance, real-time information on air quality made accessible to inhabitants, together with comparative data and instructions to reduce travelling in case of serious pollution, are appreciated by everyone.

Several company-commissioned market surveys, however, reveal a willingness to meter or manage not just one sub-section of the city (e.g. transport or energy flows) but *several* of them (including video surveillance) and to interconnect them in the proclaimed aim of *optimising the "urban system"* as a whole, thus providing a city management system for a truly *"Smart City''*. The operation is quite simple with available technology. The idea may appeal to technologists but it worries democrats. It is somewhat reminiscent of George Orwell's *"Big Brother",* a criticism all technology promoters of course deny.

There is indeed a thin line between technology designed to *help decision-making* and technology that could almost *impose decisions*, models or ways of thinking, just because of its data processing power and the "closed" aspect (as in *proprietary software* terminology) of the ICT tools needed to submit a tender in a competitive process. It is inconceivable that a city's management should depend on one company, however well-intentioned. It is even less acceptable for a local authority to be tied to a process outside its control for a long period of time.

Citizens are extremely doubtful about issues when it is explained that there is only one *single* solution (sic): Europe is as it is and cannot be changed; globalisation is what it is; industrial relations are what they are and it would be very unwise to modify the equilibrium. History is full of these supposedly universal truths that later proved to be wrong: multifamily dwellings considered to be soulless cubes, urban sprawl and the division of urban functions, the centralisation of energy systems. And the list goes on. We must not repeat these mistakes by "by-passing" citizen's aspirations "thanks to" ICT intelligence, which like computers, would always give the "right" answer, even though, once again, the process started with good intentions. History has often shown that inventors are not always in control of all the effects.

Where does the European Commission's *"Smart Cities and Communities''*[5] initiative stand?

The way work and co-ordination groups – the hub of the "*Smart Cities and Communities Stakeholder Platform"* - were set up gives a pretty good idea of the answer. There are three technical expert theme groups: Energy supply and networks, Energy efficiency and buildings and Mobility and transport. There are also two Horizontal Co-ordination Groups: Financing and Smart City Roadmap.

Except for financing, this initiative is therefore entirely centred on technological issues. This is no coincidence as it is a sub-set of the European Commission's SET Plan[6] (*Strategic Energy Technology Plan)*. The initiative aims to address the three traditional sectors - energy supply, buildings and transport - *separately*, whilst insisting on their necessary integration. Its sector-based, technological nature as well as the very limited number of cities benefiting from its support (a few dozen grouped around large companies) make this "*Smart Cities and Communities''* initiative an indispensable component of a sort of *Covenant of Mayor*'s technological laboratory[7]. The *Covenant* indeed covers a much wider urban strategy spectrum encompassing town planning, the relations between the city-centre and the outskirts, governance, stakeholders' involvement, institutional relations between decision-making levels, democratic decision-making processes, fuel poverty etc.

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[5]http://ec.europa.eu/energy/technology/initiatives/smart_cities_en.htm
[6]http://ec.europa.eu/energy/technology/set_plan/set_plan_en.htm
[7] [7]http://www.conventiondesmaires.eu/IMG/pdf/brochure_com_web_FINAL_18_11_2011.pdf , in particular page 8

Conclusion

The differentiation criterion between "good" and "poor" commercial offers as regards "*Smart technologies''* should always be the *empowerment* of local authorities, citizens and socioeconomic stakeholders. Any technology (or set of technologies) that *gives or increases the power* to influence both individual and collective fates, has a good future. On the contrary, any technology aimed at confiscating information by *withdrawing power* from stakeholders (or not giving them more power) is not promising. Let's make the technologies which enabled the Arabic spring to come into being be our source of inspiration, as opposed to the social control systems that European digital companies are eager to sell to these countries' dictators!

A "Smart City" is a city that has found ways of combining "smart economy", "smart mobility", "smart democracy", "smart quality of life", "smart governance" with, last but not least, "smart people"[8]. When developing this notion, we see that it goes well beyond purely technical issues. This is why Energy Cities prefers the *"low energy city with a high quality of life for all"* concept[9] with all the technologies needed to make it happen.

In a context where European citizens feel that "everything is being taken out of their hands", what we need is a revitalised, rather than a computerised, democracy. We must move cautiously, opening horizons for everyone and not just a few, even if this means yielding to the delights of exciting technologies.

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[8] See the report: *Smart cities – Ranking of European medium-sized cities* http://www.smart-cities.eu/download/smart_cities_final_report.pdf. The project was elaborated from April to October 2007. This report was edited by the Centre of Regional Science (SRF), Vienna, University of Technology in October 2007.
[9] http://doc2.energy-cities.eu/greenstone/collect/imagine/index/assoc/HASH023a.dir/LowEnergyCitiesMagnin2010En.pdf