Sustainable SmartGrid project design

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Introduction:

Taking into consideration the electricity bill, we may easily recognize 2 main elements of electricity price: 1. The pure sales price for energy consumed; 2 The transmission and distribution (TD) utility network due payment; These are nearly half-to-half relation. What if we had our power plant installed at our home? There is no TD cost so practically the half of the generated energy will not heat up the TD wires and will not be lost. The advantages can be seen in many aspects:

1. Half energy production can be saved (we will have a nowaday so popular „virtual power plant" with similar range of total built-in power capacity at production side, so in a renovated system the built-in total capacity can be less than current one);
2. We may connect any CO_2 *neutral* energy sources and energy storage units without limitation and without overall system instability;
3. We may start to use electric car technologies; We may save our environment, the Earth..

And many many more…

Smart grid – an evolutional leap

Smart grid is a concept for the 21th Century electrical supply system. It involves subtechnologies, which are enhancing supply security and reliability as well as which may reduce transmission cost, may support new future-proof technologies' and synergic solutions' applications (Figure 1).

These technologies which are already exist but not in use in general at the moment in TS and DS systems:

- ICT technologies (bidirectional, online data communication);
- New sensor, measuring- and monitoring systems;
- New types of RES technologies;
- New type of storage technologies;
- Electric car technology;
- New transmission technologies increasing reliability and reducing waste;
- Superconductive materials and T-D lines application….

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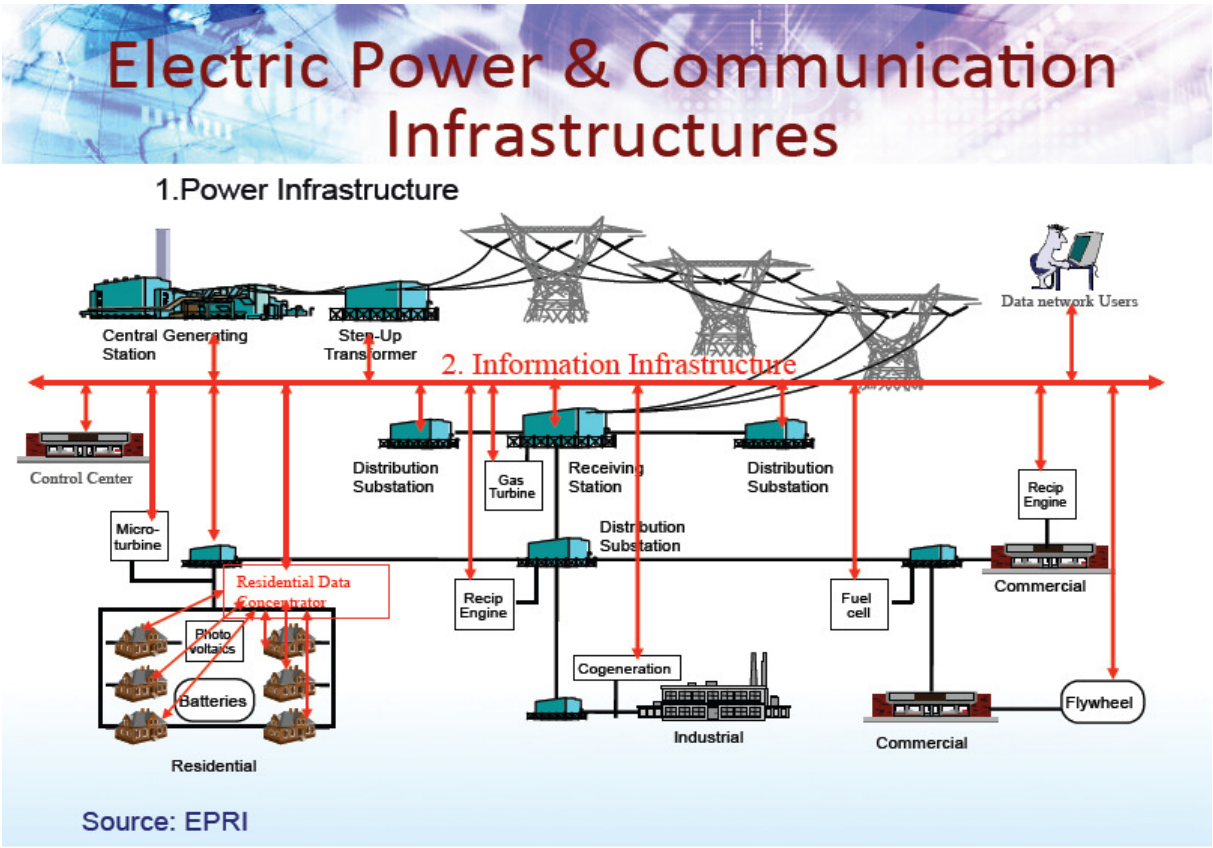

Figure 1. Smart grid vision

Why do we call this grid as „smart”?

- Energy generation, storage and transmission are directed by a central operational intelligence. It shall recover smaller system failures automatically, without human control.
- Energy efficient, thus environmental freindly solution. Supports Renewables. „ECO” solution.
- Flexible, sustainable, future-proof.
- System phylosophy is pluralism and networking against monopolistic and „one-way” system. It visionize a long-term *energy and life-standardized democracy* in a modern society.

„The CEE region is not likely to be a forerunner on SG technology and should use the advantage of latecomers from already developed standards, more mature and cheaper technologies. Considering this and the limited investment potential, priority should be given to „smart regulation”that is innovative solutions that reduce the cost of system balancing and tackle the voltage problem on the distribution networks due to the penetration of distributed/renewable generation.” [2]

[2] Summary (draft) of Danube Region Smart Grid Concept workshop, 8th April, 2013, Budapest, REKK

There are many problems with this:

- Where is the innovation? Viva la „Pal Pato"[3]!
- Where are the traditionally creative and innovative electricians' spirit like Kando, Verebely, Zipernovszky, who had patents, and solved country-wide system issues in 20th Century?
- Who will be the forerunner and latecomer since in the last 15 years nothing happened? Even not in US and so called „developed countries"…. New terms arising: Fast eats slow… etc.
- Where is the social benefit as a point of an investment in human resources?

The problem-dimensions of project generation

1st dim: Project must be profitable (pure capitalist view is not enough)

Even the investment calculation is not as simple as in a „traditional project", the values, benefits can be estimated. As we have nowadays good evaluation methods: for eg. intellectual property evaluation methods and companies can record it in Balance sheets as well as human capital is the most important capital makes the world work - can be valued and booked. Similarly, we have good models and calculations for social benefit monetized by environmental direct investments. The only question is how to price the life, the clean environment, the sustainable healthy world and quality lifestile of an overall society?

2nd dim: Project must be feasible in technological, social, legal and project financing aspects

This is the task of project generation to have clear background of the planned project stakeholders, environment, society. Each stakeholder has it's own interest and wait for „profit". To have the complex synergy and balance between these stakeholder groups and key points, we recommend a PEST analysis (or further point of views can be added to PESTEL and to STEEPLED analysis). All stakeholder groups and key poinst have to be clearly identified. What is the most important goal of the analysis is to see interests and find the few or only way to bring these together in a synergical solution. The maximization of the overall benefits of society should be the *objective function*.

3rd dim: Sustainability, future-proof solution

Pilot should guarantee remarkable result and should be extendable and repeatable. The project size, the location, the independence from phylosophies and economical/legal/political/… power is key parameter. Our solution proposal is the *central way* solution:

- Project should be big enough to be able to approve the result and be significant enough to clone the results to bigger realizations. However, the project should be as small to minimize risks, as possible.
- The geographical location at real estate invertments is key. Central location is everything.
- Avoiding too extreme cool[4] solutions and to keep simply the things in focus, centralism is a good guidance for benchmarking.

[3] Sandor Petofi's figure, Petofi is the most well known and most positive poet of Hungarian traditional poetry
4 extravaganza (Italian)

Figure 2. Problem-dimensions of project generation

Conclusion:

Considering the technology complexity, the soft factors, legal rules, diverse stakeholders interests and economical circumstances, finally we say thesis here: SmartGrid direct investment and relevant innovative technological project can be lauched by state, exclusively. We consider this as a axiom._

Reference

Istvan Szabo: (2012): Middle-Danubian Regional SmartGrid ITI project (draft), HIPO, Budapest.