

Sensors for Smart AC+DC Grids

Future sensor technologies for smart houses and grids

Michael Gouzman

Available sources of energy for smart AC+DC houses/grids.

- Basic (AC line)
- Alternative (Natural Gas)
- Additional (Solar Panels and Wind Mills)
- Environmental (Bio Gas Generators)



Advantages and disadvantages of AC grids and AC houses.

1. Exi	isted substructure	+
2. Exi	isted hardware	+
3. Exi	isted market of loaders (equipment for c	ustomers)+

- 1. Limit in power generation
- 2. Limit in power delivery to customer
- 3. Sensitivity to character of load
- 1. High cost of energy storage
 2. Low efficiency of equipment
 3. Expensive maintain
 4. High sensitivity to peak load



Advantages and disadvantages of DC grids and DC houses.

1. Low cost of energy storage	+
2. Very high efficiency of equipment	+
3. Low cost maintain and long lifetime	+
4. Ability to eliminate peak load	+
5. Flexibility in power generation (local + AC line)	+
6. Eliminate the limit in power delivery to customer	· +
7. All loads are welcome – no reactive power	+

1. Existed substructure	-
2. Existed hardware	±
3. Existed market of loaders	±



Experimental AC smart power sensor:

active + reactive powers + wireless connection to the zigbee net





Cluster communication - wireless technique of the future





Power-over-Fiber

Fiber optic sensor provides a secure environment for high voltage lines and transformers health control.





Environmentally Powered Wireless Sensor Network System for Detection of Potential Intrusion into Natural Gas Pipelines



Smart Energy Grids and Houses

Local Energy generation and storage as way to Ultimate Energy Society



Today – we know just how mach gas and electricity we have already spend.

Industry needs new control systems and sensors



Laboratory of Optoelectronic Sensors and Systems, Sensor CAT (Center for Advanced Technologies), State University of New York (SUNY), Stony Brook, NY

Michael Gouzman, Ph.D., mig@ece.sunysb.edu

