

Energy Systems - Now & Beyond!

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Content

- * The Now & Challenges
- * The Needs + How
- * Conclusion

The Now & Challenges (1)

- * **Centralised Generation**
 - * Waste often large (e.g. heat) -> **Poor overall Efficiency ? (e.g. CHP)**
 - * **Slow (demand) response time: on/off**
 - * **Large projects with long development times**
 - * **Disconnected from actual users**
- * **Hierarchical Distribution Network**
 - * **Designed for feed in from "top"**
 - * **Restricted flexibility**
 - * **Challenging integration of localised generation**

The Now & Challenges (2)

- * Heat and Electrical generation & networks are most often disconnected
- * Inefficient
- * Energy storage:
 - * Mainly large scale, which can be slow, inflexible and requires long development times
 - * Sometimes poor (round-trip) efficiencies (e.g. Hydrogen)
 - * Not always sustainable (e.g. batteries)

The Now & Challenges (3)

- * Energy providers:

- * Large & inflexible

- * Risk averse

- * Profit driven

- * Benefits towards sustainability ?

- * Often avoid investment until the equipment fails miserably, and then let government pay for it.

- * Long term planning ?

The Needs + How (1)

- * **Decentralised generation:**
 - * **Where ? Local Communities**, but how local/large ?
 - * **Communities should be self-sufficient but linked with neighbouring communities** for balancing.
 - * **Benefits:**
 - * **Community feeling & responsibility**
 - * **Creates awareness of energy generation/ consumption**
 - * **Devices need to be autonomous and interactive**, so one can build up a "network" that is also future proof.

The Needs + How (2)

- * Energy Storage:

- * New technologies needed for efficient short & long term storage.

- * How to integrate/combine storage and generation to match demand?

- * How to drive/adjust demand if and where possible?
Without further separating "rich" & "poor".

The Needs + How (3)

- * **Network** needs to be restructured:
 - * **More local interconnect**, maybe still some hierarchical interconnect.
 - * **Which equipment** can stay, what needs to change?

The Needs + How (4)

- * What becomes the **new role of the current "energy providers"** in this new model?
- * How to create a **sustainable business**?
- * **Independent advise**?
- * **Backup generation/storage** for seasonal changes and/or averse weather conditions.
- * How can **customers** be **put (more) central**?

The Needs + How (5)

- * Political / Societal and Economic needed changes:
 - * Long term strategies / planning
 - * Create local and global communities
 - * Creating “virtual” money and developing for pure economic profit / “self” benefit are not long term sustainable ...
 - * Politics will need to drive/promote cultural changes, set the scene & demo the example

Conclusions

- * The Energy Challenge is:
 - * multi-disciplinary, and even expands beyond energy
 - * if addressed as such, it can bring Europe closer together and eliminate borders of nations, through and within research.
- * There is quite some change required, but it needs to be well "calculated" from all aspects.
- * The aim should be to:
 - * bring Europe closer together.
 - * make Europe world leading, exemplar, self-sufficient & sustainable!

THANK YOU!

Discussion

