New Trends in Energy

Smart grids

Constantinos Taliotis

taliotis@kth.se

Introductory lecture – Energy commodities and technologies

This work by OpTIMUS.community is licensed under the Creative Commons Attribution 4.0 International License. To view a copy of this license, visit http://creativecommons.org/licenses/by/4.0/.
Motivation for energy technology research and development
Why innovate?

**Energy Efficiency – Cost Efficiency**
- The cheapest kWh is a kWh not generated
- Making the best out of the available resources

**Energy Security**
- Resilient and robust energy system
- Taking advantage of domestic energy sources leads to reduced reliance on fuel imports

**Climate Change**
- Transition to low-carbon economy

**Health and environment**
- Reduced emission of air and water pollutants that adversely affect health
Smart grids
Smart Grids

Built on a significant increase in the level of communication, automation and control based on a two-way flow of information and electricity, between supplier and consumer.

Smart Grids – What can they offer?

• Enable informed participation by customers
• Accommodate all generation and storage options
• Enable new products, services and markets
• Optimise asset utilisation and operating efficiency
• Provide resiliency to disturbances, attacks and natural disasters

Direct reductions: energy savings from peak load management, continuous commissioning of service sector loads, accelerated deployment of energy efficiency programmes, reduced line losses and direct feedback on energy usage.

Enabled reductions: greater integration of renewables and facilitation of EV and PHEV deployment.

Suggested further reading

- IEA Technology Roadmap: Smart Grids
  
<table>
<thead>
<tr>
<th>Date</th>
<th>Author</th>
<th>Reviewer</th>
<th>Reviser</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017-10-10</td>
<td>Constantinos Taliotis</td>
<td>Agnese Beltramo</td>
<td>Constantinos Taliotis</td>
</tr>
</tbody>
</table>

To correctly reference this work, please use the following: