The DSM University -
A tool for capacity building

Hans Nilsson
We live in a period of profound changes

• 1. Technologies will allow greater participation and more choices.

• 2. The energy system will change from being composed from single supply units to a multitude connected in a mesh
New Technologies will change business

Source: An EPRI Initiative to Advance the Efficient and Effective Use of Energy
The traditional **linear** system
The new **mesh** system

**Figure 1.2** The integrated and intelligent electricity system of the future

Source: Energy Technology Perspectives 2014
Business is changing focus

Figure 9: New business and investment opportunities are emerging close to the customer

And a new focus on electricity

Figure 1.1  Electricity demand and share of electricity

Key point  Electricity demand growth differs between OECD and non-OECD countries, but the dominant trend is towards an increasing share of electricity in the overall energy mix.

Source: Energy Technology Perspectives 2014
DSM is a tool to make large scale energy efficiency possible
DSM can change the LOAD LEVEL

Strategic growth

Strategic Saving

Adapts the system to the environmental requirements

From “carbon-fat” to carbon-lean
DSM can change the LOAD LEVEL

Strategic growth

Strategic Saving

Adapts the system to the environmental requirements

From “carbon-fat” to carbon-lean
DSM can Change the LOAD SHAPE

Adapts the load to the capacity of the system

Before

After

<table>
<thead>
<tr>
<th>Winter Day</th>
<th>Summer Night</th>
<th>Winter or Day</th>
</tr>
</thead>
</table>
DSM can change the LOAD SHAPE

Adapts the load to the capacity of the system

<table>
<thead>
<tr>
<th>Winter Day</th>
<th>Summer Night</th>
<th>Winter Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>(but)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Change Agents

*(companies, intermediaries, catalysts)*

<table>
<thead>
<tr>
<th>DSM-concept</th>
<th>Change agent role</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classic (addressing utilities as they are)</td>
<td>Deliver products and services</td>
<td>Paradip Port (India)</td>
</tr>
<tr>
<td>Monopolised markets</td>
<td>Fundraising</td>
<td>Public Benefit Charges (USA)</td>
</tr>
<tr>
<td>Customer aggregation</td>
<td>Mandate utilities to achieve a set level of energy efficiency</td>
<td>White Certificates (Italy and some Australian states) and EE Commitment (UK)</td>
</tr>
<tr>
<td>Liberalised markets</td>
<td>Decouple profit from sales volume</td>
<td>California Investor-owned Utilities</td>
</tr>
<tr>
<td>Incentivising utilities to deliver energy efficiency</td>
<td>Aggregate energy efficiency projects to the scale of a virtual power plant</td>
<td>Jiangsu, Shanghai and Guangdong (China) Efficiency Vermont</td>
</tr>
<tr>
<td>Energy Efficiency Power Station</td>
<td>Aggregation of purchasing power</td>
<td>FEMP (USA), Technology procurement (Sweden)</td>
</tr>
<tr>
<td>Government Deployment schemes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The problem is not one but several!

• **Load level**
  – a wasteful demand requires too much supply for the specific needs *(The customer do not need energy! He needs the service that energy, combined with an installation, provides)*

• **Load shape**
  – high *peaks*,
  – little *reserve capacity*,
  – *bottlenecks* in transmission and distribution

• **Market responsibilities**
  – who is the owner of the problem?
The DSM University (www.dsmu.org)
The Structure

1. The Logic of DSM, in which motivations and overview is presented in particular to decision makers and people who wants to see how issues connect to each other
   • Strategies for DSM
   • The role of Efficiency and flexibility in systems (IDSM)
   • Actors, and their roles/relations, to make DSM a reality
   • DSM potential and costs (including rebound)

2. Governance (or DSM Management), in which incentives, cost/benefit, planning, evaluation and regulation are dealt with but also institutional behavioural issues such as barriers and biases.
   • Incentives (carrots and sticks)
   • Evaluation
   • The plethora of benefits (and for whom)
   • Planning and regulation
   • Barriers and biases

Lecturers: 1) OAs or delegated experts, 2) Other authors, 3) Other IAs or IEA authors, 4) Persons with knowledge and perspectives
3. **Energy use (Load Level)**, technologies and measures to promote load level changes including strategic shifts of energy use to reduce carbon emissions.
   - Obligations and certificates (applications and practice)
   - Network and grid issue
   - Equipment
   - Calculation
   - Business models

4. **Flexibility – (Load shape)**, technologies and applications in DR systems and as regards customer benefits and participation
   - Incentives (Pricing to reflect capacity needs)
   - Demand response practices and market segments
   - Technologies
   - Market models
Structure continued

5. Integration, putting energy efficiency, storage and RES together to systems
   • Preparing for integration
   • Practical examples
   • Incentives

6. Business models, to deliver energy services
   • Empowering users
   • ESCOs and EPCs
   • Municipalities
   • Market Transformation
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors/Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>ESCo market development: A role for Facilitators to play</strong></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ISGAN Annex 2 Spotlight on Demand Management</td>
<td>ISGAN Laura Marretta</td>
</tr>
<tr>
<td>3</td>
<td>Using Demand-Side Management to Support Electricity Grids</td>
<td>15 David Crossley (RAP)</td>
</tr>
<tr>
<td>4</td>
<td>Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes</td>
<td>22 David Crossley (RAP)</td>
</tr>
<tr>
<td>5</td>
<td>Impact evaluation of Energy Efficiency and DSM programmes</td>
<td>1/9 Harry Vreuls</td>
</tr>
<tr>
<td>6</td>
<td>Managing Variability, Uncertainty and Flexibility in Power Grids with High Penetration of Renewables</td>
<td>- Lawrence Jones, Alstom</td>
</tr>
<tr>
<td>7</td>
<td>Customized, Systemic, Strategic – the way to succeed with energy efficiency in industry</td>
<td>- Catherine Cooremans, Business School of Geneva</td>
</tr>
<tr>
<td>8</td>
<td>Taking Stock – 40 years of Industrial Energy Audits</td>
<td>(eceee) Peter Mallaburn, UCL</td>
</tr>
<tr>
<td>9</td>
<td>Behavioural changes are necessary to get the full impact on energy efficiency. What works and what doesn’t (part 1)</td>
<td>24 Ruth Mourik</td>
</tr>
<tr>
<td>10</td>
<td>How to make the best technology even better, BAT becomes BAT+</td>
<td>3 Hans Nilsson</td>
</tr>
<tr>
<td>11</td>
<td>Capturing the Multiple Benefits of Energy Efficiency</td>
<td>New Nina Campbell</td>
</tr>
<tr>
<td>12</td>
<td>Consequences of learning curves for energy policy</td>
<td>- Clas-Otto Wene</td>
</tr>
<tr>
<td>13</td>
<td>„Do not take away their steering wheel!“ How to achieve effective behavioural change in the transport and SME domain</td>
<td>24-2 Ruth Mourik</td>
</tr>
<tr>
<td>14</td>
<td>Improving energy efficiency in SMEs – an interdisciplinary perspective</td>
<td>- Patrik Thollander</td>
</tr>
</tbody>
</table>
Is sustainable growth possible...

..without DSM and without global co-operation?