Energy Culture

DNV GL Energy – Sustainable Energy Use Europe
DNV GL - a world leader

Maritime
The world’s leading ship and offshore classification society and maritime advisory

Oil & Gas
A leading technical advisor to the global oil and gas industry

Energy
An energy powerhouse, supporting customers across the energy value chain

Revenue 2012 by business unit
~2,500 € mill.

Business Assurance
One of the world’s leading certification bodies
Sustainable Energy Use

- Support industry to reduce their energy costs and remain competitive
- Design, implement and evaluate policy
- Develop, operate and measure the effectiveness of Utility obligation schemes
- Capacity building and market assessments for the new energy economy (smart cities, demand side management, Measurement & Verification, etc.)
- Research & innovation
Energy Efficiency is facing many barriers, most of them non-technical and non-financial

- Low awareness
- Lack of knowledge
- Resource constraints (time, money)
- Fragmented energy saving potential
- Preference for supply side solutions
- Lack of management commitment
- Inadequate energy data
- Resistance to change
- Perceived risk of production/operation disruption
- Measurement & verification uncertainty
- Split/contradicting incentives

**Insufficient focus on non-technical solutions**
What is Energy Culture?

Energy Culture is the **shared mindset** that creates and sustains an environment that leads to continual improvement of the organization’s energy performance. It comprises people, systems, structure, skills and strategy.
Energy Culture is quantified in **eight** characteristic **dimensions** with **five** maturity **levels** for each.

This approach builds on models of behavior, theories of change, experience of DNV GL’s “Safety Culture” and energy efficiency expertise in industry.
Visibility – Is energy use visible?

- @ home – Plug in electrical meters in plugs to see direct consumption – typical 1-5% savings
- @ Work – A display that shows the energy consumption for the last month compared to target – XX% savings?
Accountability – Who is responsible?

- @ home – Everyone is accountable for turning off the lights and using less water – can be controlled via invoices and generally leads to 1-5% savings

- @ Work – Each department is directly responsible for their energy consumption – XX% savings
Targeting – Do we know what are targets are?

- @ home – Use the guidelines from your car computer to drive your car with the best fuel efficiency possible – 10% savings on gas
- @ Work – Have an indicator telling you that the process heating is running at its optimal energy performance – XX% savings on gas
Diagnostic – How to measure Energy Culture?

Data Analysis
- Baseline is calculated using current energy use
- Potential quick-win optimization projects are identified

Surveys
- Customized surveys are designed
- Surveys enable to collect a large amount of data in a relatively short period of time

Interviews
- Interviews with the management staff to confirm and complement the survey results
- Identification of non-technical barriers and issues faced in daily work

Workshops
- Workshops with engineers and operators
- Brainstorm sessions focused on one key problem
Diagnostic results example

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<thead>
<tr>
<th>Dimension</th>
<th>Level</th>
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<tbody>
<tr>
<td>Visibility</td>
<td>Inert</td>
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<tr>
<td>Accountability</td>
<td>Inert- Reactive</td>
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<tr>
<td>Collaboration</td>
<td>Inert</td>
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<td>Targeting</td>
<td>Inert- Reactive</td>
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<td>Commitment</td>
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<td>Motivation</td>
<td>Reactive-involved</td>
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<td>Learning</td>
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<td>Progress</td>
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<table>
<thead>
<tr>
<th>Nº</th>
<th>Maturity Level</th>
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<tbody>
<tr>
<td>1</td>
<td>Inert</td>
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<tr>
<td>2</td>
<td>Reactive</td>
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<td>3</td>
<td>Involved</td>
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<td>4</td>
<td>Proactive</td>
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<td>5</td>
<td>Continually improving</td>
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“Turning everyone into a decision maker. Push decision-making down to the lowest level”

-Nucor

Top management commitment with global view of profits and targets

Focus on actionable parameters in the control room
KPI

- **WHO? WHAT? WHEN? HOW?** the right decision-making support to the right people at the right time
  - production manager: GJ used/day, every morning on iphone
  - Operator: venting valve opening, every hour, on DCS

- **Role of a KPI:**
  - Clearly define what we want to improve
  - Provide a quick access to useful and accurate information.
  - Measure the improvement or deterioration of a process
  - Follow-up on performance

- **Need to include:**
  - Variables affecting Energy Performance
  - Dynamic Baseline
  - Reporting and Baseline Periods

- **Reduced cost (EUR)**
  - t/h of stream extraction
  - Average stream extraction ratio

- **Steam extraction ratio**
  - Steam extracted vs. target

- **Maintenance:**
  - Uptime steam extraction

- **Key control variable set points**
  - Steam extraction ratio
  - Steam extraction vs. target