Improving Industrial Energy Efficiency
by Changing the Energy Culture

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About DNV GL

On the 12th of September 2013, DNV and GL merged to form DNV GL. We are now...

- the world’s largest ship and offshore classification society
- the leading technical advisor to the global oil and gas industry
- a leading expert for the energy value chain including renewables and energy efficiency
- one of the top three certification bodies in the world
Industry consolidation through mergers

- DNV 1864
- KEMA 1927
- GL 1867
- Garrad Hassan 1984
- GL Garrad Hassan 2009
- DNV 2012
- DNV-GL 2013
Global reach – local competence

150 years
400 offices
100 countries
16,000 employees
Energy Culture
What is Energy Culture?

A shared mindset that creates and sustains an environment conducive to continual improvement of the energy performance of the organization.

Energy savings due to management and behaviour changes alone can be up to 15-20%
“Manufacturers have used management systems to improve quality and safety for years. As a result, quality and safety are embedded in their corporate cultures.

A key barrier to reducing industrial energy use has been the lack of a management system for energy.”

– Northwest Energy Efficiency Alliance
Energy culture, similar to safety culture, requires long-term organizational commitment to be institutionalised

- Research has shown that energy intensive facilities can achieve half of its potential energy savings of 15% - 25% simply through structural and behavioural changes
- The Energy Culture approach enables companies to realise these savings through targeted improvement measures that focus on how facilities are run

- **Diagnostic** - Assess the current status of the energy culture of an organization. Important to calculate baseline
- **Solution Development** - Based on the findings in the diagnostic stage a solution program is developed
- **Implementation** - The solution program is implemented at a pace that is suitable for the organization
- **Sustaining** - A quantitative and qualitative evaluation at regular intervals to close the circle of continuous improvement
How to measure Energy Culture?

Data Analysis

- Identify the potential savings linked to changing behavior
- Baseline is calculated using current energy use
- Potential quick-win optimization projects are identified

Surveys

- Customized surveys are designed
- Surveys enable collection of 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
How to measure and change Energy Culture?

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”
- Energy efficiency expertise in industry
Survey questions and recommendations are made according to the 8 dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Example question</th>
<th>Example actions</th>
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</thead>
<tbody>
<tr>
<td>Visibility</td>
<td>Do you have real-time information regarding your equipment’s energy use?</td>
<td>Incorporate energy KPIs in management governance system</td>
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<tr>
<td>Accountability</td>
<td>Is there an energy manager onsite??</td>
<td>Give each energy KPI an owner</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Is there a forum to discuss energy?</td>
<td>Create cross-functional team that work on energy performance issues</td>
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<tr>
<td>Targeting</td>
<td>Is energy performance measured and reported in the same way as production/quality?</td>
<td>Put systems in place to identify reasons for energy consumption drift from normal operations</td>
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<tr>
<td>Commitment</td>
<td>Do you know if there is a company energy policy?</td>
<td>Collect and implement energy improvement ideas</td>
</tr>
<tr>
<td>Motivation</td>
<td>Is there an improvement box where you can put your ideas for energy efficiency improvement?</td>
<td>Implement incentive programs for all employees linked to energy</td>
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<tr>
<td>Learning</td>
<td>Have you received any energy training?</td>
<td>Highlight and communicate all energy initiatives</td>
</tr>
<tr>
<td>Progress</td>
<td>Is there a continuous improvement group within the company?</td>
<td>Create a continuous improvement group focused on energy</td>
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- Aimed to touch *entire organization*
- Each question, targeting one of the 8 dimensions, is weighted and given a score
- The results serve as the basis for the spider diagram
DNV GL’s Energy Culture methodology was successfully applied at a chemical plant in Belgium which employs 650 people

**Project:** Assessment and improvement of Energy Culture

**Client:** Chemical plant producing silicone in Belgium with a vision to be carbon neutral by 2050

**Years:** 2013 – Present

**About:**
The site employs 650 people, have made capital investments in various energy efficiency projects and identified **behavioural change** as the next step to achieving greater gains.

**Key issues:**
- Operators see energy as a design and not operational issue
- ~10% of people surveyed only remember EE initiatives that do not require capital investments
- ~50% of people surveyed believed that capital investments are necessary to reduce energy consumption in their departments
Survey results according to the 8 dimensions help the company to pinpoint key areas of improvement.
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- Commitment and motivation are the strongest dimensions.
- Visibility is the weakest.
- Communication and measurement need to be improved.
Some behavioural changes were already observed in the first few months

**Improved oversight and communication**
- Works Council started to ask about info. on energy consumption
- Engineering department made it mandatory to study the energy consequences on all new projects
- Safety department offered to coordinate communication on both safety and energy culture

**On-the-ground initiatives**
- Operator reported building heat leaks
- Maintenance reinstalled insulation jackets
- Engineer & operators have rerouted tracing lines for better efficiency

**Quick wins identified and implemented in the 1st month yielded 1% energy savings vs. previous year’s consumption**
Thank You!

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