

# Improving Industrial Energy Efficiency by Changing the Energy Culture

**Valerie Choy, Senior Consultant**

17th June 2015

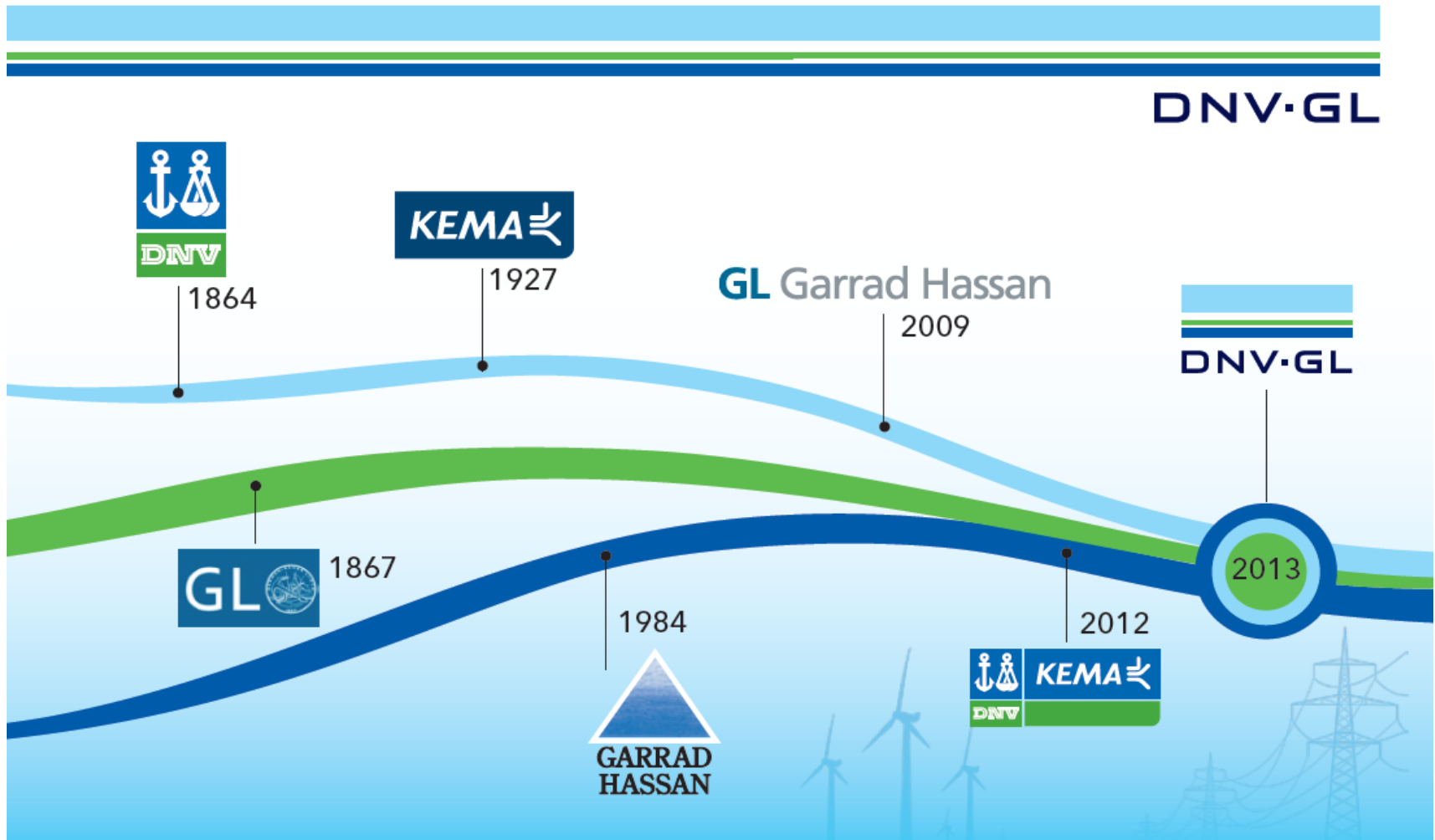
## About DNV GL

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



## Global reach – local competence



**150**

years

**400**

offices

**100**

countries

**16,000**

employees

# DNV GL business organization



**DNV GL Group**  
Headquarter: Oslo, Norway  
Group President & CEO: Henrik O. Madsen

**Cybernetics**

**Software**

**MARITIME**

**OIL & GAS**

**ENERGY**

**BUSINESS ASSURANCE**

**Research & Innovation**

**Global Shared Services**

# 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%**

## What our clients say...

---

“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

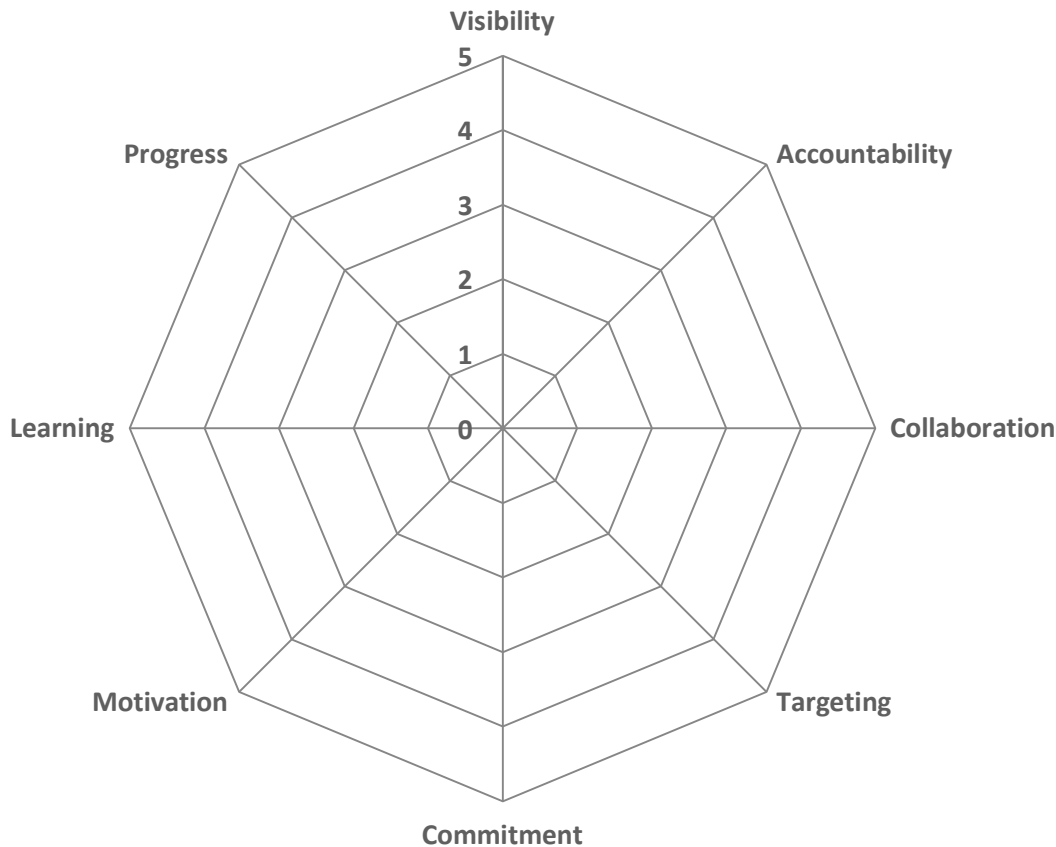
## Workshops



- 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

Dimension	Example question	Example actions
<b>Visibility</b>	Do you have real-time information regarding your equipment's energy use?	Incorporate energy KPIs in management governance system
<b>Accountability</b>	Is there an energy manager onsite??	Give each energy KPI an owner
<b>Collaboration</b>	Is there a forum to discuss energy?	Create cross-functional team that work on energy performance issues
<b>Targeting</b>	Is energy performance measured and reported in the same way as production/quality?	Put systems in place to identify reasons for energy consumption drift from normal operations
<b>Commitment</b>	Do you know if there is a company energy policy?	Collect and implement energy improvement ideas
<b>Motivation</b>	Is there an improvement box where you can put your ideas for energy efficiency improvement?	Implement incentive programs for all employees linked to energy
<b>Learning</b>	Have you received any energy training?	Highlight and communicate all energy initiatives
<b>Progress</b>	Is there a continuous improvement group within the company?	Create a continuous improvement group focused on energy

- 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



# Survey results according to the 8 dimensions help the company to pinpoint key areas of improvement



Conclusions of diagnostic phase

- **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!

**Valerie Choy**

[Valerie.choy@dnvgl.com](mailto:Valerie.choy@dnvgl.com)

+65 9430 9346

**www.dnvgl.com**

**SAFER, SMARTER, GREENER**