Energy Culture

DNV GL Energy – Sustainable Energy Use Europe

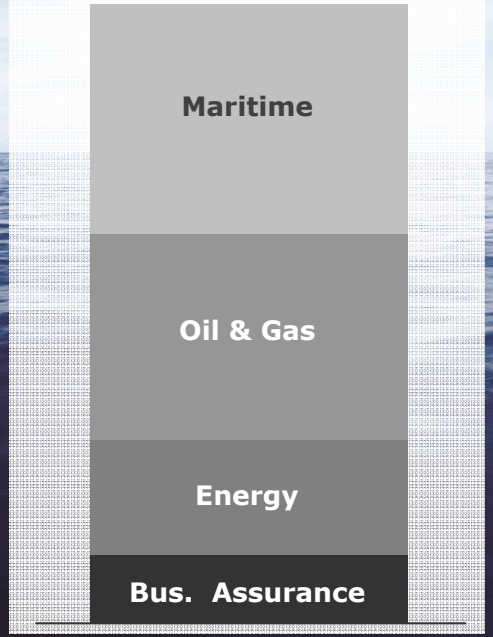
DNV GL – a world leader

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

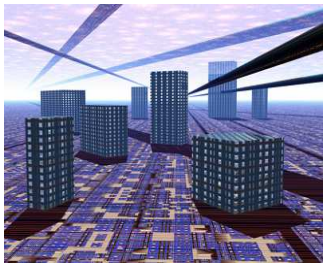
An energy powerhouse, supporting customers across the energy value chain

Business Assurance

One of the world's leading certification bodies

DNV GL Energy: One company serving the needs of the energy market place



Policy & Strategy | Production | Trading | Transport & Distribution | Use

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

Models of behavior – leads to sustainability

- Threat
- Fear
- Response efficacy
- Self-efficacy
- Barriers
- Benefits
- Subjective norms
- Attitudes
- Intentions
- Cues to action
- Habits
- Reactance

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?

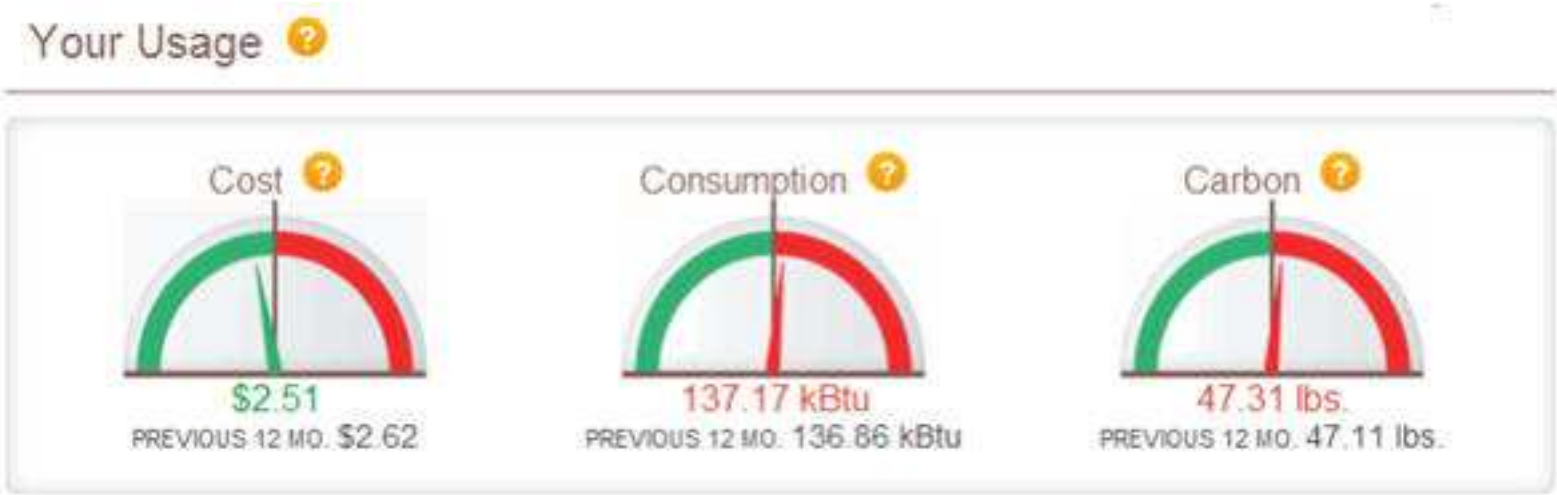
- @ home – Plug in electrical meters in plugs to see direct consumption – typical 1-5% savings
- @ Work – A display that shows the energy consumption for the last month compared to target – XX% savings?

Accountability – Who is responsible?

- @ home – Everyone is accountable for turning of 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

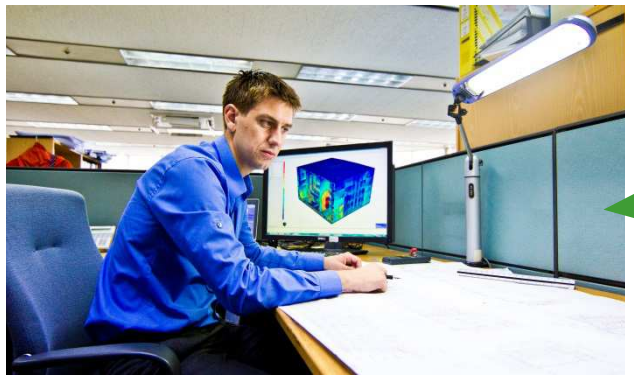
- Workshops with engineers and operators
- Brainstorm sessions focused on one key problem

Diagnostic results example

N°	Maturity Level
1	Inert
2	Reactive
3	Involved
4	Proactive
5	Continually improving

Dimension	Level
Visibility	Inert
Accountability	Inert-Reactive
Collaboration	Inert
Targeting	Inert- Reactive
Commitment	involved
Motivation	Reactive-involved
Learning	Inert-Reactive
Progress	Inert-Reactive

“Turning everyone into a decision maker. Push decision-making down to the lowest level” -Nucor

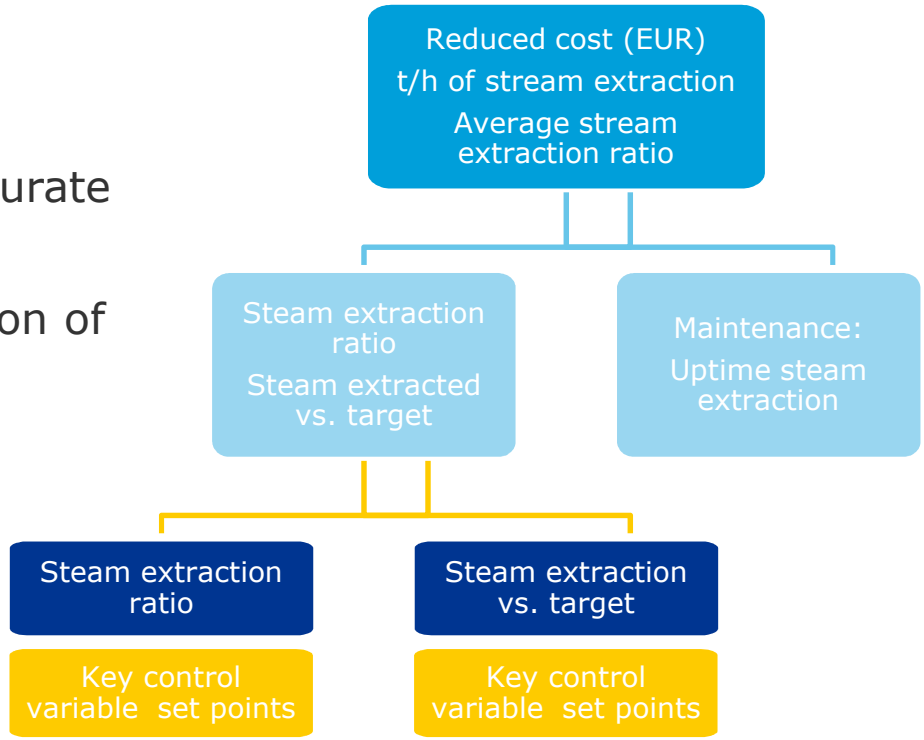


Top management commitment with global view of profits and targets

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



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