

The impact of human behaviour on energy efficiency

What happens in industry?

Sophie Chirez, DNV GL Energy

The background

Industrial processes rely on the expertise of the operational staff ...

they are the key experts and any change needs their approval first

Organisations fear the costs of change, productivity and reliability are key, so...

let's use the few resources we have to work on those aspects first

Manufacturing processes are complex and linked to multiple factors, so...

you don't mess with success

A lot of investments in new energy efficient technologies have already been made...

What else can be done?

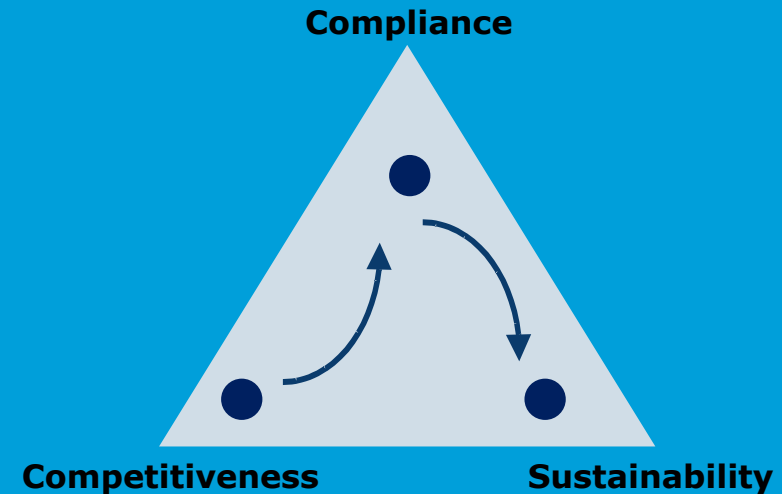
Capex budgets have been cut, so...

we don't have the money to invest in new projects

'Doing what we always do'..... isn't enough to survive

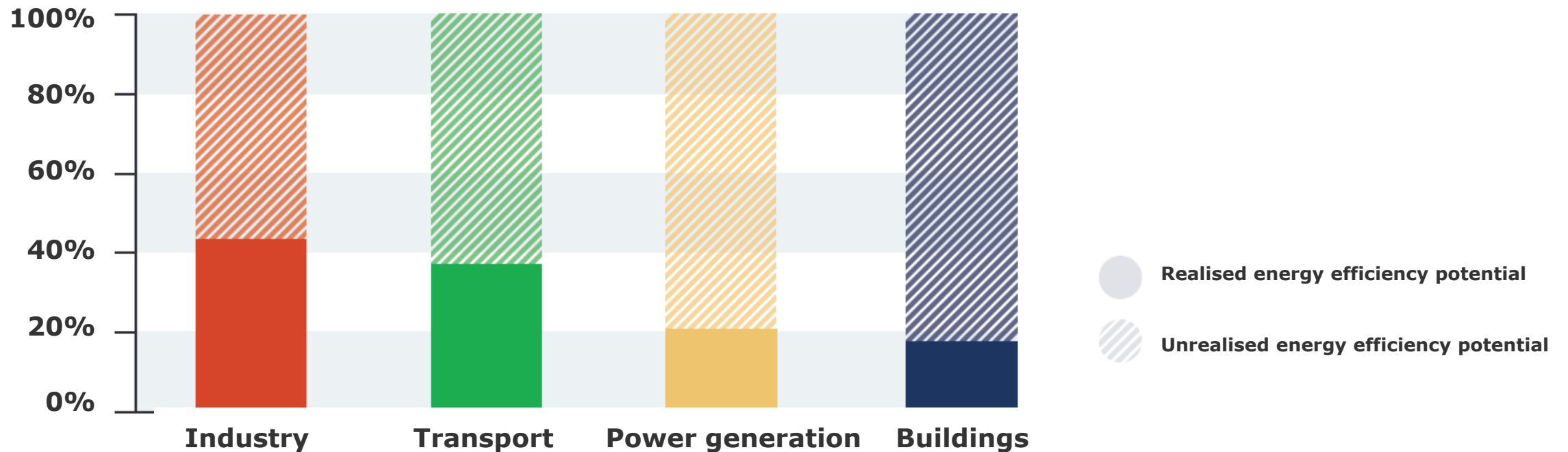


- **Cutting costs to be competitive**
- **Regulatory Compliance, a duty**
- **Sustainability, a differentiator**



Savings potential remains

IEA projections to 2035 show that as much as two-thirds of energy efficiency potential will remain untapped unless policies change



Source: IEA 2014

How constraints make us more creative?



Operational staff are the experts

Engage the people on the floor

Focus on productivity and reliability

Energy efficiency is directly linked to productivity and reliability

Industrial processes are complex

Use data analysis techniques to understand and assess energy improvement potential

Obvious solutions are installed already

Focus was on technical solutions, let's now explore the behavioural aspect

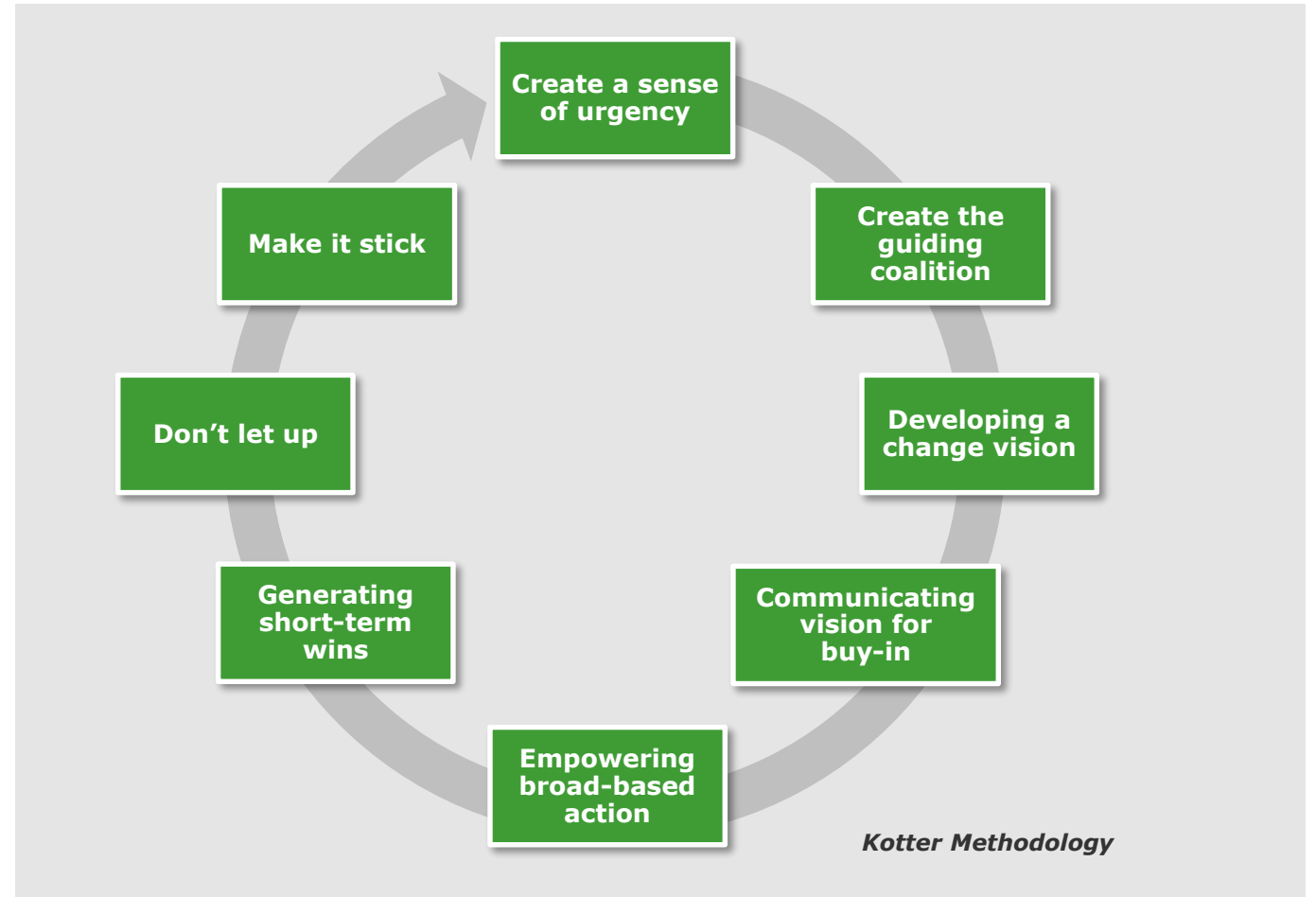
No Capex available

Quick wins don't require investments

How to deal with resistance to change?

Get people involved
'to actively participate'
in making the change

We need to take into account
the technical **and** social
aspects of the change



Energy Culture

What's Energy Culture?



A shared mindset that creates and sustains an environment conducive to continuous improvement of the energy performance of the organisation

Case study: ASPEN Notre Dame de Bondeville



ASPEN - Objectives



PERFORMANCE

Improve energy monitoring and implement ISO 50001



COMMUNICATION/ RESOURCES

Engage the whole organisation, communicate internally and externally on energy performance



PROCUREMENT

Review the contract and look for new partnerships

ENERGY CULTURE

Activities



Kick-off meeting



19 Specific interviews



**On-line survey
228 answers**



**Kaizen workshop
on Line 27**



Initial observations and conclusions

**Operators don't think they have an impact on the energy consumption, only the maintenance.
The staff are underestimating their role.**

ENGAGEMENT

The management team have set a good example and have established a vision, recognized by all

LEARNING

The staff don't think they have any specific knowledge about energy

MOTIVATION

There is a desire to learn

VISIBILITY

No information about energy available, some initial campaign, but at a site level

TARGETS

The level is ISO 50001, but the objective is not clear for the staff

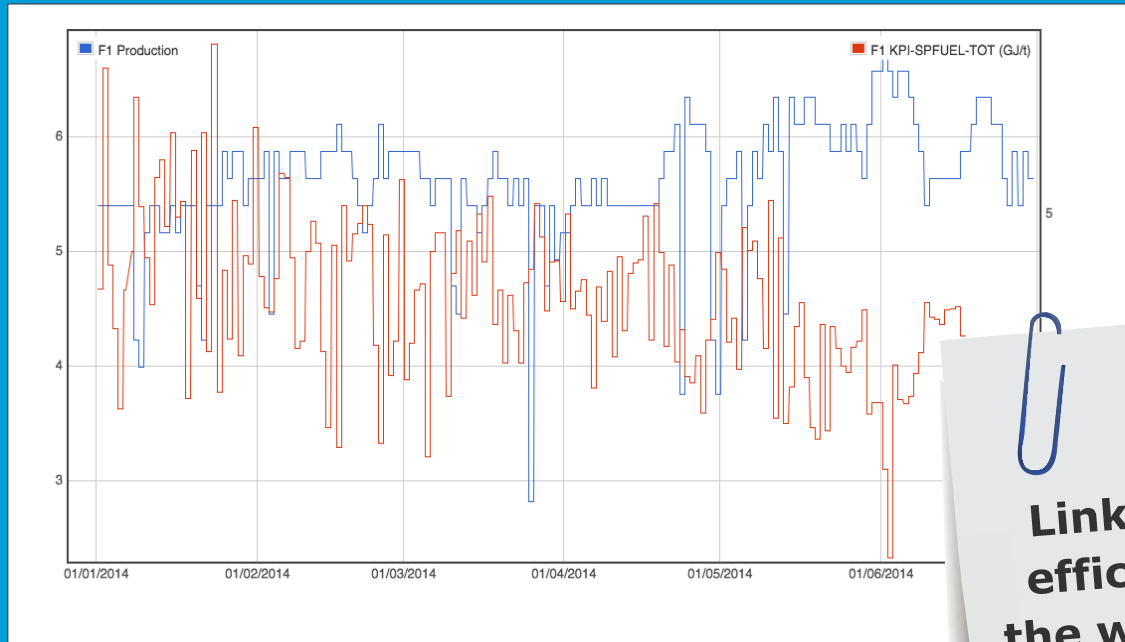
EVOLUTION

Energy is not yet a priority

Focus on the Kaizer workshop with the operators

PART 1

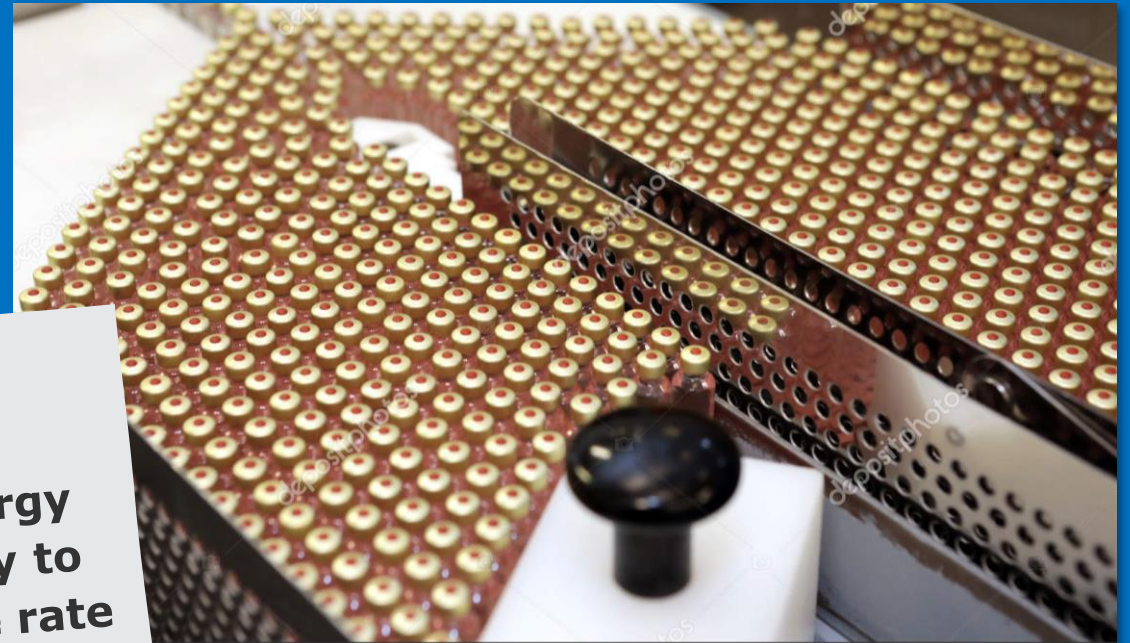
Screen the variability of the energy use on line 27



Link energy efficiency to the waste rate

PART 2

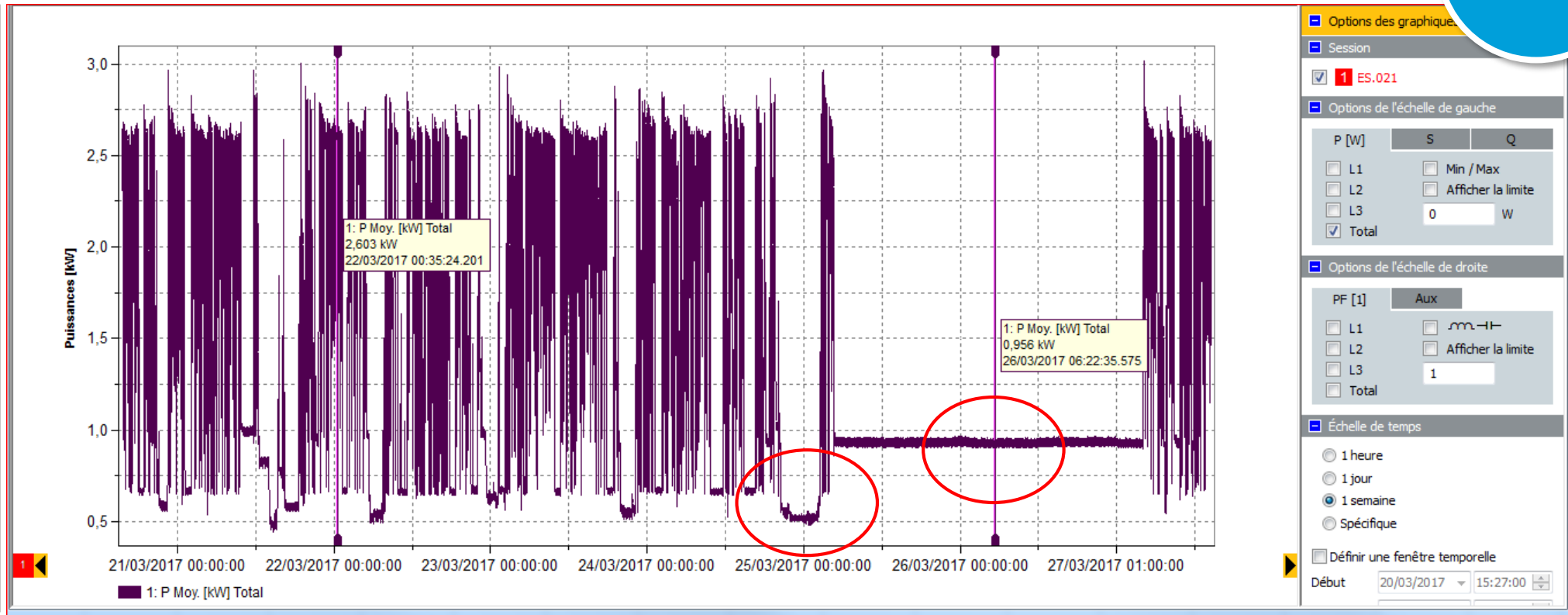
Screen the waste sources



Detailed analysis of the process

The 'stops' during the weekends are consuming more energy than during the week

WHY?




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graph LR; P[PLANNING] --> C[CONTROL];
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PLANNING

- **Change in orders**
- **PO size**
- **Timing for open valves**
- **Breaks**
- **Start of the lines, shift changes**
- **Technical stops**



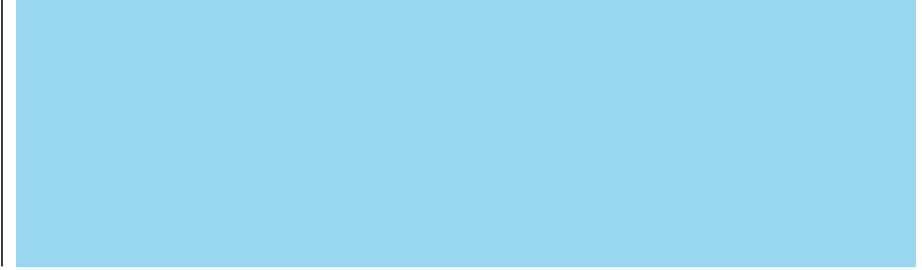
EQUIPEMENTS

- Shut down devices
- Quality issue
- Access the installation – password
- No automatic shutdown
- Automatic mode
- shutdown

OPERATIONS

- **Colour Code**
- **2/8 or 3/8**
- **No stops during the weekend**
- **Use of competencies depending on priorities**
- **Human behaviour and reactivity**
- **Change in shifts**
- **Time needed for validation**
- **Quality issue**

Discussion with the operators – Why such a rejection rate?



OPERATIONS

- Competencies and trainings
- Suspicion of problems
- Change in plates of machines
- Blisters cleaning
- Operators access to set-up
- Dust on camera
- Tracer calibration
- Technical issue "patte étui"
- Cleaning of the line after shut down
- Rods loaded and destroyed

EQUIPEMENTS

- Tracing
- Lack of rods
- Reliability
- Control system
- Reflection when reading
- Camera is moving during cleaning
- PO with labels
- Quality of label rolls
- Detected filament on safety device

Some testimonies

“ Bonne formation, Bon contenu cela m'a permis de prendre conscience sur l'énergie. ”

“ Session de formation très intéressante.
Beaucoup d'idées sont ressorties de ce workshop. ”

“ Nouvelle approche avec lien entre production et efficacité énergétique VS consommation kWh. ”

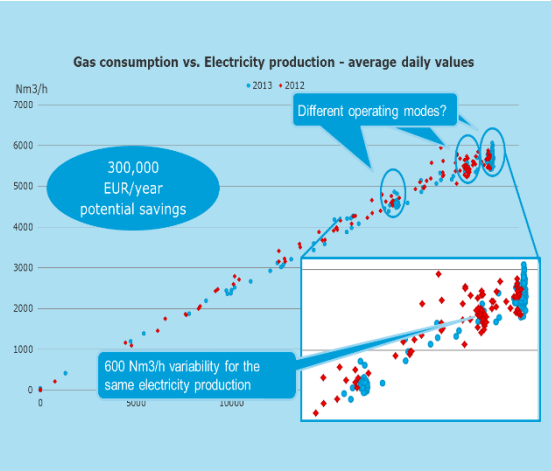
Conclusions

- Quick wins exist
- Operational staff have an impact
- It's crucial to link energy with productivity and reliability
- Strengthen the communication and collaboration within the teams
- New skills are needed for the energy managers
- Appropriate tools and knowledge should be in place

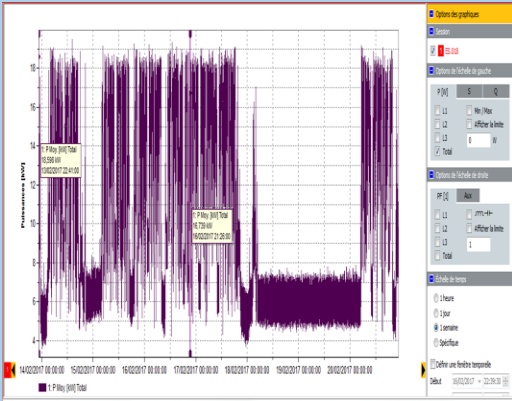


Some outputs from Energy Culture projects

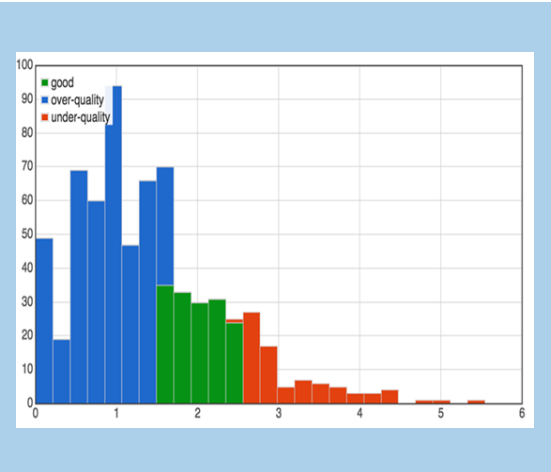
Identification of
wrong set-up



Explain atypical
consumption



Highlight
over-quality



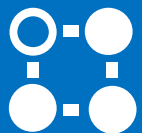
Define KPIs at
each level



Key points to take away



**Engage all levels
in the organisation**



**Take the time to
learn the organisation
and the processes**



**Use the link
between energy
and production**

“

Les présentations faites avec des éléments ludiques de comparaison entre vie au travail et vie familiale ont démontré l'implication que chacun pouvait avoir à son niveau pour améliorer l'efficacité énergétique de notre site. Cette expérience a été enrichissante pour tous, cela nous a apporté une autre vision et une autre approche de la culture énergie d'entreprise”

**Philippe Drieu,
Energy Manager,
Aspen Pharma**

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Thank you.

*Sophie Chirez – 0032 (0) 474 644 818
DNV GL Energy, Sustainable Energy Use*