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How the Dutch rail sector must prepare for the application of the Energy Efficiency Directive after 2020

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www.ricardo.com

Agenda

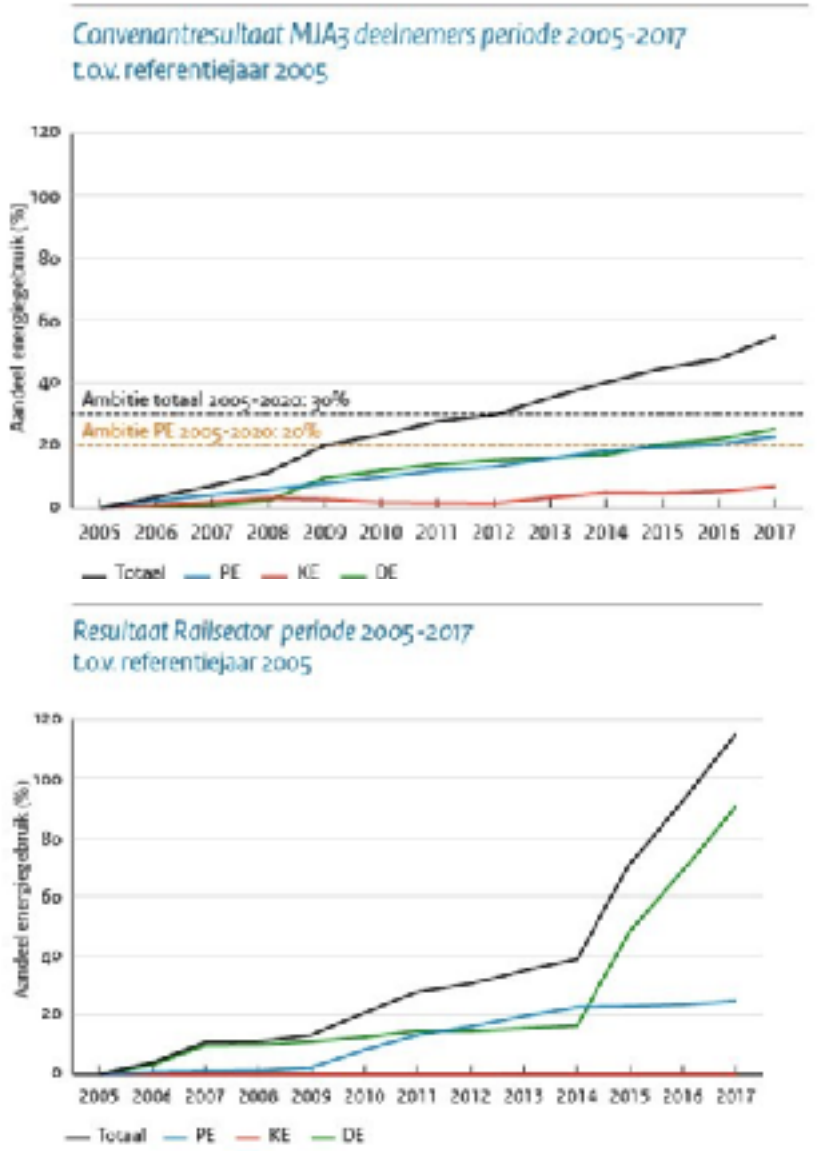
- Introduce Ricardo
- Outline energy efficiency in Dutch rail sector

About Ricardo Group

- A global, multi-industry consultancy for engineering, technology, project innovation and strategy
- Over 2,900 staff working in 40 offices worldwide
- Providing analysis and solutions for major environmental challenges
- Full suite of environmental skills and services including, energy and climate change, sustainable transport , emissions and air quality

Current and future legal framework

- The Rail sector has been covered by Long Term Agreements (MJA3)
- **Aim**: achieving 30% energy efficiency in the period 2005-2020 from 33 sectors
- The goal has been overachieved: 54.8% (2017), of which
  - 22.7% is due to process efficiency (PE)
  - 6.9% due to chain efficiency (KE)
  - and 25.2% through purchasing and own generation of sustainable energy (DE).
- Participation in (MJA3) has exempted companies from needing to comply with **Article 8 of** the EU **Energy Efficiency Directive (EED)**
- Legal framework in the Netherlands is changing
- Enterprises participating in MJA3 should be aware that **they may be captured by EED after 2020**.
- The EED also apply to suppliers, partners and the businesses operating from within stations
- What are the implications and opportunities for the rail sector?



Source: RVO analysis from RVO.nl

Background to the Energy Efficiency Directive (EED)

- EED establishes a set of binding measures to support the EU reach its energy efficiency targets
- **Article 8** requires all Member States to put in place regulations that oblige 'large enterprises' to audit the energy efficiency of their operations every 4 years.
- Audits must cover **all types of energy use** including energy consumed by buildings, industrial processes and transport. **It would therefore cover all traction and transport energy.**
- The first deadline for enterprises to comply with Article 8 was 5th December 2015. We have now entered the **second compliance cycle**, the deadline for which is 5th December 2019.
- Degree of freedom in transposition into national legislation.
- Qualification criteria Netherlands (only to Dutch branches):

More than **250** employees

OR

Annual turnover greater than **€50 million**

AND

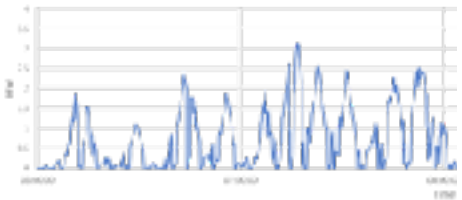
Annual balance greater than **€43 million**

Article 8 requirements

- Audits must:

Use up-to-date, measured, traceable operational data

Use load profiles for electricity



Include detailed review of the energy consumption

Buildings

Industrial operations

Transport (traction)

Life-cycle cost analysis (LCCA) rather than SPP

long-term savings, residual values, discount rates.

- **Be proportionate and representative for reliable** picture of overall energy performance.
- Lead to identification of most significant opportunities
- Where sites are uniform, a **sampling approach** is allowed for buildings and processes.
- The sample within each group must include a leading, average and lagging site

Large consumers must complete full energy audits

Medium consumers must complete 3 audits

Small consumers must complete 3 simplified audits

Article 8 EED actions

- Once LTA3 ends, enterprises may need to undertake Article 8 audits.
- The following steps are appropriate:
  - **Determine whether you are likely to qualify**, using the Netherlands qualification criteria.
  - **Review possible routes to compliance** e.g. energy audits, ISO 50001 etc.
- If you qualify
  - need to put a **plan in place to achieve this by the compliance deadline** (5th December 2019 in the current compliance cycle).
  - be likely to have **to gather data** on your total energy consumption within the Netherlands, and undertake **audits** of a proportion of your activities.
  - the energy data that you gather will need to be for a 12 month period, overlapping with the qualification date for the compliance cycle
- RVO responsible for monitoring compliance
- RVO developed a voluntary energy audit report template
- No auditor accreditation is required
- Submit evidence of your compliance (e.g. an energy audit report) to the relevant local authority, for submission to RVO, in advance of the compliance deadline.

Rijksdienst voor Ondernemend Nederland

Where should you focus?

- EED covers all energy use

Buildings

Industrial operations

Transport

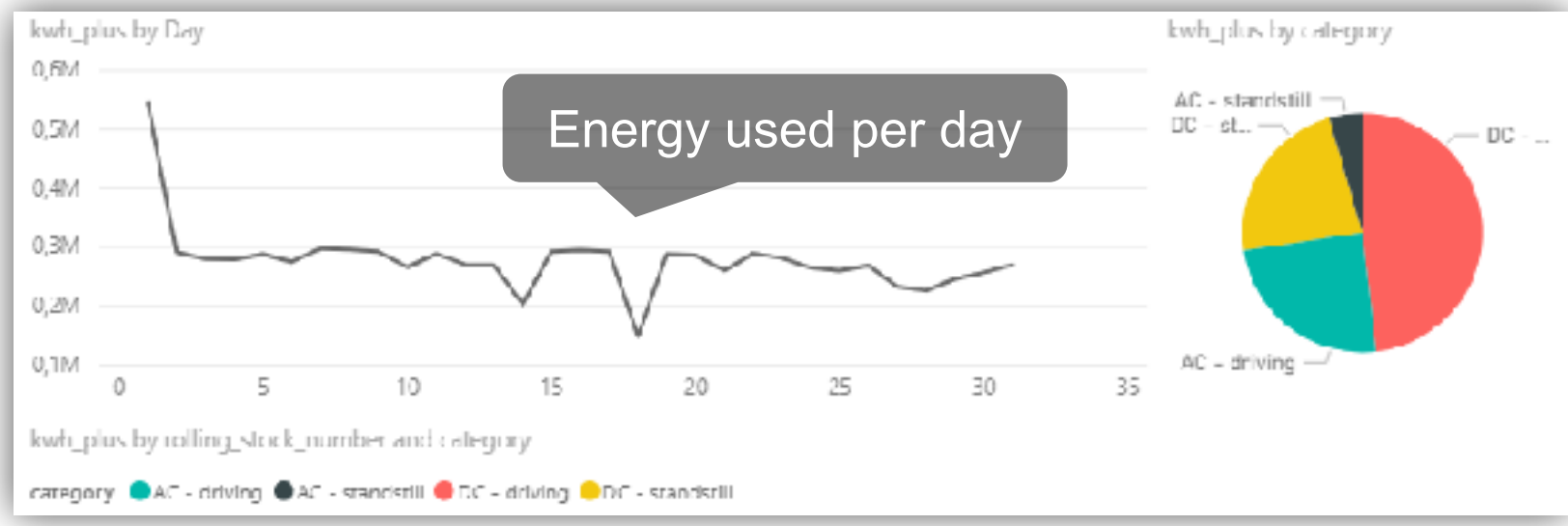
- Consider compliance routes:
  - Internationally recognized energy or environmental management system (e.g. ISO50001)
  - Standard compliance routes

- Establish methods to gather data to:
  - Target activity on key uses of energy
  - Enable benchmarking and profiling over an extended period

- Key data:
  - Energy use in buildings, including offices, depots, maintenance workshops
  - Energy use by rolling stock and any ancillary vehicles

Using energy metering data for continual improvement

- Energy meters are **mandatory** for new trains and refurbished trains from 2022
- EED requires railway operators to demonstrate continual improvements in energy efficiency
- **Plan-do-check-act** principle can be used – energy meters on-board trains support this.
- Ricardo, has carried out various projects to **implement energy meters** and we collect energy consumption data for rolling stock fleets.
- KPIs can be developed after these data have been analysed and benchmarked - supports decision-making improving energy efficiency
- Data shows that energy consumption can be improved through better design (and operation) of train
- Other KPIs relate to improvement of timetables and driving profiles, efficiency of infrastructure, etc.
- A clear view on the energy consumption of the fleet is now possible – helps to identify new opportunities for improving energy efficiency

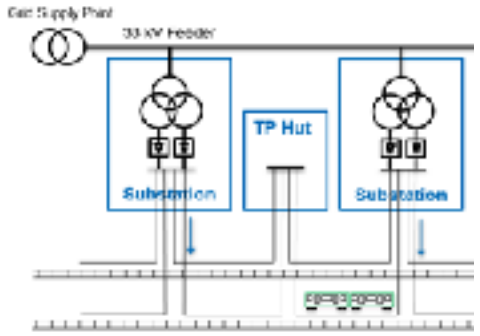


Beyond compliance

- **EED** focusses attention on energy efficiency only
- The **EU Renewable Energy Directive** sets a minimum share of renewable energy in the transport sector of 14% of final energy consumption by 2030
- **Air Quality Directive** sets legally binding limits and target values for concentrations of major air pollutants.
- Member States must put in place measures to achieve such targets.

Solar to traction

Ricardo is working with Network Rail and community energy groups to develop the technical solutions and commercial framework to enable the connection of solar to traction

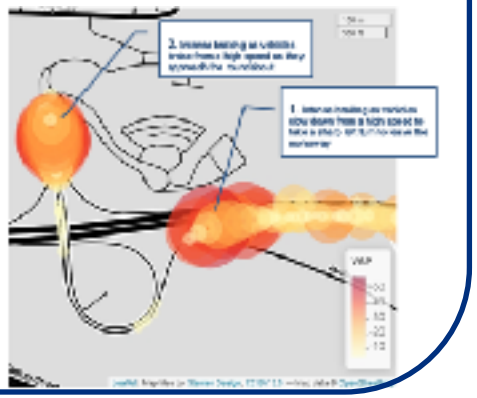


Hydrogen and battery trains

Ricardo has carried out feasibility studies, LCA, scoping studies, etc on hydrogen use in transport and wider energy sector

Non combustion emissions

We have carried out modelling and sampling to evaluate the magnitude and impacts of **brake wear emissions** in rail and road transport



Conclusions

- Rail companies in the Netherlands might be required to comply with Article 8 of the EED from 2020
- 5th December 2019 is deadline for current compliance cycle
- Energy efficiency plans and audits, including representative data collection is required
- The last technical regulations for rolling stock requires meters on new and refurbished trains
- This new data is currently collected by Ricardo to develop KPIs and will important for EED compliance
- EED directive is focused on energy efficiency, however other EU regulations applies, e.g. Renewable Energy Directive and Air Quality Directive.
- Other projects achieving emissions reductions might still make commercial sense

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Thank you

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