Aprūpinimo energija efektyvumas

Energy efficiency on supply side

Lietuvos energetikos konferencija 2013
« Nepriklausoma energetika – stipri ekonomika »

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Challenges for the European Electricity Sector

- Economic crisis
  - Reduction of consumption
  - **Need of sustainable energy**
- Energy mix evolution
  - High development of Renewable energy
  - Phase out of Nuclear & New Build
  - Coal vs. Gas for conventional energy
- Integrated market
  - Effective 1st January 2014
  - Capacity market

Solutions exist for Sustainable Energy

- Energy efficiency on both demand & supply side
- Reducing Cost of new Technologies
- Increasing capacity of New Technologies

- Innovative & efficient renewable energy (offshore, Ocean, variable PSP, CSP…)
- Demonstrating CCS
- Improving Power plants efficiency
- Improving Air quality
- Maximising Water resources

- Balanced Energy Mix
- Smart Grid
- Hybrid AC/DC grid
- Storage
- Develop Transmission Network : HVDC

EU 2020 Climate and Energy framework

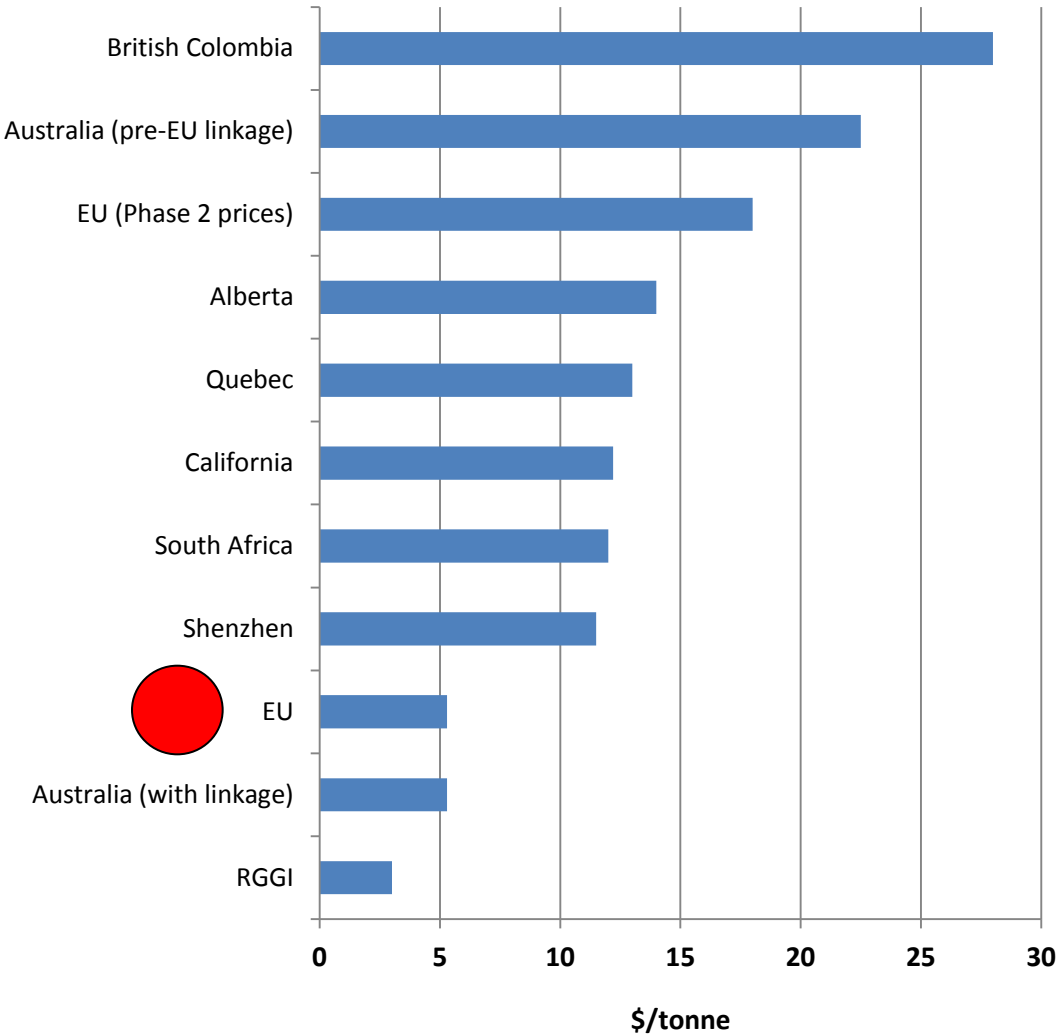
Instrument / Policy	Covers which sectors	Target	Status in 2020 ?
EU ETS Directive	Power and industry: 45% of EU emissions	Reduce emissions by 21% by 2020 compared to 2005 **BINDING**	
Renewables Directive	Power and transport	Renewables to be 20% of energy consumption by 2020 **BINDING**	
Energy Efficiency Directive	Whole economy Up to Member States to deploy (transposition on going)	Improve by 20% by 2020 vs. business as usual **NOT BINDING**	

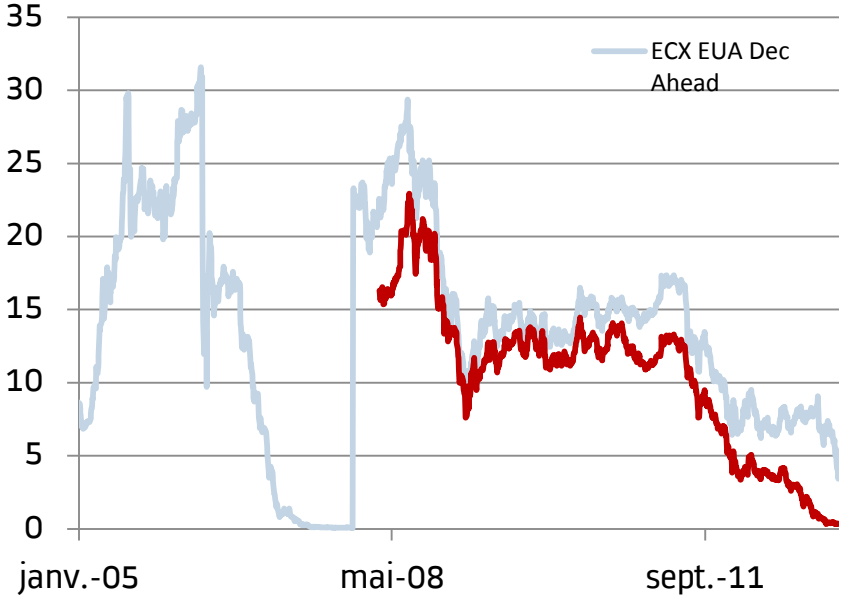
Progress on Energy Efficiency ?

- Vehicle CO2 standards will be met
- New efficiency standards and labelling for lighting and appliances

- More finance needed, especially for the renovation of buildings
- **More efforts needed on supply side efficiency**
- **More progress needed in overall transport energy efficiency**

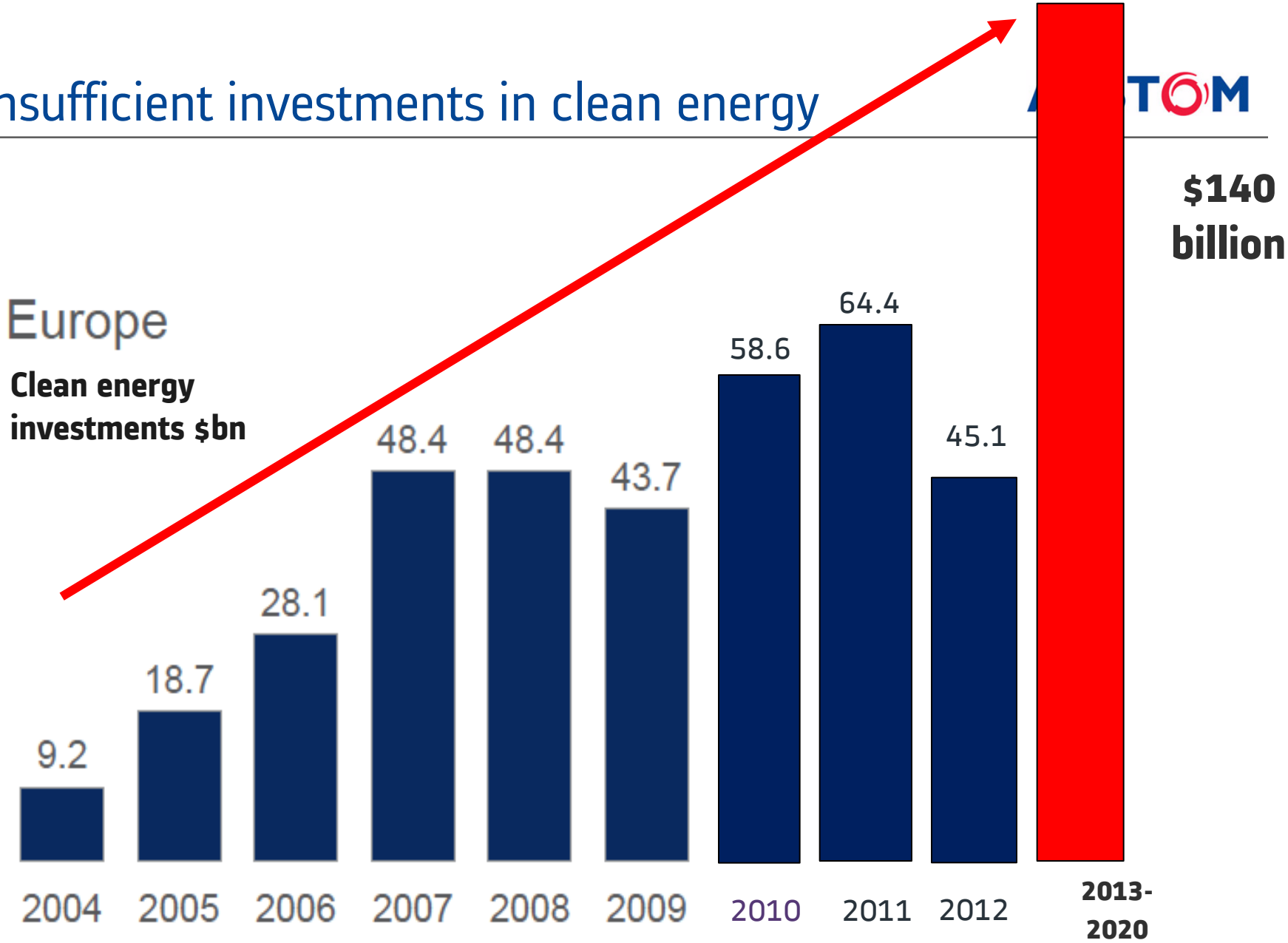
EU CO2 price too low





- Carbon price is not driving investments
- Low auction revenues

Insufficient investments in clean energy



Source: Bloomberg New Energy Finance, UNEP, SEFI

The scope for improving supply-side efficiency

- Improving supply-side efficiency means improving the **thermal efficiency** standards at our power stations, notably coal and gas-fired power plants.

- There is plenty of scope for doing so:

  - most of Europe's coal plants operate at **37-38%** thermal efficiency levels. BAT (Best Available Techniques) delivers **46%.**

  - Europe's gas turbine plants operate at an average **52%** efficiency. BAT delivers **58%.**

  - Europe's gas and oil boiler plants operate at an average **36%** efficiency. BAT delivers **47%.**

  - installing BAT on a **coal plant** can reduce its CO2 emissions by up to **13%.**

Three main activities in four sectors

93,000 employees in 100 countries, orders 2012/13 = 23.8 €bn

Alstom Thermal Power

Alstom Grid

Alstom Renewable Power

….it holds 25% of hydro electricity market

Alstom Transport

Alstom makes 1 metro in 4 and 1 tram in 4

Alstom Vision for Green Energy

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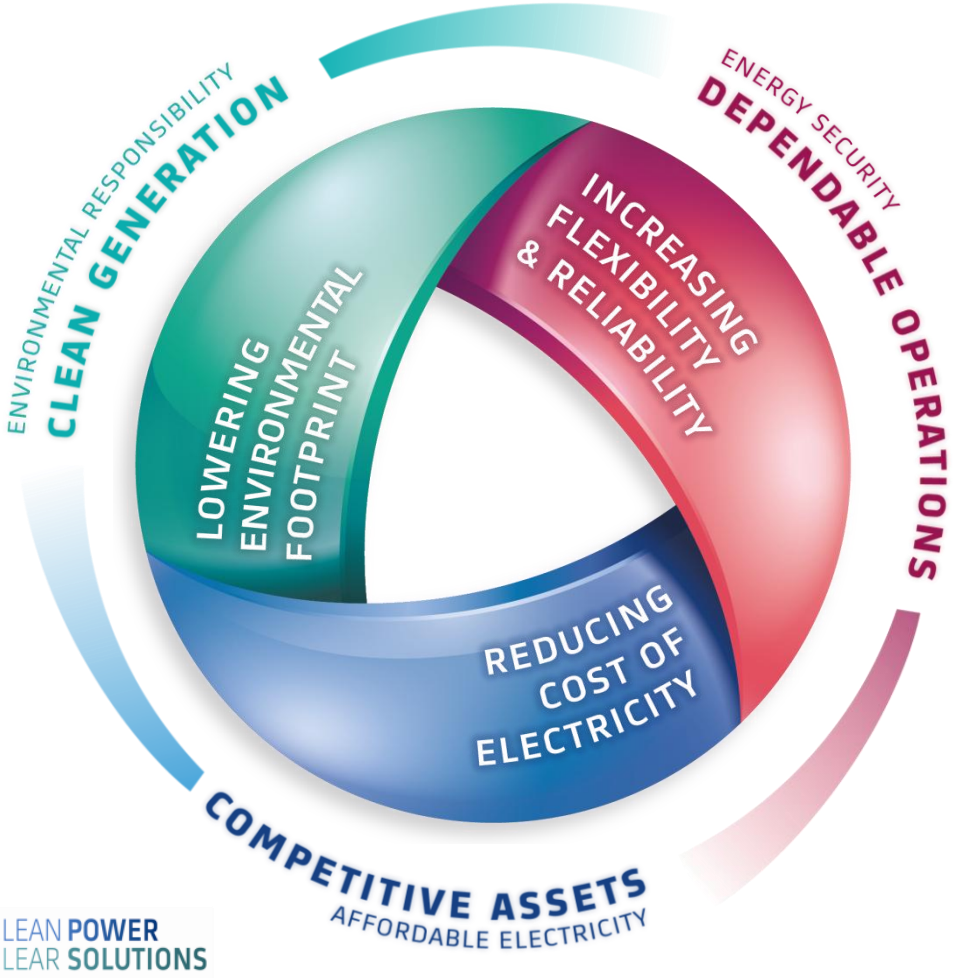

Sustainable

Affordable

Secure

Improving efficiency of gas and coal plants

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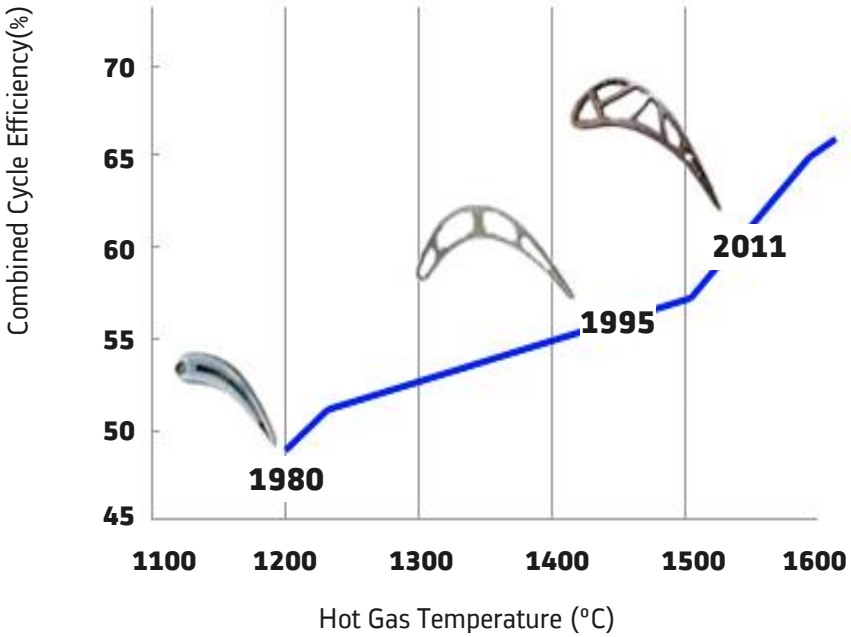
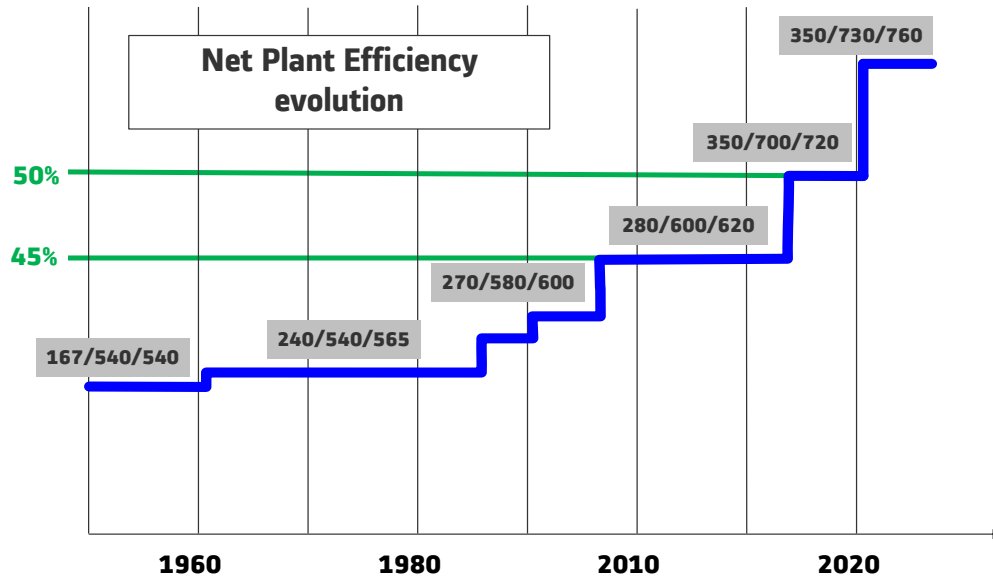
Combined Cycle power plant



Coal-fired power plant

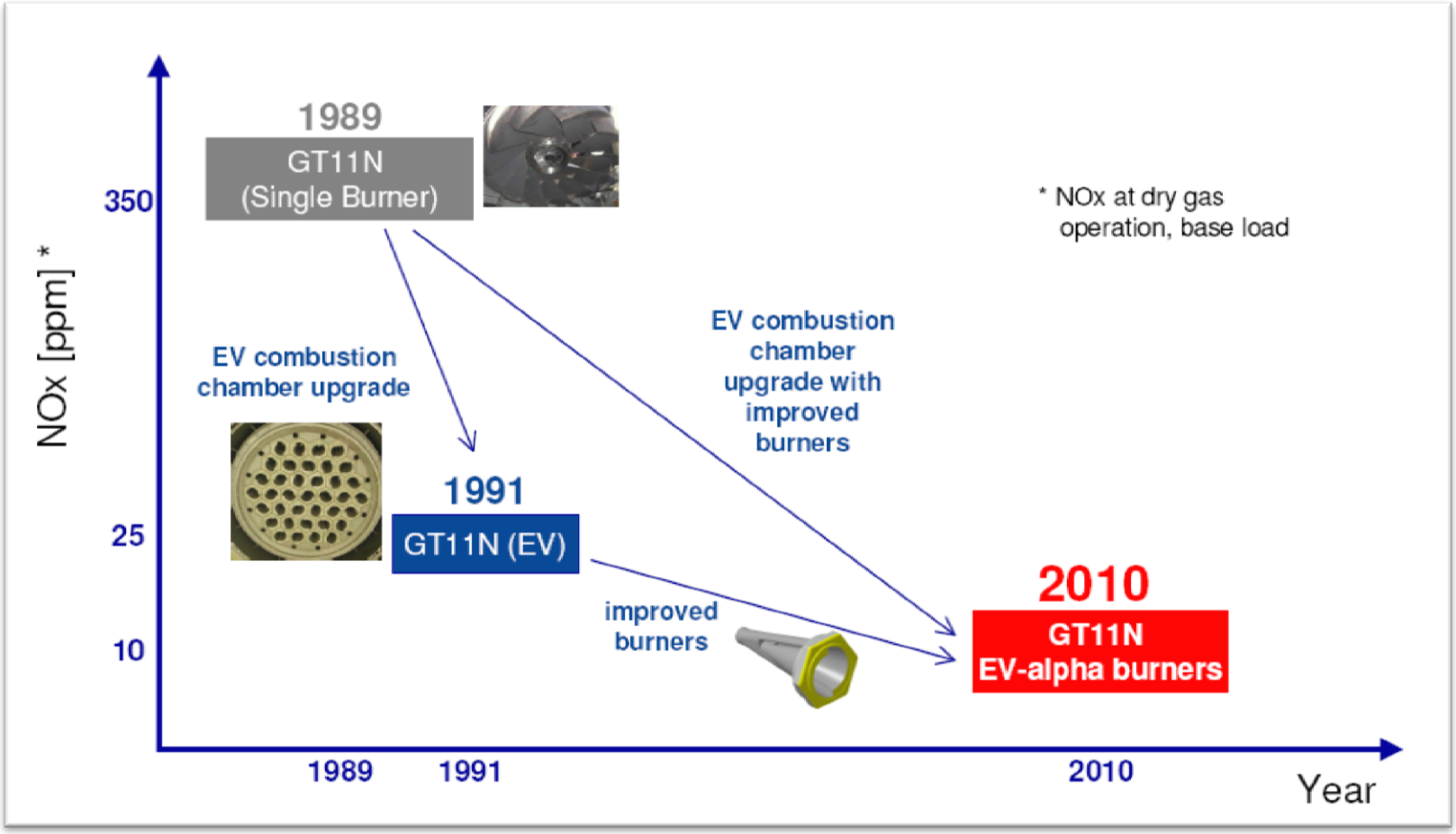


* Based on LHV and open cycle cooling at 13°C

Continuous performance improvement

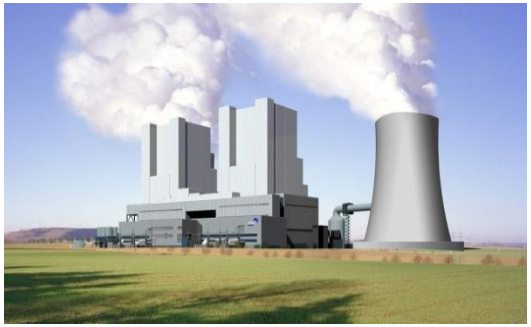
Improving air quality = public health benefits

Progress Made in Reducing NOx Emissions



Improving power plant efficiency = less CO2

New Plants

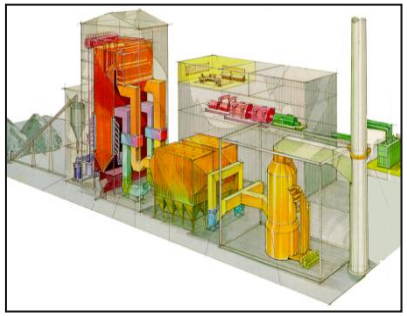


Coal: +20 p.p in efficiency saves 40% CO_2 emissions

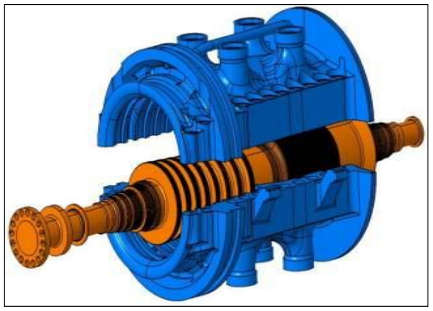
Gas: +20 p.p in efficiency saves 33% CO_2 emissions

60% of the 2030 installed base still to be built

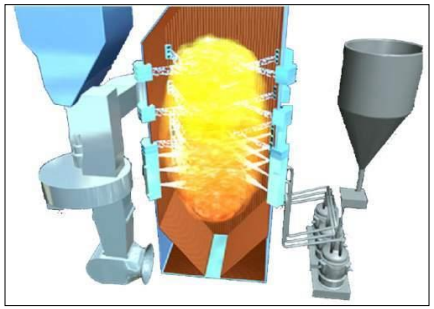
Retrofit



Plant Optimisation: -5% CO_2



Turbine retrofit: -5% CO_2



Boiler retrofit: -3% CO_2

60% of carbon emitted in 2030 will come from today's plant

Expanding Renewables

Concentrated Solar: ready for scale-up

Hydro Pumped Storage: fixed and variable speed

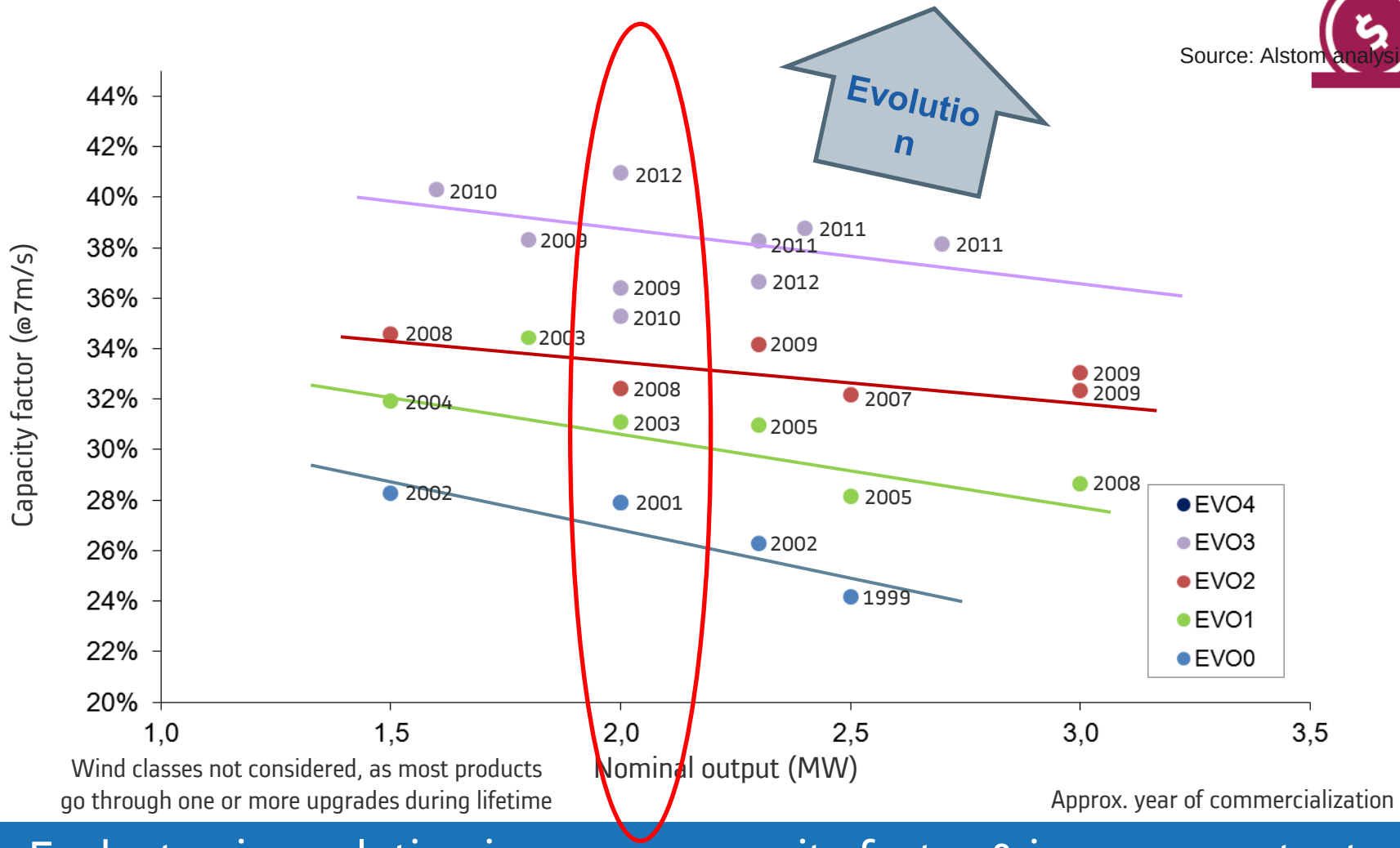
Ocean Energy: 1MW tidal device being tested

Offshore Wind: 6MW prototype operating

Low carbon solutions that optimise indigenous natural resources

Increasing capacity of new technologies: Wind

Source: Alstom analysis



Wind classes not considered, as most products go through one or more upgrades during lifetime

Approx. year of commercialization

Each step in evolution improves capacity factor & increases output

Balanced energy mix

Gas

Coal

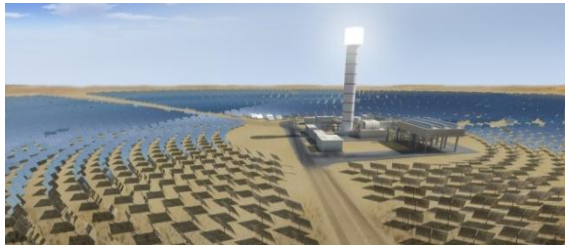
Oil

Hydro, Tidal, Wave

Nuclear

Wind: on and offshore

Solar



Geothermal

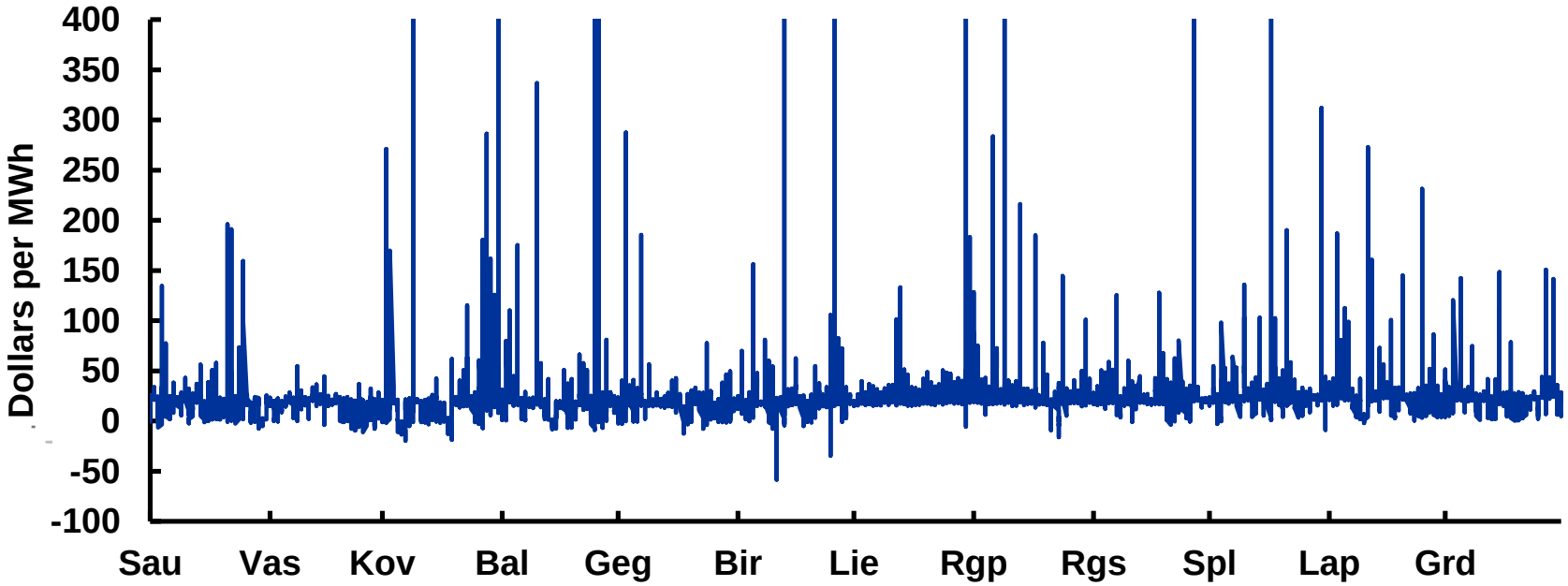
Biomass

Efficiency crucial to integrating renewables

- Intermittent resources like wind and solar power require flexible, reliable back-up power to ensure grid stability
- Flexibility is a key driver of Alstom's combined cycle product development
  - Large turn-down capability, low load operation capability
  - Part-load efficiency
  - Fast start-up & load changes
  - Grid frequency support

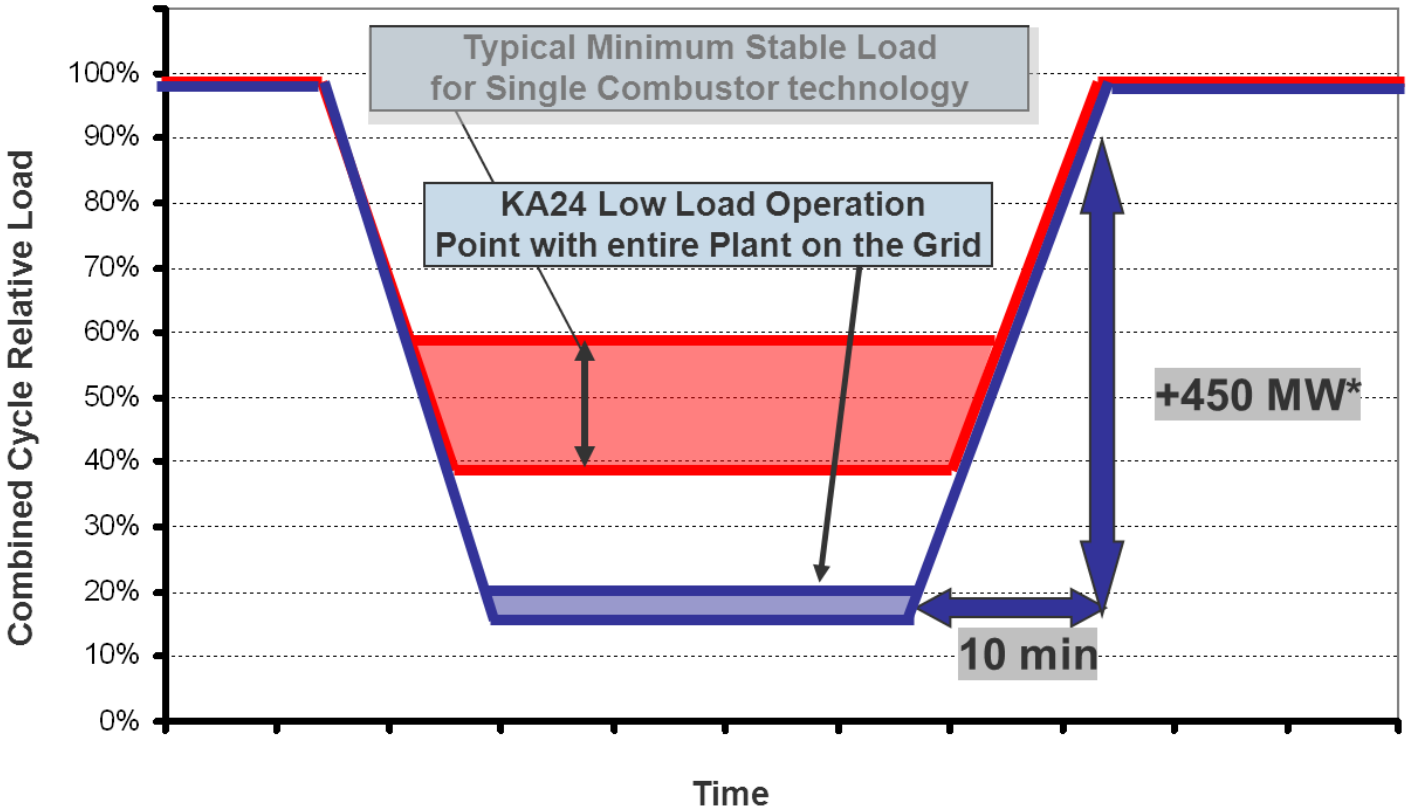
Combined cycle flexibility supports the reliable integration of renewables

Affordable = market-balancing to manage price spikes

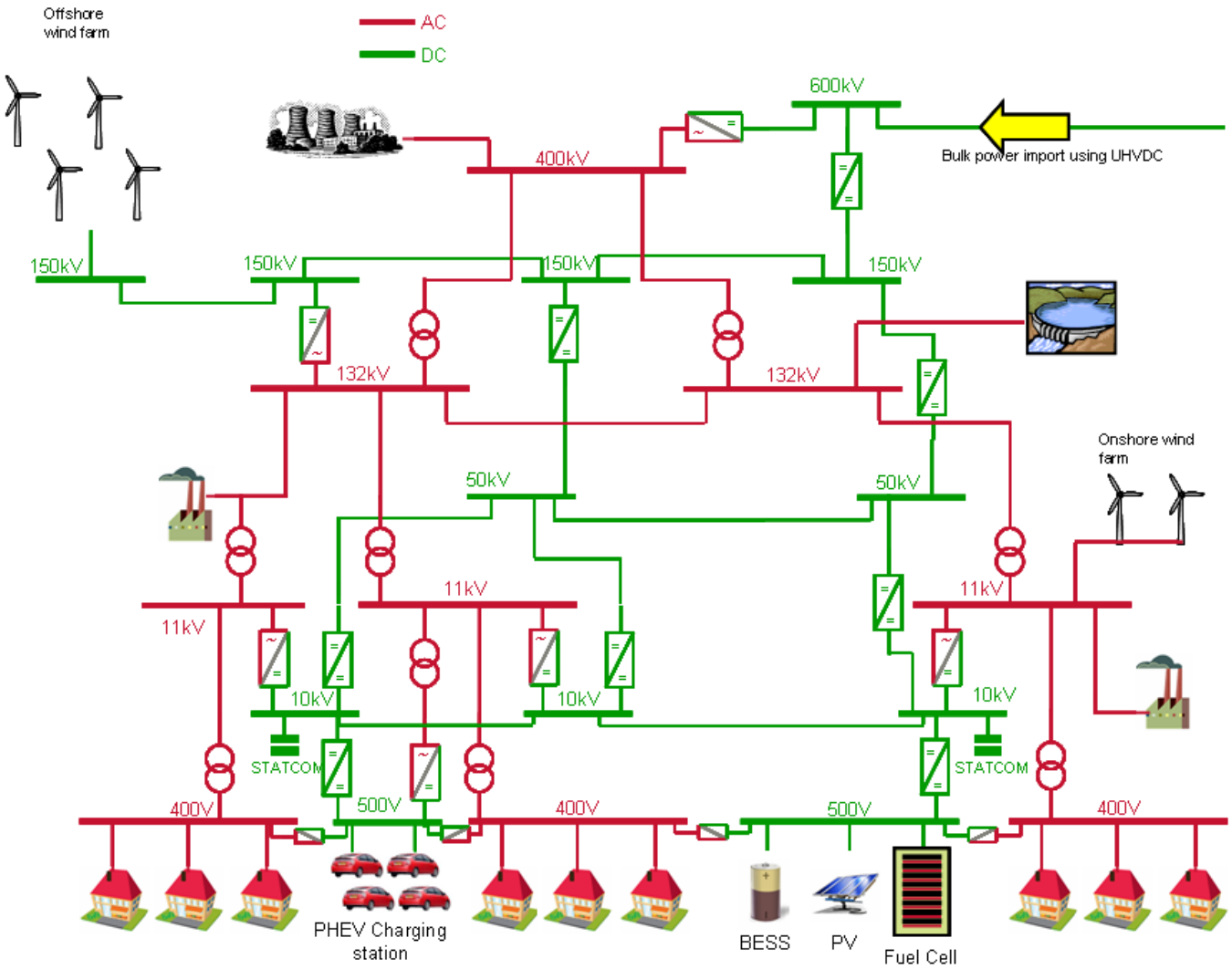


Secure = flexible power plants to integrate renewables

- **Flexible Operating Modes**
- **Highest part load efficiency**
- **Low Load Parking**
- **Fast ramp rates**



Hybrid AC/DC Grids to integrate renewables



Smart grid for flexible and reliable power

Transport: a major – and growing - contribution to Energy use & CO2 emissions in Europe

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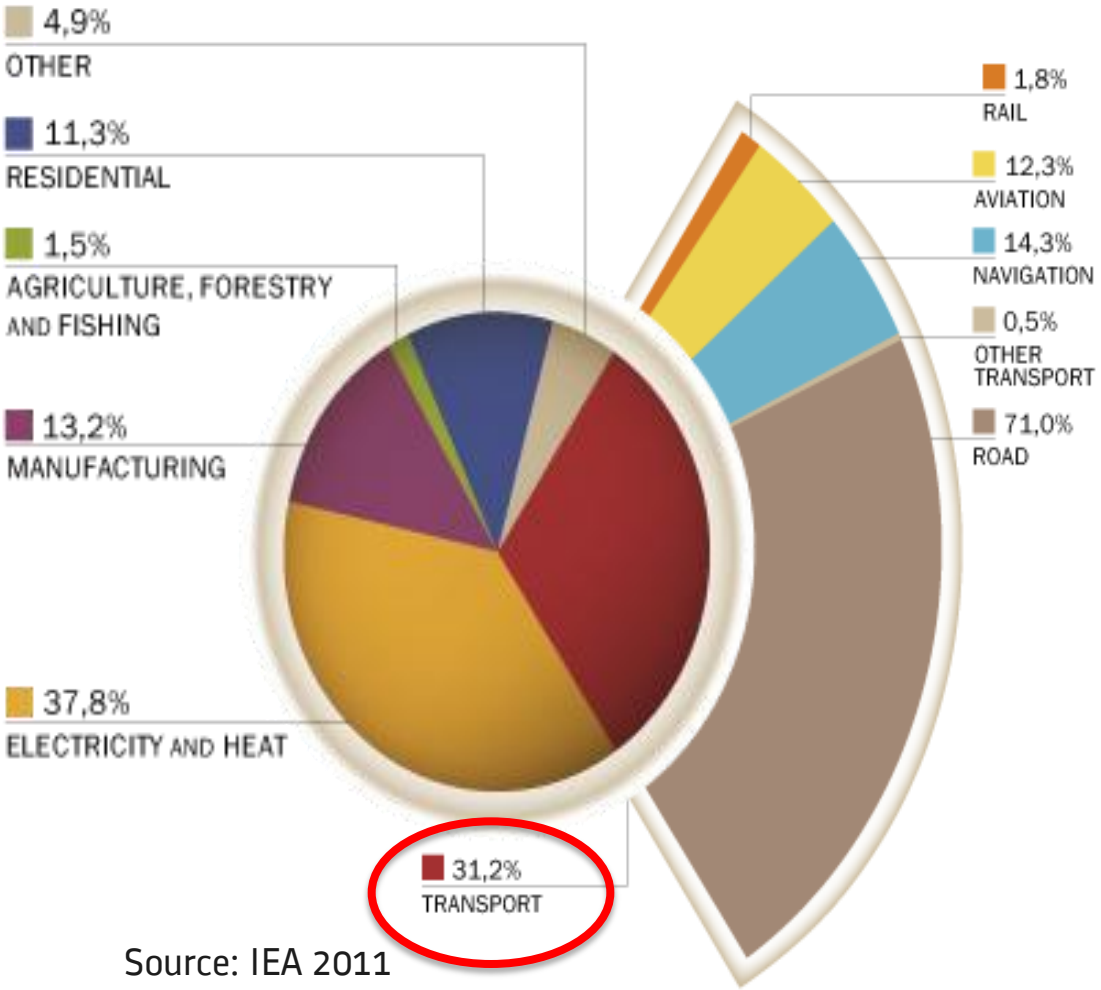

Electricity for rail integrated in rail figures

Source: IEA 2011

Alstom Transport offering for energy efficiency and CO2 reduction

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High environmental performance rolling-stock

Weight Reduction
Aerodynamics
Insulation
Efficient Traction & auxiliaries
Hybrid Traction
Braking energy recovery & storage
On-board energy management

Energy Efficiency Services

Energy Diagnosis
Energy metering
Eco-driving
Re-tractionning & Retrofit for energy efficiency

Adressing existing fleet is key to reach objectives by 2030

Smart Railway Systems

Electrification
Reversible electrical sub-stations for braking energy recovery
Smart Grid for railway
Driverless metros & ATO

Regiolis, Sustainable Mobility for French Regions

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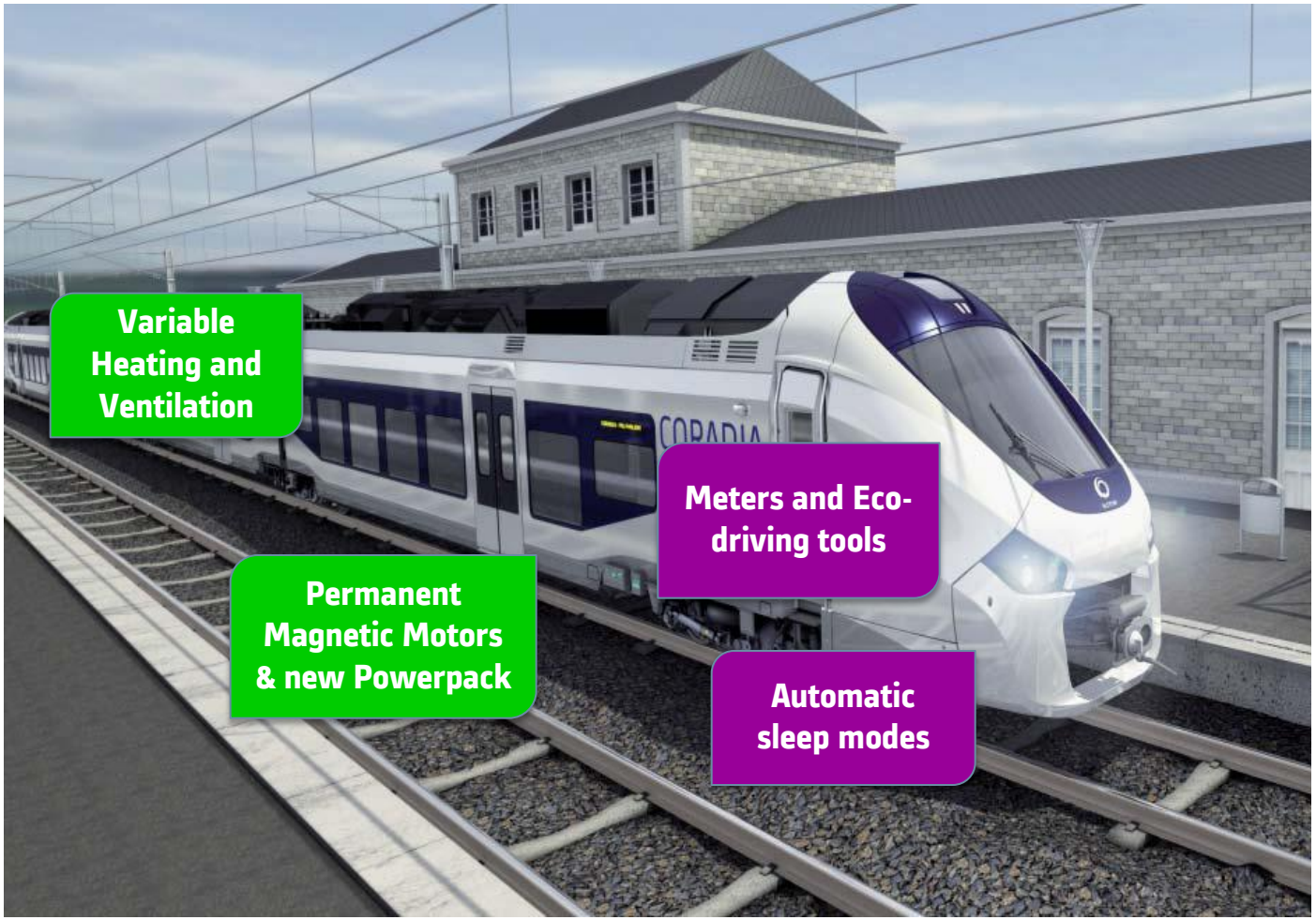
15 % less energy consumption than competition



AGV technology: reducing customers' environmental footprint

20 % less energy consumption than previous generation

10 % less than other market solutions

- Designed for **reduced weight**
- **Distributed traction** with articulated architecture
- **Permanent Magnet Motors**

Innovative Systems solutions to minimize energy losses

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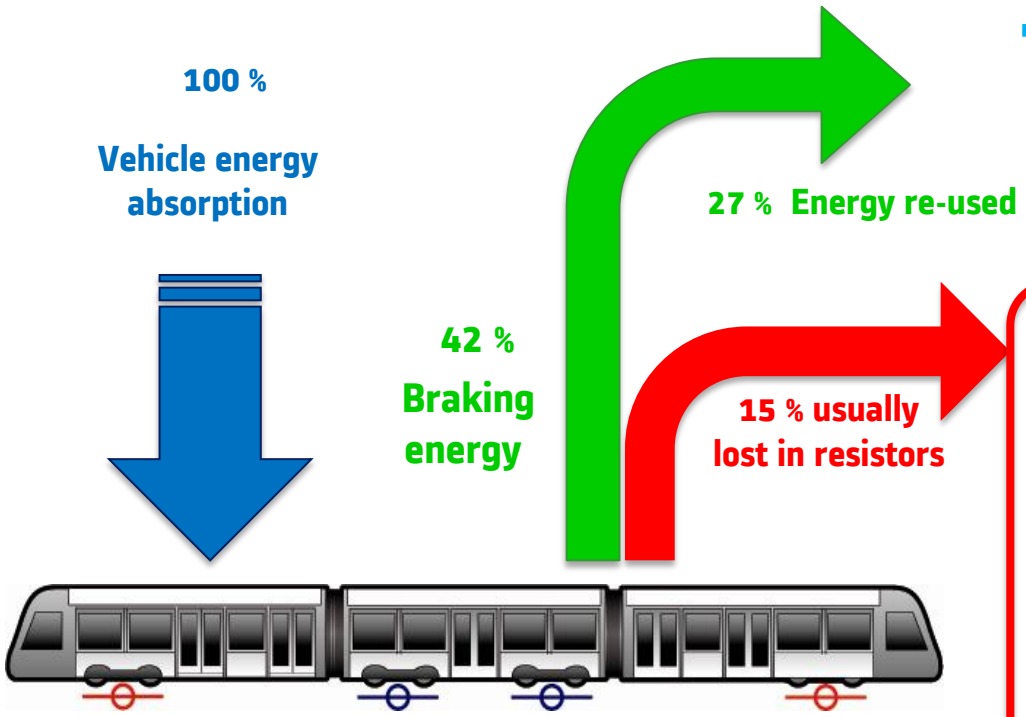

- On-board for auxiliaries
- Used by trains nearby

Source : UITP Study on energy saving (1997) based on 25 MRT and 7 LRT networks

On-board storage in supercaps

Demonstrator with RATP - STEEM : 15% energy saved

Inverters

HESOP Reversible electrical sub-station

Demonstrator with RATP - Positive results

Ačiū už dėmesį !

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