The future needs the railways. For a cleaner environment.

Green mobility.
The challenge of climate change

- Increasing growth in the world population and global economy
- Corresponding depletion of natural resources and increase in environmentally-harmful emissions
- Without counter measures: increase in annual CO\textsubscript{2} emissions to around 85 gigatons in 2050

![Graph showing world population growth from 1950 to 2050](Source: UN Population Division)

![Graph showing worldwide CO\textsubscript{2} emissions from 2000 to 2050](Source: Stern Review)
The challenge of urbanization

The spread of urbanization calls for attractive, environmentally-friendly and economic transportation solutions in order to ensure the competitiveness and appeal of urban regions in the long term.
Energy-efficient products and solutions for long-term environmental compatibility

- With its solutions portfolio, Siemens can directly impact around 26 gigatons of the annual energy-related CO\(_2\) equivalents (CO\(_2\)e) of greenhouse gas (GHG) emissions.
- Around 5.3 gigatons of this can be ascribed to transportation-related emissions.
- At around 2%, railways account for the smallest component of all transportation modes.

Source: IEA World Energy Outlook, Vattenfall, Siemens
We care for attractive and clean railway systems: Green mobility.

Intelligent solutions for more environmental sustainability:

- **Eurorunner**
  - 13 dB(A) quieter and up to 16% more economical

- **Velaro**
  - Only 0.33 liter of fuel per seat per 100 km

- **ZLS 901**
  - Route setting system
  - Fewer stops mean lower energy consumption

- **Sitrans SES**
  - Saves up to 300 tons CO₂ due to recovered braking energy

- **Syntegra trucks**
  - Energy-efficient, oil-free and lightweight

- **Metro Oslo**
  - With 95% recyclability, valuable to the end

- **Transrapid**
  - 75% cleaner than an airplane at 400 km/h

- **Combino Plus**
  - Eco-friendly large space streetcar for congestion-free city traffic
Sprinter Lighttrain

- Energy savings up to 30% through regenerative braking system
- Flexible train configurations
- Water-soluble paints and solvent-free coatings
- Wooden floors from sustainable forestry
- Environment-friendly refrigerant in the HVAC systems
- Recycling rate > 90%
- Halogen-free cables and insulation

The new environment-friendly trains from NS
Desiro ML regional trains

- Flexible train configurations
- Inter-operability
- Recycling rate 96.8%
- Water-soluble paints and solvent-free coatings
- Reduced cost of disposal

Environment-friendly right from the start

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Industry Sector, Mobility Division
Velaro high-speed trains

Converted energy consumption of only 0.33 liter of fuel per seat per 100 km with 100% occupancy

Mineral oil replaced with alternative, environmentally-compatible coolant in the transformers (with Velaro E for example)

Wooden floors from sustainable forestry

Environment-friendly refrigerant in the HVAC systems

Only 0.33 liter per seat over 100 km
Metro Oslo

- 94.7% recyclable components and materials
- 30% lower energy consumption than previous model due in part to lightweight construction and regenerative brakes
- Environmental labeling to ISO 14021 standard

With 95% recycling rate, valuable to the end
Avenio 100% low-floor streetcars

- Energy savings up to 30% through regenerative braking system
- No wear on brake linings due to electric braking
- Over 90% recyclable
- Reduced noise emission

Eco-friendly space saver for congestion-free urban traffic
Eurorunner ER20 - the diesel-electric locomotive

Compared with previous models:
- Noise emission reduced by up to 13 dB(A)
- Up to 16% fuel savings
- Up to 70% reduced pollutant emission
- Around 10 t less fine particulates calculated over the lifecycle

13 dB(A) quieter and up to 16% more economical
Syntegra bogie

- Fully-integrated traction, running gear and braking technology
- Energy-savings up to 26%, e.g. through:
  - Elimination of gearbox
  - Lightweight construction
  - Regenerative brake system
- Fewer emissions (oil, braking dust, abraded matter, noise)
- Wear-resistant and easy maintenance

Energy-efficient, oil-free and lighter in weight
Sibac ES mobile energy storage system

- Reduced pollutant and noise emission
- Recovery and storage of braking energy for acceleration
- Up to 30% reduced primary energy import
- Annual CO$_2$ emissions reduced by 50 t (e.g. in a triple-articulated Combino Plus)
- No overhead lines required e.g. for crossing city squares or underpassing structures

Stores valuable braking energy
We are committed to sustainability

- Active member in important national and international organizations
- Listing in the Dow Jones Sustainability Index for the eighth time in succession
- Global certification of Siemens' EH&S standards for projects, development and production sites according to:
  - ISO 14001
  - OHSAS 18001
Thank you for your attention!