Bo Henriksson, Country Manager, ABB in Baltic States / October 3, 2012

Lowering environmental impact
Energy efficiency and renewables

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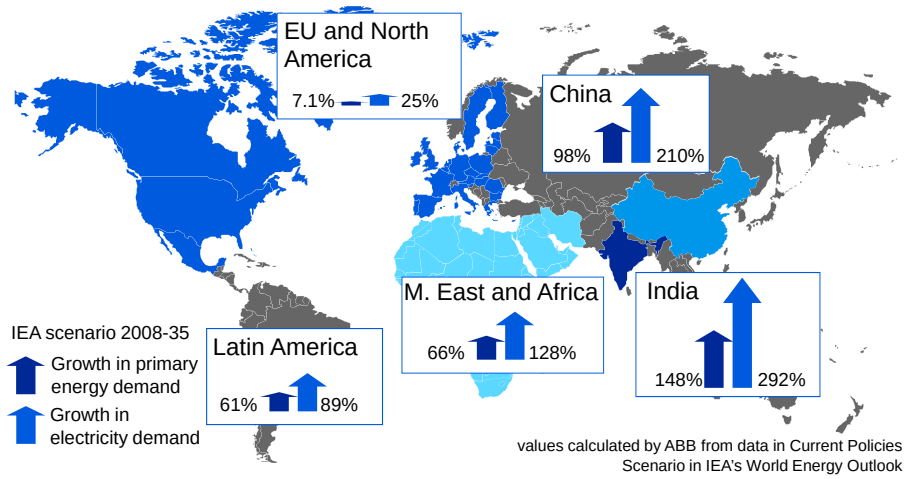
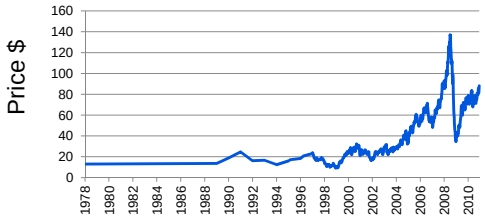
Today's energy challenge
Rising demand

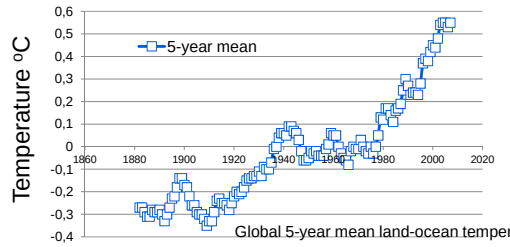


values calculated by ABB from data in Current Policies Scenario in IEA's World Energy Outlook

Today's energy challenges
Fuel costs, climate change, supply



Crude oil spot price (in $/ barrel)
Source: EIA

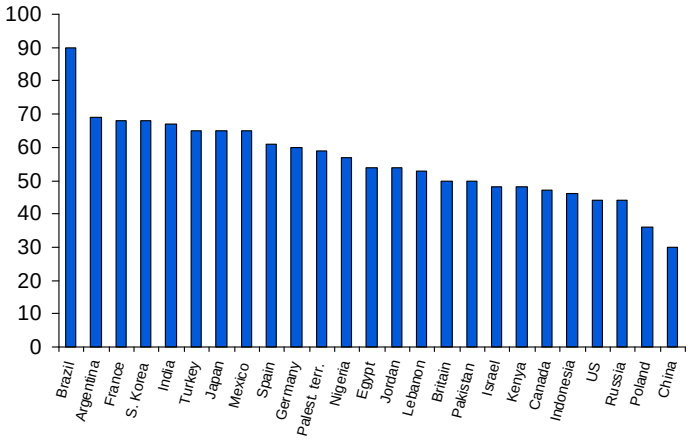


Global land-ocean temperature index (°C)
Source: NASA

Global 5-year mean land-ocean temperature anomaly relative to 1951-1980

A high degree of public concern
Majority in most countries say warming is ‘very serious’

Percentage of population saying global warming is a “very serious problem”
Source: Pew Global Attitudes Survey, May/June 2009



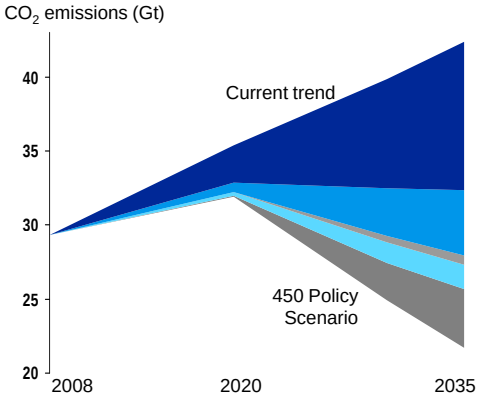
Today’s energy challenges
Cut link between growth, energy use and emissions

Meeting these challenges requires the world to:

- Reduce the correlation between economic growth and energy use
- Reduce the correlation between energy use and emissions
- Energy efficiency
- Renewable sources of energy

The case for energy efficiency
The main source of potential emissions reductions

World energy-related CO_2 savings potential by policy measure under 450 Policy Scenario relative to Current Policies Scenario
Source: IEA, World Energy Outlook 2010



	2020	2035
Efficiency	**71%**	**48%**
Renewables	18%	21%
Biofuels	1%	3%
Nuclear	7%	8%
CCS*	2%	19%

*Carbon capture and storage

The case for energy efficiency
Fast and cheap: technology is already available

"Improving energy efficiency worldwide is the fastest, the most sustainable and the cheapest way to reduce greenhouse gas emissions and enhance energy security."

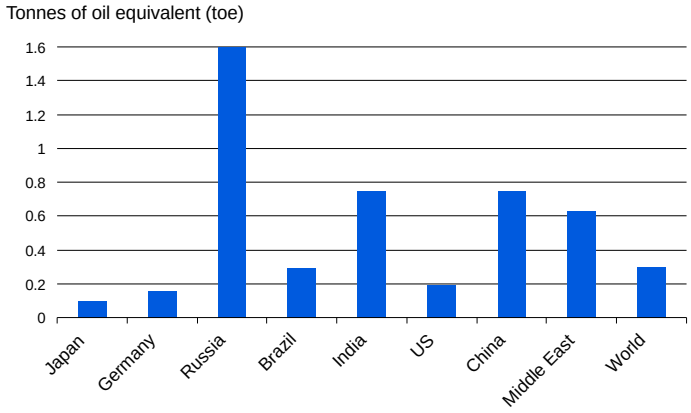
(Final statement of G-8 summit, Germany, June 2007)

"Increasing energy efficiency, much of which can be achieved through low-cost options, offers the greatest potential for reducing CO_2 emissions over the period to 2050. It should be the highest priority in the short term."

(International Energy Agency's Energy Technology Perspectives, July 2010)

Big potential for higher energy efficiency
Best practice Japan highlights scope for improvement

Primary energy used per $1,000 of GDP
Source: International Energy Agency, Key World Energy Statistics 2010



Energy efficiency in utilities
Power generation, transmission and distribution

- Power plants consume 5% of the electricity they generate
- This can be cut by 10 to 30% by optimizing operations and auxiliary systems using sophisticated control systems and energy-efficient equipment
- In transmission and distribution, ABB technologies enable more power to travel over existing networks and reduce power losses

Case studies
Power generation, transmission and distribution

- **Grosskraftwerk Mannheim, Germany**
  - 1,675 MW coal-fired power plant
  - MV drives, dry-type transformer to control boiler feed pumps
  - Emissions cut by 10,200 tons/year, revenues increased by $800,000/year
- **Power Grid Co. of Bangladesh**
  - FACTS technologies installed in 8 substations, reducing electrical losses by 34 MW
  - Investment <15% of similar capacity fossil-fuel power plant
  - Payback time 18 months

Energy efficiency in industry
Other industries accounts for 33% of global energy use

- Modern control solutions, automation products and electrical equipment run plants productively and efficiently
- Key technologies include controls, enterprise software, instrumentation, low-voltage products, drives, motors, robots and turbochargers
- ABB's energy consultants are experts at identifying energy waste

Case studies
Industry

- **Cementos Cruz Azul, Mexico:**
  - Drives replace damper fan control of two fixed-speed fans
  - Saves 5,300 MWh and $260,000/year
  - Six months investment payback time

- **ArcelorMittal steel mill, France**
  - ABB identified 53 energy-saving opportunities
  - Savings potential of about $13.9 million/year, including:
    - Gas savings - $8.3 million
    - electricity savings - $6 million

Energy efficiency in transportation
ABB helps ship and rail operators reduce consumption

- Azipod ship propulsion system brings savings of 5 to 15%, while turbochargers boost diesel engine output four-fold
- In rail, ABB technologies transfer power efficiently from grids to railways, while on board components and complete traction packages increase efficiency

Case studies
Transportation

- **Sinorail Bohai Train Ferry Co., China**
  - Three new ferries fitted with Azipod power and propulsion solutions
  - Fuel consumption reduced by ca. 20% vs conventional arrangements
  - Saving approximately $2.2 million/year

- **Deutsche Bahn, Germany**
  - New traction converter developed for first fleet of InterCityExpress trains in just 13 months
  - Energy consumption cut by at least 12%
  - Operating and maintenance costs reduced

Energy efficiency in buildings
Buildings account for 40% of energy consumed

- ABB building control systems adjust temperature, lighting and energy consumption of electric appliances
- ABB is also a leading producer of low-voltage, energy efficient devices for building applications
- High-efficiency ABB motors and drives cut energy consumption of pumps and fans in heating, ventilation and air-conditioning (HVAC) systems

Case studies
Buildings

- **State Library of Victoria, Australia**
  - Drives help control indoor climate
  - Saving of 1,800 megawatt-hours (MWh) and $160,000 per year
  - Payback time of 13 months

- **Museo d'Arte Moderna in Rovereto, Italy**
  - ABB i-bus KNX technology installed
  - 28% energy savings with advanced lighting control systems
  - Saves 450,000 kilowatt-hours (kWh) per year and cut costs by $112,000/year

Renewable energy could deliver 1/5 of cuts needed
Sizeable contribution from wind, solar and geothermal

World energy-related CO_2 savings potential by policy measure under 450 Policy Scenario relative to Current Policies Scenario
Source: IEA, World Energy Outlook 2010

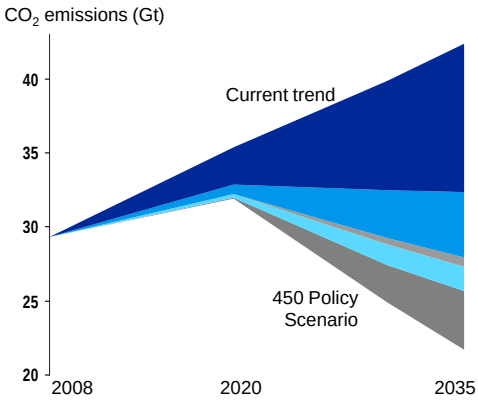


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ABB technology opportunities in wind power

Transformers

Compact substations
(can also be used offshore)

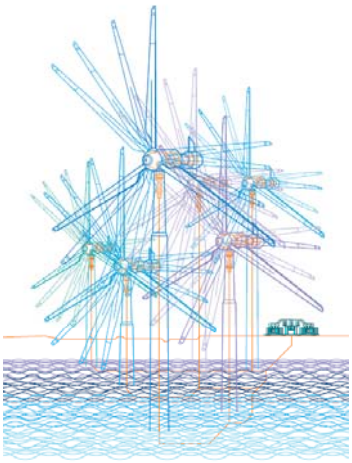
Converters
(handling intermittent power supply for storage, changing power frequency for conventional grids)

Power electronics
(control "unstable" power flows)

HVDC Light
(underground or subsea connections to the grid)

Switches & breakers | Control products | Transformers | **Permanent magnet generators** *(maintenance free)* | Static var compensation

Wind project in Germany
400 MW transmission from North Sea to mainland



Wind park Borkum 2:

On completion, will be

- Farthest wind park from mainland
- 1.5 million tons/year CO_2 reduction

ABB scope

- Converter stations
- Sea cable 128 km
- Land cable 75 km
- Platform

Selected renewable energy projects
Wind, solar, wave

- Thornton Bank wind farm, Belgium's largest (300 MW), avoids 450,000 tons/year of CO_2
- ABB supplies C-Power NV with electrical system analysis, underwater power cables and electrical equipment

- Europe's largest parabolic trough solar thermal power plant (100 MW) in Spain avoids 345,000 tons/year of CO_2
- ABB supplies the Andasol power plant with control system for plant, power transformers and substation equipment

- World's first commercial wave farm (2.25 MW) in Portugal, avoids 6,000 tons/year of CO_2
- ABB supplies Enersis with customized generators for new wave energy technology

What ABB is doing
A history of action

Saving energy

- 1998-2003: Greenhouse gas emissions cut by 1% pa
- 2006-09: Rolling two-year program to cut energy use per manufactured unit by 5%
- From 2010: annual 2.5% reduction in energy use per employee and annual 2.5% reduction in energy in buildings (kWh/m^2)

Pioneering environmentally conscious design

- 1991-1993: audit of impact of manufacturing processes
- From 1994: implementation of environmental management systems
- From 1998: focus on environmental performance of products over their life cycle
- Today: sustainability criteria embedded in product design and development model. >50% of research efforts aimed at increasing energy efficiency

Energy efficiency achievements in our own facilities
Often through use of our own products

- 40% energy savings ($140,000) at new transformer factory in Germany (motion-sensitive lighting, ultra-efficient transformers)
- ABB drives reduce annual electricity use by 442 MWh, saving $80,000/year at our Italian plastic injection factory
- 50 projects at ABB in Sweden have cut energy bills by $800,000/year

Summary

- Today's challenge is to cut link between GDP growth and consumption, and between consumption and emissions
- Improving energy efficiency and promoting use of renewable energy are cheapest and fastest options
- There is huge potential to reduce energy waste all along energy chain.
- ABB has leading technology at each step
- By reducing energy losses, ABB technology:
  - Mitigates demand for new power generation
  - Makes better use of natural resources
  - Makes industry more efficient and competitive

Power and productivity
for a better world™