

ENERGY CHALLENGES: world energy outlook?



Global awareness of climate risks has come of age, as the attribution of the Nobel Peace Prize to Al Gore and Dr. Pachaury for the IPCC¹ demonstrates. The discussions held at the United Nations Climate Change Conference in Bali were significant in this respect. The negotiations proved tough, but disagreement lay not with whether the climate is changing or if its causes are anthropic, but with solutions. The latest IPCC forecasts paint a grim picture that requires us all to radically change the way we think about our energy future.

MÉDIATHÈQUE EDF - SAMUEL BOLLENDORF



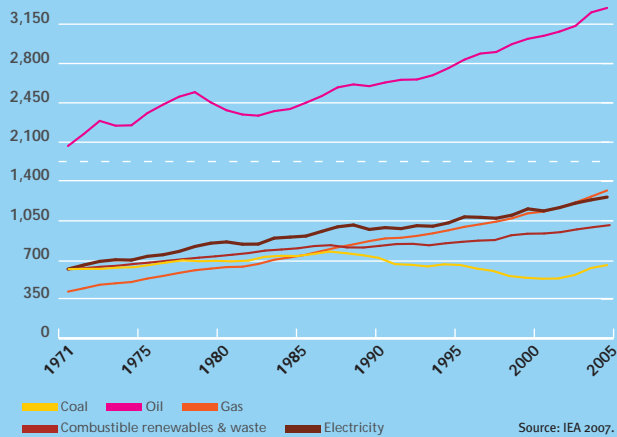
GROWING ENERGY NEEDS

According to the International Energy Agency (IEA), world consumption of energy is expected to increase by 50% between 2004 and 2030, keeping pace of population and economic growth. Electricity companies are particularly concerned since consumption of electricity is likely to increase twice as fast as energy consumption on the whole (+100%). Building the facilities to meet this demand is going to require tremendous investment, not to mention that the old generation plants of industrialized nations also need replacing. According to the European Commission, between 2004 and 2030 Europe alone will need to build 600 to 700 GW, half of which to cover new demand and the other half merely to replace existing facilities. In just two years (2006 and 2007), China added generation capacity equal to twice that of France.

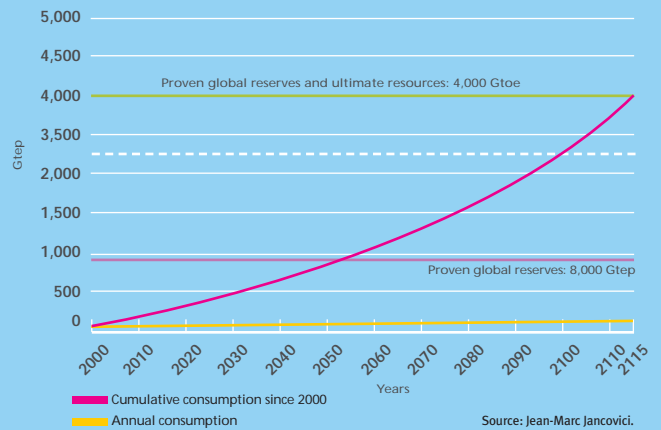
Today, fossil fuels account for 80% of global energy consumption and over 65% of electricity generation. This situation is not sustainable, since fossil fuels are the leading cause of greenhouse gas emissions and reserves are limited.

Between 2005 and 2030, global energy needs are expected to increase by 55% and CO₂ emissions by 57%.

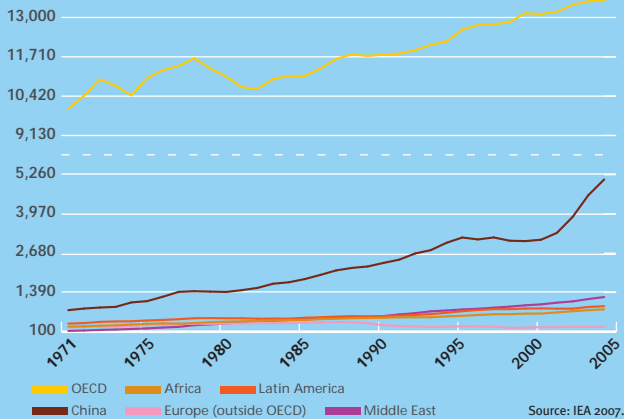
WORLD CONSUMPTION OF ENERGY (Mtoe)



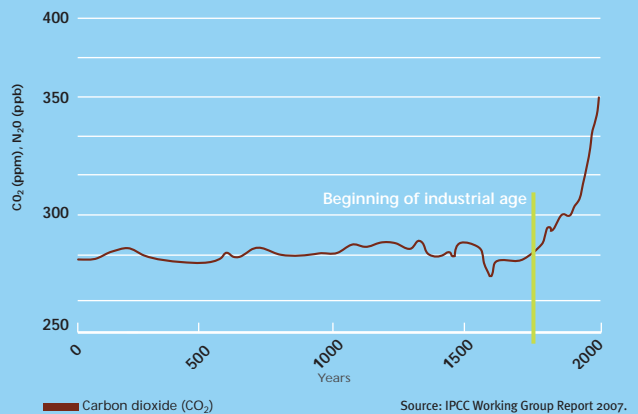
GLOBAL ENERGY CONSUMPTION BASED ON 2% ANNUAL GROWTH



CO₂: GLOBAL EMISSIONS BY REGION (in MtCO₂)



GREENHOUSE GASES: ATMOSPHERIC CONCENTRATIONS



RISING GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

Greenhouse gases such as carbon dioxide (CO₂) accumulate in the atmosphere, bringing about global warming. According to the IPPC, the earth's temperature will increase by 1.8 to 4 °C over the course of the century. The consequences? Rising sea levels and extreme weather patterns. The IPPC is continuing to narrow down its figures. A stabilization target of 550 ppm² by 2050 is no longer deemed sufficient if we are to remain within the acceptable 2 °C temperature increase, but rather 450 ppm. This makes action all the more urgent.

DWINDLING FOSSIL RESOURCES

Growing energy consumption also gives rise to concern over security of supply. Oil production is expected to decline as of 2030 and natural gas as of 2050. The five-fold increase in the barrel price of oil (on which the price of gas is calculated) from \$20 to \$100 in five years reflects the tight supply. Even the price of coal increased in 2007.

IMPOVERISHED NATURE AND BIODIVERSITY

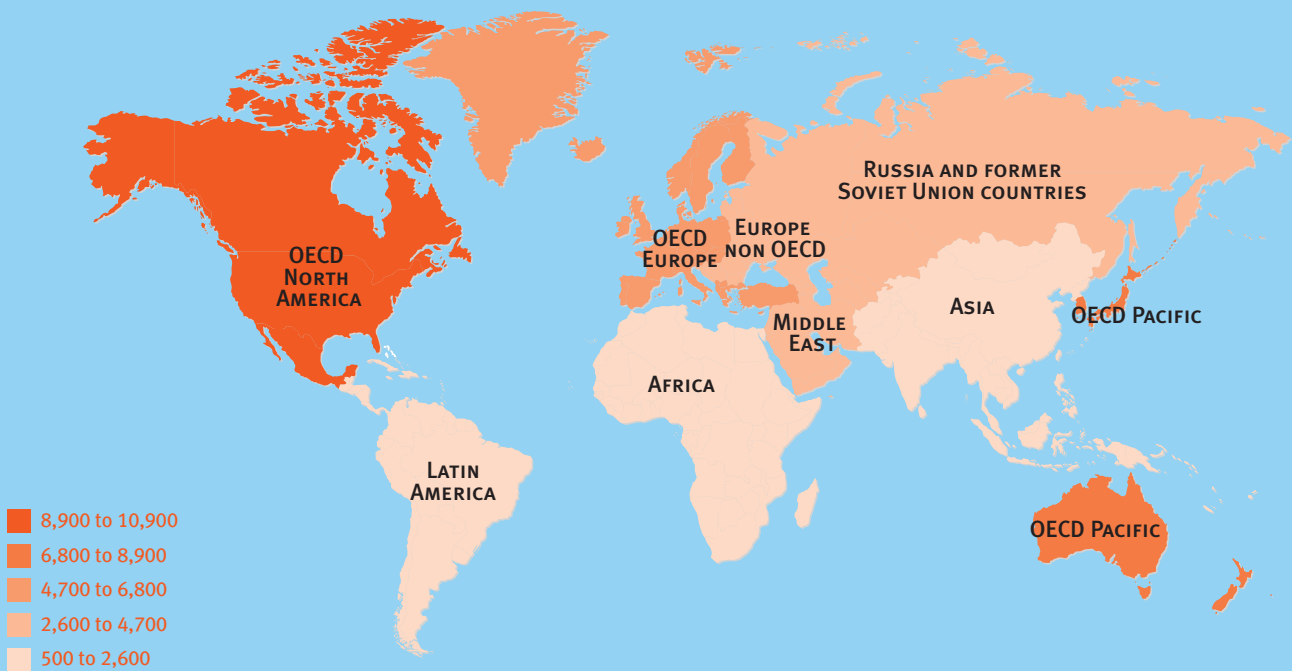
The GEO4 report published in 2007 by UNEP predicts that greenhouse gas emissions accelerate the loss of biodiversity already underway due to human activity. Humans have modified nature more rapidly in the last five decades than ever before. The rate of species extinction is 100 to 1,000 times higher than in the past. Regardless of the scenario, species are likely to disappear ten times faster in the 21st century, with climate change alone accounting for one-quarter of these.

1.8 to 4° Celcius

Increase of the average temperature on earth over the course of the century, according to the IPCC

1. Intergovernmental Panel on Climate Change, a G7 initiative launched in 1988.
2. Ppm (parts per million) or ppb (parts per billion) indicates here the proportion of greenhouse gas molecules to molecules of compressed air.

MAP OF ENERGY CONSUMPTION PER CAPITA AND CONTINENT, IN 2005



© 2007 OECD/IEA.

Source: IEA Energy Statistics.

2007: a year of reckoning and early measures

- > Al Gore and the IPCC win the Nobel Peace Prize
- > France: the national conference on the environment (*Grenelle de l'environnement*)
- > UK: Energy Review: Nuclear Whitepaper (01/10/08)
- > European Union: Green Book
- > UN: GEO4 report
- > World: Climate Change Conference in Bali
- > Global electricity companies: WBCSD³ report.

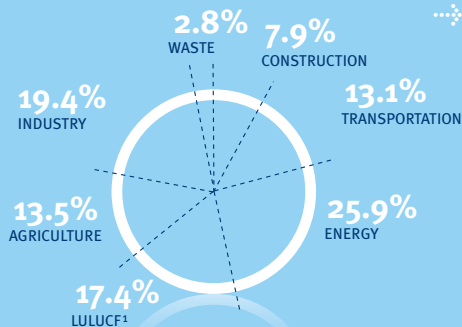
WIDENING GAP IN ACCESS TO ENERGY

Access to energy was a priority at the 2002 Johannesburg Earth Summit. Energy, and especially electricity, is indispensable to group and individual development. It is a condition for a healthy economy and a healthy population, for alphabetization, education and social life. Two billion people in developing countries have insufficient energy and 1.6 billion are without access to electricity. Even in industrialized nations, the poorest share of the population does not have sufficient access to energy: 15% of the population of Europe according to the OECD.

2007: A YEAR OF RECKONING AND EARLY MEASURES

EDF contributes to global efforts and supports alongside more than 180 other companies the Caring for Climate initiative by Global Compact, UNEP and WBCSD. Participants commit to developing strategies to reduce their greenhouse gas emissions and to communicating their progress annually. The first joint report is due to appear in 2008. EDF and other major companies are also involved in the WBCSD's Energy Efficiency in Buildings project, based on the concept of net zero energy buildings, aimed at drastically reducing CO₂ emissions in the construction industry by 2050. The Group participates in international organizations like the WBCSD, WEC⁴ and the e8⁵ to assess energy issues and seek operating solutions.

GLOBAL GREENHOUSE GAS EMISSIONS BY SECTOR IN 2004



Since 1970, six greenhouse gases² covered by the Kyoto Protocol have increased by 70%, reaching 49 GtCO₂-eq.³ in 2004.

1. Land use, land use change and forestry.
2. Carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆).
3. Emissions are expressed in CO₂ equivalent (CO₂-eq.), a way to measure the global warming potential (GWP) of any greenhouse gas.

3. World Business Council for Sustainable Development.
4. World Energy Congress.
5. Organization bringing together eight electricity companies involved in sustainable development.
6. International Energy Agency report: Electricity Information 2007.

How is EDF meeting these challenges?

❖ Through its ethic of responsibility and its commitment to sustainable development. **p. 10 to 21**

❖ By opting for a low CO₂ generation mix and developing energy eco-efficient customer offers and by intensifying research in both of these areas. **p. 22 to 31**

❖ By constantly improving the safety and security of its facilities and their impact on the environment. **p. 38 to 49**

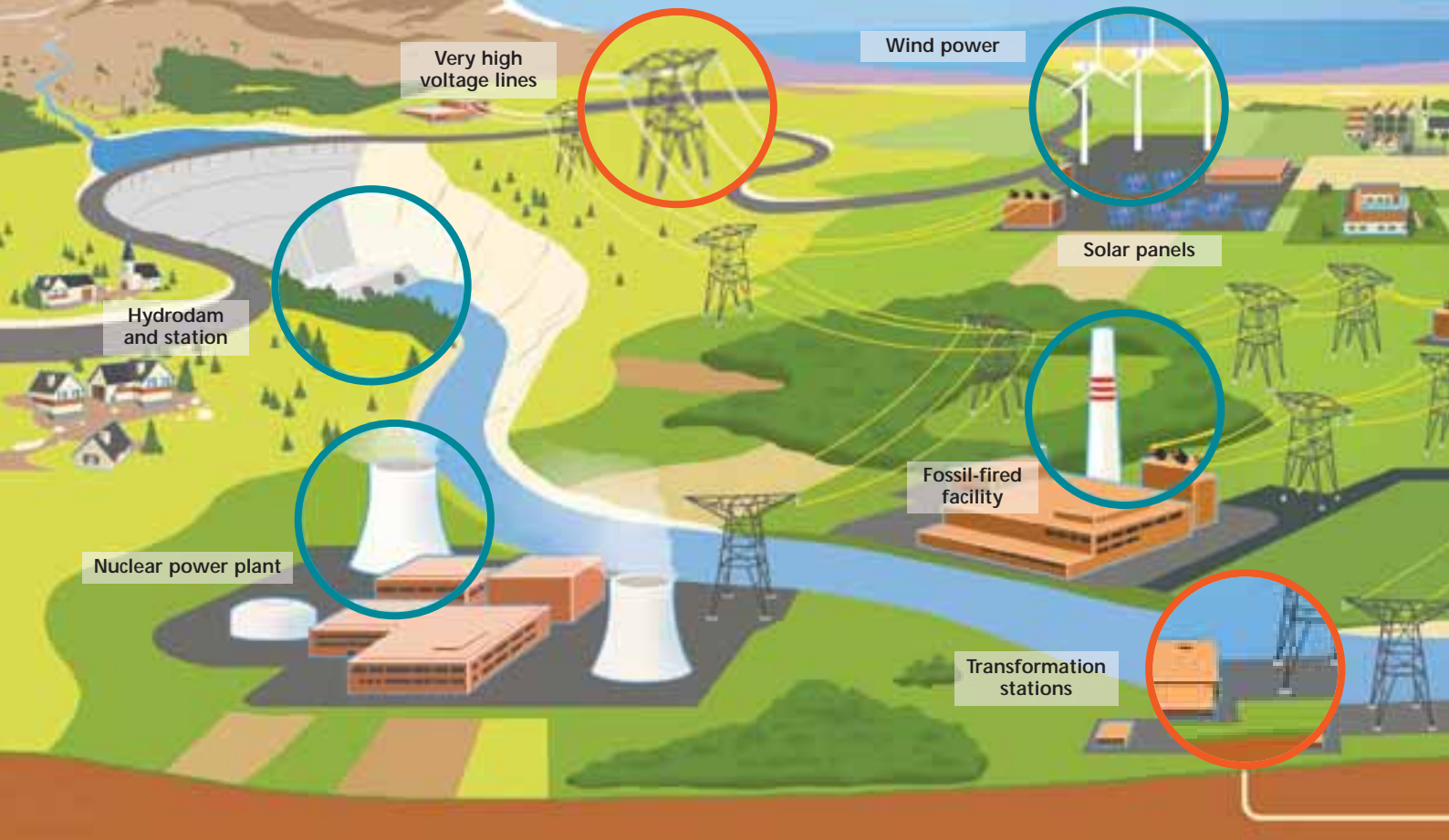
❖ Through local community action and support for vulnerable customers and populations without access to electricity. **p. 50 to 59**

❖ As a socially responsible employer and contractor. **p. 60 to 67**



Access to energy is a necessary condition not only for economic growth but also for health, education and social development.

EDF GROUP SUSTAINABLE



Very high voltage lines

Wind power

Solar panels

Hydrodam and station

Nuclear power plant

Fossil-fired facility

Transformation stations



Generation/industrial activities

•• ENVIRONMENTAL ISSUES

- **Guarantee** safety of facilities
- **Reduce** greenhouse gas emissions thanks to an adapted energy mix and the development of renewable energies
- **Limit** the impact of industrial activities on the environment and health in keeping with regulations by:
 - Close control and tracking of effluents and emissions
 - Management of radioactive waste
 - Reduction and recycling of conventional waste
- **Take action** to protect biodiversity
- **Ensure** rational use of water and foster consensus on the sharing of this resource
- **Dismantle** decommissioned nuclear plants and track radioactive waste

•• SOCIAL ISSUES

- **Anticipate** and participate in renewal of talent with an eye to a sound balance of generations
- **Manage** restructuring and disposals in a responsible manner
- **Work side-by-side** with subcontractors and suppliers toward sustainable development
- **Promote** diversity in all its forms
- **Improve** safety in the workplace
- **Respect** human and labor rights and ensure they are respected by subcontractors

•• ECONOMIC AND SOCIETAL ISSUES

- **Guarantee** security of energy supply
- **Generate** electricity at best cost
- **Invest** to be able to meet rising demand
- **Guarantee** safety of populations living near facilities
- **Ensure** local acceptability of activities through dialogue with stakeholders
- **Inform** stakeholders on industrial activity as transparently as possible
- **Contribute** to regional economic and cultural life
- **Limit** the social and economic impact of our worksites and facilities on populations living near

Regulated network

•• ENVIRONMENTAL ISSUES

- **Take action** to protect biodiversity
- **Improve** sorting and recycling of waste, encourage all employees to recycle
- **Preserve** quality of residential life by burying power lines
- **Raise** awareness of electricity risks

Challenged by energy issues (greenhouse effect and dwindling fossil resources),
Encourage career advancement throughout the professional

DEVELOPMENT ISSUES



activities in Europe

•• SOCIAL ISSUES

- **Carefully prepare** employees for the separation of distribution and sales and marketing activities (market opening 2007)
- **Constantly improve** the safety of people in the workplace
- **Promote** diversity

•• ECONOMIC AND SOCIETAL ISSUES

- **Sustainably satisfy** the needs of customers and society as a whole
- **Guarantee** system security for reliable supply
- **Ensure** network acceptability through ongoing dialogue and consensus
- **Ensure** access to electricity for all regions
- **Develop** local rapport with customers thanks to accessible employees and customer service centers

Supply, services and trading

•• ENVIRONMENTAL ISSUES

- **Develop** offers to supply electricity from renewables
- **Help** customers produce renewable energy for their own usage
- **Develop** energy saving offers and services
- **Assist** customers in limiting their carbon emissions

•• SOCIAL ISSUES

- **Accommodate** and train a large staff transferring from distribution
- **Develop** a diversity policy that reflects society as a whole

•• ECONOMIC AND SOCIETAL ISSUES

- **Develop** energy saving services
- **Contribute** to the development of eco-neighborhoods
- **Guarantee** access to energy for vulnerable populations

invest in research that contributes to preparing a sustainable energy future in France and in Europe
lives of employees and promote workplace dialogue