# The Nuclear Energy Agency: *Opportunities for Cooperation and Progress*

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***Nuclear Energy Agency***

16th FNCA Ministerial Level Meeting
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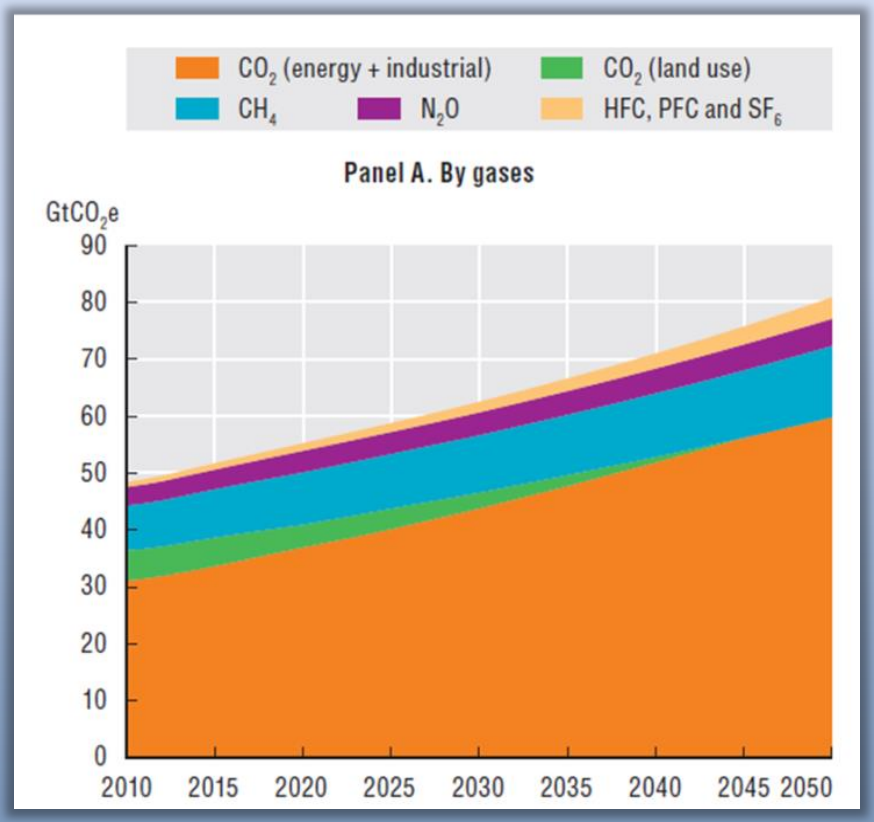
# COP 21 – Negotiations are Underway

- UN-sponsored meeting began last week – a total of 40,000 attendees are expected.
- Countries plan to negotiate an agreement intended to limit global temperature increases to below 2°C from pre-industrial levels by reducing global $CO_2$ emissions by 50% from 1990 levels.
- Under the status quo (see right), global $CO_2$ emissions will steadily rise, possibly leading to a 6°C rise in global temperatures.

GHG emissions – baseline scenario:




*Source: OECD Environmental Outlook 2050*

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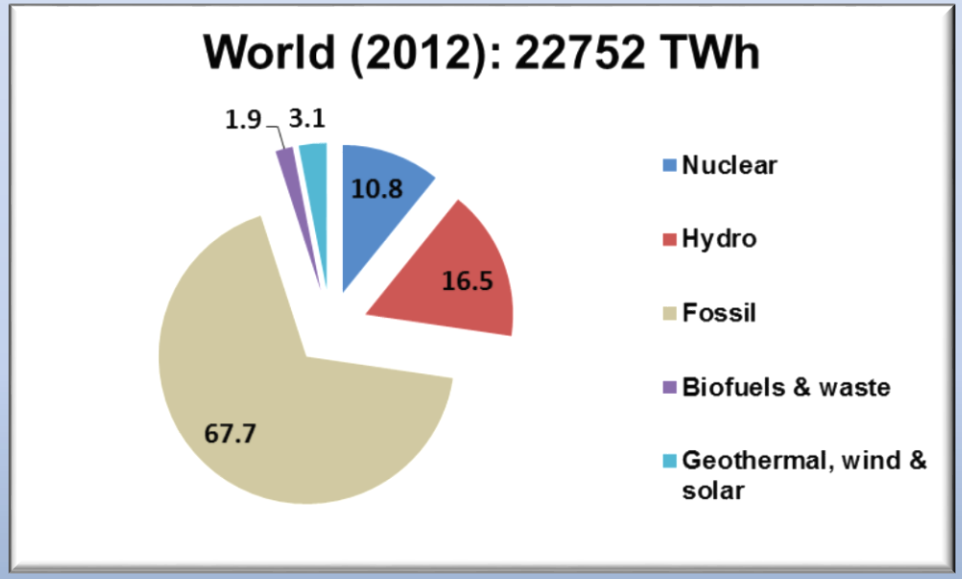
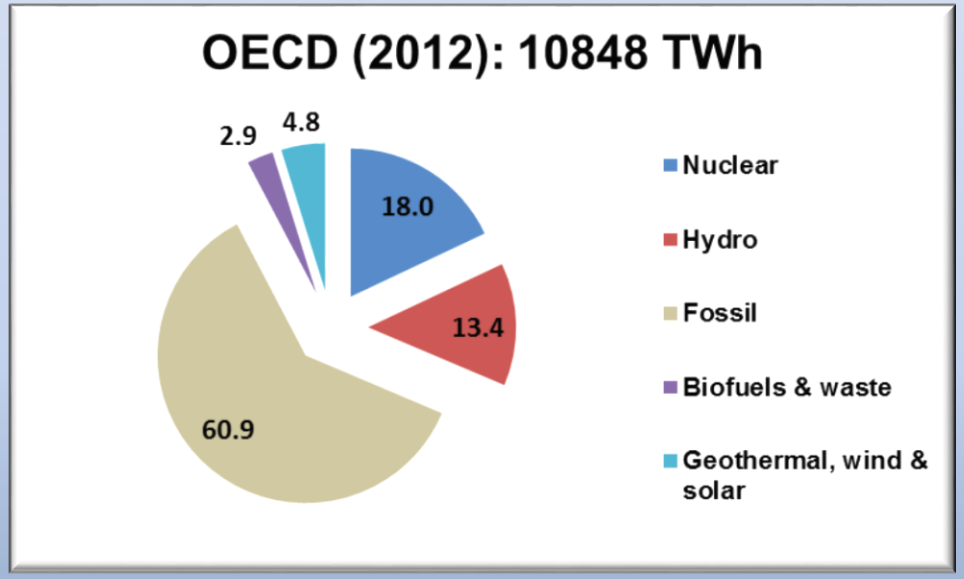
# Electricity Today: *Still A Carbon Society*




**Electricity Generation by Source (%), World and OECD**

- Nuclear is the largest source of low carbon electricity in OECD countries
- Nuclear is the 2nd largest low carbon power source globally (after hydro)
- 2/3 of global electric power production today is based on fossil fuel

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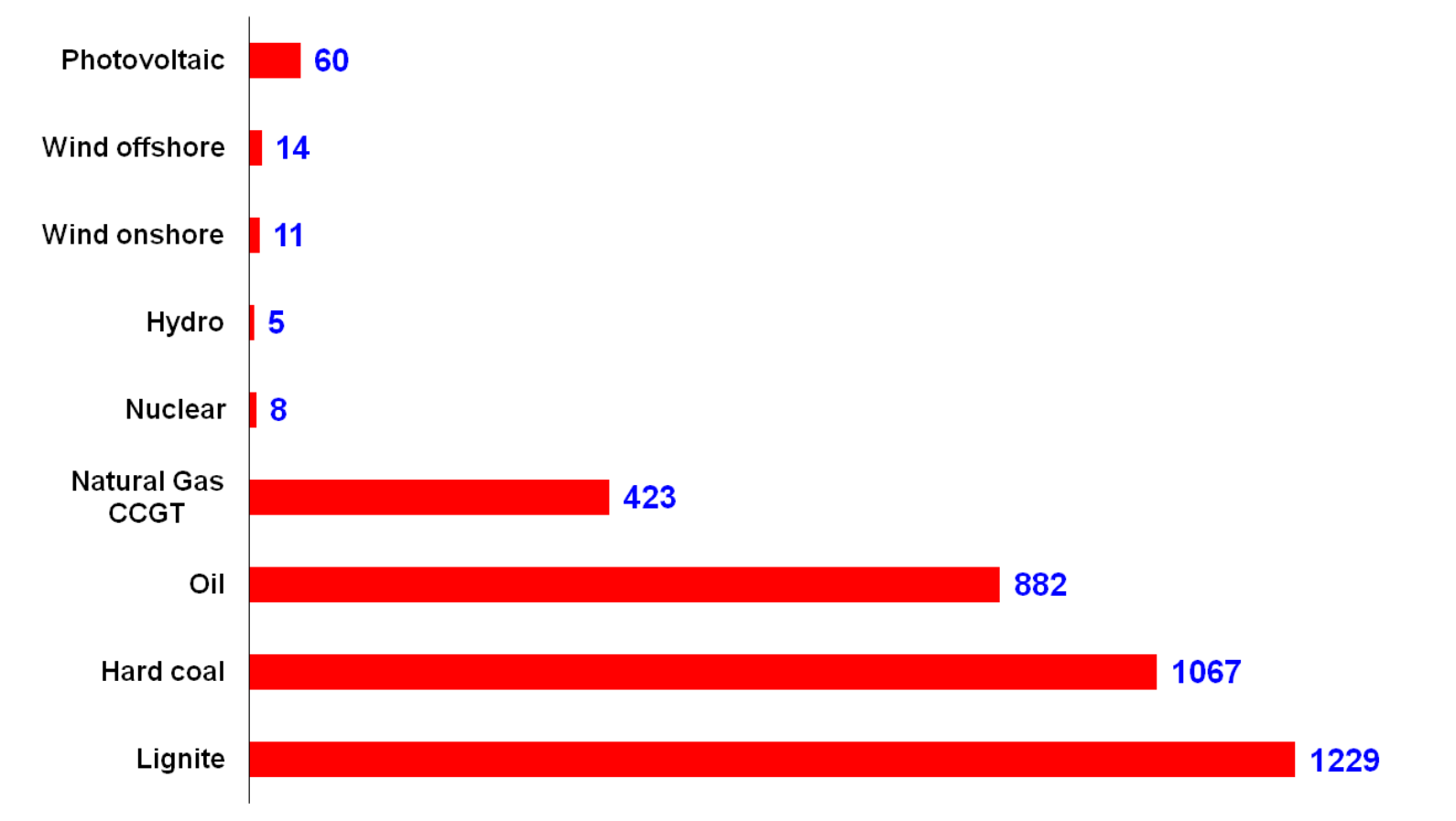
# Average GHG Emissions from Electricity Chains in Europe (g $CO_2$ eq./kWh)




Source: NEA 2007

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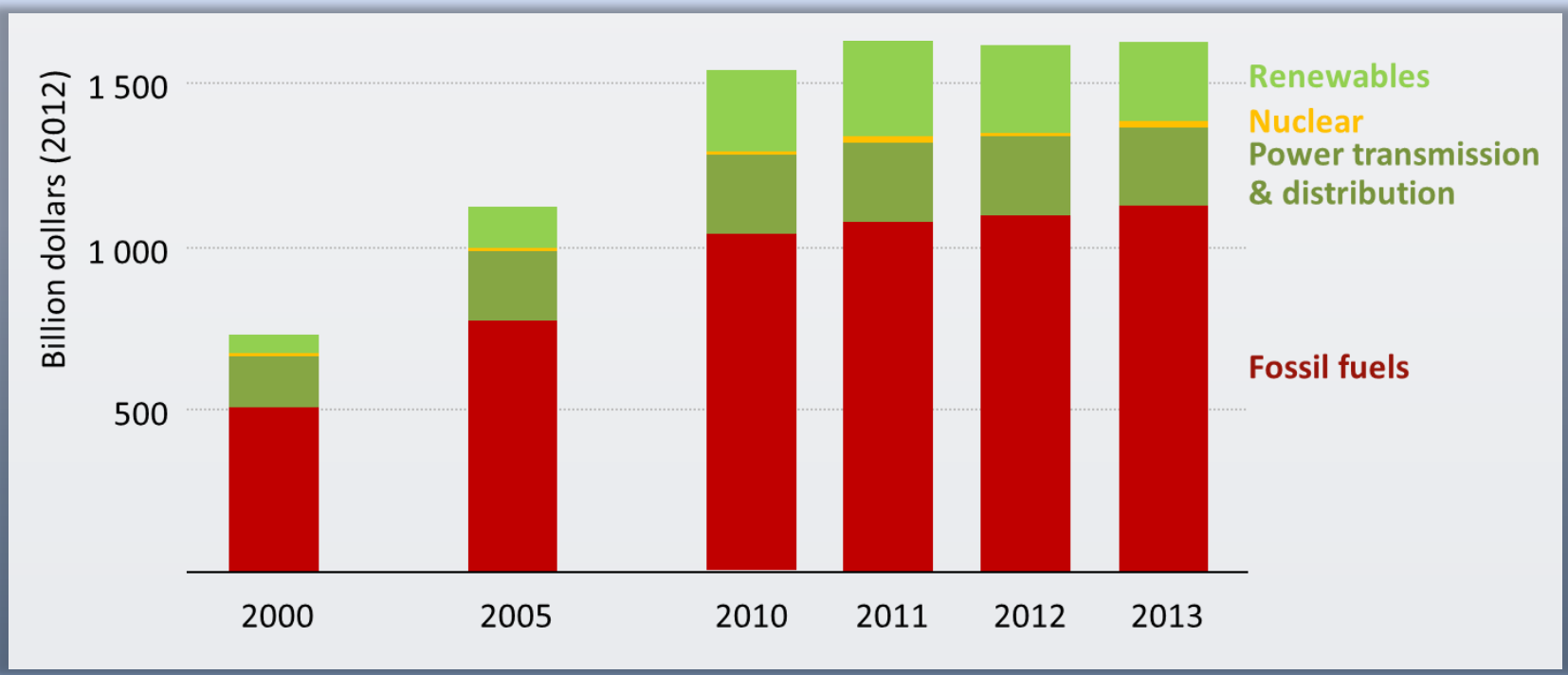
# Investment in Energy Supply: *Dominated by Fossil Fuels*




Source: IEA (2014), *World Energy Investment Outlook*, International Energy Agency, OECD/IEA, Paris.

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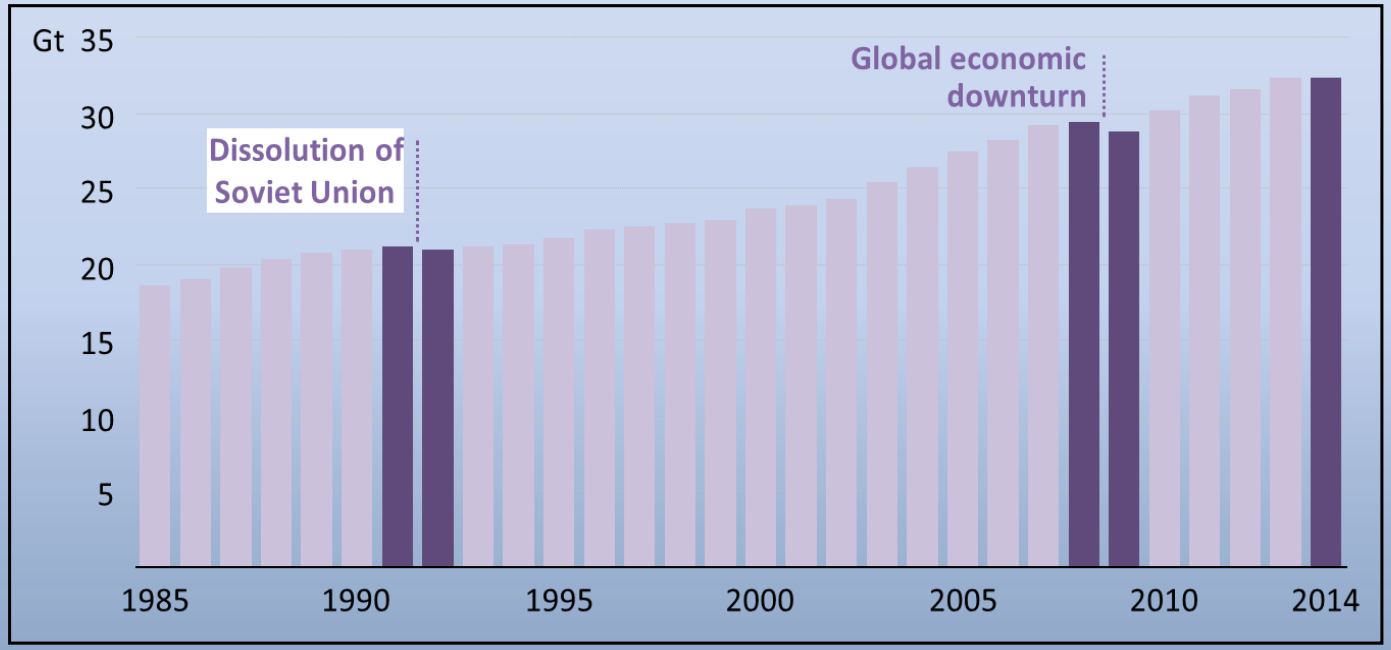
# Considerations of Carbon:
## *It's all about energy production*




*Source*: IEA

- Energy use is responsible for about 70% of total, global GHG emissions.
- $CO_2$ constitutes 90% of total energy-related emissions.
- In the energy sector, $CO_2$ is *exclusively* generated by fossil fuels.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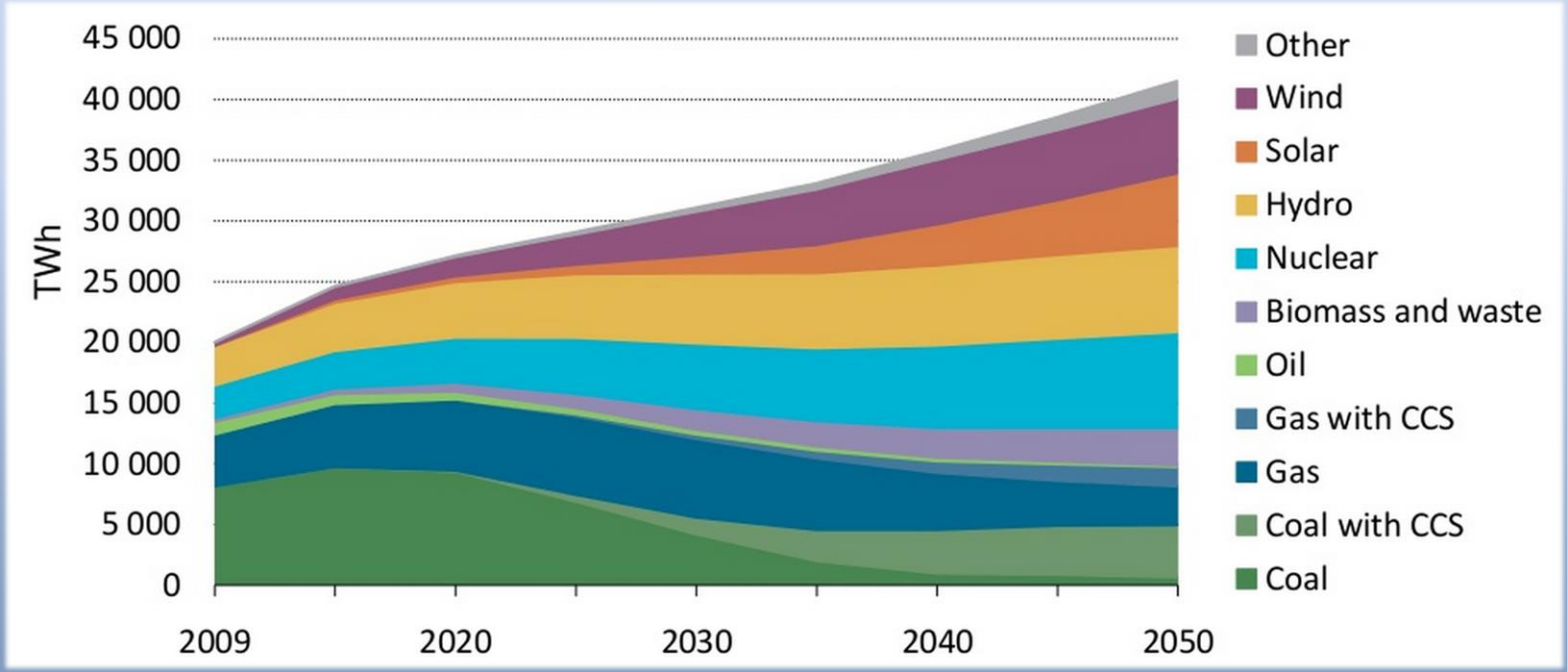
# IEA 2°C Scenario:
## Nuclear is Required to Provide the Largest Contribution to Global Electricity in 2050




*Source:* IEA

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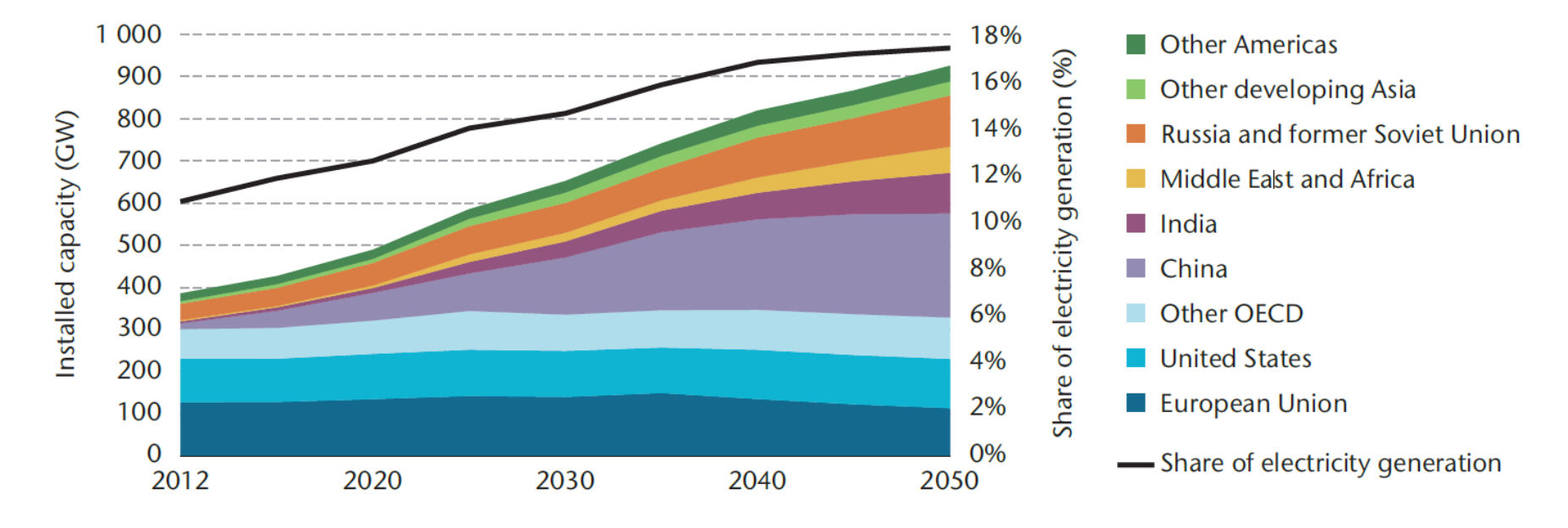
# Global Nuclear Capacity in the 2°C Scenario




(All capacities are gross capacities)

- **930 GW by 2050 (up from 390 GW today) – an additional 500 reactors**
- **Nuclear's share of global electricity rises to 17% (up from 11% today)**
- **A formidable challenge – increase current capacity by 2.3X in 35 years**
- **Meanwhile, many current reactors will retire and would be replaced**

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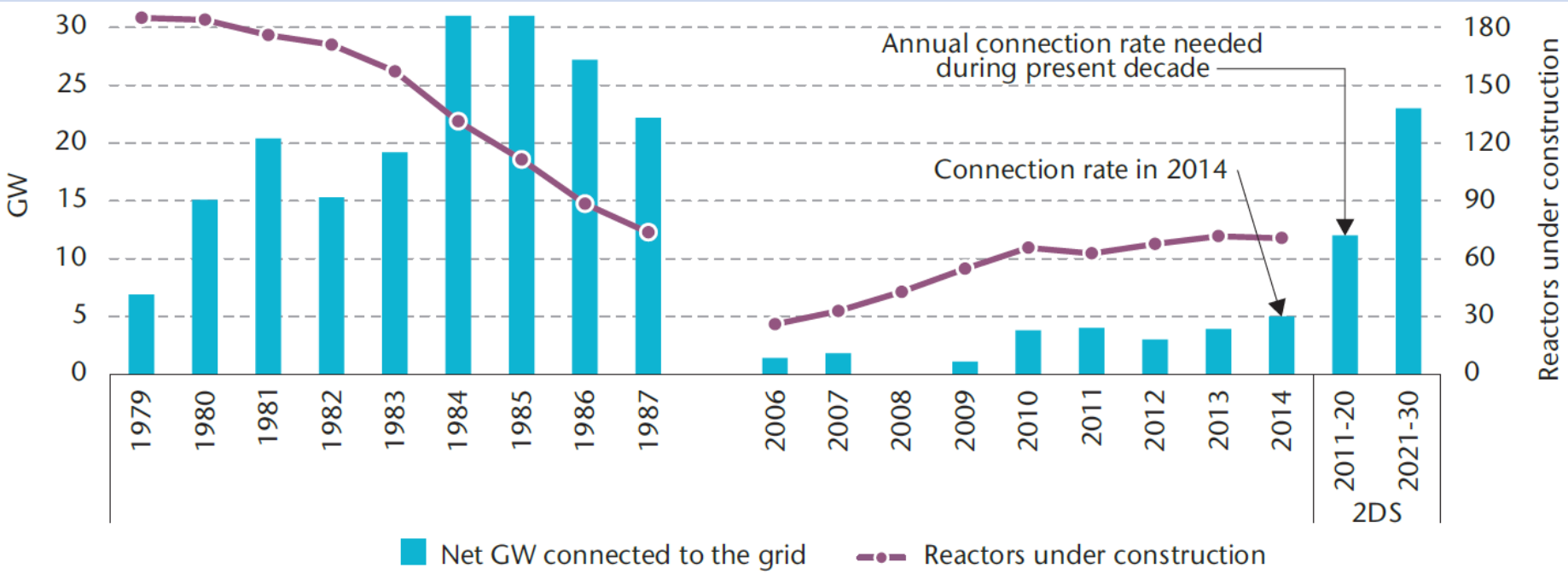
# Nuclear Capacity Additions




- **In 2014, 3 construction starts, 5 GW connected**
- **Need more than 12 GW/year to meet target**
- **Nuclear is <u>not on track</u> to fulfil its role in the 2°C Scenario**

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# The NEA: A Forum for Cooperation

- Founded in 1958
- 31 member countries
- 7 standing technical committees
- 75 working parties and expert groups
- 21 international joint projects

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# NEA Member Countries

*The NEA's current membership consists of 31 countries in Europe, North America and the Asia-Pacific region. Together they account for approximately 85% of the world's installed nuclear capacity.*

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# Major NEA Separately Funded Activities

## 21 Major Joint Projects

(Involving countries from within and beyond NEA membership)

- **Nuclear safety research** and experimental data (thermal-hydraulics, fuel behaviour, severe accidents)
- **Nuclear safety databases** (fire, common-cause failures)
- **Nuclear science** (thermodynamics of advanced fuels)
- **Radioactive waste management** (thermochemical database)
- **Radiological protection** (occupational exposure)

## Secretariat-Serviced Organisations

- **Generation IV International Forum (GIF)** with the goal to improve sustainability (including effective fuel utilisation and minimisation of waste), economics, safety and reliability, proliferation resistance and physical protection.
- **Multinational Design Evaluation Programme (MDEP)** initiative by national safety authorities to leverage their resources and knowledge for new reactor design reviews.
- **International Framework for Nuclear Energy Cooperation (IFNEC)** forum for international discussion on wide array of nuclear topics involving both developed and emerging economies.

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# Improving Human Factors is Crucial

- ✓ Organisational decision making.
- ✓ Safety culture of the plant staff and the regulator.
- ✓ Training to ensure that operators are well-prepared for a wide range of possible challenges.
- ✓ Openness and transparency.
- ✓ Stakeholder involvement.

→ The NEA created a **Division of Human Aspects of Nuclear Safety** to deal with these vital issues.

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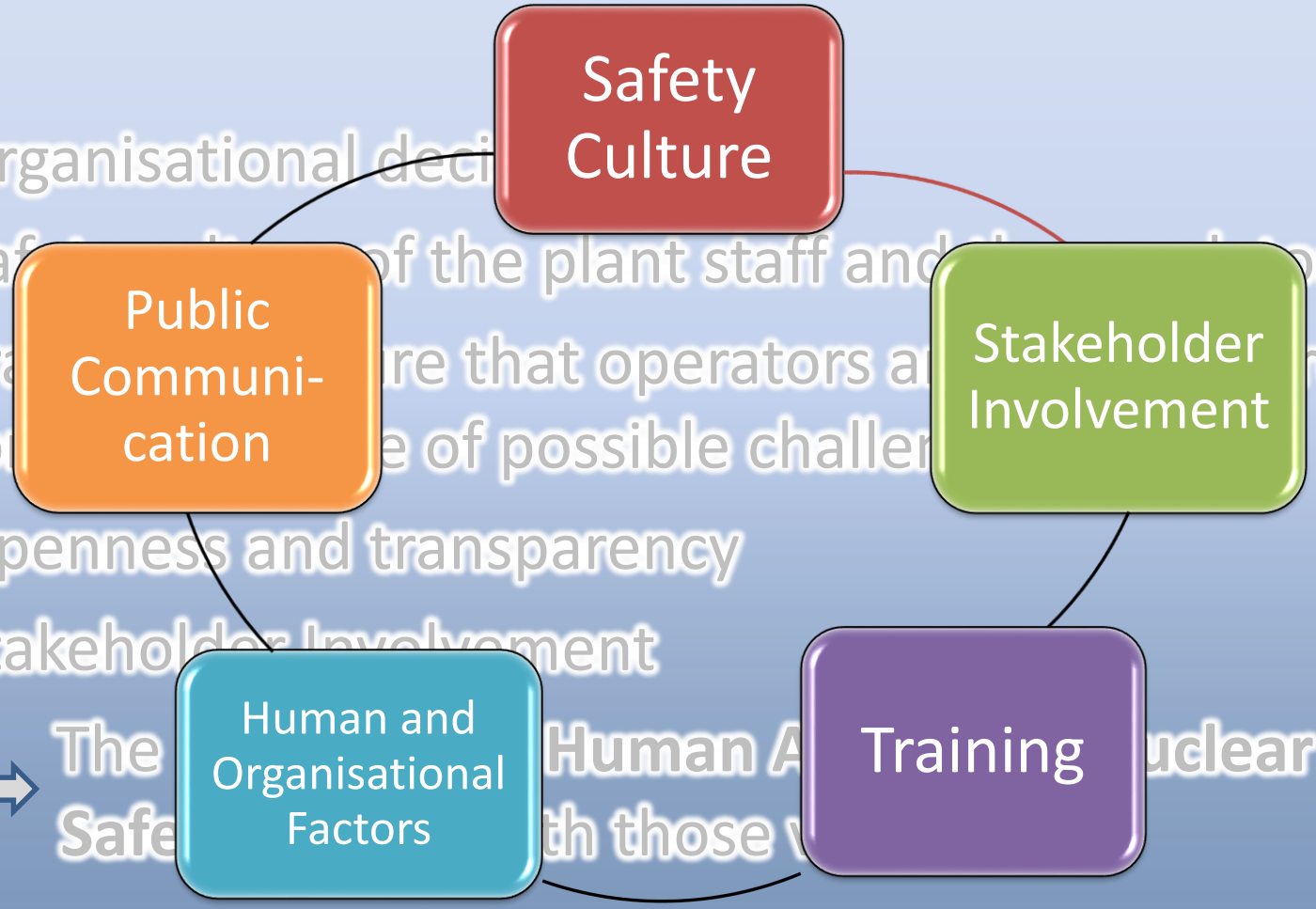


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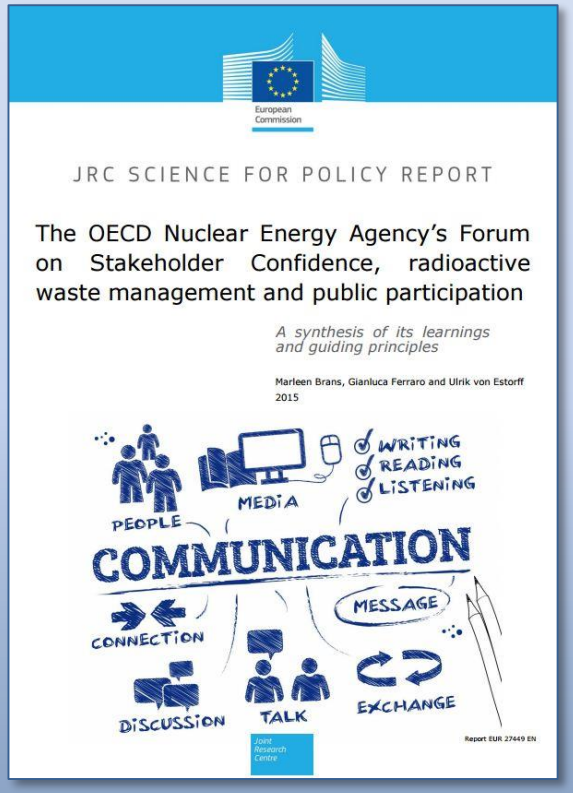
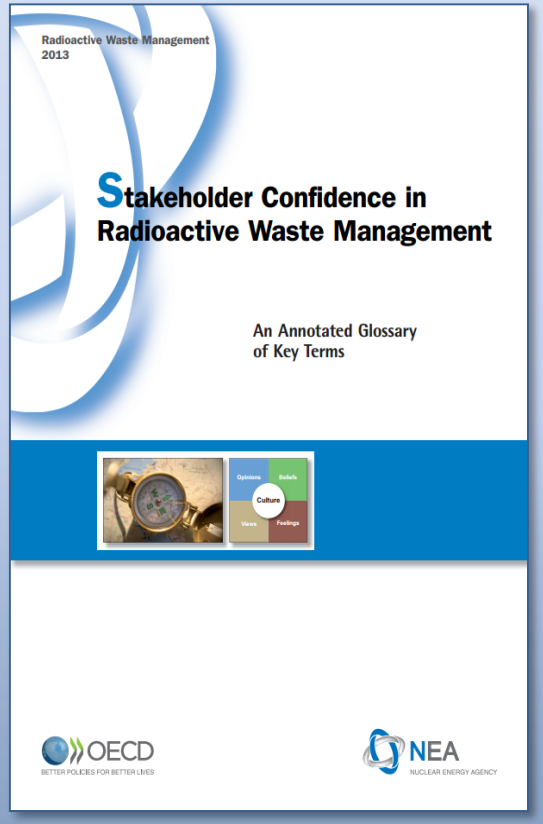
# Forum on Stakeholder Confidence




*The OECD Nuclear Energy Agency's Forum on Stakeholder Confidence, radioactive waste management and public participation. A synthesis of its learnings and guiding principles (2015)*




*Stakeholder Confidence in Radioactive Waste Management: An Annotated Glossary of Key Terms (2013)*

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# Legal Education/Publication Programmes

**Legal Education Programmes:**

- International School of Nuclear Law (ISNL)—Established in 2001 in co-operation with the University of Montpellier (France). ISNL is a two-week summer programme designed to provide students and young professionals with a comprehensive understanding of all nuclear law fields and an overview of nuclear technology and policy issues.

- International Nuclear Law Essentials (INLE)—Established in 2010, the INLE is a five-day intensive programme held in Paris in February for mid-career professionals working in the nuclear field (not specifically lawyers). Provides a comprehensive understanding of the various interrelated legal issues relating to the safe, efficient and secure use of nuclear energy.

**Major Legal On-line Publications:**

- Nuclear Law Bulletin (NLB)—Published twice a year in English and French.
- OECD/NEA country reports on regulatory and institutional framework for nuclear activities

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