

Towards a Secure and Sustainable Energy Future

**Ambassador Richard H. Jones, Deputy
Executive Director,
International Energy Agency**

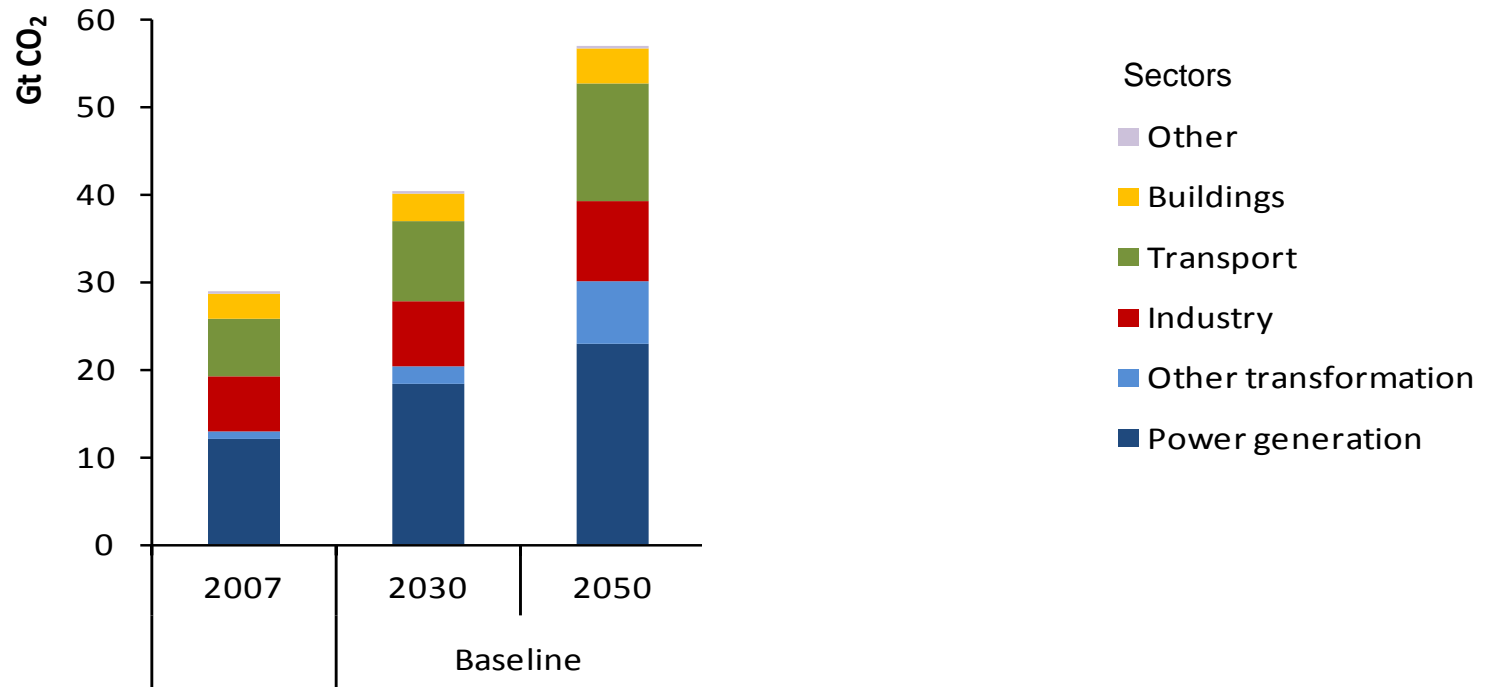
**SUSTAINABLE HYDROPOWER CONFERENCE
Rio de Janeiro 23-24 November 2010**

The context

- **Need a global energy technology revolution to meet key challenges:**
 - **Climate Change**
 - **Global Energy Security**
 - **Price Uncertainty and Risk**
 - **Affordable Access to Energy**

- **Some early signs of progress, but much more needs to be done.**
 - **Which technologies can play a role?**
 - **What are the costs and benefits?**
 - **What policies are needed?**

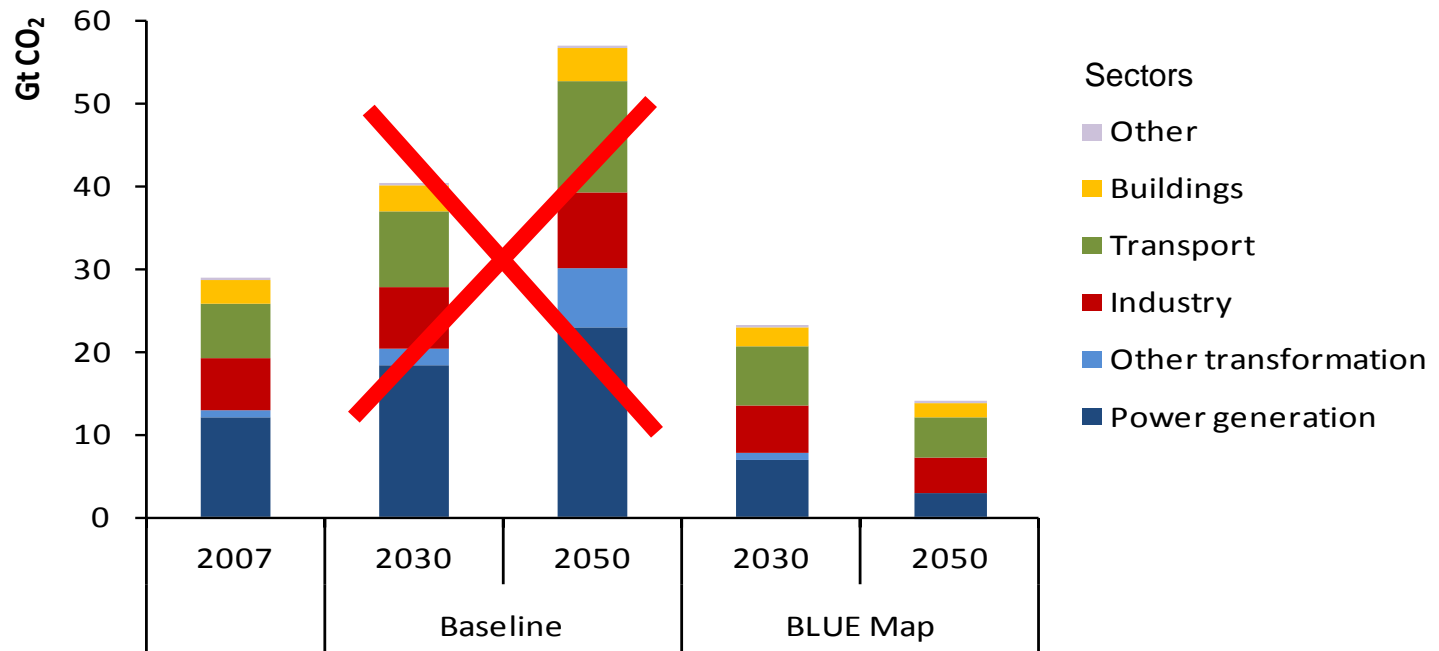
Present trends are unsustainable



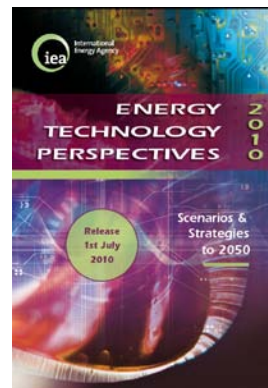
Global energy-related CO₂ emissions double in the Baseline Scenario

- ▶ Energy Security
- ▶ Environmental Protection
- ▶ Economic Growth
- ▶ Engagement Worldwide

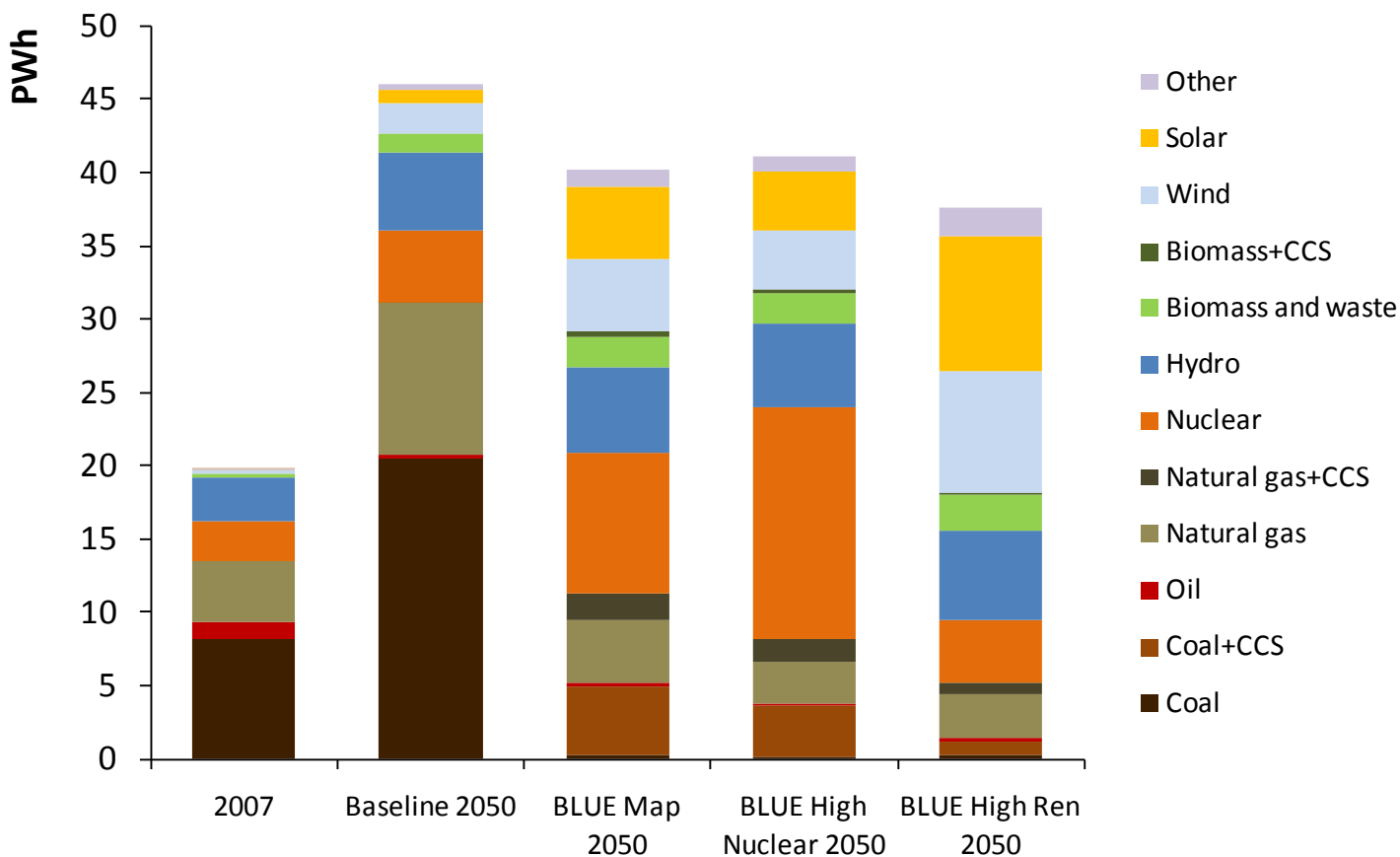
Global energy-related CO₂ emissions in the Baseline and BLUE Map scenarios



In the BLUE Map scenario abatement across all sectors reduces emissions to half 2005 levels by 2050.



Decarbonising the power sector – a new age of electrification



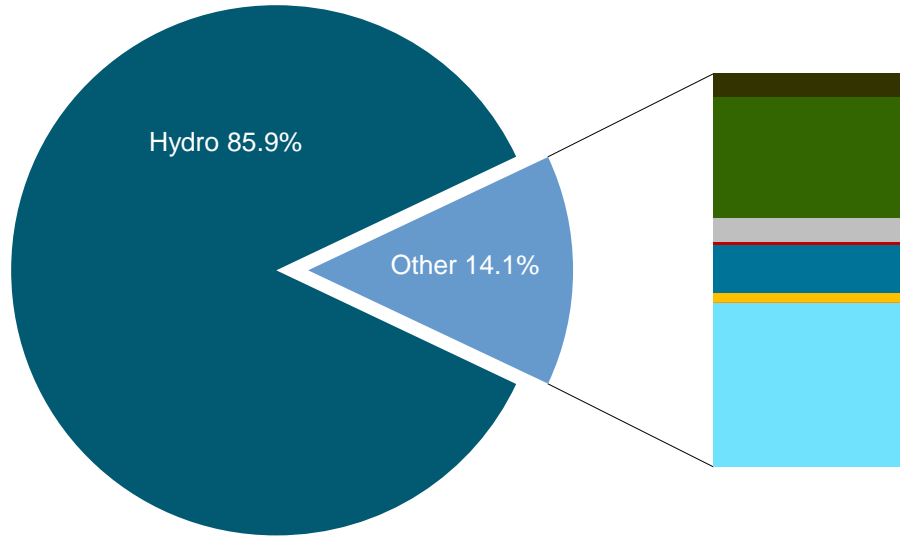
A mix of renewables, nuclear and fossil-fuels with CCS is needed to decarbonise the electricity sector.

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Composition of renewable power generation, 2008

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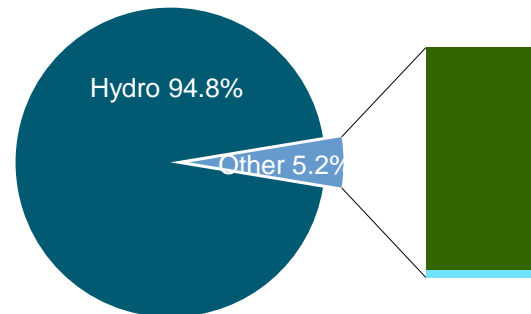
Total renewables: 3 733 TWh



- Renewable municipal waste (31 TWh)
- Solid biomass (163 TWh)
- Biogas (31 TWh)
- Liquid biomass (3 TWh)
- Geothermal (65 TWh)
- Solar PV (12 TWh)
- Solar CSP (1 TWh)
- Ocean (1 TWh)
- Wind (219 TWh)

Hydropower is currently the most important renewable energy source for electricity generation.

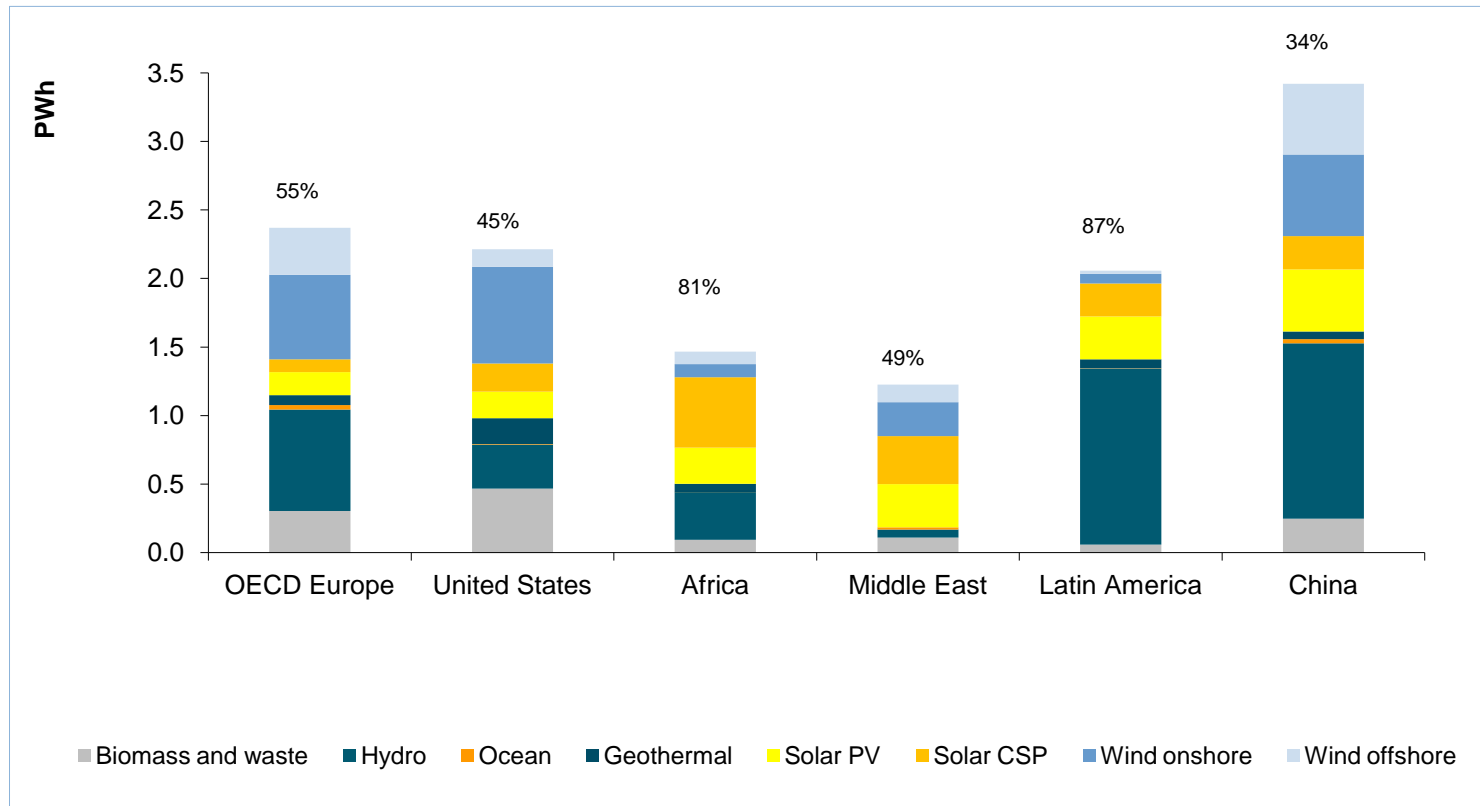
Total renewables: 390 TWh



- Solid biomass (20 TWh)
- Wind (1 TWh)

BRAZIL

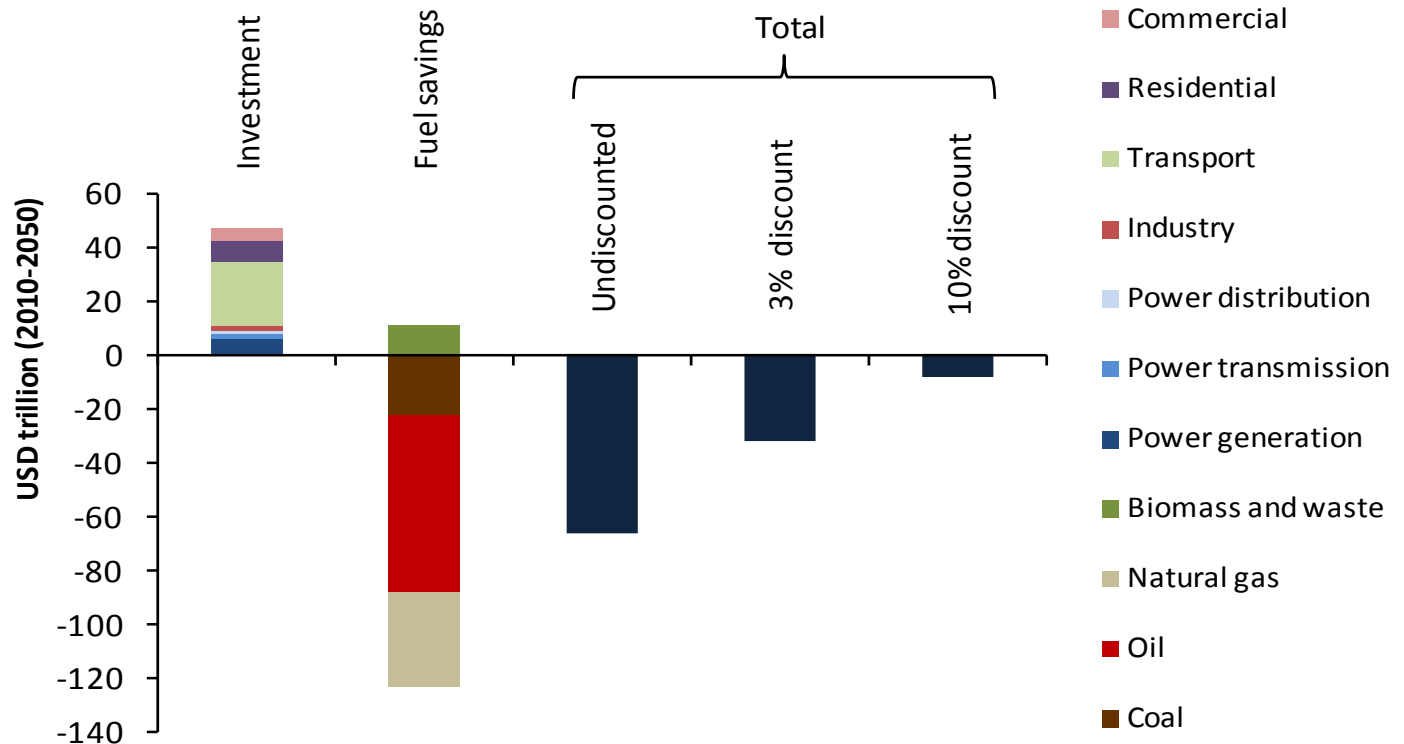
There is a VERY significant need for Renewable electricity generation



A high penetration of variable renewables, such as solar, wind and ocean power, is complemented by the availability of flexible hydropower.

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Additional investment and fuel savings, 2010-2050



Even using a 10% discount rate, fuel savings in the BLUE Map scenario more than offset the additional investment required.

Energy Technology Roadmaps

Roadmaps help develop a common vision and identify actions to be implemented at international and national levels

■ The IEA roadmap process

- Engage cross-section of stakeholders
- Identify a baseline – where is technology today?
- Establish accelerated deployment pathway to achieve 2050 goals
- Identify barriers – technical, regulatory, policy, financial and public acceptance
- Develop near-term action items for all stakeholders

■ The IEA roadmap recommendations

- Depending on the technology: policies needed, investment requirements, incentives, technology performance milestones
- General Conclusion: We need to raise the level of annual public clean energy RD&D spending to 2 – 5 times pre-stimulus [2008] levels

Energy Technology Roadmaps

- ▶ Energy Security
- ▶ Environmental Protection
- ▶ Economic Growth
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Technology Roadmap
Concentrating Solar Power



Technology Roadmap
Wind energy



Technology Roadmap
Solar photovoltaic energy



Technology Roadmap
Nuclear Energy



Published

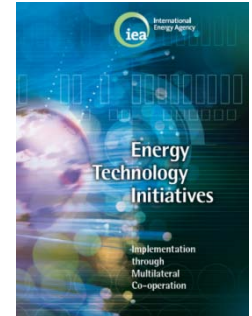
Carbon capture and storage, Electric vehicles, Cement sector, Wind energy, Solar PV, Concentrating solar power, and Nuclear power

In Development

Geothermal energy, Smart grids, Vehicle efficiency, Biofuels, Biomass combustion for heat/power, Clean/high-efficiency coal, Chemical sector, Energy efficiency in buildings: Design & operation, and Energy efficient buildings: heating and cooling

Multilateral Technology Initiatives

proven, demand-driven, flexible co-operative groups that produce concrete results under 42 Implementing Agreements



- **Global network of 6,000 experts**
- **More than 1,000 projects to date**
- **Governments and industry working together**

- **Supply**

- ◆ **Cleaner fossil fuels**
- ◆ **Renewables**
- ◆ **Fusion**

- **Demand**

- ◆ **Efficiency in buildings, electricity networks, industry, transport sectors**

- **Cross-cutting**

- ◆ **Modelling, knowledge base, capacity building**

Government of Brazil

Hydropower IA

Bioenergy IA

SolarPACES

Energy Technology Data Exchange (ETDE)

Companies from Brazil

Eletrobras (Clean Coal Centre IA)



International Low-Carbon Energy Technology Platform

a forum for all interested countries and stakeholders to accelerate and scale-up action for the development and deployment of clean energy technologies.

JUST LAUNCHED
15 OCT, PARIS

- **Catalysing technology collaboration initiatives**
- **Sharing experience on best-practice technologies and policies**
- **Reviewing progress on the low-carbon energy technology transition**
- **Looking forward to participation of many Latin and Central America, as well as African countries**
- **Sustainable Hydropower Conference first regional conference in Latin America in 2-yr work plan**

▶ Energy Security

▶ Environmental Protection

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Key concluding messages

- **Current trends are unsustainable**
- **The electricity sector will need to be substantially decarbonised through the use of both new and existing low-carbon technologies**
- **Hydro is already the largest source of renewable electricity today, and is a key enabling technology for the penetration of variable renewables**
- **Further development of hydro requires overcoming key barriers, especially to ensure sustainability**
- **A roadmap for sustainable hydro, substantiated by pilot projects, will be a key step for moving forward**

▶ Energy
Security

▶ Environmental
Protection

▶ Economic
Growth

▶ Engagement
Worldwide