



# Approaches for Greenhouse Gas Mitigation in the Power Sector

Session 3 – Existing Sector Wide Initiatives

Jim Burpee

Executive Vice President  
Ontario Power Generation

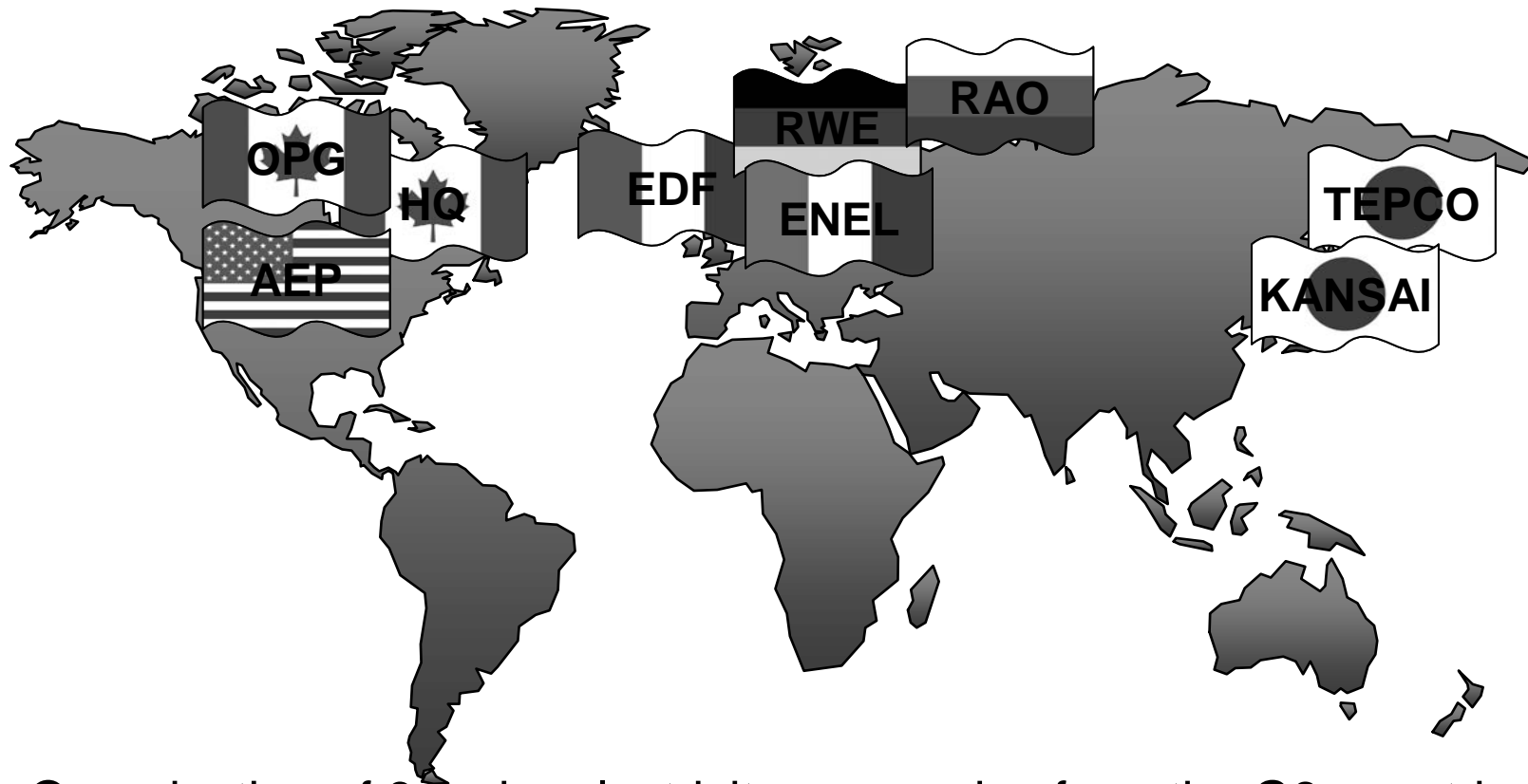
October 30, 2006



**ONTARIO** **POWER**  
GENERATION

- ◎ Two Perspectives on Collaboration for GHG Emissions Mitigation
  - e8 and International Cooperation
  - OPG and Initiatives in Canada
  
- ◎ Observations about Effectiveness





- ⦿ Organization of 9 major electricity companies from the G8 countries
- ⦿ e7 became the e8 in May 2006 to better reflect the membership



- ⊙ Play an active role in global electricity issues and promote sustainable development

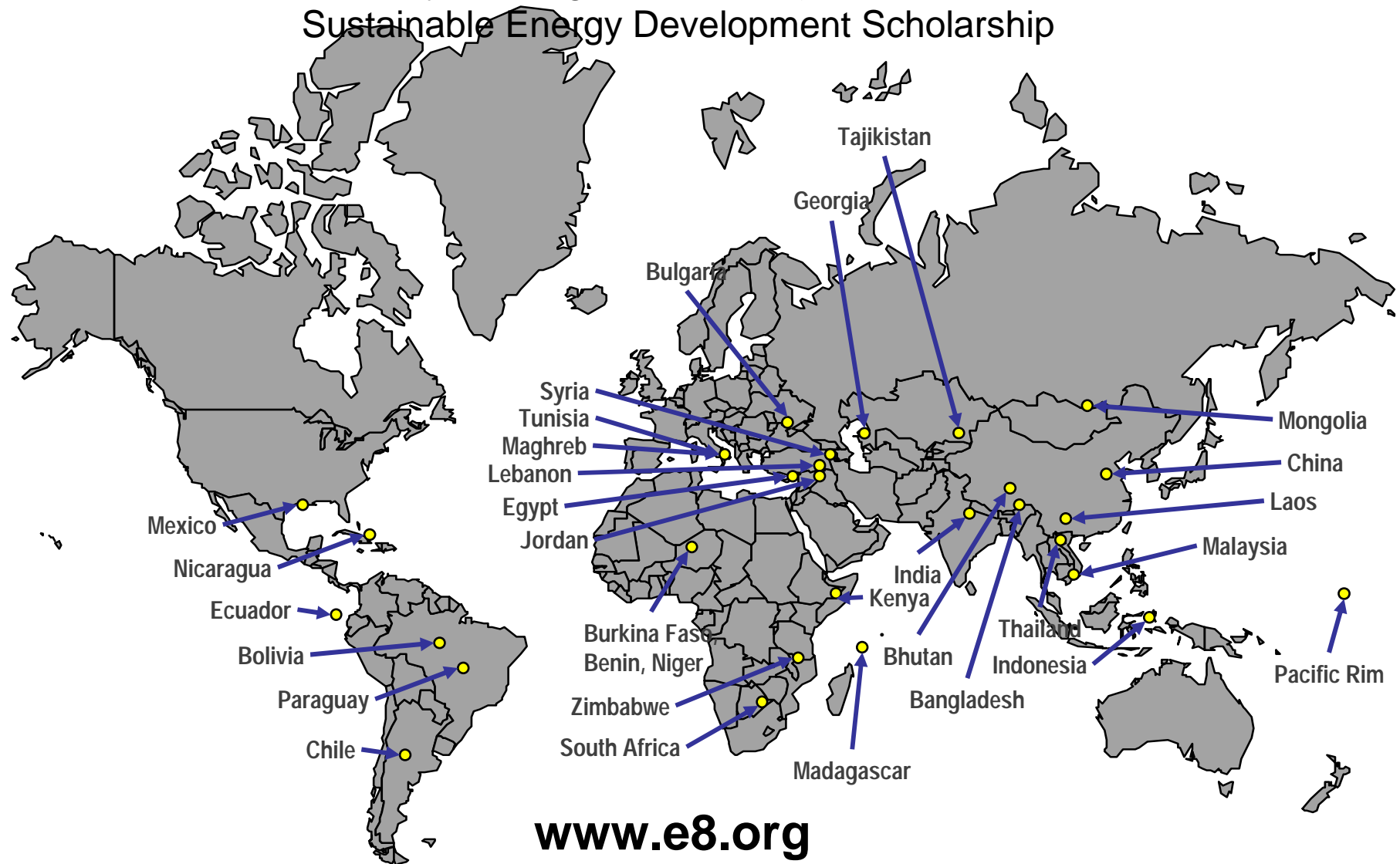
## Strategic Objectives

- ⊙ Provide human capacity building on the efficient generation and use of electricity
- ⊙ Demonstrate small-scale renewable energy projects
- ⊙ Develop common policy positions on global electricity-related issues



# 14 Years of e8 Projects

Human Capacity Building, Capital Projects, Members Forums,  
Sustainable Energy Development Scholarship



# e8 Partnerships

- ⊙ United Nations (umbrella agreement) and its agencies:
  - UN Department for Economic and Social Affairs (UN DESA)
  - UN Environment Programme (UNEP)
  - UN Industrial Development Organization (UNIDO)
  - UN Foundation
  
- ⊙ The Energy and Resources Institute (TERI), India
  
- ⊙ ENDESA, Spain
  
- ⊙ Project host countries
  
- ⊙ Other private partners for specific project implementation



# e8 Projects with Partners - Highlights

## Galapagos Islands

(AEP, EDF, ENEL, HQ, RWE, OPG)

- ⊙ Construct three wind turbines (2.4 MW) on San Cristobal Is. (USD 10 M)
- ⊙ Displace 50% of existing diesel generation
- ⊙ Approx. 2,727 tons CO<sub>2</sub>/y to be avoided
- ⊙ Project began late 2001
- ⊙ Partnerships:
  - Agreement with local utility covers power purchase, import duties and tax exemptions
  - Ecuadorian Government provides direct funding and allows national companies to direct income tax payments to the project
  - UNDP
  - UN Foundation



# e8 Projects with Partners - Highlights

## W Park (2003)

(EDF, ENEL, HQ, KANSAI, RWE)

- ⊙ Solar power systems installed for rural electrification and water supply in a UNESCO World Heritage Site and Biosphere Reserve and immediate vicinity
- ⊙ Ownership, operation and maintenance of the installations has been transferred to the traditional local W. African cooperatives
- ⊙ Project initiated in 1999
- ⊙ Partners
  - Three host countries - Benin, Burkina Faso and Niger
  - UNESCO
  - UNDP
  - European Union



# e8 Projects with Partners - Highlights

## Indonesia (1994 - 2001)

(RWE, HQ, KANSAI)

- ⊙ Small renewable energy systems supplied in Indonesia
  - Four micro-hydropower plants, one PV/wind-hybrid system and 195 solar home systems installed between 1997 and 2000
  - Generate one million kWh/y
  - Provide electricity to eight remote communities and 5000 people
  
- ⊙ Independent, village-run micro-utilities created to manage operations, maintenance and finances
  
- ⊙ Solar home systems component has been replicated in Nusa Tenggara Timur, 3000 units installed and 1000 underway
  
- ⊙ Partners:
  - Non-governmental organisations and users groups



# e8 Projects with Partners - Highlights

## e8 Sustainable Energy Development Scholarship (OPG)

- ⦿ Creates new partnerships
- ⦿ Programme supports outstanding students from developing countries pursue advanced studies in SED
- ⦿ Students from Bangladesh, China, India, Ecuador, Eritrea, Ghana, Kenya, Mali, Nigeria, the Philippines, Uganda have received scholarships to study in Canada, US, Germany, UK, Thailand, Australia
- ⦿ 5 Post-Doctoral and 23 Masters scholarships awarded since 2001



# Projects with Partners – Under Development

## Madagascar (EDF lead)

- ⦿ Develop mini-hydro project and distribution system in a remote area
- ⦿ Agreement with a private investor for project development and funding

## Maghreb Wind Project (ENEL lead)

- ⦿ Install wind turbines to power a desalination plant to produce fresh water
  - Satisfy drinking water needs
  - Improve health conditions
  - Improve access to electricity to develop local economy
- ⦿ Desalination plant to be constructed by partner

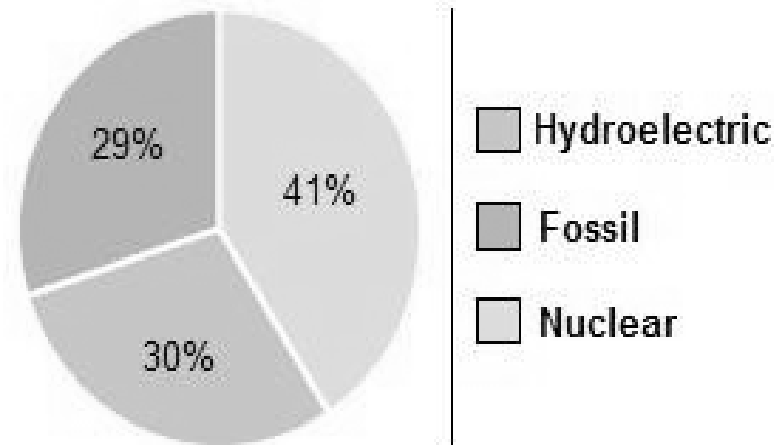


# Observations - e8 Partnership Projects

- ⊙ Partnerships are essential to develop projects in developing countries
  - To facilitate regulatory approvals
  - To assist in financing
- ⊙ Projects are small and expensive relative to those undertaken at home
- ⊙ Replication of pilot projects has been limited to date
- ⊙ Shareholders of e8 member companies differ in their endorsement of international capital projects



- ⊙ Ontario-based electricity generation company whose principal business is the generation and sale of electricity in Ontario
- ⊙ 22,000 MW
- ⊙ 71% of electricity produced from hydroelectric and nuclear sources which are virtually free of air emissions causing smog, acid rain and global warming
- ⊙ OPG generated 108.5 TWh in 2005
- ⊙ Own two nuclear generating stations which are leased on a long-term basis to Bruce Power L.P.



## ⦿ Mandate

- Expand hydroelectric generation
  - Initiated construction of a 10 km water diversion tunnel that will supply enough water to the Sir Adam Beck hydroelectric complex to produce an additional 1.6 billion kWh/year
  
- Continuously improve nuclear performance
  - In September, initiated the federal approvals process for new nuclear units at the Darlington Nuclear site
  
- Operate fossil-fuelled plants according to commercial principles until they are shut down as specified by the Ontario government's coal replacement policy



# OPG – GHG Related Collaborations

## ⊙ International

- e8
- Pew Center on Global Climate Change
- International Emissions Trading Association
- IEA
- EPRI (Gas User Association)

## ⊙ Canadian

- Canadian Electricity Association
- R&D Projects



# e8 Chairmen's Statement on Climate Change - Highlights

- ⊙ Need all forms of electricity generation – including nuclear and large hydro - and energy efficiency - to meet electricity demand
- ⊙ Construction and maintenance of electricity infrastructure requires significant new private investment and this requires a stable and predictable regulatory framework
- ⊙ Transmission networks need to be further integrated to create regional efficiency and optimise the use of resources
- ⊙ Cooperation between electricity companies in all countries is needed to achieve significant improvements in technology
  - e8 (AEP) has launched a programme under the AP6 umbrella to share best practices in power generation with engineers from developing countries.
- ⊙ International financial institutions should prioritise energy issues and develop appropriate financial mechanisms to attract private investment and to transfer technology to developing countries
- ⊙ Long-term contracts in the electricity sector could allow companies to meet security of supply without diminishing the fluidity and efficiency of short-term markets.



# Canadian Electricity Association

- ⦿ Proposed an emissions performance equivalent standard to government
  - Recognizes climate change as a long term issue
  - Based on life cycle of thermal power plant
  - Thermal power plant, upon 40<sup>th</sup> year of operation will offset emissions to the equivalent of a combined cycle gas turbine
  - Initial agreement was compromised with overlay of the Kyoto timeline which created inequity of obligations across thermal electricity companies across the country



- ⊙ International forum to promote market-based trading systems
  - Clean Development Mechanism
  - Joint Implementation
  - Emissions trading
  
- ⊙ Operating principles
  - Education
  - Issues Analysis
  - Participation in the development of the architecture of market mechanisms
  - Providing networking opportunities



# OPG – R&D Partnerships

- ⊙ **BIOCAP Canada**
  - Research network funded by Canadian governments (Federal, Provincial), industry, nongovernmental organizations
  - Areas of research include
    - Sinks in agricultural lands, managed forests and aquatic systems
    - Production, access and conversion of biomass into a usable energy resource
  
- ⊙ **Canadian Clean Power Coalition**
  - IGCC with CO<sub>2</sub> capture
  - Conventional pulverized coal combustion with amine CO<sub>2</sub> capture
  
- ⊙ **IEA Clean Coal Center**
- ⊙ **IEA GHG Capture and Sequestration**
  
- ⊙ **EPRI**
  - Monitor performance and developments related to IGCC, with/without CO<sub>2</sub> capture and sequestration



# Observations re Collaborations

- ⊙ Statements from powerful collaborations that educate and provide solutions have the best potential to influence
- ⊙ The lack of progress in achieving recognition for large hydro and nuclear necessitates a re-examination of communication methods
- ⊙ Risk that collaborations are viewed as foils rather than promoters of action
- ⊙ R&D initiatives benefit from collaboration as a means for leveraging funds
  - Inconsistent funding delays progress



# Recommendations to Improve Collaborations and Partnerships

- ⦿ Messages must go beyond the lowest common denominator
- ⦿ Target messages to the audience
- ⦿ Offer new information and analysis
- ⦿ Support messages with actions
- ⦿ Provide stable funding for initiatives



# Recommendations to Improve Collaborations and Partnerships

