Impacts and Adaptation of the Hydroelectric Industry in the Province of Quebec, Canada

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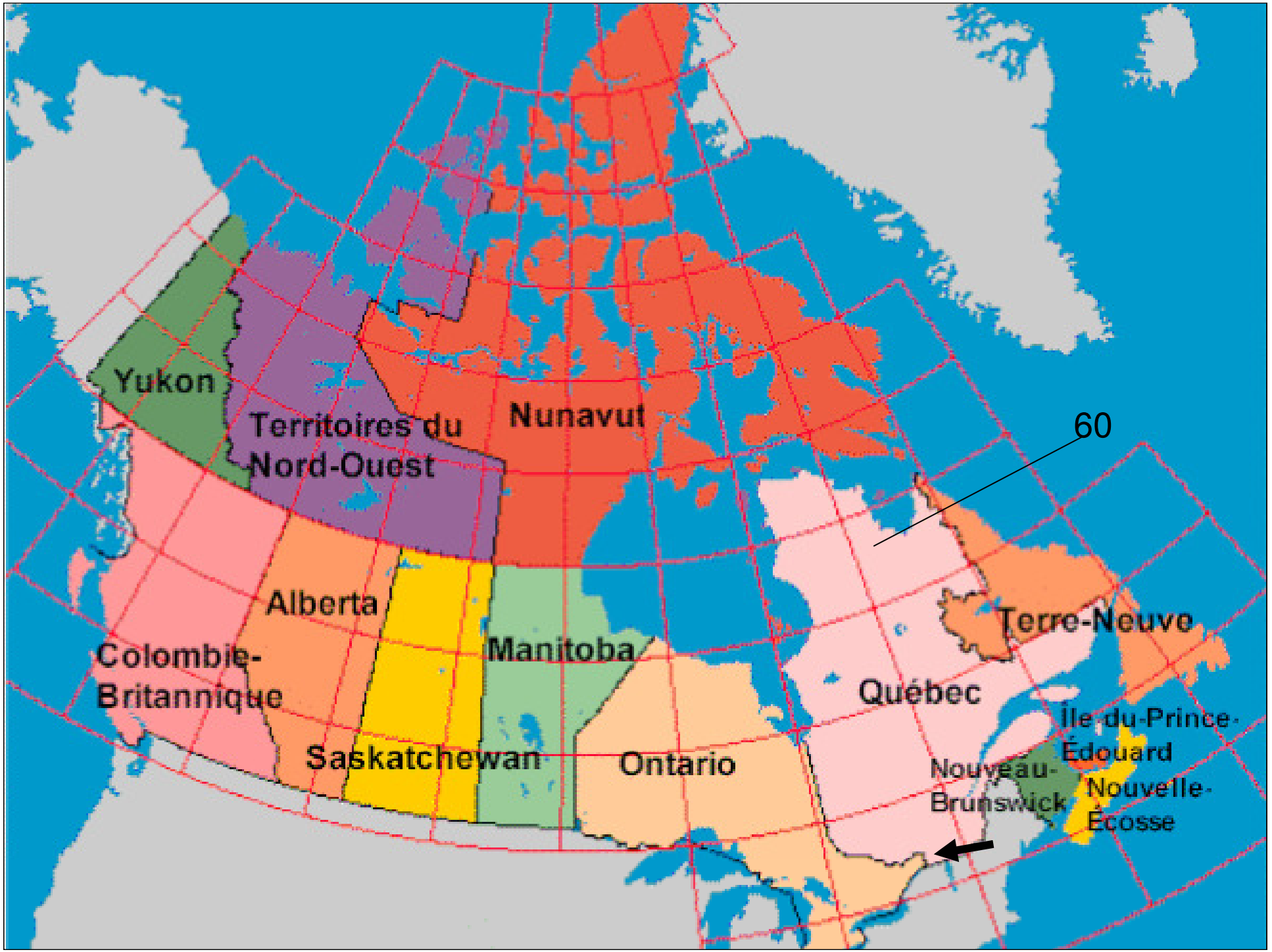
Presentation outline

- ***Context***
- ***Climate and hydrological considerations***
  - *Climate and hydrological models*
  - *Impact Assessments*
- ***Adaptation to Climate Change***
  - *The rationale*
  - *The experimentation*
  - *The instruments (non structural / structural)*
  - *Pre-requisite and barriers to adaptation*
- ***Conclusions***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Québec
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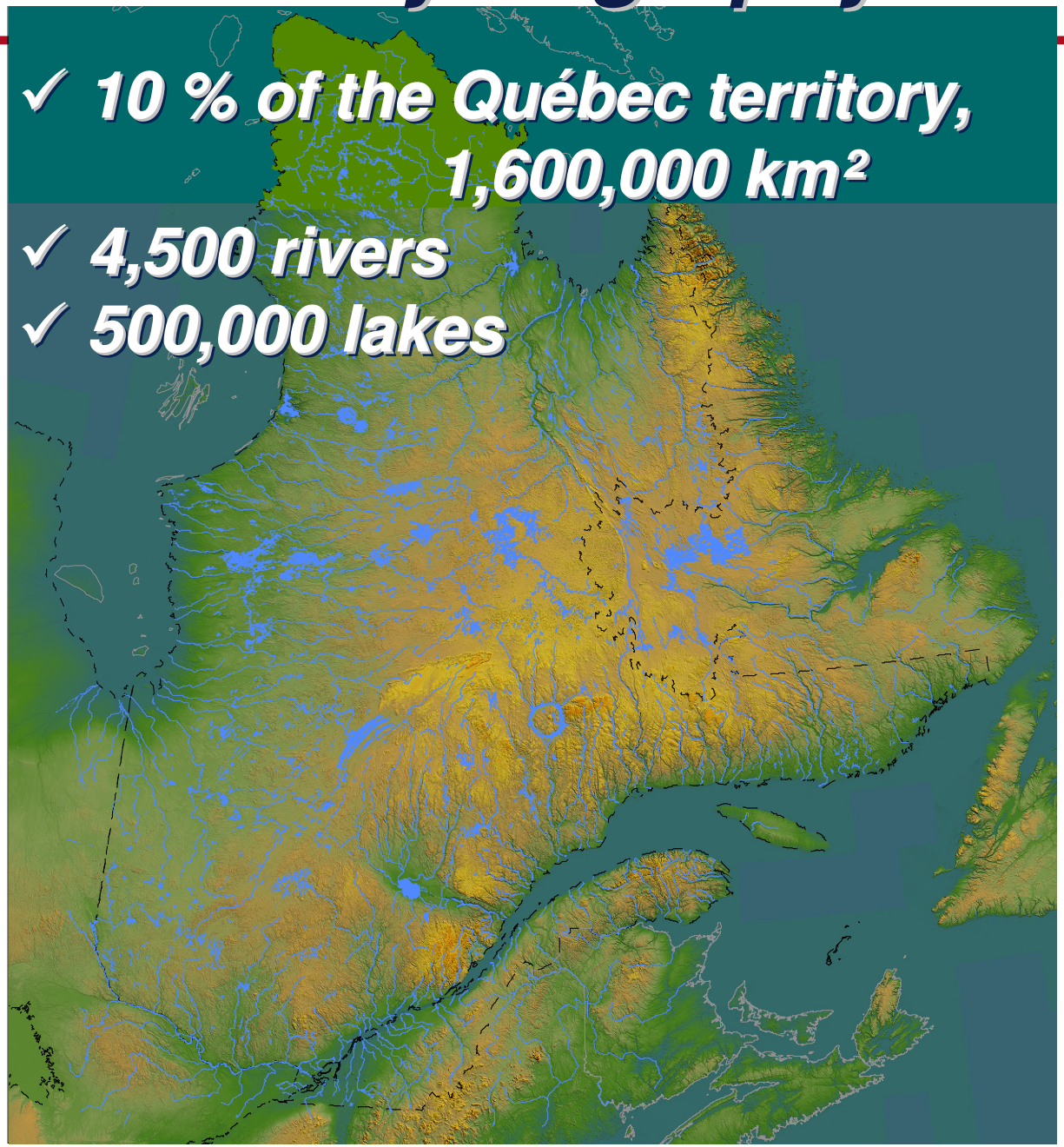
Île-du-Prince-Édouard
Nouveau-Brunswick
Nouvelle-Écosse

Québec hydrography

- ✓ 10 % of the Québec territory, 1,600,000 km²
- ✓ 4,500 rivers
- ✓ 500,000 lakes



2,000 km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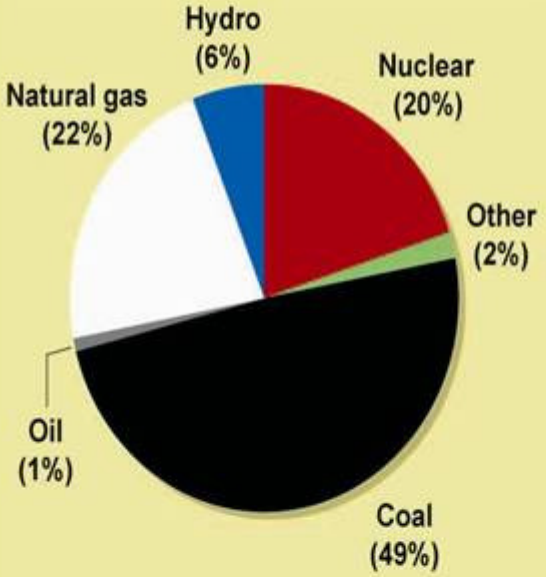
Generating Options

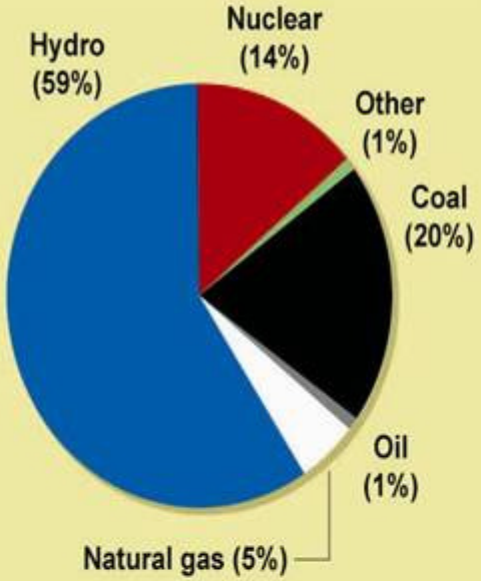
UNITED STATES 2008 (a)

Electricity Generation: 4,110 TWh



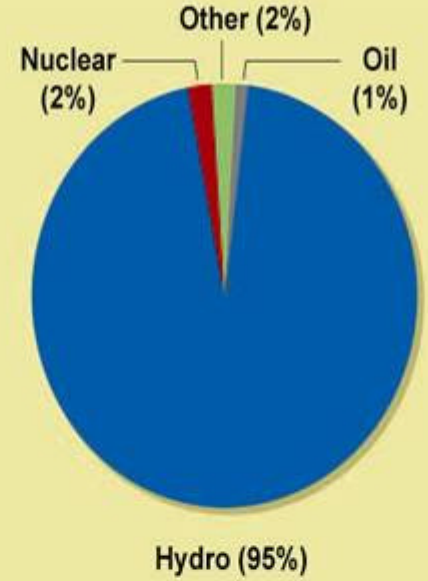
CANADA 2007 (b)

Electricity Generation: 617 TWh



QUÉBEC 2007 (b)

Electricity Generation: 192 TWh



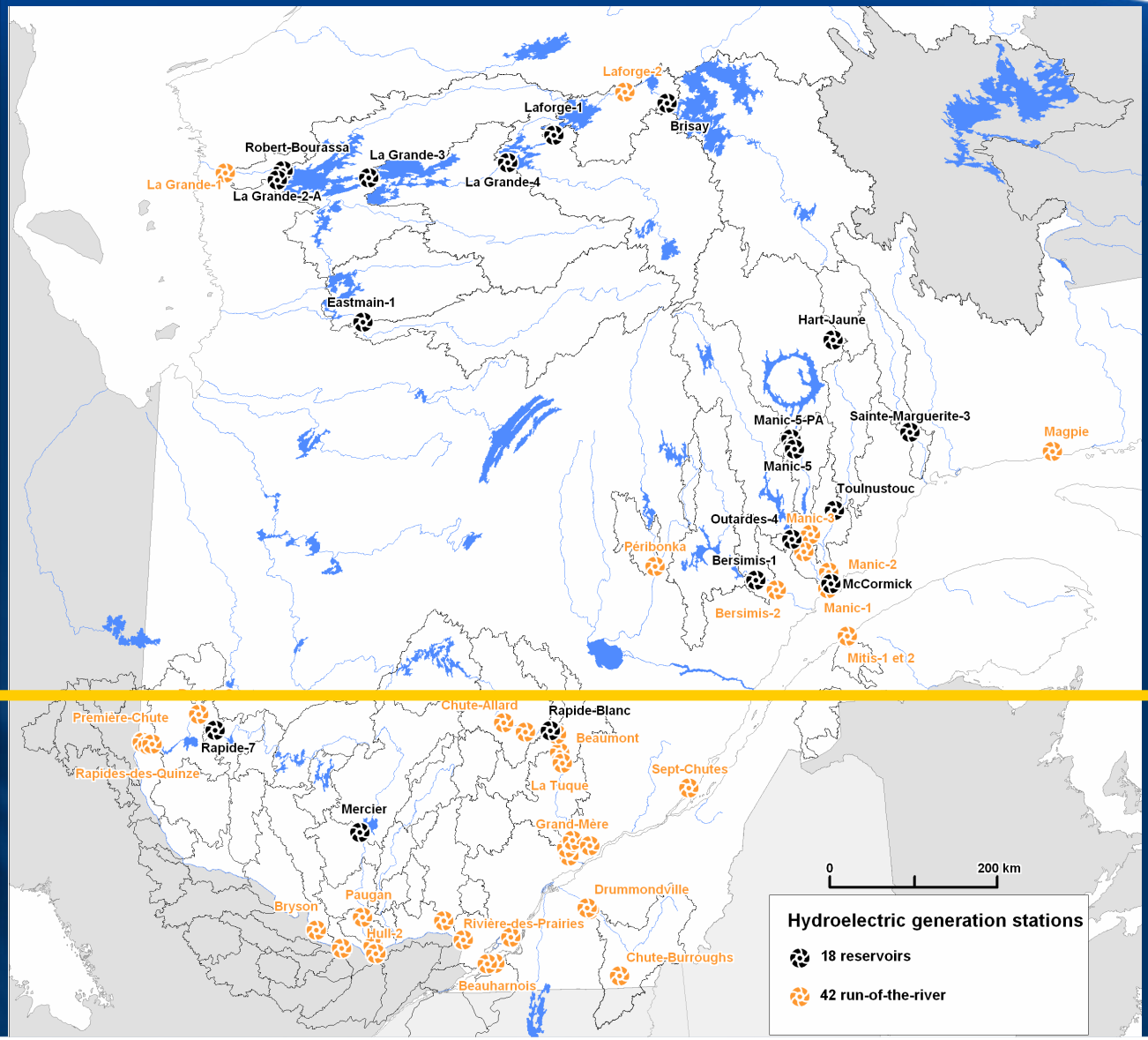
Sources: (a) Energy Information Administration and Electric Power Annual, 2009 – (b) Statistics Canada, 2007

60 Hydro plants / 34,499 MW / 188 TWh

2009

#1 Hydro

42 run-of-the-river / 18 with reservoir Power houses
175 TWh storage capacity



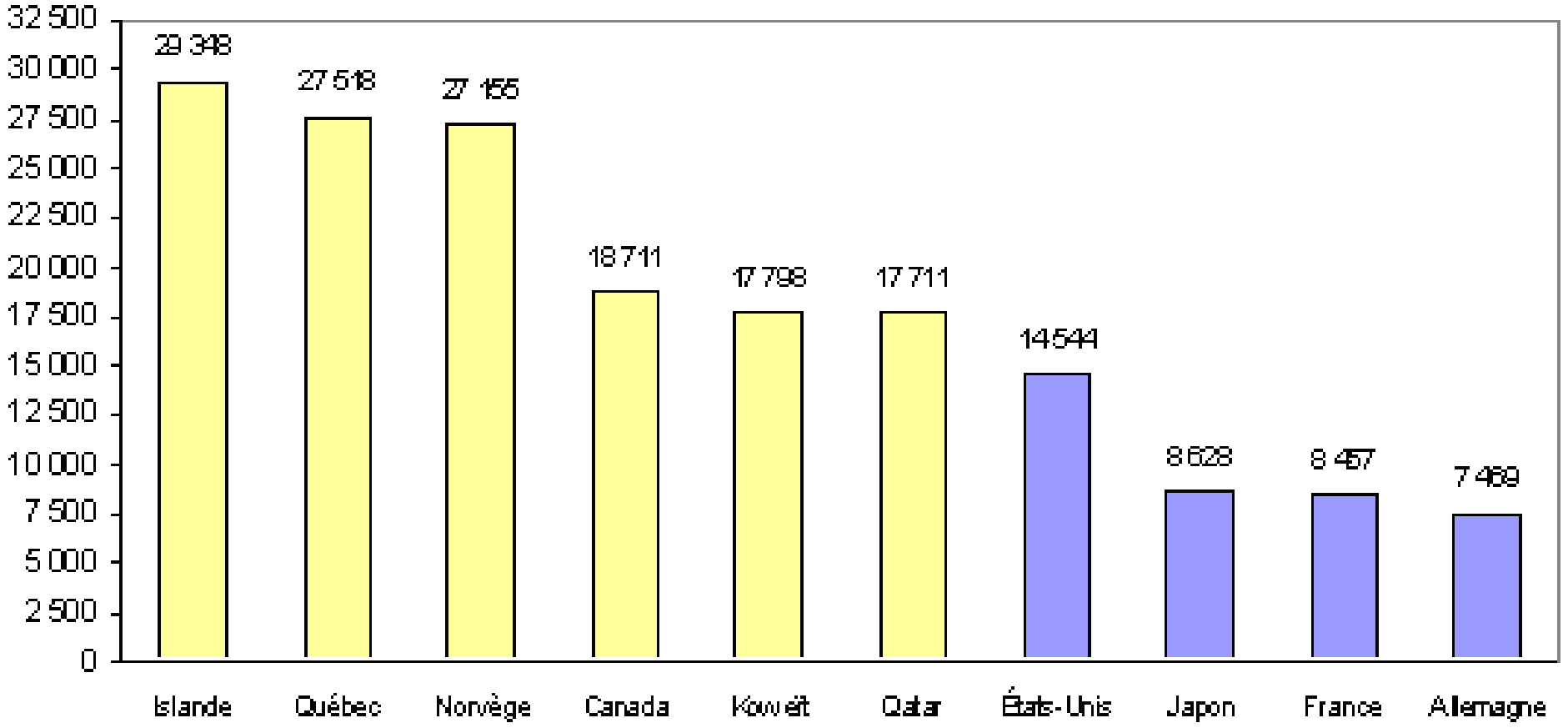
La Grande River Hydro Project
the largest in North America from 1971

- Watershed 177,000 km²
- 3,000 km of new roads
- 7 transmissions lines + 7,000 km(735 kV)
- 9 reservoirs, total area ± 14,000 km²
- 9 power plants : 16,500 MW
  - +2 under construction: 17,500 MW
- A first and a last

La Grande-2 and La Grande-2A

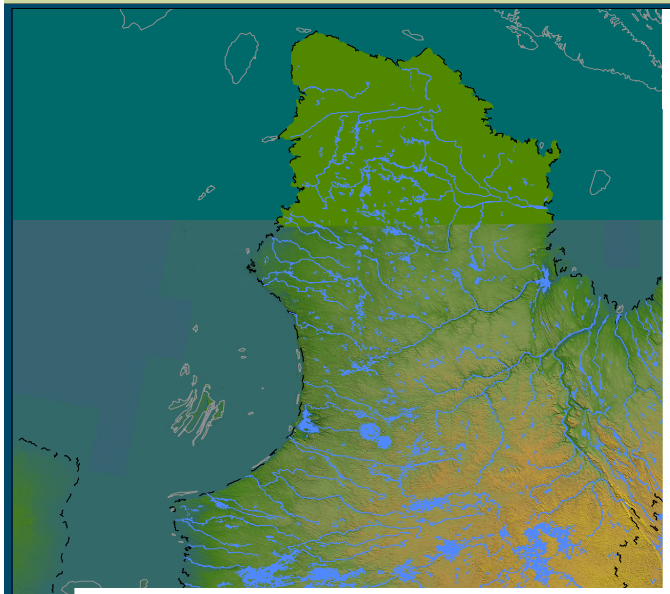
A

Electricity Consumption / Capita
(kWh, 2005)



Aluminium (90%), households (75%) and water (90%) heating and exports

Extreme Climate Events



Saguenay (1996 : 800 M $)
Flood 1: 11,000 years

The Great Ice Storm (1998 : 1,6 Billions $)
1,5 millions customers without electricity for up to 30 days

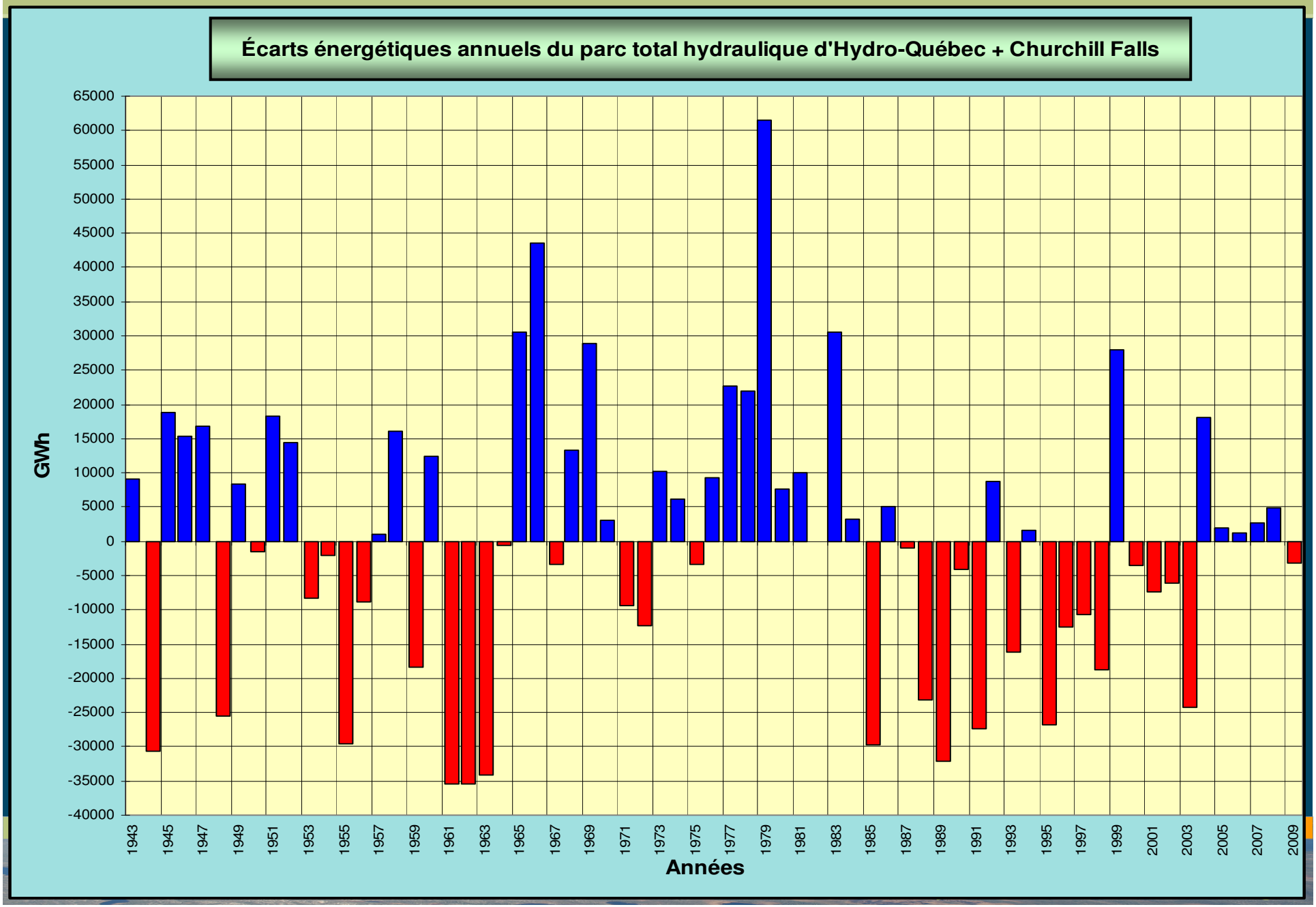
Ouranos: the Mission

Ouranos' mission is to acquire and develop knowledge on climate change, its impact and related socioeconomic and environmental vulnerabilities, in order to inform decision makers about probable climate trends and advise them on identifying, assessing, promoting and implementing **local and regional adaptation strategies**.

The major Issues

- Public safety and secure infrastructures
- Energy supply
- Water resources
- Health
- Forestry, agricultural, mining, tourism and transportation operations
- Protecting the natural environment

Mean Annual Inflows 1943-2009



The question to be answered

- ***How to manage climate change-associated risks in water resource infrastructure projects (existing and planned) ?***

  - ✓ *Climate change impact study*
  - ✓ *Implementation of Adaptation Measures*


Climate and hydrological considerations

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