

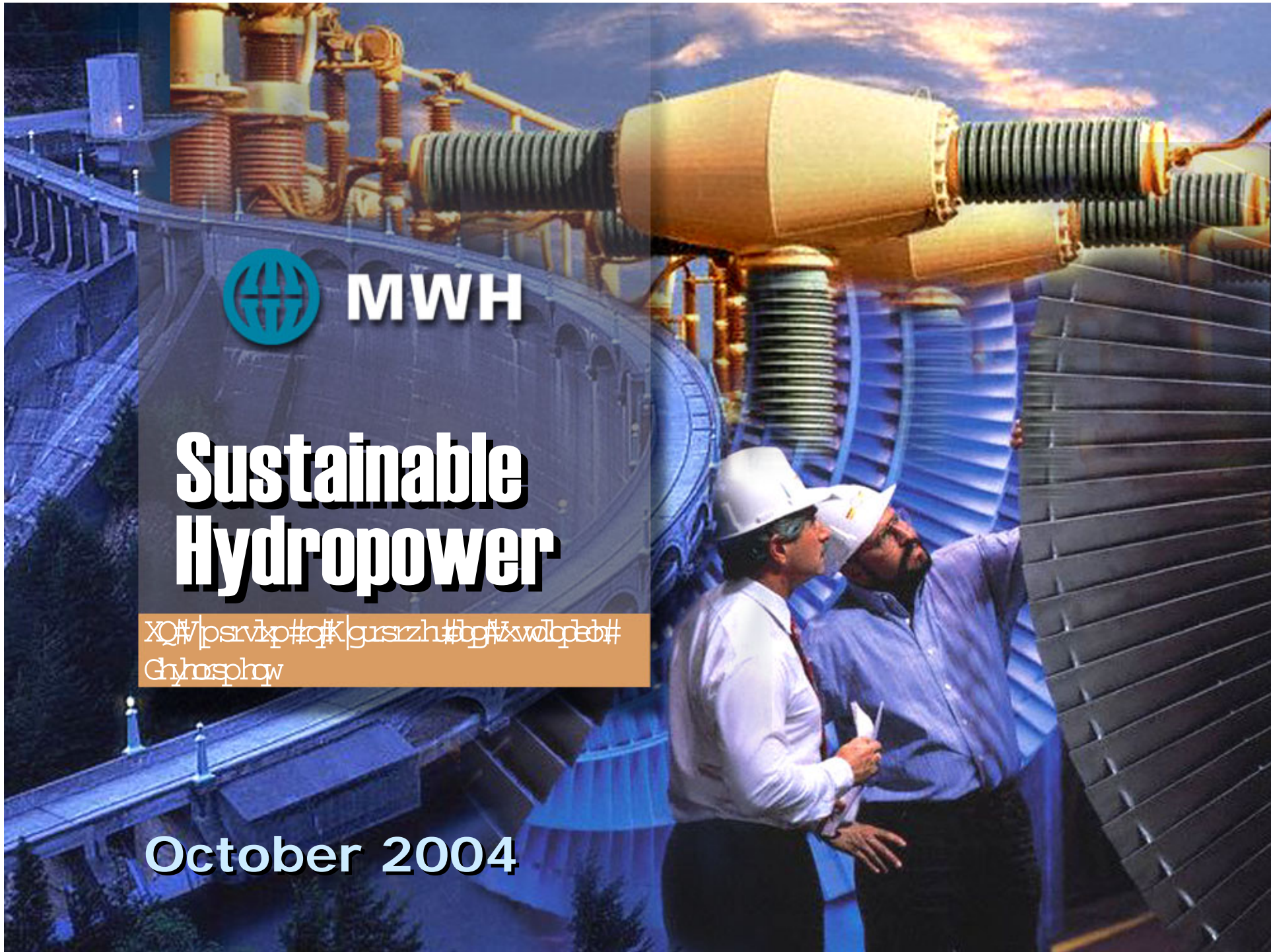


MWH

Sustainable Hydropower

Worldwide
Hydropower

October 2004

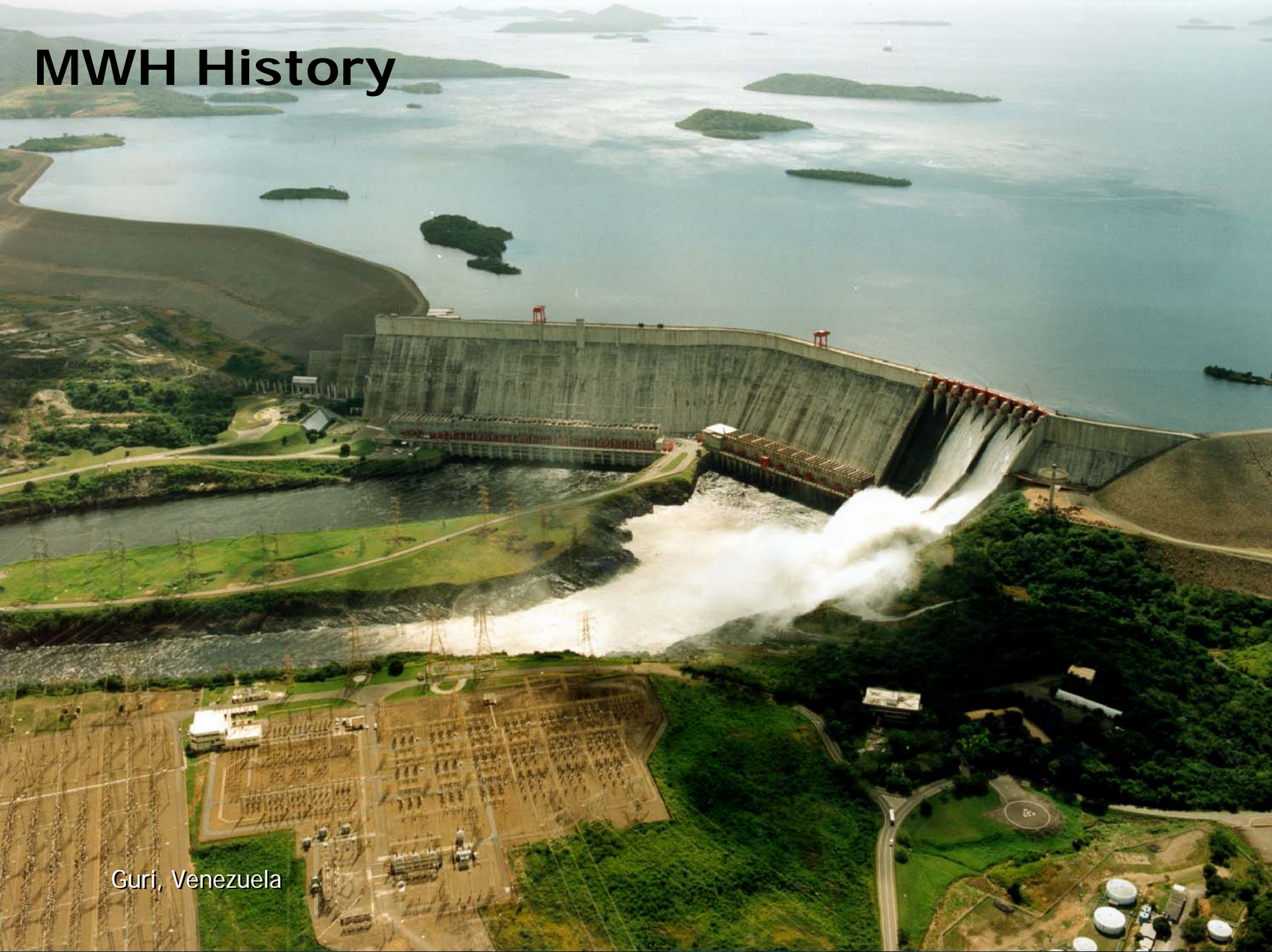


Agenda

- **MWH History**
- **World energy needs**
- **Meeting the world's energy needs through hydropower**
- **Issues with hydropower**
- **Defining sustainable development**
- **New era in hydropower**

Caruachi, Venezuela

MWH History



Guri, Venezuela

In 2001 MWH was Created to Form the Leading Water, Energy, and Infrastructure Consulting Firm in the World

Current Leadership:



Murli Tolaney
Chairman



Bob Uhler
CEO



Refaat Abdel-Malek
Vice Chairman

- Current Annual Revenues of Nearly \$1 Billion
- Over 6,000 Employees in 130 Offices in 30 Countries
- Recognized as a Leader in the Americas, Europe, and Asia



MWH is Responsible for Benchmark Hydropower in Every Region of the World

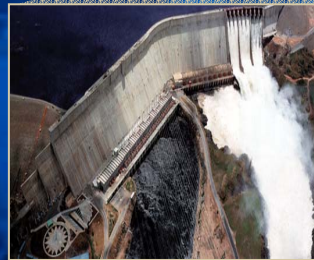
**Priest Rapids Project,
Washington**



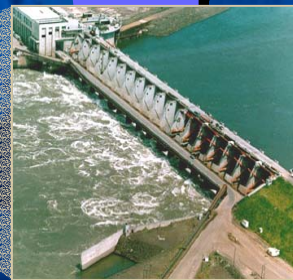
**Reza Shah
Kabir Project,
Iran**



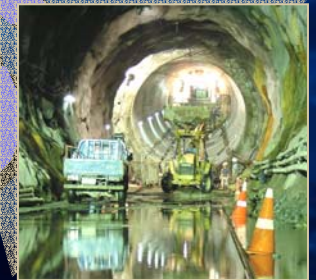
**Three
Gorges
Project,
China**



**Guri Project,
Venezuela**



**Yacyreta Project,
Argentina/Paraguay**



**San Roque Project,
Philippines**

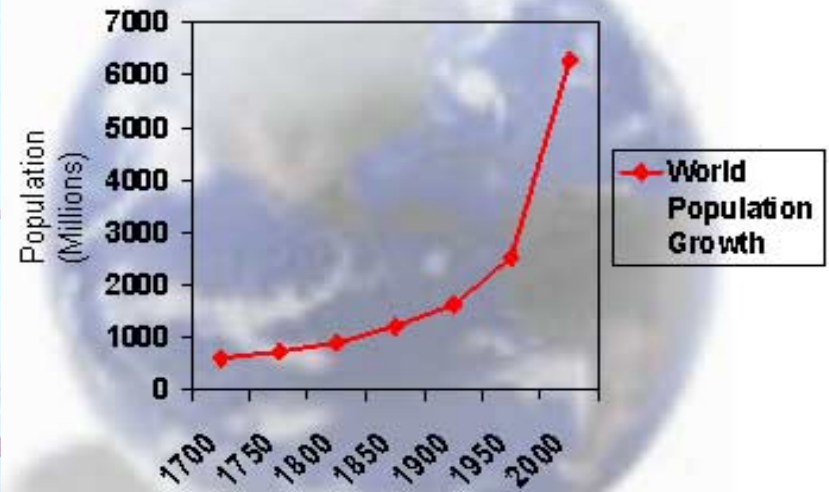
World Energy Needs



Barrigón Dam
Esti Hydroelectric Project, Panama

World Population Growth

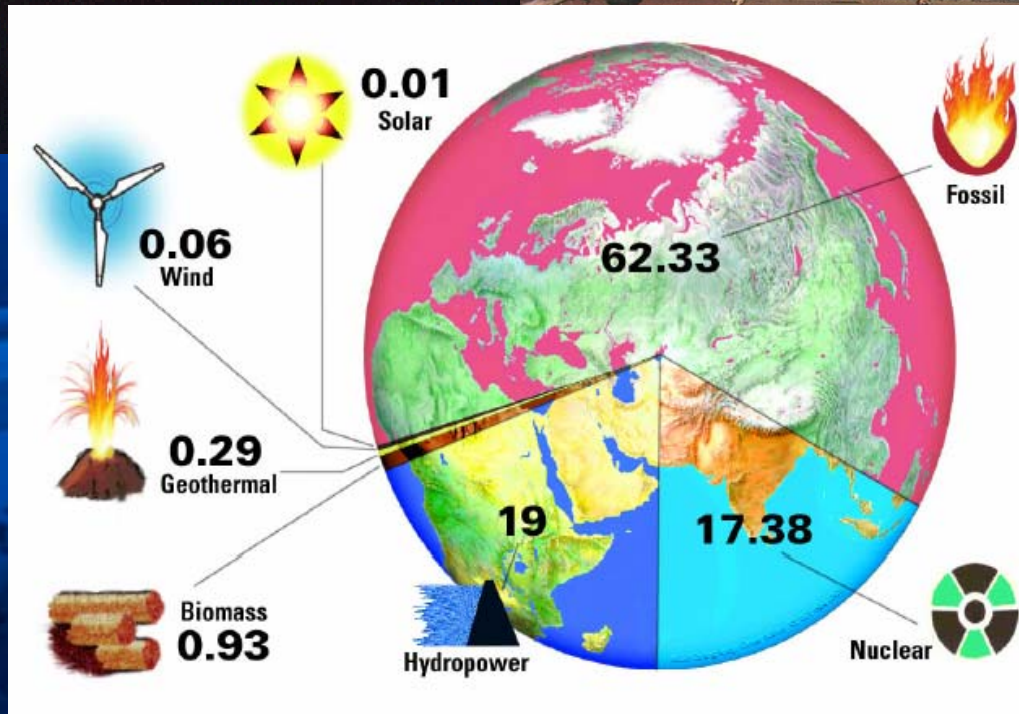
World population passed 6 billion in 2000, and is projected to climb to about 8 billion in 2025



Eventually, the world will need to support several billion more people.

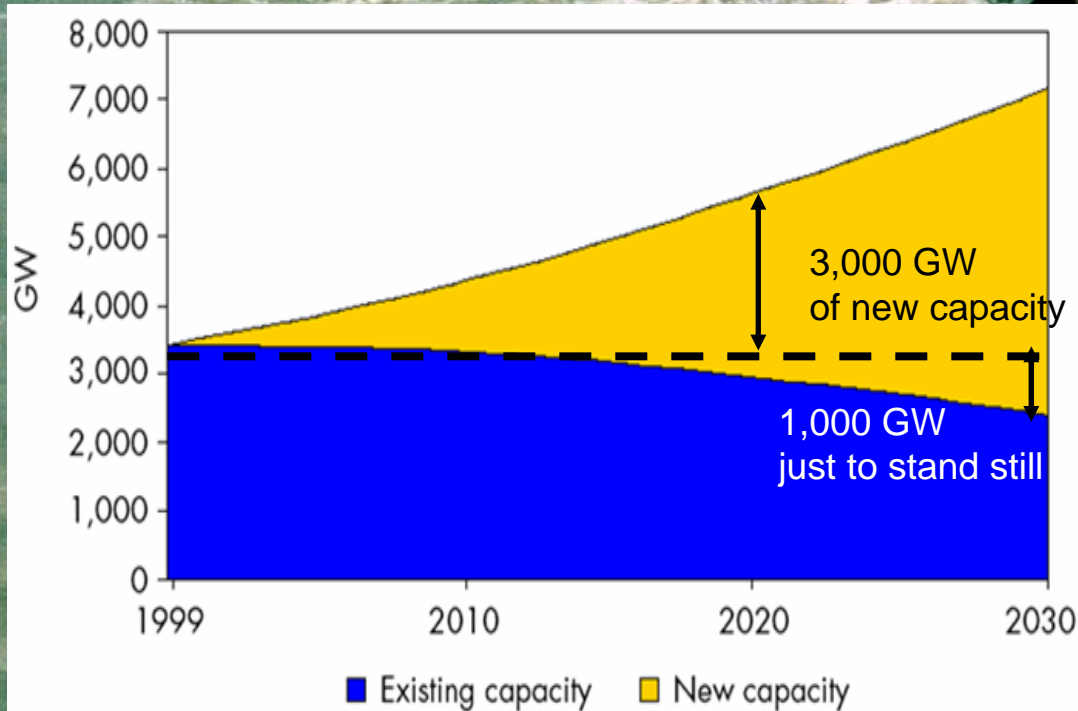
Three Gorges Construction, China

Current Electricity Sources



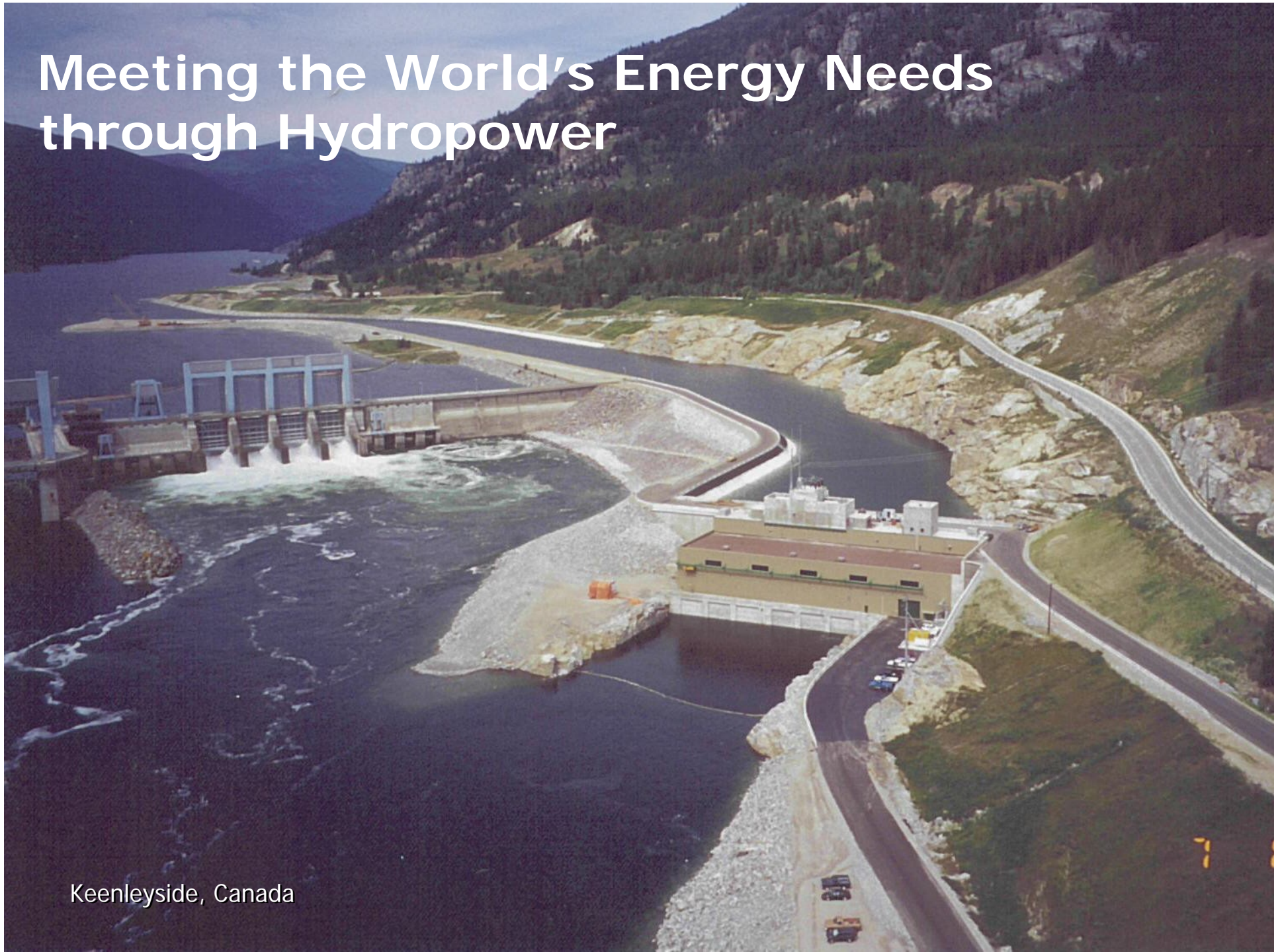
Source: Electricité de France

The Need for Hydropower



Source: IEA – World Energy Outlook

Meeting the World's Energy Needs through Hydropower



Keenleyside, Canada



The Bonn Political Declaration, Signed by 154 Countries...

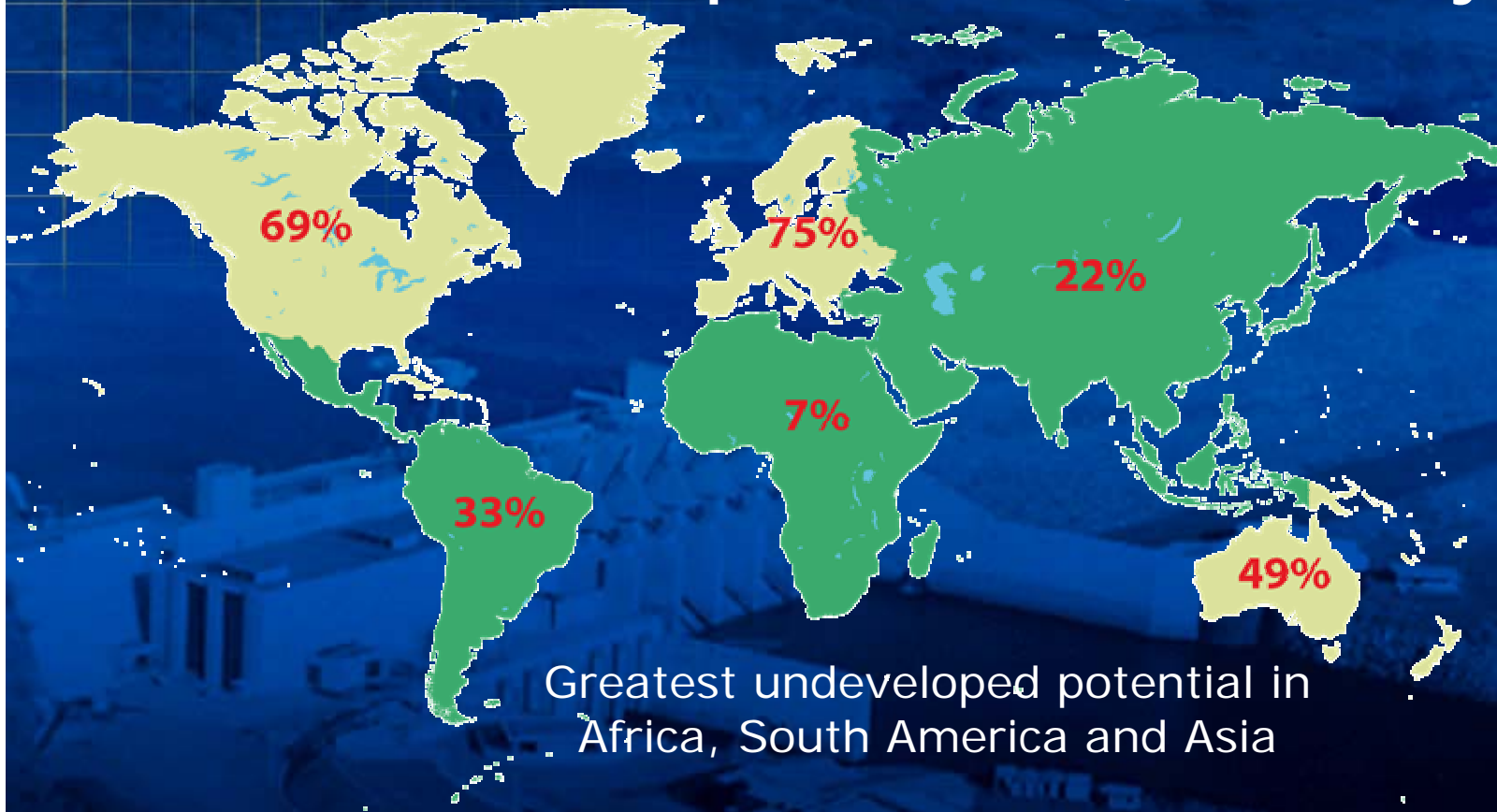
*Identifies hydropower as one of
the renewable technologies "to be
substantially increased with a
sense of urgency.*

*International Conference for
Renewable Energies – Bonn 2004*

Three Gorges, China

Renewable and Clean Energy

- World potential developed: 33%
- Current hydro production: 2,700 TWh/y
- Potential production: 8,000 TWh/y



Greatest undeveloped potential in Africa, South America and Asia

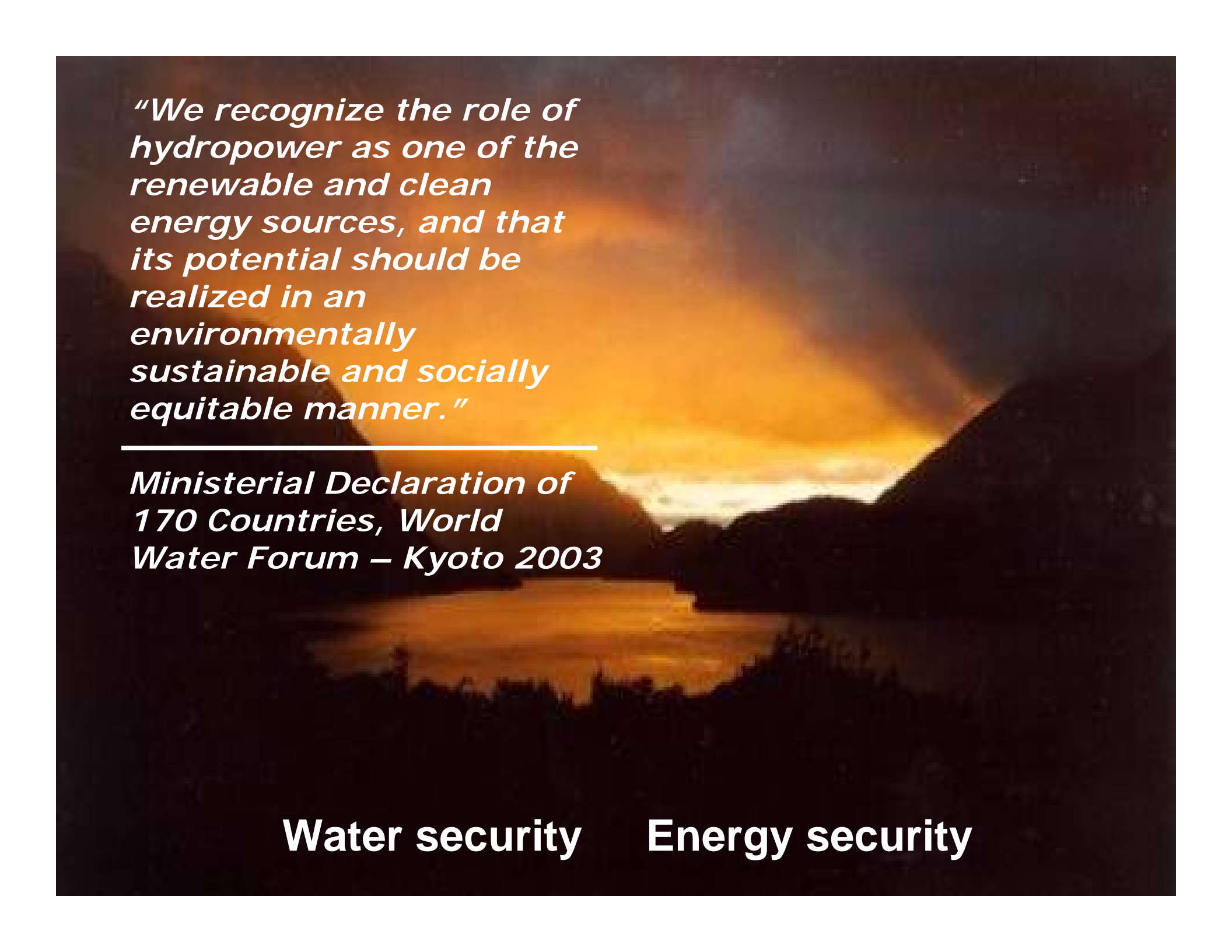
Source: International Hydropower Association

Multipurpose Benefits



“Water, Energy, Health, Agriculture and Biodiversity (WEHAB): five key areas in which progress is possible with the resources and technologies at our disposal today.”

**Kofi Annan, UN Secretary-General,
World Summit on Sustainable
Development, Johannesburg 2002**



"We recognize the role of hydropower as one of the renewable and clean energy sources, and that its potential should be realized in an environmentally sustainable and socially equitable manner."

Ministerial Declaration of 170 Countries, World Water Forum – Kyoto 2003

Water security

Energy security

"We recognize the role of hydropower as one of the renewable and clean energy sources, and that its potential should be realized in an environmentally sustainable and socially equitable manner."

Ministerial Declaration of 170 Countries, World Water Forum – Kyoto 2003

Water security

Item 19E "Diversify energy supply by developing advanced, cleaner, more efficient, affordable and cost-effective energy technologies, including fossil fuel technologies and renewable energy technologies, HYDROPOWER included..."

Plan of Implementation, World Summit on Sustainable Development – Johannesburg 2002

Energy security

Issues with Hydropower



Rocky Mountain, U.S.A.

Large dams have often been seen as an effective way of meeting water and energy needs.



Ertan, China

Large dams have often been seen as an effective way of meeting water and energy needs.



Ertan, China

Recent efforts to undermine the value of this resources has affected its progress, especially in developing countries.

Large dams have often been seen as an effective way of meeting water and energy needs.



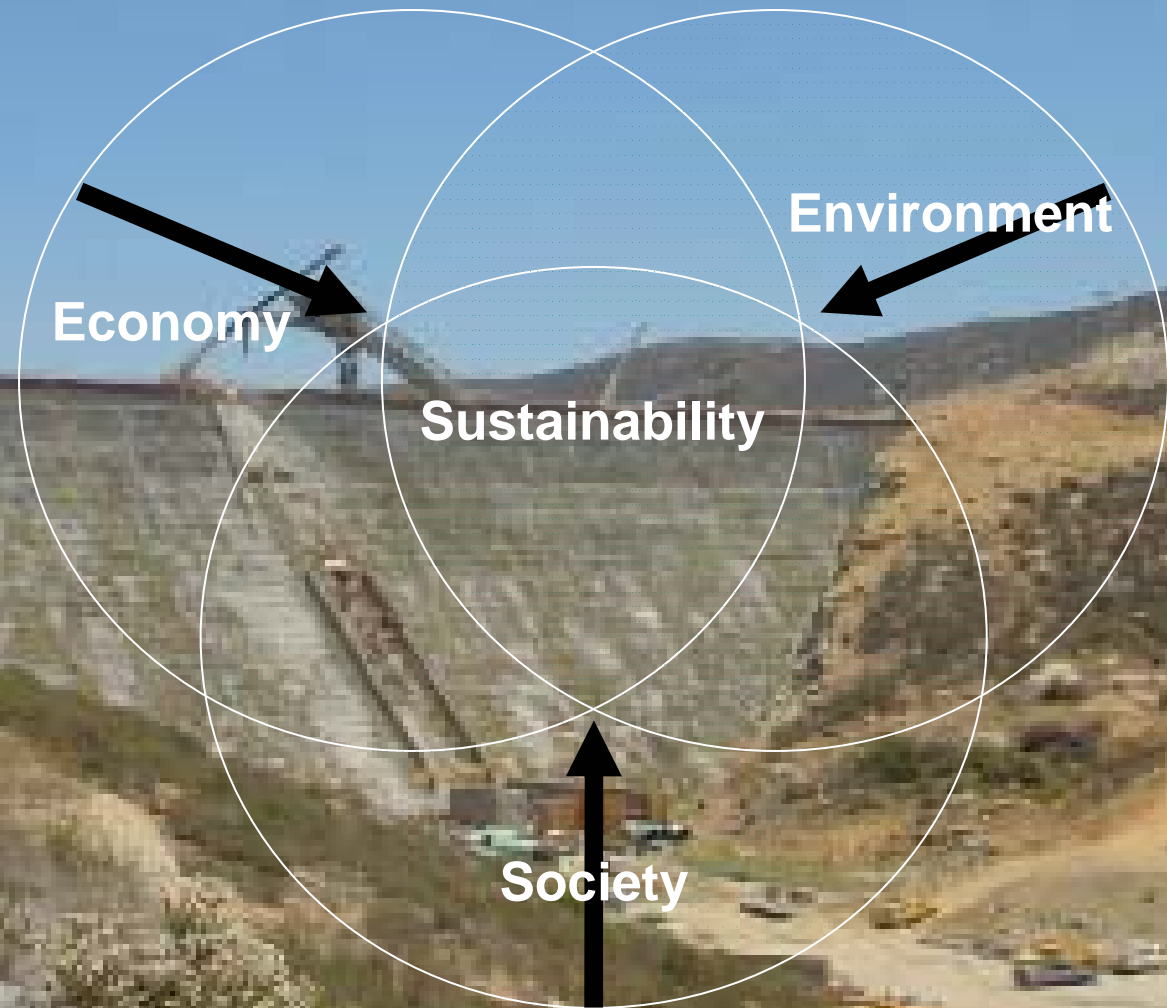
Recent efforts to undermine the value of this resources has affected its progress, especially in developing countries.

Countries that have endorsed hydropower as a renewable resource, such as China, India, Iran, Turkey, and Brazil, continue to develop their projects.

Defining Sustainable Development

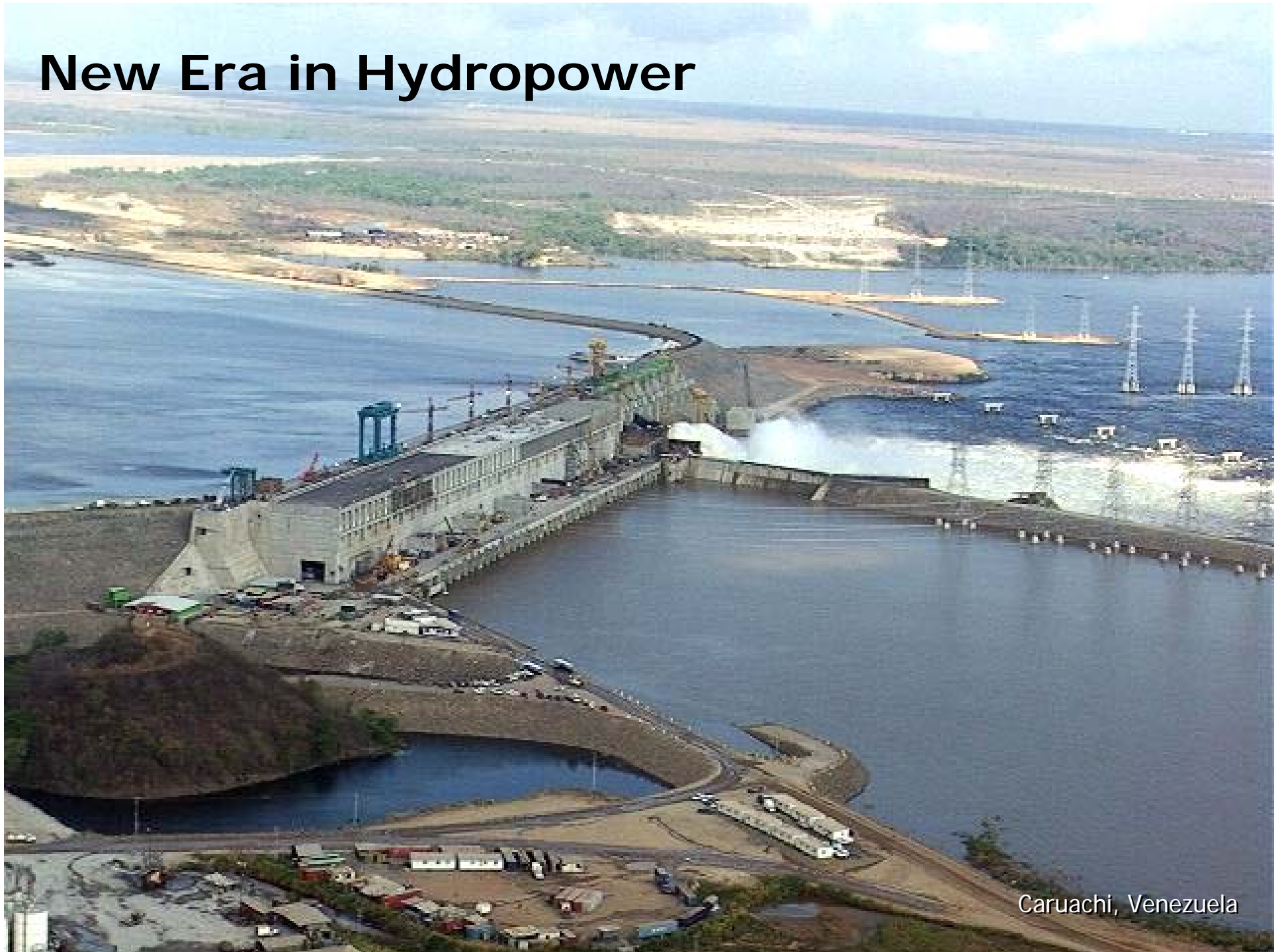
Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs

- Economic development
- Social development
- Environmental protection



Olivenhain, U.S.A.

New Era in Hydropower



Caruachi, Venezuela

Hydropower – A Cornerstone of Sustainable Energy Systems

*International Hydropower Association members are committed to the principles of social responsibility, economic development and environmental protection contained in the IHA's **Sustainability Guidelines**.*



Macagua, Venezuela

Hydropower – A Cornerstone of Sustainable Energy Systems

*International Hydropower Association members are committed to the principles of social responsibility, economic development and environmental protection contained in the IHA's **Sustainability Guidelines**.*

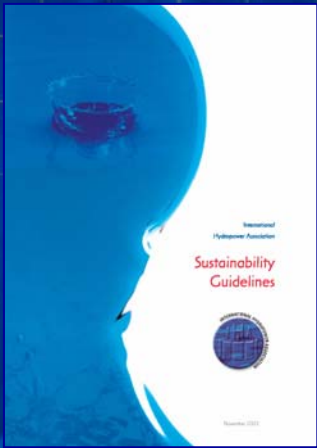
*A **Compliance Protocol** is also being developed to measure the performance of new projects and existing schemes against the requirements of the **Guidelines**.*



Macagua, Venezuela

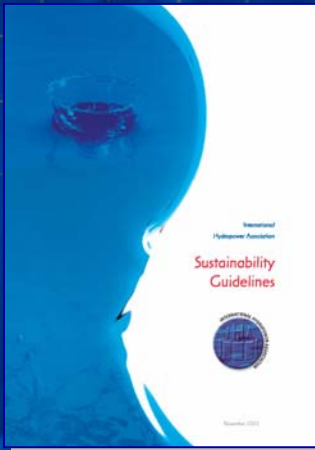
Principles Outlined in the Sustainability Guidelines Span Several Elements

- International Hydropower Association member policy



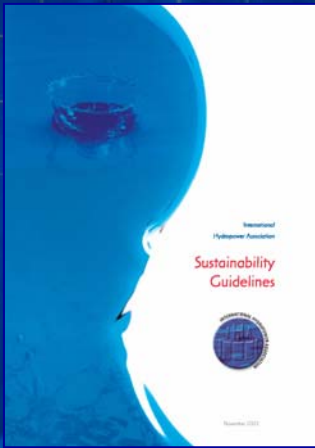
Principles Outlined in the Sustainability Guidelines Span Several Elements

- International Hydropower Association member policy
- The role of governments



Principles Outlined in the Sustainability Guidelines Span Several Elements

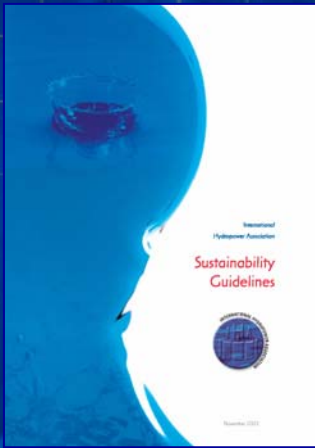
- International Hydropower Association member policy
- The role of governments
- Decision making processes



Principles Outlined in the Sustainability Guidelines Span Several Elements



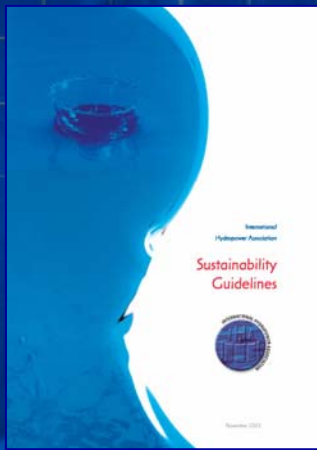
- International Hydropower Association member policy
- The role of governments
- Decision making processes
- Hydropower – environmental aspects of sustainability



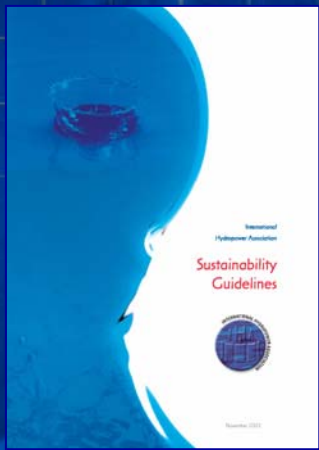
Principles Outlined in the Sustainability Guidelines Span Several Elements



- International Hydropower Association member policy
- The role of governments
- Decision making processes
- Hydropower – environmental aspects of sustainability
- Hydropower – social aspects of sustainability

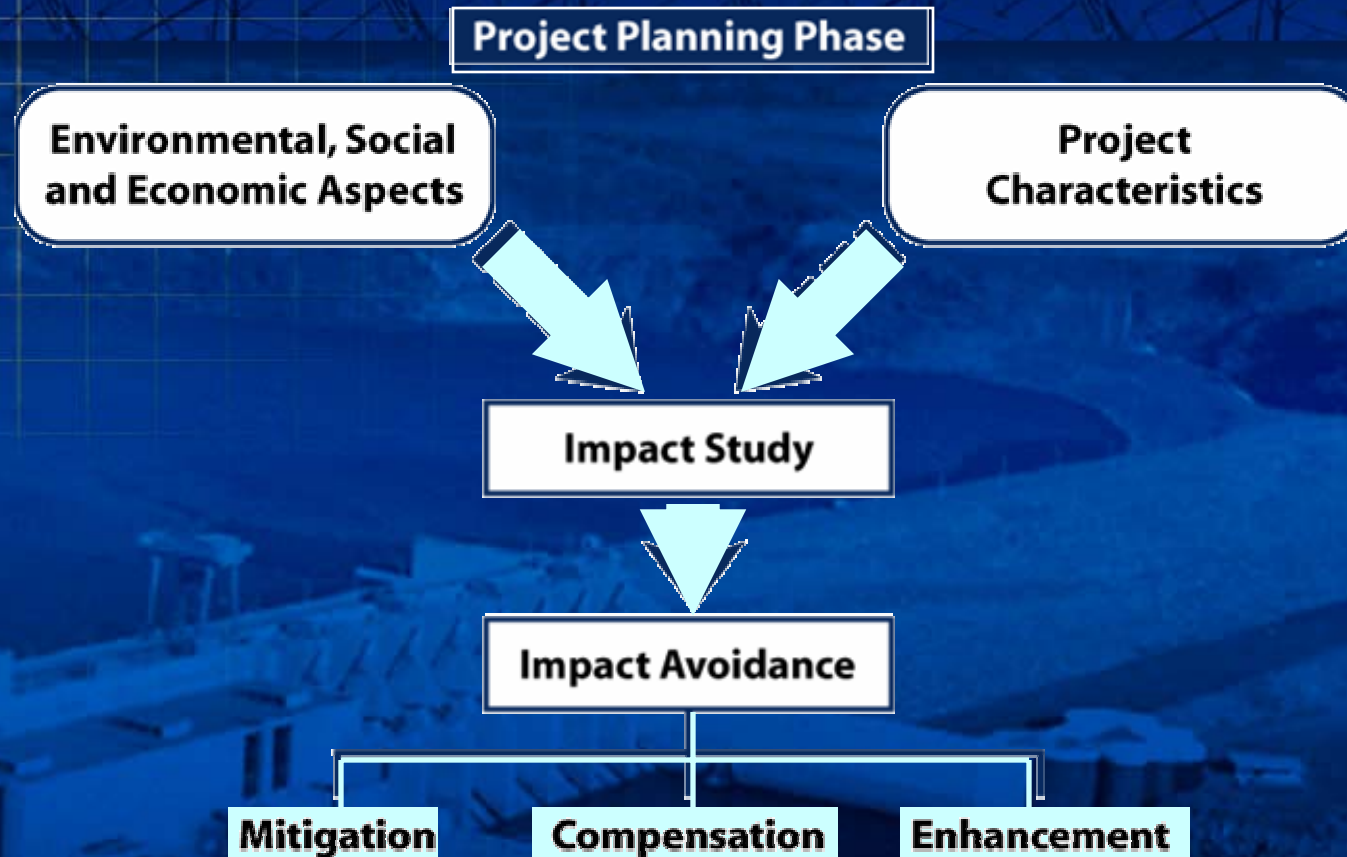


Principles Outlined in the Sustainability Guidelines Span Several Elements



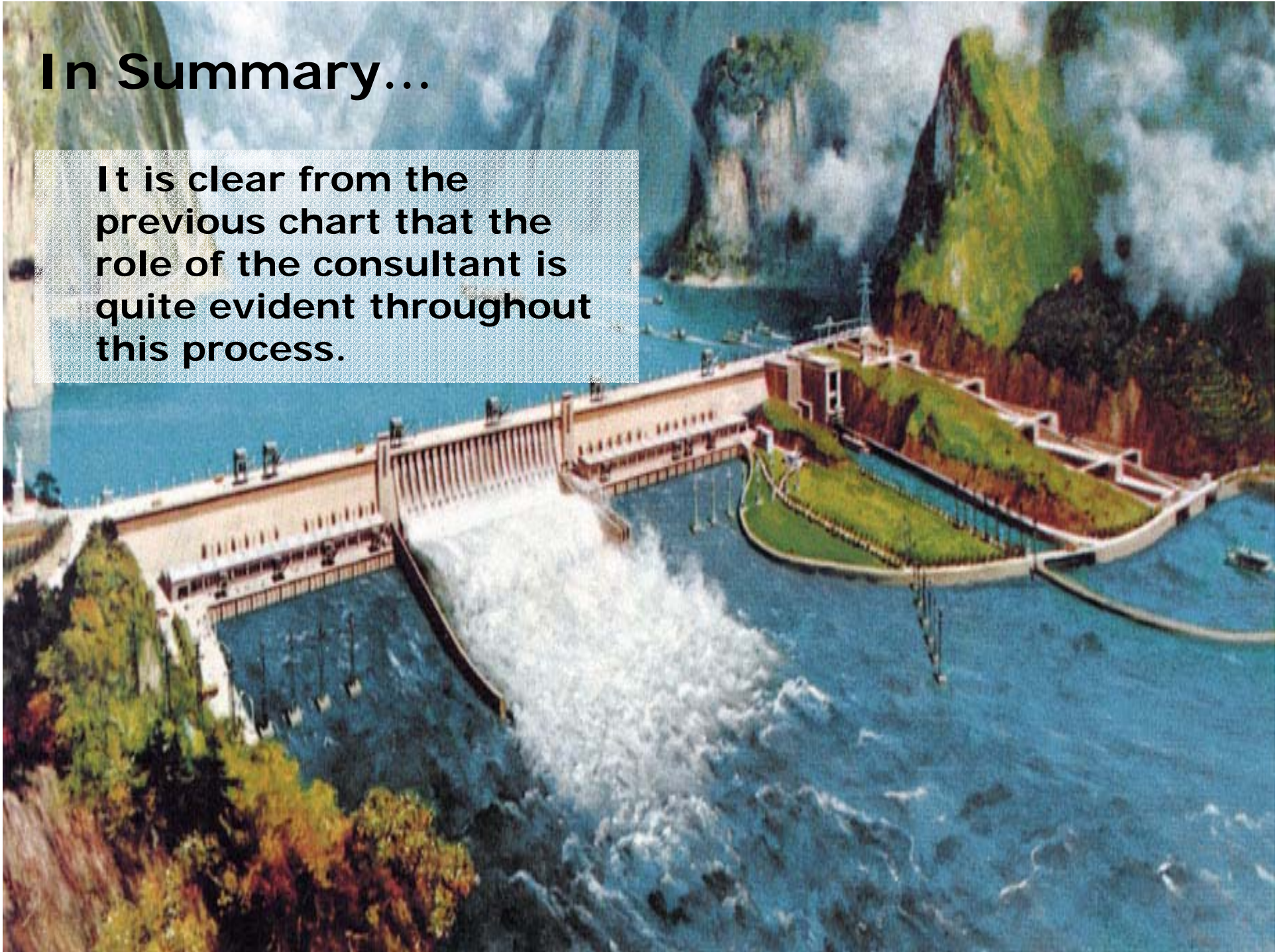
- International Hydropower Association member policy
- The role of governments
- Decision making processes
- Hydropower – environmental aspects of sustainability
- Hydropower – social aspects of sustainability
- Hydropower – economic aspects of sustainability

Basic Components of Impact Management



In Summary...

It is clear from the previous chart that the role of the consultant is quite evident throughout this process.



In Summary...

Managing the planning process within sustainability guidelines is the joint responsibility of the partnering relationship between the project owner, power producer, and their consultant.



In Summary...

The consultant's responsibility is to be proactive and fully engaged throughout all phases of the development to ensure compliance with accepted guidelines.





MWH

Thank You

XQW|psrvk|p#q#k|gusrzh#p#k#wolpab#
Ghymosphow

October 2004

