PARALLEL INTRODUCTION TO MEKONG AND RHONE RIVERS
With common features...

2 international rivers under the influence of flow management upstream
Rhone operated by CNR is nearly 10% of Mekong Basin

Rhône River by CNR (in total):
80 000 km² (95 600 km²)
500 km (810 km)
1500 m³/s (1 650 m³/s)

Mekong River:
795 000 km²
4 500 km
15 000 m³/s
MEKONG AND RHONE BASINS
TWO LARGE RIVERS...

With common features...

High potential for the development of hydropower

Rhône River profile similar to d/s China stretch
With common features...

Same development strategy in LMB => Cascades of multipurpose HPPs
MEKONG AND RHONE BASINS
TWO LARGE RIVERS...

With common features...

Run-of-river multipurpose projects

- No Storage
- All water use
- Sustainability

Environment & Fish pass facilities
14 Navigation locks (330 km nav. way)
19 Run-of-river HPP
32 Pumping station (agriculture)
29 Ports
With common features... and major differences!

<table>
<thead>
<tr>
<th>Rhône River</th>
<th>Mekong River</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>River development</strong></td>
<td><strong>Non-Power Interests</strong></td>
</tr>
<tr>
<td>• One developer: CNR</td>
<td>• Hydropower as an opportunity to develop non-power interests</td>
</tr>
<tr>
<td>• A multipurpose concession</td>
<td>• Final equalization among water uses</td>
</tr>
<tr>
<td>• Consistency of the cascade (design and operation)</td>
<td><strong>International Organization</strong></td>
</tr>
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<td></td>
<td>• Constraints from developers’ perspective</td>
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**Non-Power Interests**

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<td>• Hydropower as an opportunity to develop non-power interests</td>
<td>• Hydropower as first priority</td>
</tr>
<tr>
<td>• Final equalization among water uses</td>
<td>• Xayaburi as a benchmark but consistency still questionable</td>
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**International Organization**

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<td>• No so-called “Rhone River Commission”</td>
<td>• Mekong River Commission</td>
</tr>
<tr>
<td>• Agreement between CNR and other operators (Switzerland and main tributaries)</td>
<td>• China and Myanmar as observers</td>
</tr>
<tr>
<td>• Exchange of information and data</td>
<td>• Room for water diplomacy and knowledge dissemination</td>
</tr>
<tr>
<td>• Co-organization of specific operations (sediment flushing, flood management...)</td>
<td>• Final decisions are up to Member Countries’ Governments</td>
</tr>
</tbody>
</table>
Producing **hydroelectricity**

Developing inland **navigation**

Facilitating **irrigation** for agriculture

**Unique “CNR model”**

⇔

**Financial equalization between 3 missions**

**Design, construction, operation, maintenance, optimization and experience sharing**
CNR: 25 YEARS OF CONTRIBUTION TO MEKONG RIVER DEVELOPMENT
Mekong development based on CNR experience on the Rhone River

Evaluation of the hydropower potential of the Mekong River (1993-1994) on behalf of the Mekong Secretariat

Methodology based on CNR experience of the Rhône River

Recommendations for impact assessment studies

Run-of-river HPP to minimize environmental and social impacts compared to large reservoirs

To-date the reference study for development of the Mekong River
Optimization Study on the flow regulation of 5 HPP Mekong projects northern of Laos on behalf of Government of Lao PDR

Cascade Optimization instead of a project by project optimization

Updating the 1993/94 study and performing additional studies: hydrology, hydraulics modeling, flood mapping, power generation, operating guidelines, ESIA screening…

Implementing environmental, social, technical and economical criteria in order to optimize and propose a manageable operation regime for all 5 projects upstream Vientiane

To-date the reference study for development of Lao upper stretch of the Mekong River
FS review: CNR contribution to design review and improvement

4 issues to address
- Hydrology
- Sediment transportation and hydraulics
- Dam safety
- Navigation

On 4 projects
- Pak Beng
- Pak Lay
- Sanakham
- Phou Ngoy
FS review: same driving principles as on the Rhone River

Reference to international standards
• MRC PDG (final version of August 31st, 2009)
• WB Operational Policy on safety of dams
• ICOLD Bulletins about safety of dams

On-site monitoring as a key for design improvement
• Generally a lack of data in the FS
• Need for accurate site specific data for design and demonstration of the efficiency of the technical solutions proposed by the developer
• Input data useful for both design phase and operation phase

Request of the documentation to be provided by the developer
• Reference to international standards (including PDG)
• Every management plan that is required must be delivered
• Consistent with existing regulation

Design, construction and operation must be given the same importance
• Developers and their design institutes are usually familiar with design and construction.
• Most of the time, there is a need to improve capacity regarding operation, operation preparation before COD and operation of run-of-river HPP in particular.
Sharing CNR extensive know-how about run-of-river HPP operation

Run-of-river concept

- No storage
- No regulation capacity
- What is flowing in is flowing out

- Need to go back to natural flow conditions if all gates opened and power house turned off.
- In particular, need to go back to natural conditions in case of flood event.

- Operation pattern of the project is mandatory and must be consistent with run-of-river concept.

- Need for flow monitoring and forecasting
Contributions to Xayaburi HPP

Xayaburi as a benchmark
• Xayaburi design used as a reference
• Consistency of Mekong cascade design and operation

Main contributions to Xayaburi HPP
• Design improvement (LLO, navigation lock…)
• Sediment study from Chiang Saen to Vientiane
• O&M preparation
• Hydrometeorological Monitoring and Forecasting to optimize flow management and power production
Need for operation coordination and control in Lao PDR

- FS for the development and implementation of a GoL state agency dedicated to the coordination and monitoring of the management of all the multipurpose HPPs implemented in Lao PDR
- Mekong River upstream Vientiane as a first step
- Core functions to address:
  - Integrated water resource management, incl. institutional issues, power and non-power water uses,
  - Safety: dam safety, coordination of flood management, early warning system, water quality, etc.
  - Continuity: sediment management, fish migration follow-up, inland navigation development, etc.
CONCLUDING REMARKS
CNR, as designer, developer and operator of the multipurpose Rhone River cascade in France, has been supporting Lao PDR as GoL Engineer for 25 years.

Major issues at stakes while developing large rivers:

- Run-of-river production is a catalyst for development of large rivers (no storage and no regulation capacity) and an opportunity to develop non power water use:

  - Energy
  - Navigation
  - Agriculture
  - Fresh water
  - Flood management
  - Environment
  - Fish
  - Ports
  - Industry
  - Tourism
  - Green mobility
  - Balancing renewables
  - Climate adaptation

- River Cascade development needs consistency in the design from upstream to downstream and coordination of operation;

- Integrated vision of a whole river is of paramount importance to implement best practices.
ขอบใจสั่งทำความสิ่งใดสิ่งจ่ำบ
ขอบคุณสำหรับความสนใจของคุณ

Cảm ơn vì sự quan tâm của bạn
Thank you for your attention
Merci pour votre attention