Hydropower development: Environmental and Social Impacts

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PRESENTATION OUTLINE

- Overview of hydropower development in Vietnam
- Benefits of hydropower
- Environmental impacts
- Social impacts
- Resettled communities
- Downstream areas
- Roles of stakeholders in decision making process
Benefits of Vietnam hydropower development

- River system: 2360 river with more than 10 kilometres of length
- 9 river system with more than 10,000km2 of basin

- Map VII: increase capacity total from 9,200 MW (2009) to 17,400 MV (2020), accounting for more than 23.1% of 75,000 MW of national electric power

- Map VII and 9 solution groups: electric supplying security, capital, electric price, management, environment, science – technology, human resource, mechanism, effectively electric power using
<table>
<thead>
<tr>
<th>River</th>
<th>Capacity (MW)</th>
<th>Construction ( Nlm - MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Đa</td>
<td>6,800</td>
<td>Hòa Bình (1920), Sơn La (2.400), Lai Châu (1.200)</td>
</tr>
<tr>
<td>Dong Nai</td>
<td>3,000</td>
<td>Trị An (400), ĐN 6, 6A (240),..</td>
</tr>
<tr>
<td>Sesan</td>
<td>2,000</td>
<td>Ialy(720), Sê San3 (260), Sê San4(360), Pleikrong (120),…</td>
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<tr>
<td>Lo - Gam</td>
<td>1,600</td>
<td>Tuyên Quang (342)</td>
</tr>
<tr>
<td>Vu Gia-Thu Bon</td>
<td>1,500</td>
<td>A Vương (210), Đăk Mi 1 (250), Sông Bung (220)</td>
</tr>
<tr>
<td>Ma - Chu</td>
<td>760</td>
<td>Trung Sơn (260)</td>
</tr>
<tr>
<td>Ca</td>
<td>480</td>
<td>Bản Vẽ (320)</td>
</tr>
<tr>
<td>Huong</td>
<td>280</td>
<td>Tạ Trạch (30), Phong Điện</td>
</tr>
<tr>
<td>Ba</td>
<td>550</td>
<td>Ba Hạ (220),..</td>
</tr>
<tr>
<td>Small plant</td>
<td>3,000</td>
<td>…</td>
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Location of building hydropower plants

- High ecological sensitivity: National parks, natural reservation, watershed forests, primeval forests, dangerous terrain, border areas,..
- Long settlement of the ethnic minority: diverse cultural and customs, poor, rely on nature, vulnerable
- Many hydro-electric ladders, lake by lake (Da, Se San, Dong Nai, ..) Form many small hydropower ladders, some of which are dense
(Nguồn: www.vinacold.com)
Benefits of hydropower

Clean and renewable energy
- important power for national energy security
- Contributing to flood resistance for lower basin
- supply water and water regulation for lower basin
- promote socio-economic development of mountainous areas, border areas and ethnic minority
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</thead>
<tbody>
<tr>
<td>Hydropower</td>
<td>21.8</td>
<td>60.4</td>
<td>37.1</td>
<td>23.1</td>
</tr>
<tr>
<td>Coal thermo-electric</td>
<td>16.7</td>
<td>15.4</td>
<td>23.8</td>
<td>48.0</td>
</tr>
<tr>
<td>Oil thermo-electric</td>
<td>16.1</td>
<td>5.6</td>
<td>1.6</td>
<td>-</td>
</tr>
<tr>
<td>Diesel</td>
<td>35.7</td>
<td>11.1</td>
<td>10.8</td>
<td>-</td>
</tr>
<tr>
<td>Gas</td>
<td>9.7</td>
<td>4.5</td>
<td>25.3</td>
<td>16.5</td>
</tr>
</tbody>
</table>

( Nguồn EVN, 2010)
Hydropower and environmental impacts

- Deforestation due to hydropower plants
- Affection on biodiversity conservation
- Loss of productive land, erosion, sedimentation of reservoirs
- Rivers: hydrological changes, loss of water in lower basin, shared basin water
- Negative impacts on aquatic ecosystems
- Water pollution
Deforestation due to hydropower plants

- Areas of construction: important works, sheds, yard waste, dumps, storages, transportation. Lake: the flooded and submerged area
- Resettlement area: housing, infrastructure, land illegal exploitation of wood and forest products
- How much forest to build a work? (16 hectares / 1 MW?)

Does small hydropower plant mean small deforestation?

Long-term effects of deforestation and restoring forests?
Hydropower affects biodiversity

The area of hydropower associated with special – use and protection forest with high biodiversity

There are 119 hydropower plants associated with 47 special – use forest : each natural reservation / national park carries 2.5 hydropower plants (PanNature, 2010)

A natural reservation / national park has several projects : Cat Tien (6 projects), Hoang Lien (5 projects), Song Painting (7 projects), ...

continuous influence to habitat of endangered species both on land and water, conservation corridors

Some small projects were out of planning due harm the national park: River Painting (5), Muong Nhe (11), Dak Rong (TD A Cho), ...
Loss of farmland due to hydropower

- Include: land for cultivation, forest land, industrial trees, gardens, rich soil along rivers, ponds, and land for cattle and poultry
  
  Loss of land: up and down of dam (Ho moong for cultivation commune has about 900 households, 4537 people completely loss rice land for cultivation, which is equivalent to 7 months of food self-sufficiency)

- Irrigation, create land for compensate people: inefficient.
  
  up the dam: land for 2 crops converting to submerged land

- Down the dam: land for 2 crops converting to land for 1 crop or completely lost

  Loss of industrial trees, gardens, and income of households
Hydropower affects on river

- Changing hydrological system, the flow of the river basin flood discharge damages to lower basin (Ba Ha-2010, Nam war 2009 - 2010), ..
- Loss of freshwater resources for production activities (A Vuong, Dak Mi-Da Nang, Quang Nam); An Khe Ka Nak (An Khe, Gia Lai Bang-K), ...
- Aquatic ecosystems: fish and aquatic creatures, aquatic vegetables, ...
- Water pollution: Lake (fish, upstream pollution ...) and lower basin (rock, sediment and pollution from the lake, ..)
Hydropower increases social problems

- Affect on livelihoods: people of resettlement, people in lower basin, ..
- Traditional culture of ethnic minority
- Social evils: alcohol, karaoke, traffic violations, ...
- Loss of local knowledge: general cultivation, upland farming, indigenous genetic resources, medicinal plants and folk remedies, ..
- Education and public health
- Social conflict
Disadvantages of resettlement areas

- Bad preparation of resettlement
- Lack of productive land, especially land for cultivation (Pleikrong, Huong Hoa, drawings, ...)
- Compensation is not enough, bad land, new reclaimed land, water shortages, ..
- Lack of gardens, toilets, cages, ponds, forest gardens, ..

Water and sanitation
- Continuously impact on forest resources and forest land in new residential
- Resettlement after resettlement due to hydropower ladder 'tank by tank'
Disadvantages under of dam

Impact caused by flood: operating procedures of lakes and lake by lake? inform the flood drop, response of the residents Loss of productive land
Loss of fish resource and aquaculture products
Loss of water supplying for daily life Water pollution
Partners analysis

- Agency approving the project: National Assembly, Government, Ministries, provincial People's Committee
- The investor-EVN - electric management boards; Enterprises, ..
- Providers of capital: WB, ADB, Vietnam Bank
- Field Unit: contractors / subcontractors, professional consultants and supervision consultants
- Local authority: People's Committee at all levels and departments
- Independent consultations, civil society organizations
Community and the people
Discussion

- Responsibility, authority and observation of approval, the evaluation of projects / works
  Clearly define the responsibilities and the combination of investors, project management board, local authority
  Management by law: SEA and EIA? Public and monitor environmental management plan .. at all stages of the project
- The position and capacity of professional consultants: EIA report
  Join of community: how to hold community consultation?
- Responsibility of banks to the sustainable development of projects
- Institution Building (mechanism and fund organizations)
- Review and supervision of the independent consulting organizations, NGOs, .. in the process of decision-making, construction and operation of hydropower projects.
THANK YOU FOR YOUR ATTENTION