Karun 3
Dam and Hydroelectric Powerplant

University of Hawai‘i – CEE 491
Group Presentation 4
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Overview

- Description of Infrastructure Project
- Magnitude and Costs
- Social and Economic Benefits
- Environmental & Technical Issues and Technical Innovations
- Social & Cultural Challenges
Location
Description/Background

- Hydroelectric dam on Karun River
- Help with national energy needs
- Provide flood control
- Opened in 2005
Magnitudes & Costs
Magnitudes

- Concrete double arch
- 205 m high from foundation
- 29.5 m wide at base, 5.5 m at crest
- 462 m crest length
- 1.3 million cubic meters of concrete
- Eight 250 M.W. generators
- Handle 15,000 meters cubed per second PMF
Costs

- Initial estimated cost of $750 million
- Was reduced to $382 million
- Annual revenue of about $200 million
- Average annual electric power generation of 4137 GWH
Social and Economic Benefits
Social & Economic Benefits

- **Electricity Generation**
  - 64% of Region uses electricity
  - Clean electricity
  - Considered essential for any level of sustainability to any region.
Social & Economic Benefits

- Employment Opportunities
  - Karun 3 employed 5,000 people
  - New Mines were located
    - Vital for construction industry
    - Can be utilized in future
Comparison of Employment and Existing Activities in Affected Areas

<table>
<thead>
<tr>
<th>Description</th>
<th>Employment(%)</th>
<th>Activity(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submerged or affected Villages</td>
<td>37</td>
<td>67</td>
</tr>
<tr>
<td>Villages of the Province</td>
<td>40</td>
<td>80</td>
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</tbody>
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Social & Economic Benefits

- **Flood Control**
  - Dam reservoirs help to control floods
  - Mitigate high peak discharges
  - Provides safer environment for livestock
  - Allows more fertile farming land
Social & Economic Benefits

- Increase in tourism
  - Dam provides different types of activities
    - Bungee jumping
    - Tours
Environmental & Technical Issues and Technical Innovations
Environmental & Technical Issues and Technical Innovations

- Dam built in a rugged, rocky & seismic area
- Constructed on sedimentary, limestone and calcareous marl strata
- Grouting was the most complicating task in building the dam
- 8 turbine units, each with the capacity of 250 (M.W)
- Produces 2965 GWH of energy annually
- Flow rate compensation orifices were designed at the middle altitude of dam body to prevent damage to river bed
Before and After Images of Karun River
Social & Cultural Challenges
Social & Cultural Challenges

- Iran’s cultural heritage washed away from local government dam building programs
  - Iran Cultural Heritage Organisation (ICHTO)
  - Iran’s historic Shaloo Bridge submerged
  - 18 sites from the Epipaleolithic period (20,000-10,000 BC), including 13 caves and four rockshelters discovered during one month archeological survey in late 2004
  - River valley rich in rock-carved reliefs, graves, ancient caves and other remains from the Elamite era (2700BC- 645BC) many of which are now underwater
...Thank You...