



SYEIP Project Main Conclusions & Recommendations

Final Presentation
5th-6th December 2006, AFESD offices Kuwait



SYEIP – Objectives

Objective of Economic Study

- Evaluate the power & Energy exchange between both countries
- Evaluate the reliability improvement for both systems
- First evaluation of the interconnection capacity and the commissioning year
- Cost/Benefits analysis

SYEIP – Objectives

Objective of Technical Study

- Evaluation and comparison of technical alternatives to interconnect the electrical grids of the Republic of Yemen and of the Southern area of the Kingdom of Saudi Arabia

Comparison of technical alternatives

Evaluation/confirmation of the transfer capacity

Static Analysis

Dynamic Analysis

- Define the functional specification and the routing of the interconnection line

SYEIP – Conclusions

Selected Solution

- Interconnection between Bani Hoshis (Yemen) and Kudmi (Saudi Arabia)

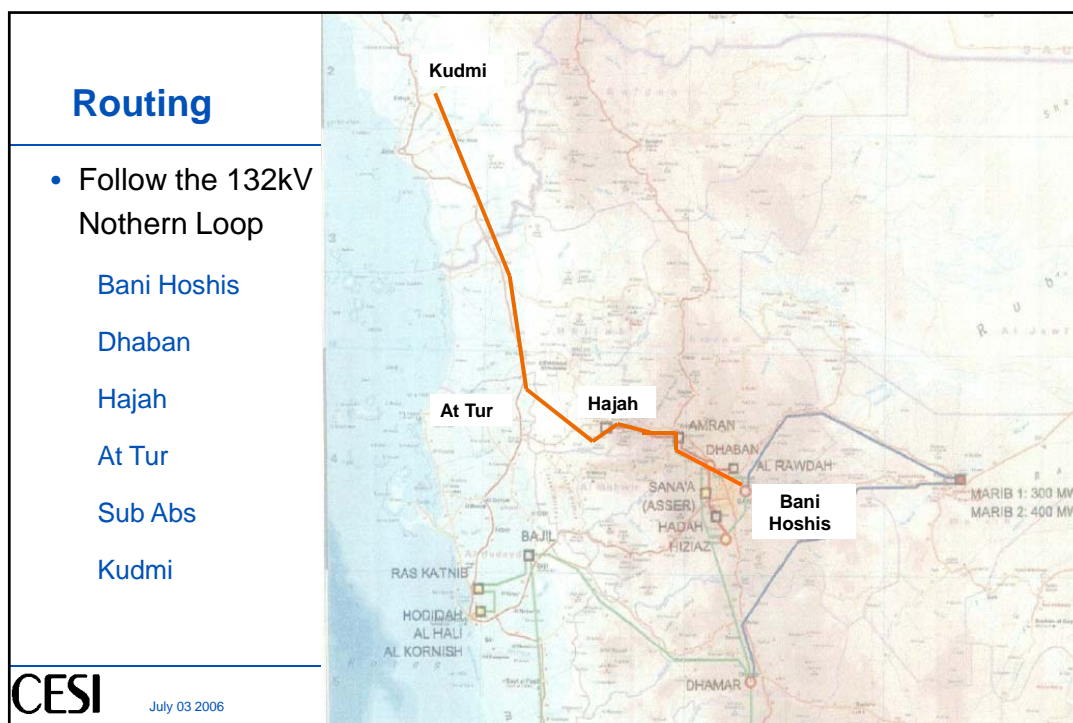
- 2009

First BtB Station of 250 MVA at Kudmi

400kV between Bani Hoshis and Kudmi

- 2013

Second BtB Station of 250 MVA at Kudmi



SYEIP - Selected Solution

- Pre-requisites
 - New power plant in Mabrar available from 2013 (800 MW)
 - New 400 kV double circuit line from Bani Hoshish to Mabrar required from 2013 to guarantee adequate corridors
 - Special Defence Actions to be installed (including Power/Frequency capacity of the link)
- Advantages
 - Reinforcement of Northern Loop
 - Central location of Yemeni border substation
 - Possibility to increase the capacity of the interconnection (up to 3x250 MW) at the horizon 2015-2020

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Technical Study

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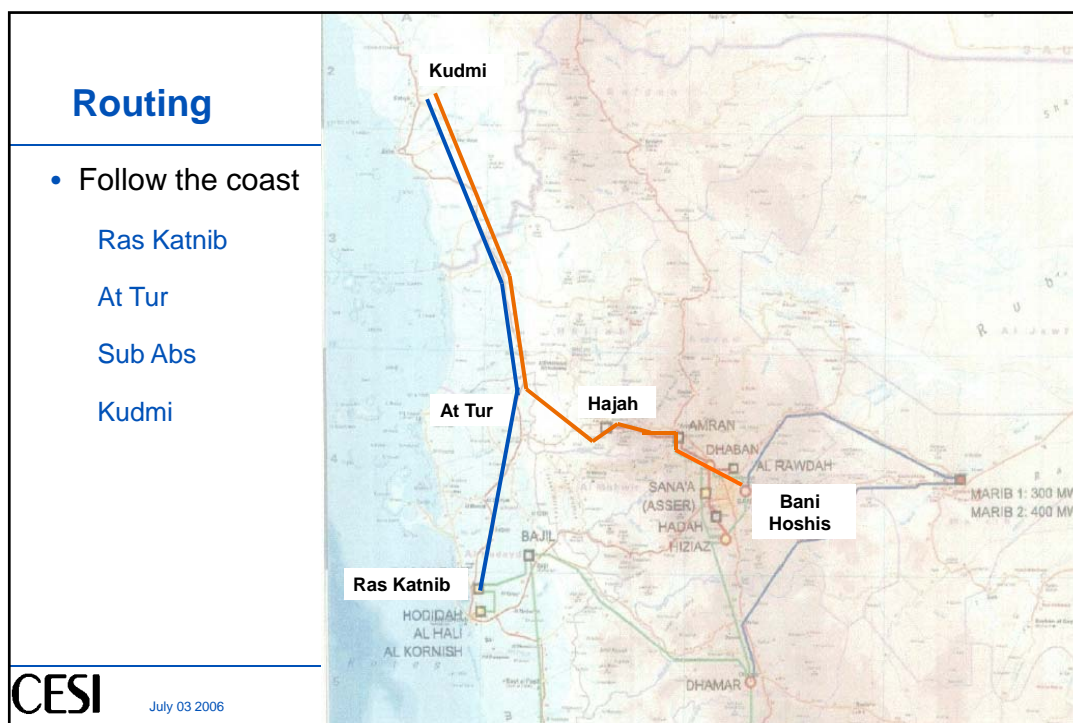
SYEIP – Cost/ Benefits Analysis

- Investment & Operating Costs : 372 M\$
- IRR of 15%, PBP of 7 Years
- Net Present Value : 209 M\$
- Massive exportation from Yemen to Saudi Arabia
- Revenues mainly due to energy exchanges and explained by the difference in primary energy (Gas in Yemen and crude oil in SOA)

SYEIP – Other possible alternative

Interconnection between Ras Katnib (Yemen) and Kudmi (Saudi Arabia)

- 2009
 - First BtB Station of 500 MVA at Kudmi
 - 400kV between Ras Katnib and Kudmi
- 2013
 - Second BtB Station of 500 MVA at Kudmi



SYEIP – Other possible alternative

- Pre-requisites (2009):
 - East-West Gas pipeline in Yemen
 - New 400 kV double circuit line from Bani Hoshish to Ras Katnib
 - New CCGT power plant in Ras Katnib
- This solution is **not** selected

Due to the uncertainties relevant to the investments (mainly gas pipeline to Ras Katnib and consequently the CCGTs)

The interconnection would be too far from other Yemeni Power Plant (Mabar, Marib) in Mabar

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SYEIP – Conclusions & Recommendations

- Strong technical & Economic justifications of Yemen- Saudi Arabia Interconnection
- Fair repartition of Benefits between Countries
- Requirement of an ambitious generation expansion plan in Yemen
- Building process to be launched as soon as possible