The Development of a Gas Fired Thermal Power Facility at Sheberghan: Key Stakeholder Workshop 10 July 2005

Introduction and Overview
Interaction of MMI and MEW
SHEBERGHAN GAS FIRED THERMAL POWER STATION

Site Selection
Main Determinants of Project Feasibility

- CERTAINTY of Power on by end of 2007
- Integration with other infrastructure improvements
- Commercial opportunities from waste stream
- Most efficient use of donor funds
Relevant Infrastructure

- Gas supply
- Gas treatment
- Power transmission
- Water supply
- Accessible transportation
Site Assessment Categories

- Availability and suitability of land
- Transmission grid connection considerations
- Water supply
- Fuel supply
- Construction cost factors
- Provision of civil facilities and site development
- Environmental considerations
- Social considerations
- Safety and security considerations
- Operations and maintenance
- Risk considerations
- Economics
Candidate Sites: Locality
Site 1: Gerquduq
Site 2: Khoja Gogerdak
Site 3: Qarakent
Site 4: Sheberghan City
Site 5: MMI Fertilizer Plant, Mazar-e-Sharif
Site 6: Mazar-e-Sharif Substation
Candidate Sites: Descriptive

- **Site 1**, at Gerquduq in the vicinity of the existing DABM substation and the Afghan Gas Company well field and processing facility.
- **Site 2**, at Khoja Gogerdak adjacent to the Afghan Gas Company well field and processing facility.
- **Site 3**, at Qarakent, in the vicinity of the existing water pumping station, which supplies potable water to Sheberghan City and the Afghan Gas Company assets at Gerquduk and Khoja Gogerdak.
- **Site 4**, on the Eastern outskirts of Sheberghan City, on land identified as a potential industrial zone.
- **Site 5**, adjacent to the Ministry of Mines and Industry fertilizer plant at Qala Jangi, near Mazar-e-Sharif.
- **Site 6**, adjacent to the existing DABM substation at Mazar-e-Sharif.
Selection Methodology

- Identify selection elements across 12 assessment categories
- Rank each site for each of 79 selection elements
- Apply an importance weighting to each element within each assessment category
- Determine a weighted average score for each site, with the best site having the highest score
- Apply different weightings to assessment categories to achieve 5 project outcomes
- Assess influence of assessment category weightings on overall site rankings
- Check sensitivity of site ranking to assessment category weighting ratios
Feasibility Study Recommendation: Site 1, Gerquduq

- Close to existing gas transmission and collection infrastructure, conveniently located with respect to undeveloped fields
- Close to existing transmission grid infrastructure
- Highly secure water supply from Qarakent
- Government owned land
- No new easement requirements for gas or water supplies
- No land use conflict
- Land has little economic or environmental opportunity cost
- Impact of emissions on community and ecology expected to be minimal
Major Differentiating Characteristics of Gerquduq Site

- Proximity to suitable fuel source
- Proximity to existing power transmission assets
- No conflicting land utilisation
- Simplistic land ownership/easement issues
Sheberghan Area, Gerquduq, Khoja Gogerdak
Gas Reserves
Northern Transmission System

HRT-NBD = 52 km (plus river crossing approx 1 km)
KLM-NBD = 25 km
MZR-NBD = 24 km
KLM-PUL = 140 km
Mazar-e-Sharif Substation (Existing)
NBD New Switching Station (near Hairatan road turn-off)
HRT River Crossing Towers at Hairatan (Existing)
KLM Khulm Substation (Existing Site)
PUL Pul-e-Khumri Substation (Existing Site)

Proposed 220 kV Circuit 1 150 MVA
Proposed 220 kV Circuit 2 150 MVA
Proposed 220 kV Circuit 1 300 MVA
Proposed 220 kV Circuit 2 300 MVA

Existing Lines

Mazar-e-Sharif Substation (Existing)
Sheberghan (Gerquduq) Substation (Existing Site)
Sarepul Substation (Existing Site)
AKY Andkhoy Substation (Existing Site)

TUK-AKY = 37 km (plus 8 km to Zerno Sub)
AKY-SHB = 72 km
SHB-MZR = xx0 km
SHB-SPL = 60 km
MZR-Mazar-e-Sharif Substation (Existing)
SHB Sheberghan (Gerquduq) Substation (Existing Site)
SPL Sarepul Substation (Existing Site)
AKY Andkhoy Substation (Existing Site)

Proposed new alignment, basically parallel and adjacent with main road.
Alignment near the Gorge, needs to be confirmed.
Existing PI poles

Proposed 110 kV Circuit 2

Existing 110 kV Lines

Line was only partially constructed in this section.

TUK
Turkmenistan

Andkhoy
AKY

Sheberghan (Gerquduq)
SHB

Mazar-e-Sharif

MZR

SHB-MZ

Mazar-e-Sharif

MZR

SPL
Sarepul

Maimana

MMA

TUK-AKY

AKY-SHB

SHB-MZR

SHB-SPL

MZR-Mazar-e-Sharif

SHB Sheberghan (Gerquduq) Substation (Existing Site)
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Existing 110 kV Lines

NOT TO SCALE

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Alignment near the Gorge, needs to be confirmed.
Existing PI poles

Proposed 110 kV Circuit 2

Existing 110 kV Lines

Line was only partially constructed in this section.
Gas Processing
Water Supply
Site 2, Khoja Gogerdak: Site 1, Gerquduq

- Land suitable but slightly more valuable for agriculture
- Longer supply lines for water and power transmission
- Gas supply situation similar, but further for transmission of Gerquduq gas
- Construction and site development costs slightly higher
- Environmental and social outcomes similar
- Slightly inferior safety and security situation due to greater remoteness from population centre
- Identical operations and maintenance situation
- Risk situation similar
- Economic outcomes similar if gas treatment for power plant is co-located with power plant
Site 3, Qarakent: Site 1, Gerquduq

- Significant utilisation of surrounding land, land ownership to be resolved
- Slightly longer supply line for power transmission
- Closest to water pumping station
- Less favorable site for co-location of gas treatment
- Slightly less favorable construction cost and site development situation
- Less favorable environmental situation due to proximity of plant to existing activities
- Unfavorable social impacts associated with conflicting land use
- Similar safety and security situation
- Identical operations and maintenance situation
- Unfavorable schedule risk arising from land procurement issues
- Similar economic situation excluding compensation costs for displacement of existing land users
Site 4, Sheberghan City: Site 1, Gerquduq

- Suitable land identified but availability not certain, new easements required for gas and water
- Transmission connection will come close to existing built up areas
- Potential conflicting use if ground water drawn from site for station use
- Similar construction cost and site development situation
- Less favorable environmental situation due to proximity of plant to populated area
- Similar social situation, land procurement issues excepted
- Slightly more favorable security situation due to proximity of plant to populated area
- Slightly more favorable operations and maintenance situation due to proximity of plant to populated area
- Unfavorable schedule risk due to land procurement and easement issues
- Slightly less favorable economics, especially if gas treatment plant is remote from power plant
Site 5, Mazar-e-Sharif fertilizer plant: Site 1, Gerquduq

- Less favorable land availability and suitability
- Longer supply line required for power transmission
- Slightly less favorable water supply security situation, potential surface water source
- Unfavorable gas supply situation, 90km of pipeline refurbishment required
- Similar construction cost and site development situation
- Slightly less favorable environmental situation due to plant proximity to a populated area
- Similar social impact situation
- Similar security situation
- Slightly more favorable operations and maintenance situation due to plant proximity to populated area
- Unfavorable schedule risk due to length of gas pipeline refurbishment
Site 6, Mazar-e-Sharif substation: Site 1, Gerquduq

- Less favorable land suitability due to proximity of populated area
- Identical power transmission situation
- Unfavorable water supply security and potential usage conflicts
- Unfavorable gas supply situation, approximately 120km of pipeline refurbishment and new pipeline required
- Similar construction cost and site development situation
- Unfavorable environmental situation due to proximity of plant to populated areas
- Less favorable social situation due to potential land use conflicts
- Less favorable security situation due to gas line vulnerability
- Similar operations and maintenance situation
- Unfavorable schedule risk due to extent of pipeline work and potential land ownership delays
- Unfavorable economics due to cost of pipeline works, lost efficiency with gas treatment remote from power plant