The Development of a Gas Fired Thermal Power Facility at Sheberghan: 07 July 2005 Workshop

Session 1 Presentation

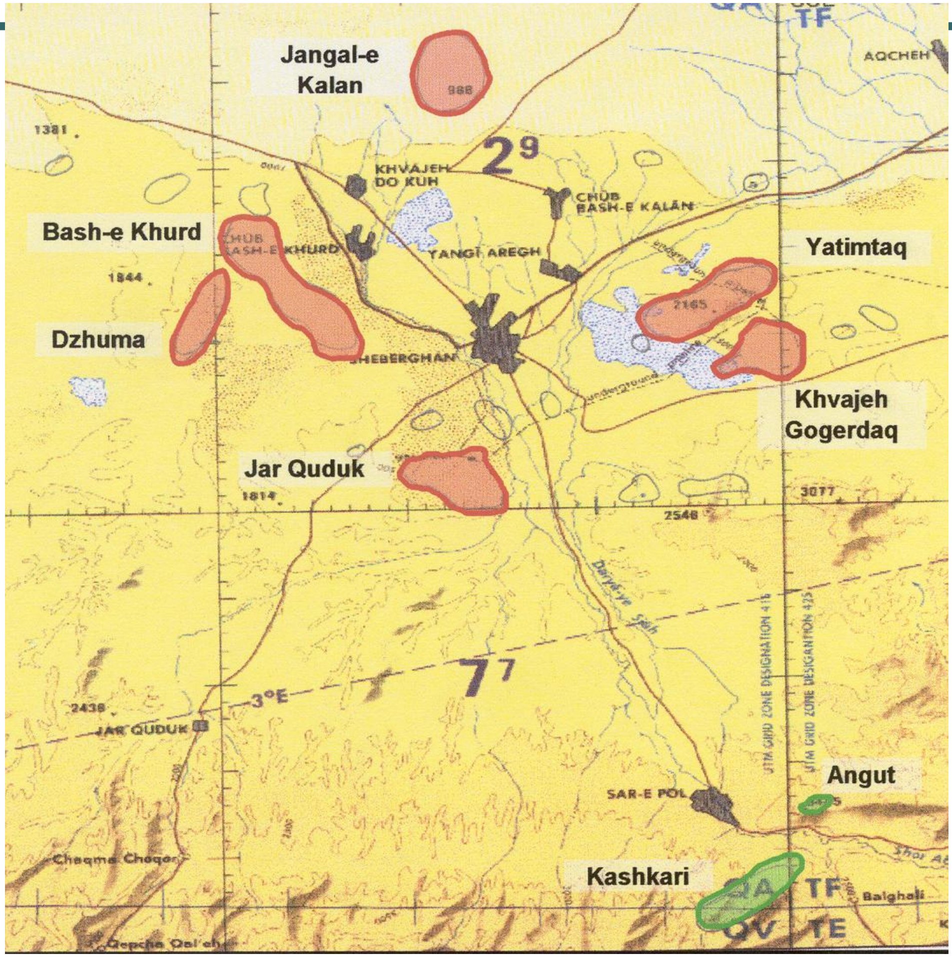
Review of Project Scope

Sheberghan Power Project

- Main Purpose of Study
  - Gas Assessment
  - Site Selection
  - Technology Selection
  - Power Plant Engineering
  - Environmental Impact
  - Development Schedule

Sheberghan Power Project
Gas Assessment

- Need to Complete by 1Q 2007 to support Sheberghan Project
- Initial field remediation at Jerquduq; location of power plant.
  - Sample and test relevant wells for composition and calorific value
  - Undertake deferred maintenance program



Jangal-e Kalan
Bash-e Khurd
Dzhuma
Yatimtaq
Khvajeh Gogerdaq
Jar Quduk
Angut
Kashkari
KHVAJEH DO KUH
CHUB BASH-E KALAN
CHUB BASH-E KHURD
YANGI AREGH
SHEBERGHAN
JAR QUDUK
SAR-E POL
AQCHEH
Balghali
Chaqma Choqor

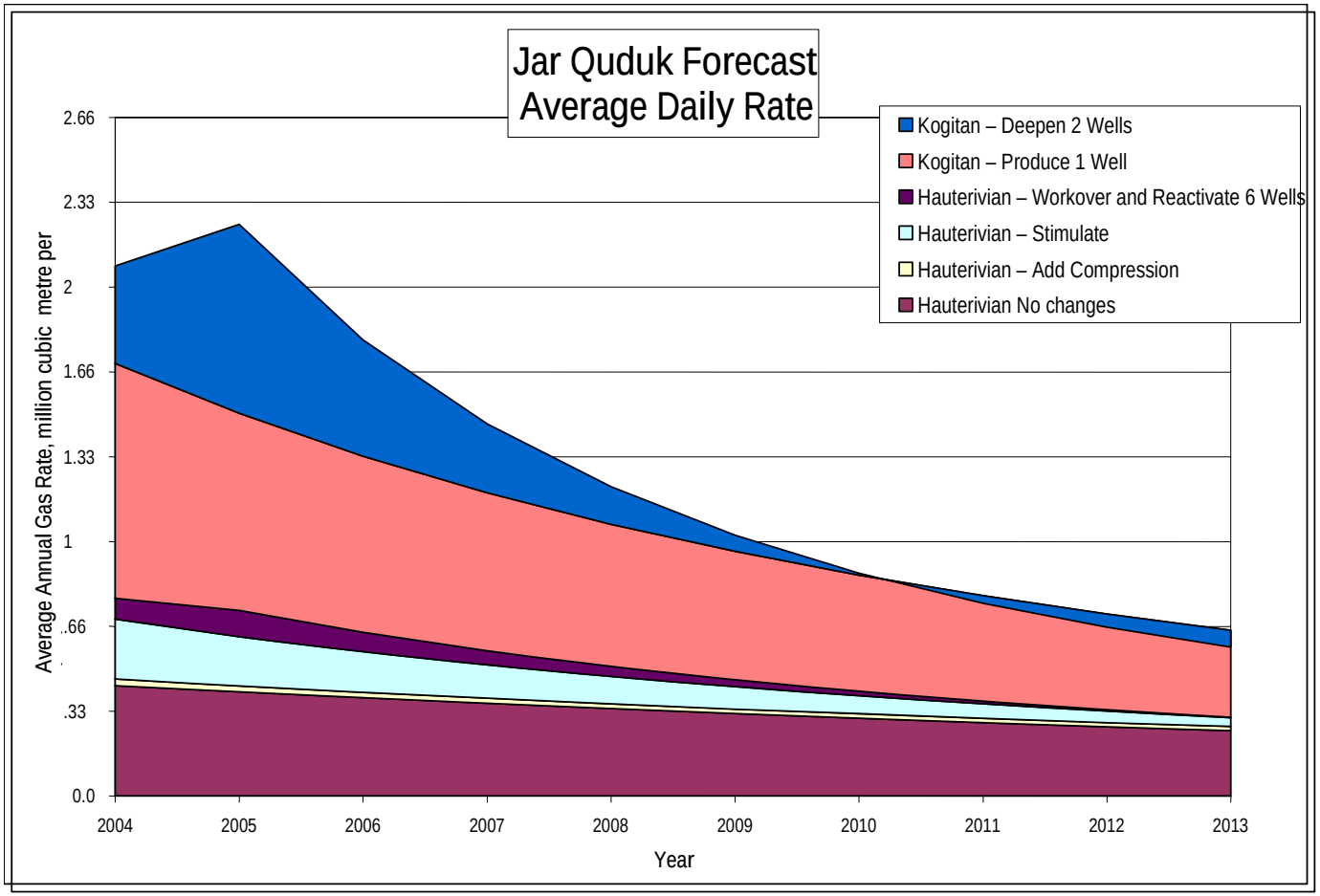
Gas Related Project Issues

Overview of Gas Supply

Age	Formation	Gerquduq	Gogerdak	Yatimtaq
Cretaceous	Albian	?	exploited	No data
Cretaceous	Aptian	?	exploited	No data
Cretaceous	Hautvarian	exploited	exploited	No data
Jurassic (Sour)	Kogitan	58 wells not exploited	6 wells not exploited	No data

Gerquduq Forecast

Gustavson and Associates April 2004



Overview of Gas demand (SCMD)

Figures from May 2003 ADB report unless noted	2005	2008	Future
Domestic and commercial	220,000	220,000	384,000
Fertiliser incl embedded Power Station at 35% output	360,000	0-1,000,000	0-1,000,000
Lost Gas	250,000	?	?
105 MWe Power Facility (ref AEAI report)	0	600,000	600,000
Total	830,000	820,000+	984,000+

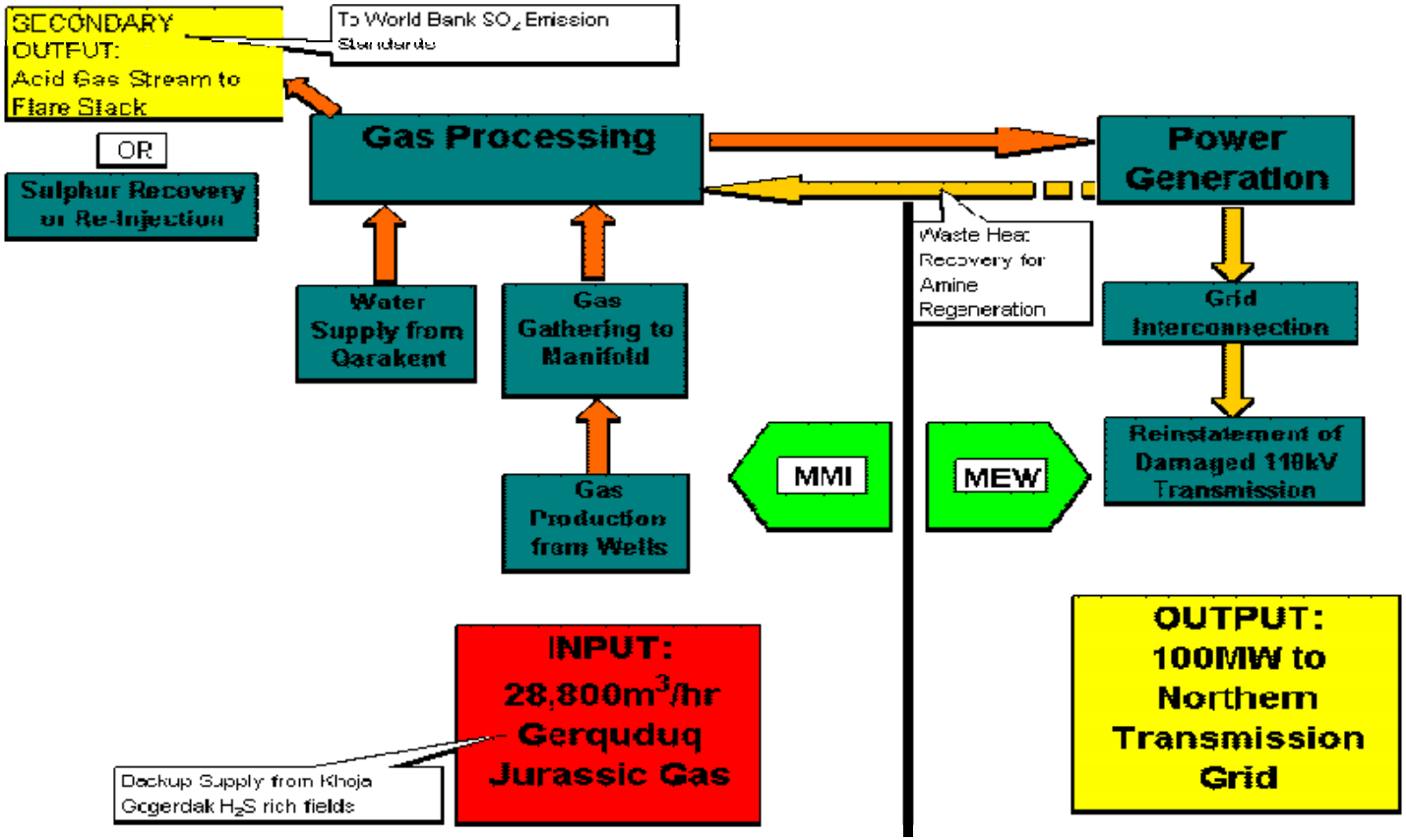
Power Station Gas Demand

- Creditworthy Large Volume Consumer
- 4.3 Billion M3 over 20 years
- Low H2S gas (<300ppm)
- Dehydrated to 100mg/m3
- CO2 no requirement

Role of MMI

- Gas Extraction and Gathering
- Gas Processing (H_2S removal and dehydration)
- Delivery of Gas to Power Station Gate at Contracted Specification

Interaction of MMI and MEW



Contract Options

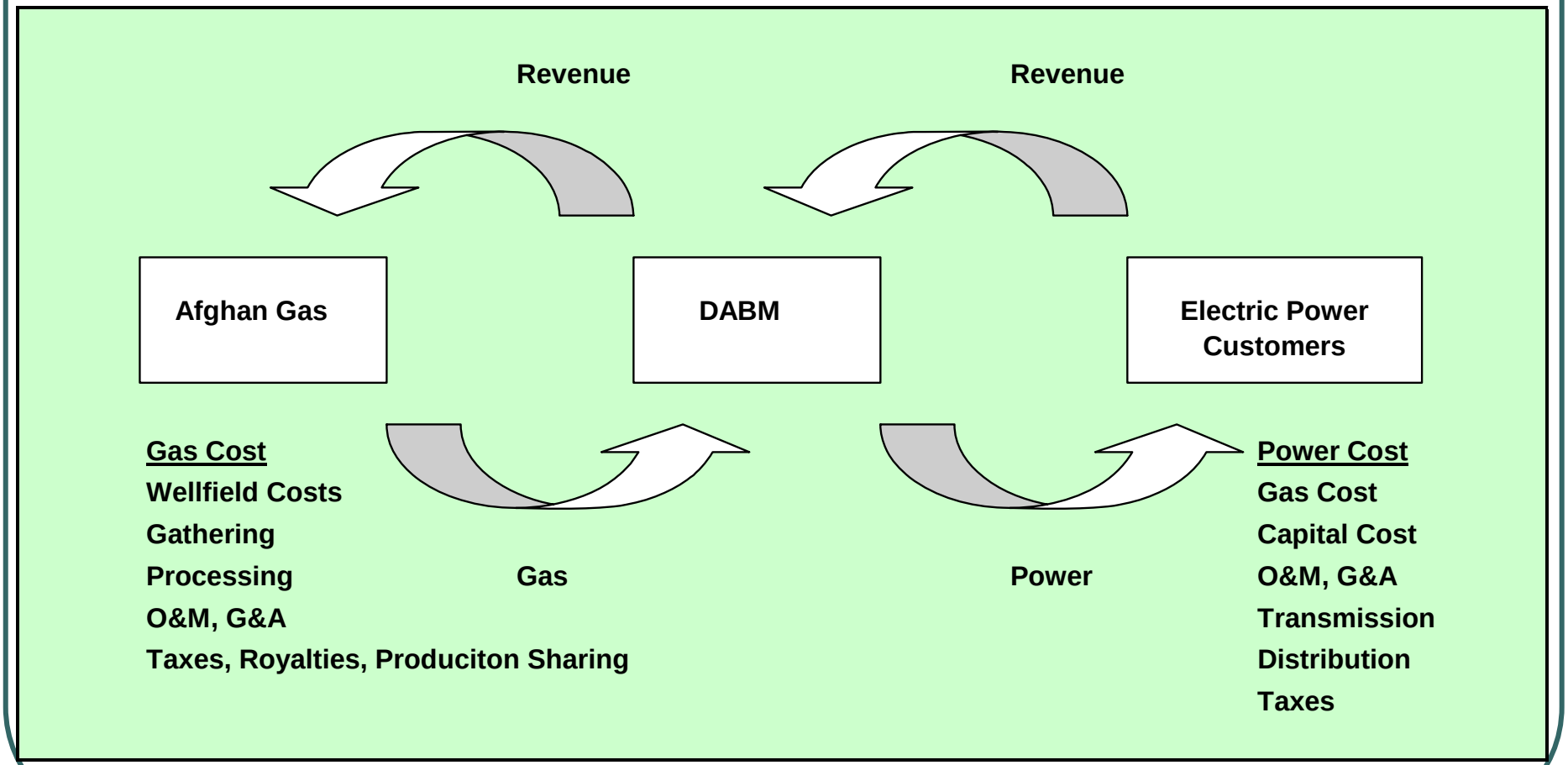
Employment Aspects

- Construction Period
- Permanent Staff
- Training Commitments

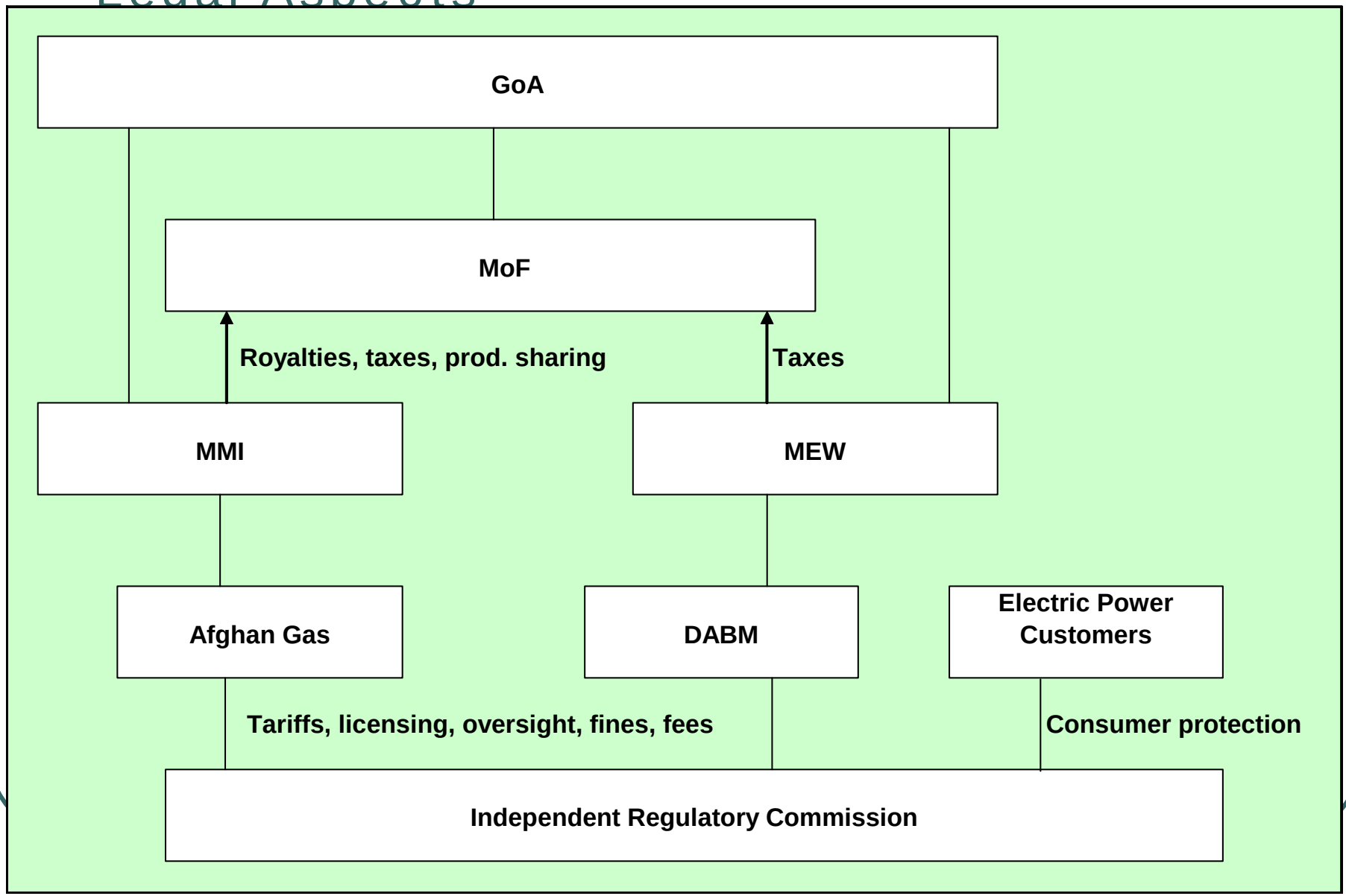
Environmental Aspects

- Emissions to Air
- Water Resource Management
- Easement Requirements

Financial Aspects



Legal Aspects



Project Design and Operation

- Role of MMI
  - Strategic
  - Operations
- Overall project management
  - QC
  - Decision-making
- Allocation of tasks to public or private
- Employment and environment issues

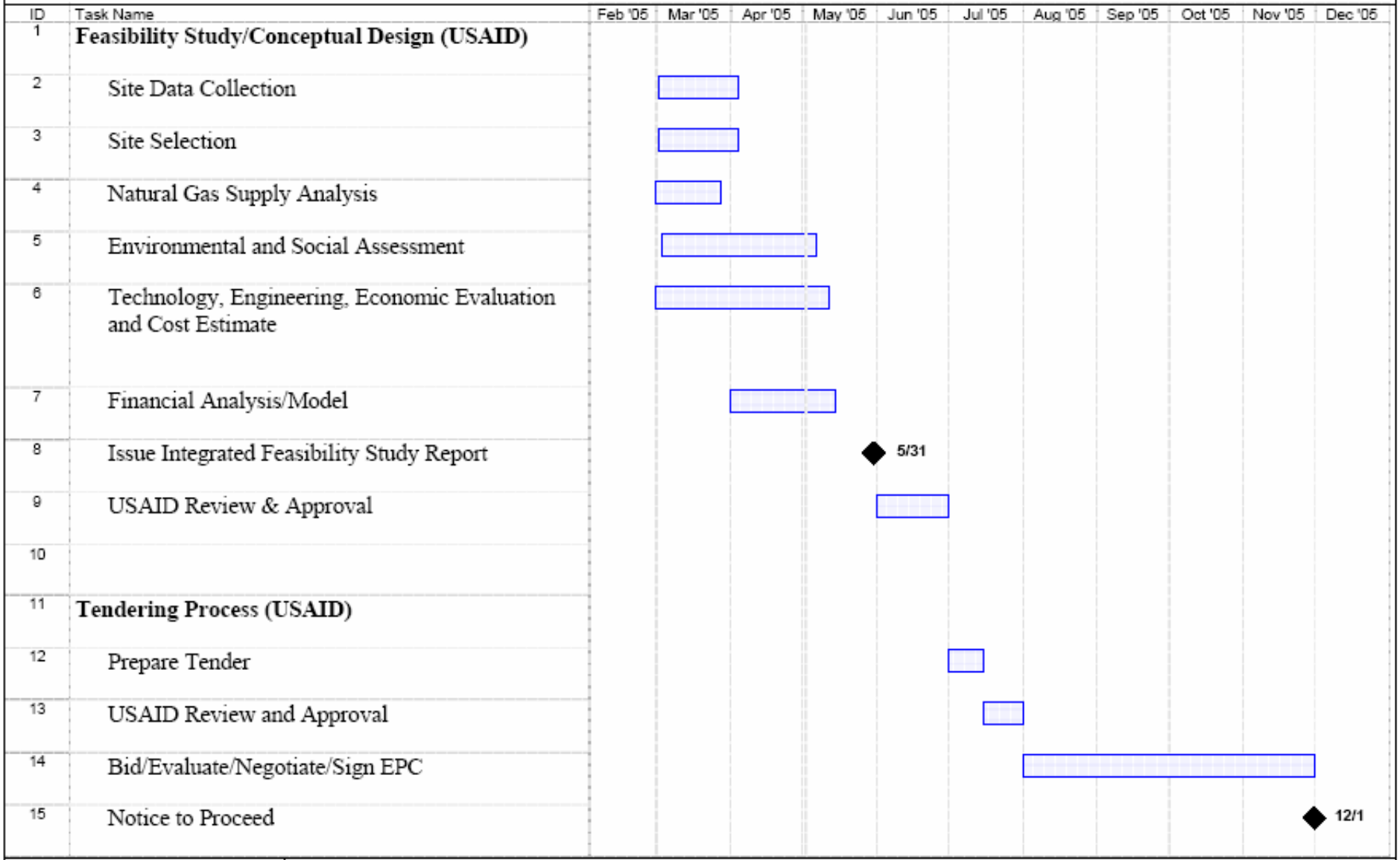
Project Staging

- Physical project
  - Timeline
  - Major risks/obstacles
- Institutional support required
  - Near-term facilitation of construction
  - Needed for transfer to Afghan operation
    - Energy law
    - Commercialization
    - Regulation
    - Social safety net

Next Steps

- Big pieces and funding
- Gaps, need to fund, study
- Working group: responsibilities, who, what
- PIU, responsibilities, who, what
- Information exchange, management
- Pledge of goodwill

Sheberghan Power Project



Project: Sheberghan Schedule (incl. E
Date: Mon 5/2/05

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Technical Issues

Well Identification

- Gerquduq Jurassic Kogitan
  - Well 21 already completed
    - flow tested at 300,000 m3/day
  - Gustavson recommends completion / deepening of wells 76 and 77 into Kogitan
  - Total flow up to 1,000,000 SCM per day from 3 wells from day 1

Is 3 wells enough?

- What if this reservoir has problems?
- Production will fall, how quickly?
- Mobilisation costs?
- We need a backup fuel supply for the power station.

Power Facility Backup Fuel Supply

- Khojo Gogerdak Jurassic Kogitan
  - 6 wells drilled
  - High Sulphur
  - 10 BCM reserves.
  - Requires Some repairs to existing pipelines to Gerquduq

Well Rehabilation

- Gerquduq - well 21, minimal work already connected
- Gerquduq - well 76/76 requires completion into Jurassic
- Khojo Gogerdak - well 3 minimal work already tested
- Khojo Gogerdak - wells 9,40,41,42,43 to be perforated and flow tested

Gas Field Development

- Gas Field Management requires continual investment
- Reservoir management plans
- Strategy for power facility is to target low value Sour gas reservoirs.
- Rehabilitation of other reservoirs will need to be funded from Income generated

Transport Development

- Khojo Gogerdak Backup fuel supply
- Field Flowlines
- Gas gathering to Gas Conditioning

Enabling Issues

Gas Production Costs

- World Bank minimum cost
  - Exploration and development of undeveloped fields
  - Rehabilation of developed cretaceous reservoirs
  - Depletion premium for Sour Gas (low value)
  - Cost of production (minimal)
  - Gas Treatment
  - Transmission (N/a through the fence)
  - Distribution (N/A through the fence)
  - Taxes/ royalties?
  - Future expansion?

Gas Processing Cost

Power Facility only 691,000 m3/day

- Total US$30MM

- 1,000,000 m3/day
  - Total US$36MM

- 1,500,000 m3/day
  - Total US$41MM

Options for Project Design

Gas Quality Required

	Raw Gas	Load 1 Power	Load 2 Domesti	Load 3 Fert
H2S	1800-7000 ppm	300ppm	4ppm	300ppm
CO2	8.8%	<10%	<4%	<10%
Water	3800 mg/m3	100 mg/m3	100 mg/m3	100 mg/m3

Technology Advantages

Gas Engines	CCGT
No Water use	Lower O&M costs
Quicker Schedule	Efficiency advantage for large unit size
Higher Availability	
Lower Capex	
More Local Involvement	

Power Station Cost

excludes contingency, indirects and owners costs

No off	Size MWe	Technology	Equipment supply US$MM	Installation US$MM	Directs US$MM
16	6.57	Engines	54	19	73
6	17	CCGT	77.4	23.6	111
1 (2+1)	130	CCGT S206B	73.3	30.7	104
1 (1+1)	106	CCGT S106FA	60.5	25	85.5

Sheberghan Power Project
Site Selection

- Six Sites Considered
  1- Jerquduq Gas Field
  2- Koja Gogerdak Gas Field
  3- Qarakent Pumping Station
  4- Eastern Outskirts of Sheberghan
  5- Adjacent to Fertilizer Plant @ Mazar-e-Sharif
  6- Adjacent to DABM Substation @ Mazar-e-Sharif

Sheberghan Power Project