



# **Clean Coal Partnership Program**

**September 16 – 19, 2008**

## An Overview of Afghanistan's Energy Sector

- Population = 23 Million
- Operating Capacity = 460 MW\*
- Energy Production = 1.6 Million MWh\*\*
- DABM Customers = 543,333
- Number in Kabul = 181,726 (33%)

\* Compares to 1 million MW in US. Afghanistan would need 170 times existing generation to equal US capacity on a per capita basis.

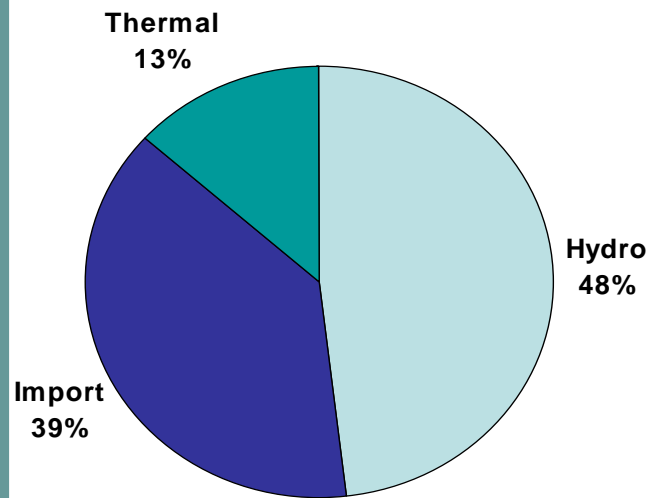
\*\*Equates to one 25 Watt bulb per person six hours/day for year.



## An Overview of Afghanistan's Energy Sector

- Power availability is crucial for development
- Urban households, 10-12% have access to electricity
- Rural areas
  - Majority of households rely on non-renewable biomass
  - App. 0.5% have access to electricity through MHP/solar system generated power
  - ANDS reports 25% of rural areas will be electrified by 2012
- Population has access to power at 18.50 to 19.25 KWH per capita

## Sources of Afghan Energy Production (2007)\*



Available potential in Afghanistan:

- Hydro:23000MW
- Coal :514 -525MW
- N Gas :350 -500MW
- Oil : 125 -300MW

\*DABM production (excludes private generation).

# Summary of Afghan Generation Capacity

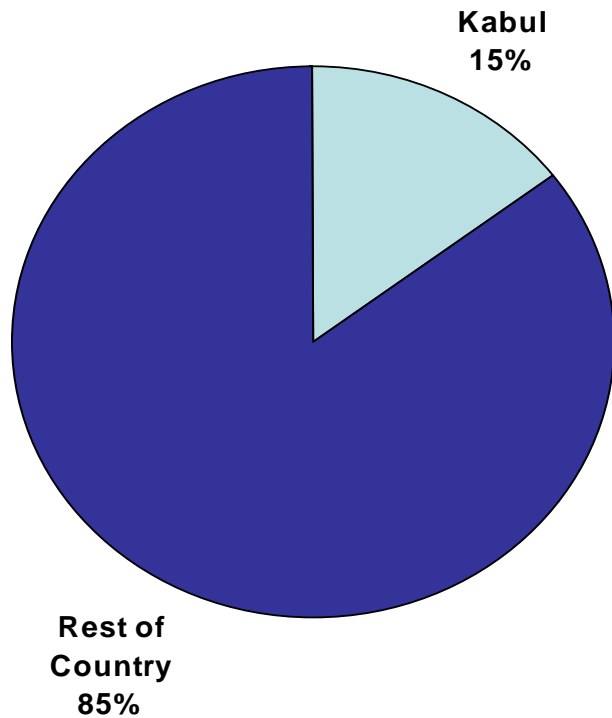
## Summary of Afghan Generation Capacity

|                             | Capacity (MW)    |                  |
|-----------------------------|------------------|------------------|
|                             | <u>Installed</u> | <u>Operating</u> |
| <b>Grid-Connected</b>       |                  |                  |
| Hydro                       | 304.6            | 172.4            |
| Thermal                     | 101.2            | 63.0             |
| Diesel Generators           | 32.8             | 32.8             |
| Imports                     | 220.5            | 96.0             |
| <b>Subtotal Grid =</b>      | <b>659.1</b>     | <b>364.2</b>     |
| <b>Off-Grid*</b>            |                  |                  |
| Micro Hydro                 | 14.8             | 14.8             |
| Diesel Generators--Off-Grid | 86.2             | 82.7             |
| Solar                       | 0.7              | 0.7              |
| <b>Subtotal Off-Grid =</b>  | <b>101.7</b>     | <b>98.2</b>      |
| <b>Total =</b>              | <b>760.8</b>     | <b>462.3</b>     |

\*Off-grid is defined here as capacity that is not connected to a substation or transmission line.

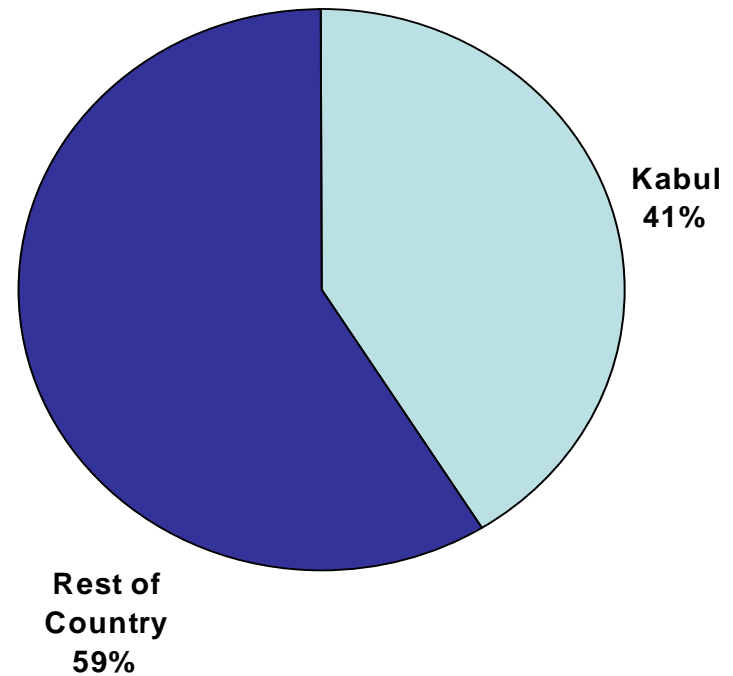
# Energy Consumption is Concentrated in Kabul

## Population (Million)



Total = 23.0 Million

## Energy Consumption (MWh)



Total = 1.6 Million MWh



## **Energy Challenges in Afghanistan**

- **85% of population relies on traditional fuels to meet energy needs, leading to serious deforestation and environmental degradation.**
- **Only 12% of population has access to electricity today. Compare with 12% in 1980 and down to only 4% in 2002. (use only 18 kwh/capita annually, one of world's lowest)**
- **Power infrastructure severely damaged by years of war**
- **Energy institutions weak - shortage of trained energy workforce**
- **Limited financial resources – High Utility (DABM) losses (60%)**
- **Conditions for private investment lacking**



## **Renewable and alternate Energy Initiative**

- **Majority of households rely on non-renewable biomass**
- **App. 0.5% have access to electricity through MHP( 14.8 MW) and solar systems (0.7 MW) generated power**
- **ANDS reports 25% of rural areas will be electrified by 2012**
- **Solar and Wind resources have been mapped**
  - **Afghanistan averages 300 days sun shine per year**

## Current Natural Resources

- Natural Gas (mainly located at north), estimated 120 billion m<sup>3</sup>:
  - **Jarqodoq**
  - **Yatemtaq**
  - **Bashikurd**
  - **Khoja Gogerdaq**
  - **Jangalikalán**



## Current Natural Resources

- Coal Mines:
  - **Sabzak**, located at west
  - **Darai Soof**, located at north
  - **Saighan Ashposhta**, located at north
  - **Karkar – Dodkash**, located at north
  - **Nahreen**, located at north



## Current Natural Resources

- A total of 67 deposits of coal has been discovered.
- 400MMT of proven and more than 2 trillion tons of coal ,having an energy of 4500 – 9000KK/Kg. has been anticipated.
- In this year 300,000 tons of coal is being produced by Government and Private sectors.
- During next 3 years will increase to 1.5MMT.
- Resorting to electricity production from coal.



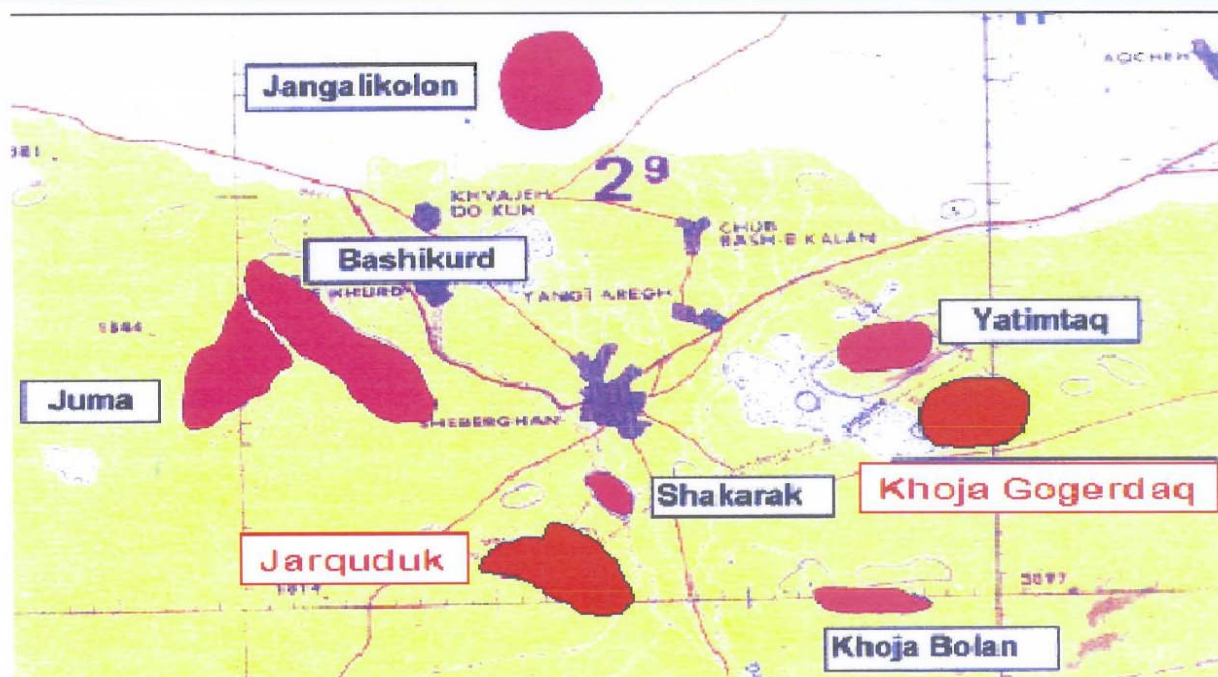
## Current Natural Resources

- Undiscovered gas reserves are 444 billion m<sup>3</sup>
- Undiscovered oil reserves are 219 MMT.
- Undiscovered liquid gas condensate reserves range from 20 million m<sup>3</sup> to 206.7 million m<sup>3</sup>



# Renewable and alternate Energy Initiative

## Sherberghan Gas Fields



Infrastructure and Rehabilitation Program (IRP)



## Current Natural Resources

- Major Oil Reservoirs of North and NW, 45 million ton:
  - Angut
  - Aqdarya
  - Bazari Kami
  - Qashqari
  - Zamrudsai
  - Ali Gul



## Government policy advocacy in development of energy resources

- Mine law has been passed
- Private sector involvement and encouragement in exploitation of mines via bidding process
- Necessary facilities to local and international investors
  - Free market investment
  - Low tax to encourage investor
  - Given priority to energy sector



## Expectations from the workshop

- Share ideas and thoughts with other South Asia countries in regard to natural resources
- Learn more about exploitation of mines and to be familiar with new technology used by India
- Utilization of coal mine for production of power and other industries

A tropical sunset scene with palm trees silhouetted against a colorful sky and a calm sea. The sky is filled with soft, golden light from the setting sun, with scattered clouds catching the light. The palm trees are dark against the bright sky, and their reflections are visible in the water. The overall mood is peaceful and serene.

Thank You !