

**Natural Resources GP**

# **Evaluating Natural Resources, the case of Afghanistan: Rare Earths to Renewables**

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**Natural Resources GP**

**Consulting Services**

**Evaluating Natural Resources, the case of Afghanistan: Rare Earths to Renewables**

**Evaluating the potential of**

- **A country**
- **Its' mineral resources**
- **Its' energy resources, esp. renewables**
- **Energy and minerals are closely linked**

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### Evaluating the potential of a country

- **Weber's Pyramid of Needs: Priority of 'higher-order' considerations: health and safety, environment, corporate social responsibility?**
- **Competitiveness: World Bank report 'Doing Business In...' ... *See next slides***

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## When is a country attractive for FDI?...

- **Investment: in stocks, in physical plant**
- **Western companies & funds [Norway!] vs. Chinese criteria**
- **Funding for Junior Companies : Sources of equity finance, IPO & AIM, valuation of projects, role of joint ventures, case histories**
- **Tax & Company Structure : tax models, taxation agreements, carry forward provisions, royalties, depreciation allowances, management accounts & audits**
- **Resources**
- **Competitiveness**

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**...When is a country attractive for FDI?...**

- **Competitiveness**
- **Basic indicators: GDP, Population, GDP per capita, GDP as a share of world GDP**
- **Institutions: Strength of investor protection**
- **Infrastructure: airlines, fixed telephone lines, mobile telephone subscriptions**
- **Macroeconomic environment: Government budget balance, National savings rate, Inflation, Interest rate spread, Government debt, Country credit rating**

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### **...When is a country attractive for FDI?**

- **Health and primary education, eg Infant mortality, Life expectancy, Primary education enrollment**
- **Higher education and training, Secondary & Tertiary enrollment rate**
- **Goods market efficiency**
- **Total tax rate**

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## Energy and Minerals are closely linked

- **most energy: product of extractive industry [coal, oil, gas, uranium]**
- **minerals and metals used in energy production: essential [Fe, Cu, Al, refractories...] or critical [RE]**
- **energy supply generates demand for minerals...**
- *[Green energy: emphasis not on bulk extraction and shipping but on processing and chemistry]*
- **...and vice-versa: minerals/metals production needs energy...**
- **...hence, energy saving is a serious concern in minerals/metals production**
- **Greenhouse gases**

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## Evaluating the potential of a country's mineral resources

### – Case study: rare earths [RE] NR study

- methodology: geological records>exploration>feasibility study>financing - proven vs. rumored; +geological vs. economically exploitable: JORC etc diagrams, excessive emphasis on quantity alone contributed to the demise of the Soviet empire
- market: Afgh. could increase, int'l could experience downturn
- infrastructure
- financing: presently a serious difficulty -- internationally
- hype is unnecessary: RE
- relocation from EU to Afgh.? → GHG certificates



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**Evaluating the potential of a country's energy resources, especially renewables: biomass, wind, solar, hydro; no nuclear!**

### **Methodology**

- +biomass availability**
- +wind maps and measurements**
- +solar maps**
- +hydro measurements**
- +GHG certificates???**

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## **The case of Afghanistan**

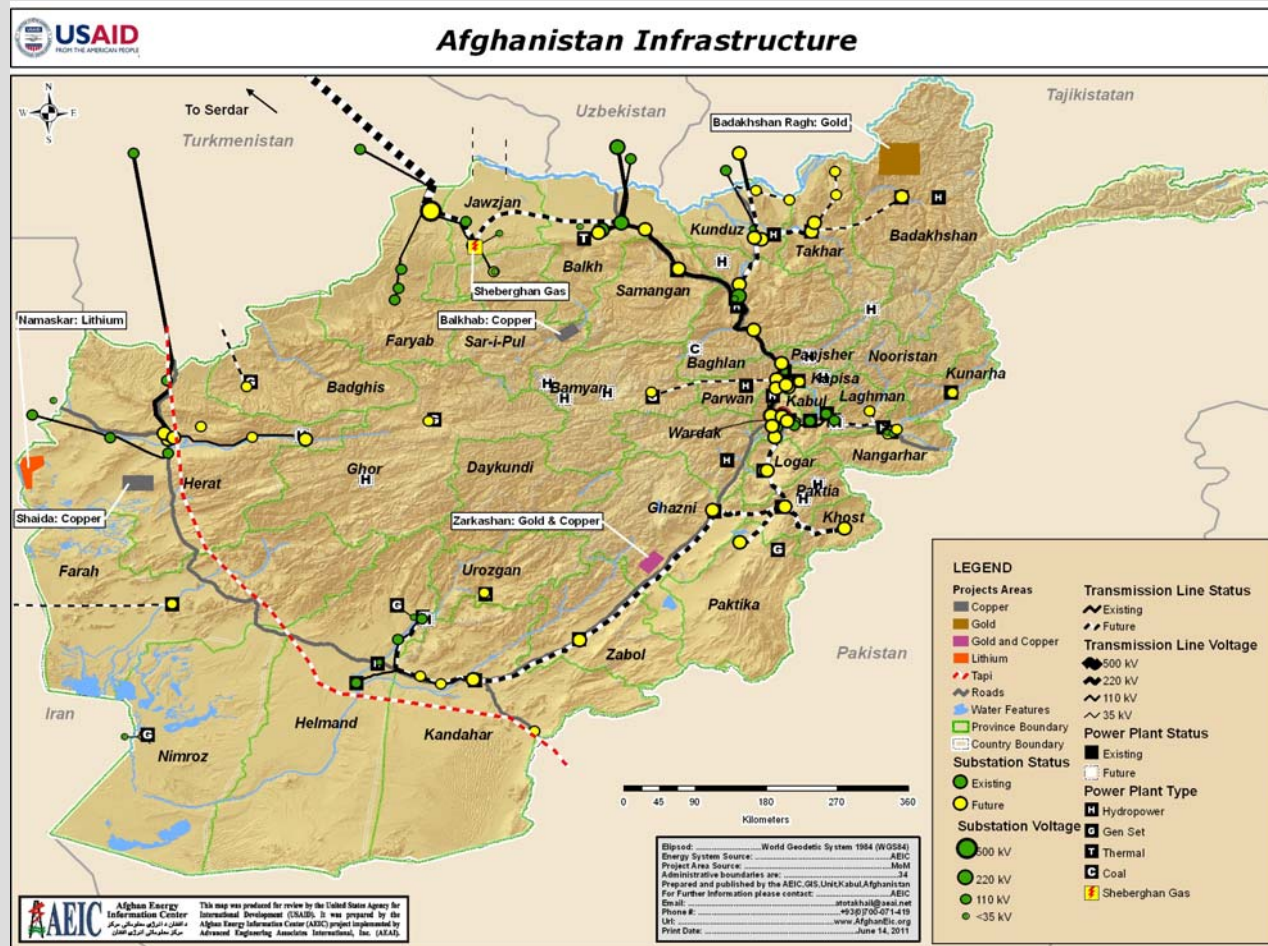
- **The political situation: need for law**
- **EU engagement in Afghanistan: this is why we are here**
- **World Bank/IFC report ‘Doing Business In Afghanistan’**

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<b>DOING BUSINESS 2012</b>	<b>Topic Rankings</b>
• <u><a href="#">Starting a Business</a></u>	<b>30</b>
• <u><a href="#">Dealing with Construction Permits</a></u>	<b>162</b>
• <u><a href="#">Getting Electricity</a></u>	<b>104</b>
• <u><a href="#">Registering Property</a></u>	<b>172</b>
• <u><a href="#">Getting Credit</a></u>	<b>150</b>
• <u><a href="#">Protecting Investors</a></u>	<b>183</b>
• <u><a href="#">Paying Taxes</a></u>	<b>63</b>
• <u><a href="#">Trading Across Borders</a></u>	<b>179</b>
• <u><a href="#">Enforcing Contracts</a></u>	<b>161</b>
• <u><a href="#">Resolving Insolvency</a></u>	<b>105</b>

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Investment Opportunities & the Economic Future of Afghanistan  
 Brussels Oct 26, '11

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## USGS

- **'large untapped energy and mineral resources, which have great potential...' major mineral resources include chromium, copper, gold, iron ore, lead and zinc, lithium, marble, precious and semiprecious stones, sulfur, and talc**
- **Most minerals have not been investigated thoroughly. Only graphite, chromite, potash, RE, talc and asbestos have specific assessments.**
- **Deposits of large flake graphite are estimated at 1m. Tonnes**
- **There could be up to 27.5m. tonnes of undiscovered potash deposits**

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## Minerals

- ‘RE elements, U in Helmand province - associated w/ carbonatite body. Estimates of undiscovered deposits: mean expected value 1.4m. tonnes REE, 3.48m. tonnes niobium’
- ‘Afghan Ministry of Mines: the country’s mineral wealth could be valued as high as three trillion US dollars...
- ...high lithium deposits’, which were not mentioned by the USGS in the latest survey
- *Note: Canada-based Stans Energy to restart HRE production in Kyrgyzstan in '12 & to design new thorium extraction + solvent extraction plants to start operations in '13*

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## Production of Mineral and Metal Commodities [est.]

in metric tons



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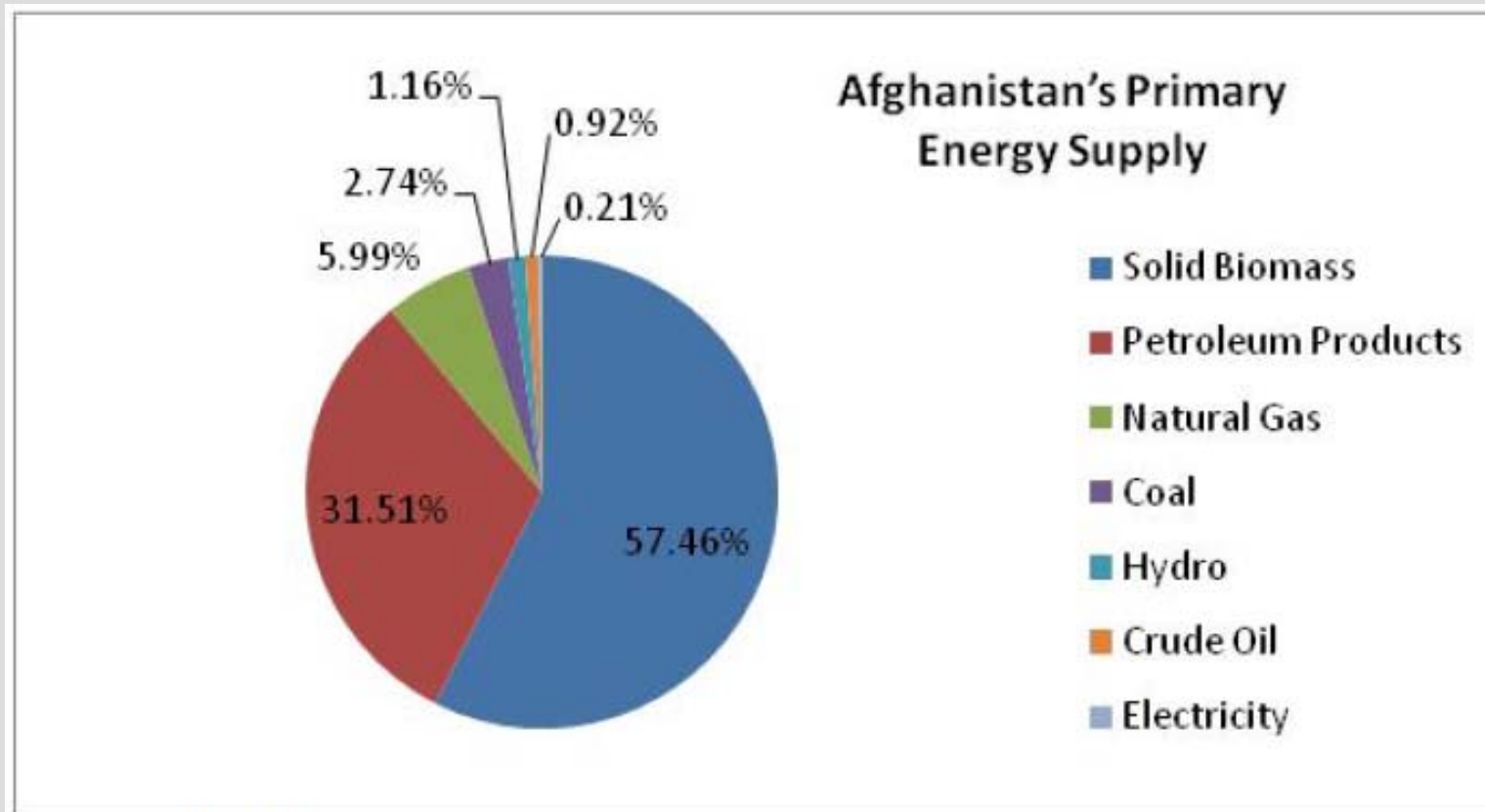
### **Energy**

- **Energy production/supply very unstable**
- **Damaged & fragmented power generation and distribution**
- **High dependency on imported petroleum products**



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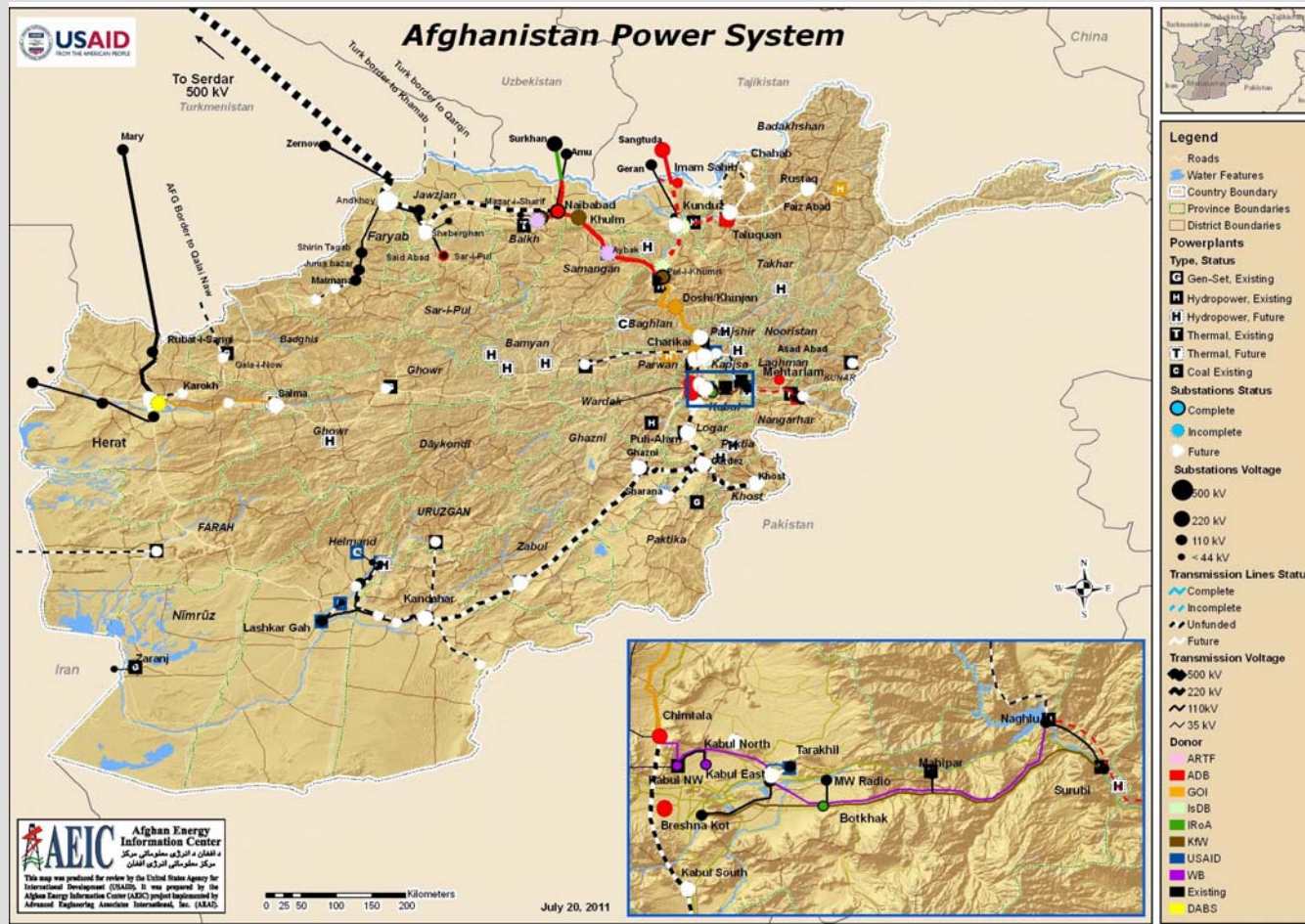
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Source: ADB 2006; figure illustrates percentage of total energy supply

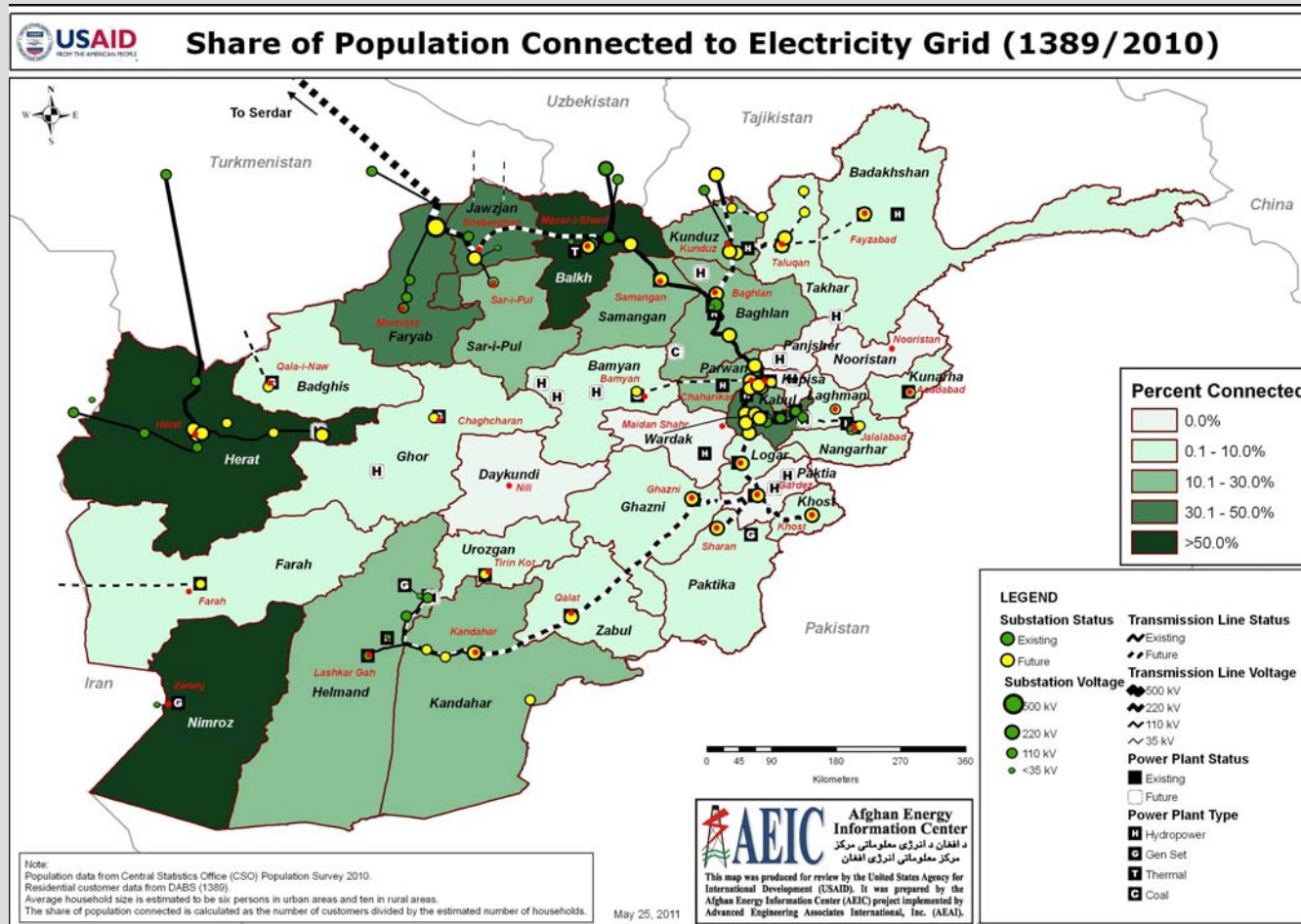
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## **The Future**

**The viewpoint is one of**

- **an int'l mining executive for 35 years**
- **a member of mining policy associations for over 30 years**
- **consultant for 6 years – Note: Multi-tasking, not 35+30+6!!!**
- **author of a book on Corporate Governance**
- **author of 2011 study on RE Industry and Policy Analysis**

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### **The Future**

**Will avoid discussing politics per se ... but a reliable legal framework is imperative**

**Conference theme: 'Investment opportunities & the economic future of Afghanistan'**

**Benchmark with other parts of the world**

**Fiscal regime -- incentives for investment in mining and other sectors': fine, but also other important factors at play**

**The 3 essential pillars: Market, Infrastructure, Finance...**

**...and, obviously, people. At all levels: educate/train plus repatriate**

**Develop quarries, mines, metallurgy, renewable energy**



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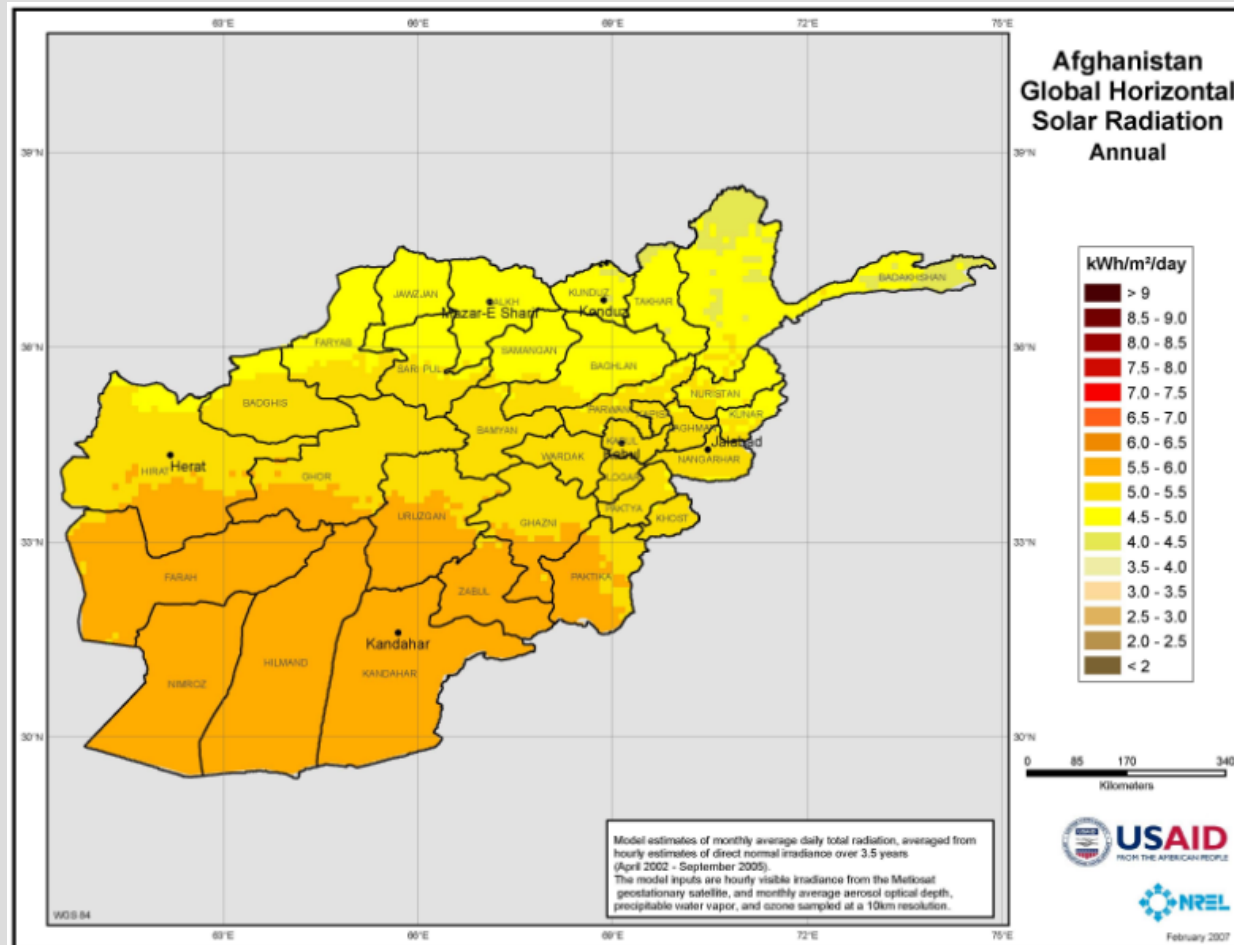
## Develop mineral resources

- legal framework, mining code
- infrastructure & transportation projects for mining
- small-to-medium scale quarries/mines for local needs, eg. construction, agriculture, animal feed; larger-scale for exports: Aynak Cu, Hajigak Fe ore project; + Cu exploration, Balkha; Au, Badakhshan, gemstones & Li, Nuristan
- **RE?** 'Huge Afghan RE riches - but who will risk developing them?'
- **USGS:** After 5 years, royalties from mineral production > \$1.2 billion py; after 15 years \$3.5 billion py

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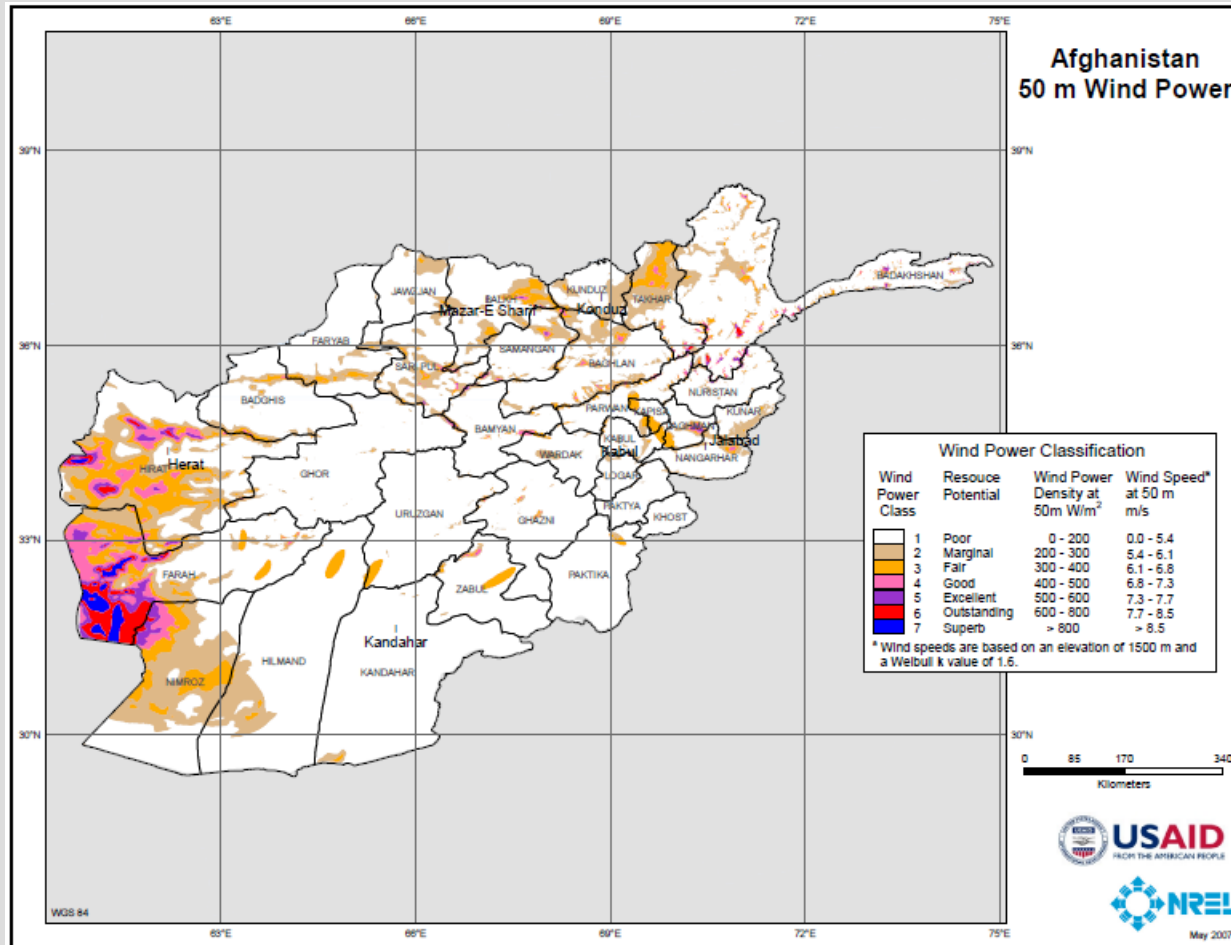
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## Solar map



# Evaluating Natural Resources, the case of Afghanistan: Rare Earths to Renewables

## Wind map





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## Renewables

- **Legal framework, tariffs**
  - **small-to-medium scale for local needs: biomass for heating, greenhouses etc**
  - **grids small [also large?] will be needed**
  - **GHG certificates???**
- **Biomass / biofuels**
  - **biogas from animal manure**
  - **waste-to-energy from urban discards**
  - **oilseed production for food+fuel could offset cooking oil imports & provide local biofuels; also, alternative crops to opium**
  - **nonedible oilseed crops from the mustard family [camelina and pennycress] could have great potential. Grow well on marginal lands & require minimal water, fertilizer, and pesticides**

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## Overall development steps

1. **start with actions by int'l agencies + Afghani govt: establish security, infrastructure, legislature [mining, energy, fiscal, environment/health/safety]**
2. **only then will investors follow – incl. Chinese and Indian – locals for smaller projects**
3. **EU, US etc. investors: in collaboration with local, Chinese and Indian investors?**

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## Final Remarks

### International Context

- **World economic situation: problematic...**
- **...including tight financing**
- **On the other hand: China limiting exports of raw materials → Afghanistan could [partly] fill the gap – resources are there**
- **[Western] foreign investors need the following [still missing]: rule of law, clear fiscal/ administrative/ legal/ court [environmental?]/ procedures**
- **High risk → high reward**

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## **In Afghanistan**

- **Need the whole range of projects: small, medium, large**
- **Infrastructure [physical, other] is key: World Bank, NATO etc**
- **Energy: essential, including renewables and microgrids**
- **People, especially professionals**
- **Financing, including insurance for political risk**
- **Partnerships: [Western] foreign investors with locals, with neighbors**

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### **Hence**

- **Methodology for change: gradual, confidence-building steps; tipping point**
- **No need for extreme perceptions: neither ‘nothing’ nor ‘Eldorado’**
- **This is not a 100m sprint race, it is a marathon!**

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**Thank you very much!**

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