

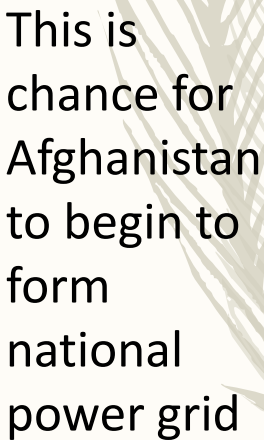
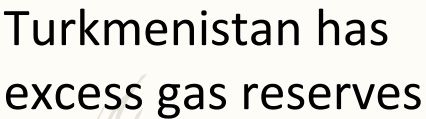
TAPP-500 Project

Turkmenistan-Afghanistan-Pakistan High-Voltage Overhead Line Project

- Project will follow “TAP Corridor” which is planned to include TAPI gas pipeline, fiber optic cable line and high-speed rail line. The initial project consists of three phases:
 1. A 375 km, an AC line with 300 MW capacity from Mary to Herat
 2. A 1,150 km, a 500kV HVDC line with 1.2 GW capacity from Mary to Quetta
 3. A 575 km, an AC line with 300 MW capacity from Herat to Kandahar
- Construction will take 3 years with estimated cost of \$2 billion USD. Project will be built and operated by private enterprise.
- Gas supplied from Galkynysh Field (2.8 TCM) in Turkmenistan
- Power supply by high efficiency CHP Gas turbine with 1.574 GW capacity



The project can expand in next phase and connect to Pakistan national electricity grid from Quetta to Multan



Rationale for TAPP-500 project

Socio-Economic benefits

Export of affordable energy from Turkmenistan which will displace high cost energy in Afghanistan and Pakistan.

Avoid business interruption costs owing to the increase in reliability of electricity supply.

Impact of increased electric supply contributes to economic and socio-economic growth.

The development of cross-border economic activities.

Avoid Greenhouse Gas emissions as a result of switching from electricity produced by diesel supply to electricity produced by gas supply is 2.0 million-ton CO₂e p.a. .

Region	Electricity Consumption per Capita (kWh)
Global average	3,132 kWh
Turkey	2,847 kWh
South Asia	705 kWh
Pakistan	448 kWh
Afghanistan	186 kWh

Pakistan and Afghanistan use limited electricity per capita due to lack of supply

Status: Project is off to excellent start



On 23.02.2018
Intergovernmental
Agreement (IGA) has
been signed between
Turkmenistan,
Afghanistan and Pakistan



On 11.10.2018
Memorandum of
Understanding (MoU)
has been signed
between Turkmenistan
and Afghanistan



On 07.11.2018 MoU
between Afghanistan
and Çalık Holding has
been signed

Construction of the CHP Gas Turbine Power
Plant has been completed and is operating



Construction of Phase 1 transmission
line to Herat will begin in 2020

Next Steps: Project implementation

- Towers (tension/suspension),
- Conductors (1272 MCM Pheasant),
- Switchyards (500/220/110 kV),
- Transformers and auto-transformers
- Line reactors
- Engineering
- Civil Works
- Installation





CALIK ENERJİ

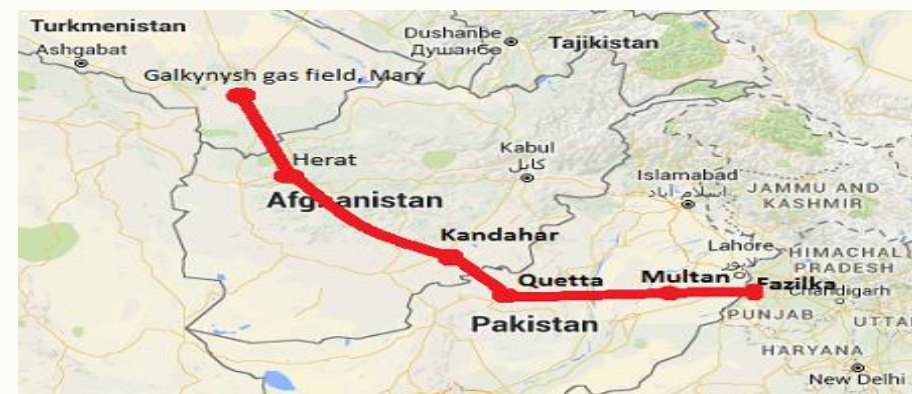
Advantages of project for all parties

- **For Turkmenistan:** Profitable use of abundant gas resources. Value added for natural resource: by selling power rather than just natural gas, adding value in-country
- **For Afghanistan:** Electricity can be directly used in areas that are currently suffering severe power shortages. Phased nature of project allows initial results in short time frame. Transit fees to Pakistan will also provide additional income.
- **For Pakistan:** Brings electricity to section of country Baluchistan, currently suffering severe power shortages. Power can be directly used by Pakistan, reducing need to additional capital expenditures to generate electricity. Obvious room for expansion to supply electricity to the rest of Pakistan.
- **Regional benefits:** Helps establish the TAP corridor which will have other projects
- **Greenhouse gas emission reduction:** Eliminates widespread use of diesel generators in cities along route in Afghanistan and Pakistan. CHP gas turbine is most efficient power generation use of fossil fuels as well as lowest GHG emitter.

Eventual expansion to India: With the successful completion of Phase 3, expansion to India could be considered. Replacement of coal with low GHG generated electricity will be a high priority for India and the world in the coming decade and this will likely be the best solution for Northern India!



Galkynysh processing plant



Feasibility of TAPP Expansion: Examples worldwide show that comparable long and powerful transmission lines have been successfully completed

Possible TAPP Expansion Plan:

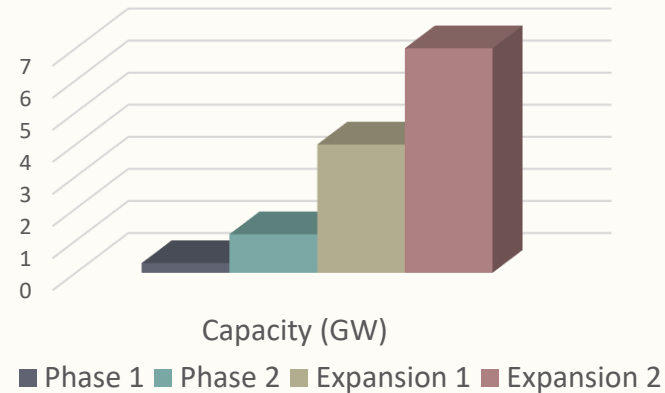
Phase 1 (2021): 375 km 300 MW AC capacity line to Herat

Phase 2 (2023): 1150 km 1.2 GW HVDC capacity line to Quetto

Expansion 1(2025): 1670 km 4.0 GW UHVDC capacity line to Multan

Expansion 2(2027): 2120 km 7.0 GW UHVDC capacity line to India

TAPP Expansion Possibilities



*future possibility, not yet negotiated



2385 km Madeira line has 7.1 GW capacity



1728 km NE Agra line has 8.0 GW capacity



2090 JinPing-Sunan line has 7.2 GW capacity



1980 km Xiangjiaba-Shanghai line has 7.2 GW capacity