CASA-1000 Project
Central Asia- South Asia
Regional Power Connectivity

Sequence

- CASA-1000 Project – A Brief Background
- Project Scope & Pricing
- Current Status of the Project & Bidding Issues
- CASA-1000 Project – an Icebreaker for Regional Power Connectivity

Central Asia – South Asia Transmission Interconnection (CASA-1000)

- The idea of Central Asia – South Asia Transmission Interconnection Project (CASA-1000) was conceived in 2008 to transmit 1300 MW of surplus electricity (May to Sept) from existing hydel resources in Tajikistan and Kyrgyz Republic through Afghanistan to Pakistan.
- Out of 1300 MW of expected power, 300 MW is for Afghanistan and 1000 MW will come to Pakistan.

Central Asia – South Asia Transmission Interconnection (CASA-1000)

- The project structure was conceived to be a contractual joint venture among the member states.

- An expert level Joint Working Groups and Inter-Governmental Council (IGC) comprising four member states was created to steer the Project.

- Since the Inter-Governmental Council held in September 2013 the project has progressed on fast track basis, and up til December 2014 IGC resolved all the pending issues and ratified resolution No.2014.

Route for HVDC T/line-CASA -1000

Central Asia – South Asia Transmission Interconnection (CASA-1000)

Scope of work proposed by the Consultants for Import of 1000 MW power from Tajikistan to Pakistan:

- 500 kV HVAC T/L from Kyrgyz to Tajikistan (477 km)
- ±500 kV HVDC T/L from Tajikistan to Pakistan via Afghanistan (750 km)
- 300 MW HVDC substation at Kabul in Afghanistan.
- 1300 MW HVDC convertor station at Tajikistan
- 1300 MW HVDC convertor station at Peshawar

Salient Features of CASA-1000 Project

• Average Energy Available/Annum	4250 GWh
• Energy Charges	5.15 Cents/kWh
• Transmission Charges	2.98 Cent/kWh
• Afghan Transit Fee	1.25 Cent/kWh
• Tajik Wheeling Charges	0.10 Cents/kWh
• Average Price for Pakistan	9.48 Cent/kWh
• Implementation period	40 months

Current Status CASA-1000 Project

- Master Agreement / Power Purchase Agreements with Tajikistan and Kyrgyz Republic signed on 23-24 April 2015.

- Afghanistan and Pakistan Power Purchase Agreement has been initiated during the IGC of 24th November, 2015 and has been signed on 05th December, 2015.

- World Bank and IDB are the main Financiers along with other financial institutions. Financing agreement have also been signed between members countries and respective financial institutions and most of the project cost has been covered with some minor Gaps.

Bidding Issues

- Bidding process for owner's engineer and Afghan part of transmission line has been completed

- Technical and Financial Evaluation of bid for 03 convertor stations is a major concern with Chinese bidders M/s TBEA & CSGI.

- On 15th March 2016, the bidder (M/s TBEA) submitted revised Technical proposal along with Financial bid which is under review.

- An IGC planned on 15th April to discuss future action related to bidding process

Regional Connectivity Concept

Objective

- Collective use of abundant resources through regional interconnection
- Early power delivery from neighbouring countries to meet urgent power needs in Pakistan

Requirements

- Power delivery to Pakistan should be in near future (2017-18)
- Investment required and cost of power delivered to Pakistan grid should be competitive with locally produced power
- Power delivered to Pakistan should be year around
- Transmission line to provide benefits to communities along the way

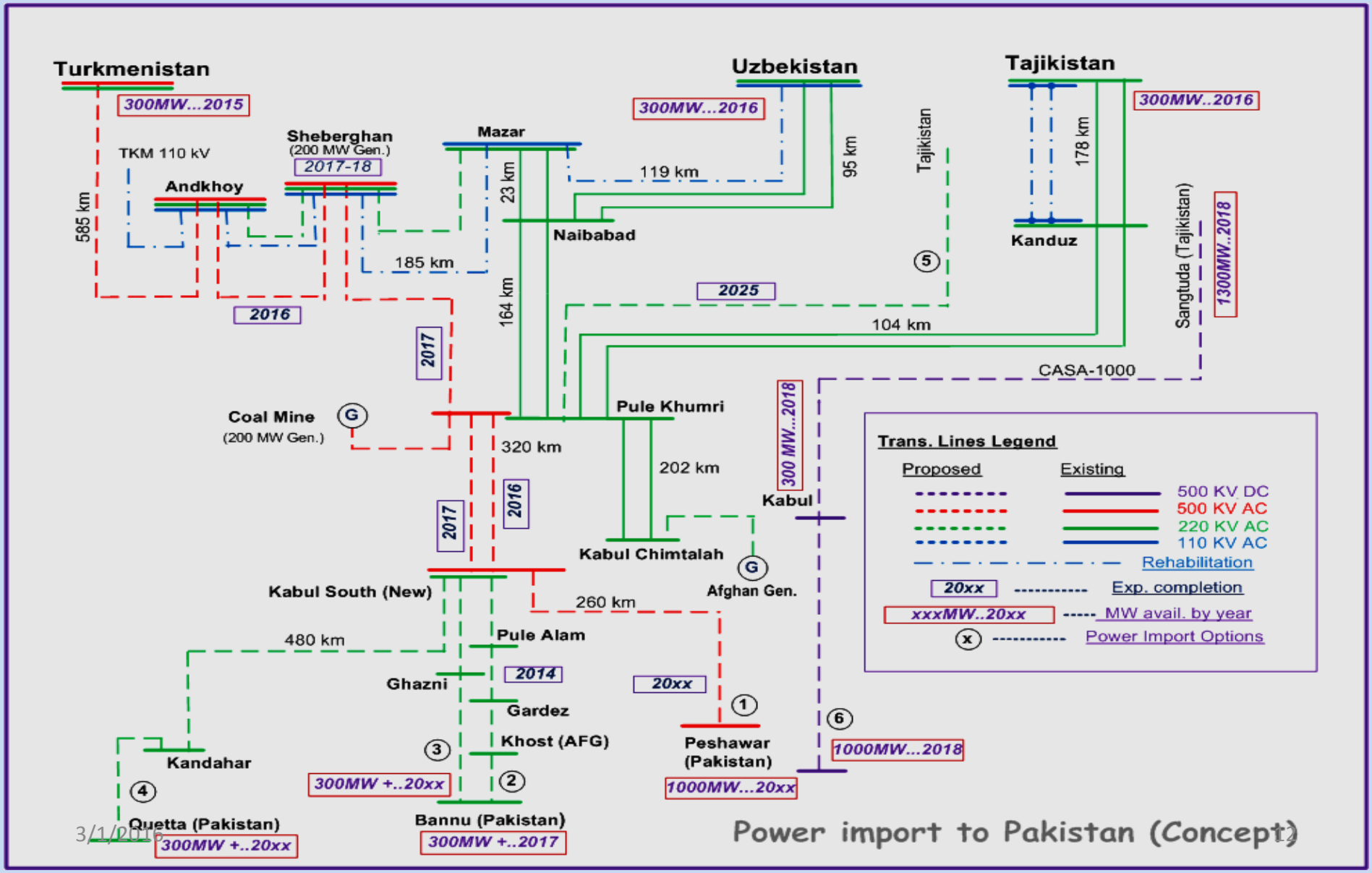
Collateral Benefits

- Power transmission corridors to complement other regional initiatives and projects leading to accelerated economic growth in the area.

Regional Import Options

- Import of Power from Tajikistan/Kyrgyzstan (CASA-1000 Project)
- Import of Power from Iran
- Import of Power from India
- Import of Power from Tajikistan (outside CASA-1000)
- Import of Power from Turkmenistan/Uzbekistan
- Import of Power from China

Power Import for Pakistan- Single Line Diagram



Power Import From Iran

1. Existing Interconnection Projects:

Import of 74 MW Power border areas of Pakistan (in Baluchistan):

i. 70 MW at 132 kV (continued since 2003. Initially, it was 35 MW)

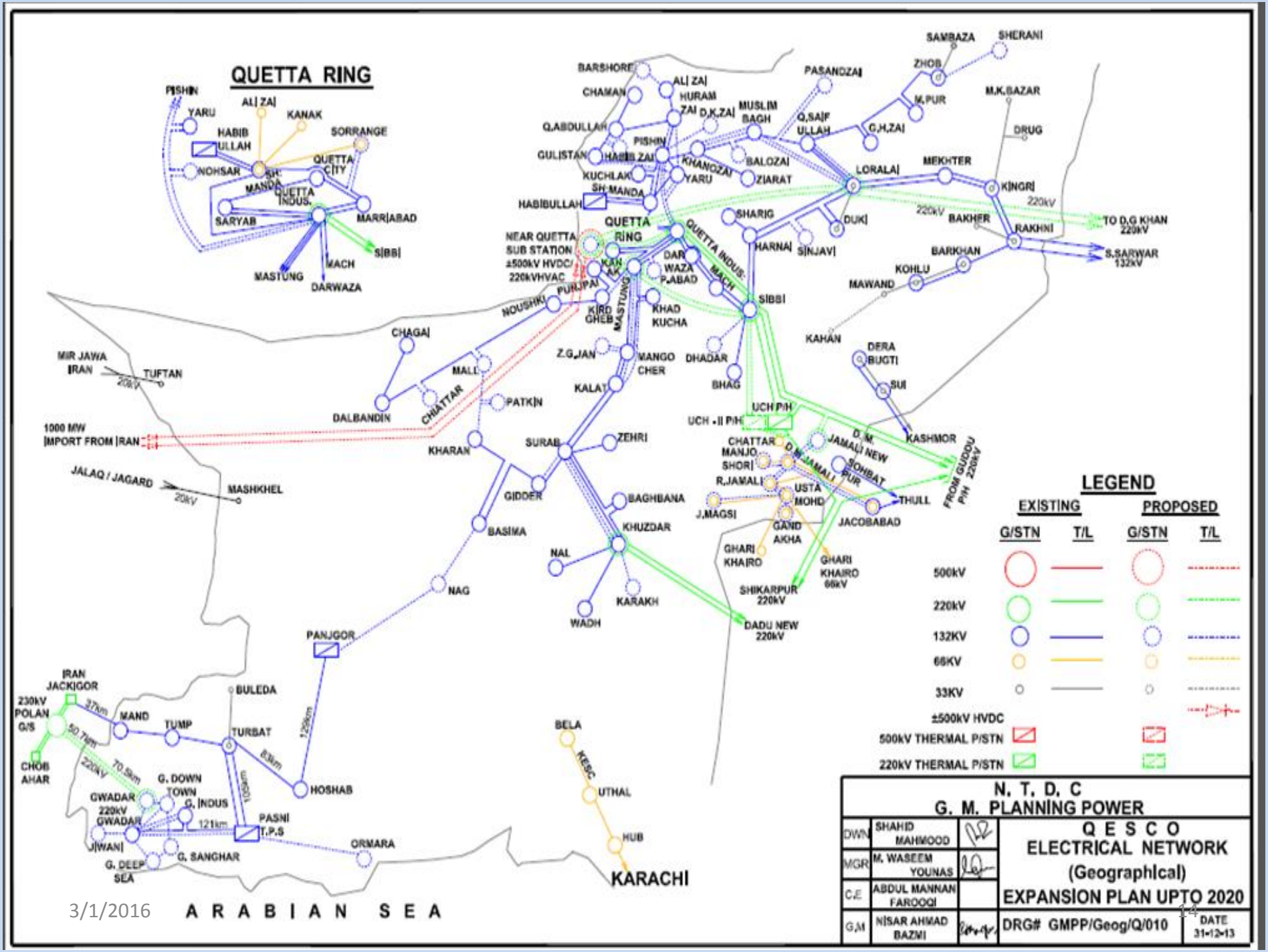
ii. 4 MW at 20 kV (continued since 2002)

iii. Supplies being increased to 104 MW to meet growing demand

2. Planned Interconnection Projects:

i. 100 MW at Gwadar through 220 kV D/C T/Line (contract signed)

ii. 1000 MW at Quetta through ±500 kV HVDC Bipole (MoU signed)


QUETTA RING
PISHIN
YARU
ALI ZAI
KANAK
HABIB ULLAH
SORRANGE
NOHSAR
SH. MANDA
QUETTA CITY
QUETTA INDUS.
SARYAB
MARRIABAD
SIBBI
MASTUNG
MACH
DARWAZA
BARSHORE
CHAMAN
ALI ZAI
HURAM ZAI
D.K.ZAI
Q.ABDULLAH
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MUSLIM BAGH
PASANDZAI
SAMBAZA
SHERANI
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M.K.BAZAR
DRUG
Q.SAIF ULLAH
G.H.ZAI
GULISTAN
HABIB ZAI
KHANOZAI
BALOZAI
ZIARAT
YARU
KUCHLAK
SH.MANDA
HABIBULLAH
QUETTA RING
LORALAI
MEKHTER
KINGRI
220kV
TO D.G KHAN 220kV
BAKHER
RAKHNI
S.SARWAR 132kV
BARKHAN
KOHLU
MAWAND
SHARIG
DUKI
HARNAI
SINJAVI
NEAR QUETTA SUB STATION
±500kV HVDC/ 220kVHVAC
KAN AK
DAR WAZA P.ABAD
QUETTA INDUS.
MACH
PURJPAI
NOUSHKI
KIRD GHEB
MASTUNG
KHAD KUCHA
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DERA BUGTI
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1000 MW IMPORT FROM IRAN
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20kV
MASHKHEL
GIDDER
BAGHBANA
KHUZDAR
BASIMA
NAL
KARAKH
WADH
SHIKARPUR 220kV
DADU NEW 220kV
NAG
PANJGOR
IRAN JACKIGOR
230kV POLAN G/S
37km
MAND
TUMP
BULEDA
TURBAT
50.7km
220kV
70.9km
83km
125km
132kV
CHOB AHAR
G. DOWN TOWN
G. INDUS
GWADAR
220kV GWADAR
121km
HOSHAB
PASNI T.P.S
ORMARA
JIWANI
G. SANGHAR
G. DEEP SEA
BELA
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500kV THERMAL P/STN
220kV THERMAL P/STN
N. T. D. C
G. M. PLANNING POWER
DWN
SHAHID MAHMOOD
MGR
M. WASEEM YOUNAS
C.E
ABDUL MANNAN FAROOQI
G.M
NISAR AHMAD BAZMI
QESCO
ELECTRICAL NETWORK
(Geographical)
EXPANSION PLAN UPTO 2020
DRG# GMPP/Geog/Q/010
DATE 31-12-13

Power Import From India

- A pre-feasibility study for import of 500 MW power by Pakistan from India was conducted by consultants. The study was funded by World Bank.

- In the study report, the following scope of transmission interconnection was proposed:

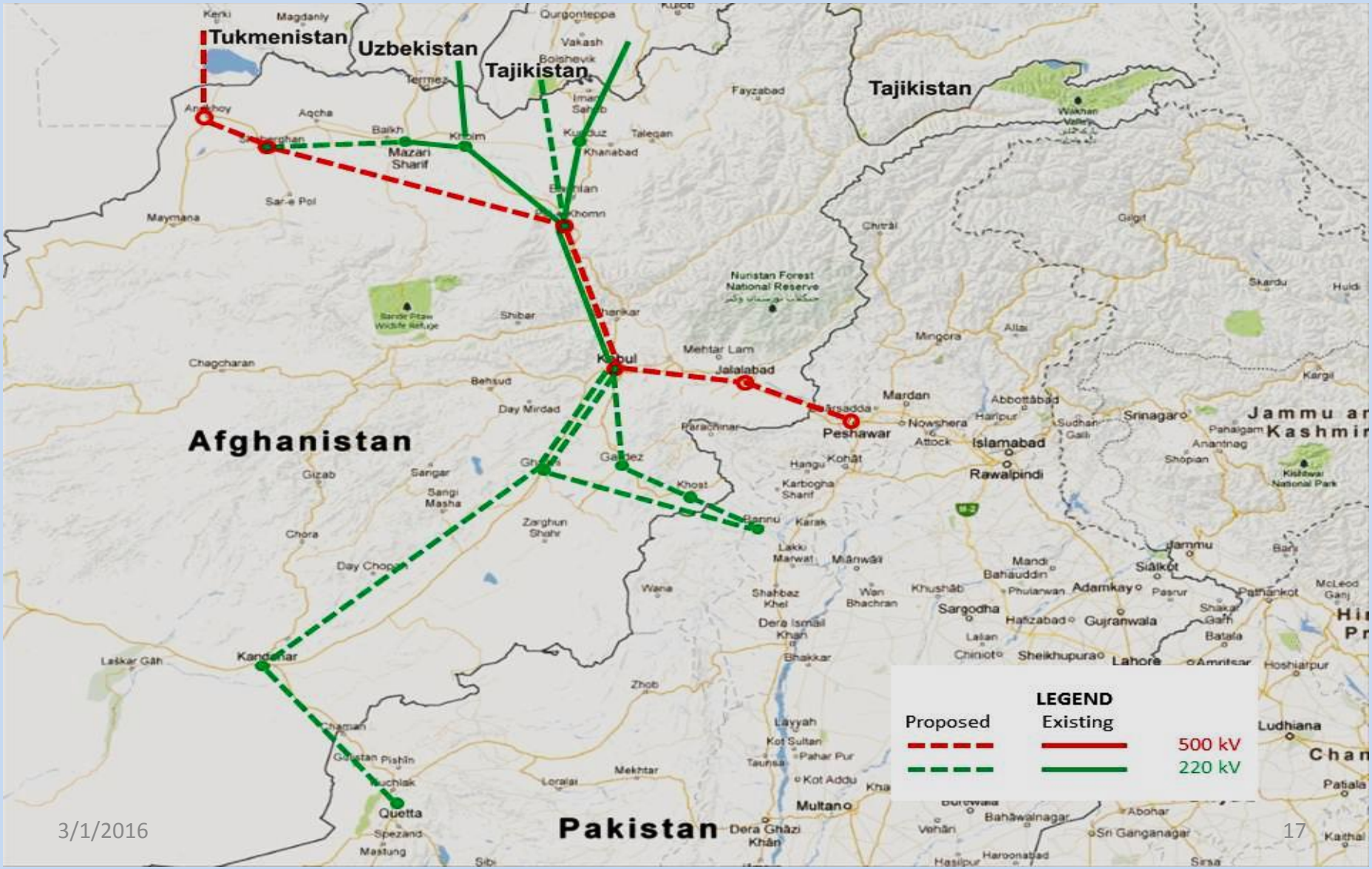
- 400/220 kV HVDC Back-to-Back Convertor Station in Pakistan
- 400 kV D/C T/Line (approx. 26 km) from Balachak to Pak-India Border.
- 400 kV D/C T/Line (approx. 10 km) from Convertor Station to Pak-India Border
- 220 kV D/C T/Line from Ghazi Road to Convertor Station

CAR Options through Afghanistan

Outside current CASA system, Turkmenistan will be the main supply source of power round the year

- Option A - Connect Afghanistan Khost 220 kV substation to Pakistan Bannu 220 kV substation. Line may pass through newly planned (NTDC) 220 kV Substation at Miran Shah in Pakistan border.
- Option B – Connect Kabul South 500/220 kV substation in Afghanistan to 500 kV Peshawar II substation in Pakistan
- Option C – Connect Ghazni 220 kV substation in Afghanistan to Bannu 220 kV substation in Pakistan.
- Option D – Connect Kandahar 220kV substation in Afghanistan to 220 kV substation in Quetta, Pakistan

Phase I : 300 MW Khost-Bannu Line (by 2017-2018) &
Phase II: 600 MW Khost-Bannu + 300 MW Kandahar - Quetta &
1000MW Kabul-Peshawar (after 2018)



New Initiatives on Power Import Options

Power import from Tajikistan Pakistan and Tajikistan are considering import of 1000 MW outside CASA. An MOU has been signed and a committee has been constituted to study the route options

Power import from Turkmenistan *there is a proposal for import of 1000 MW from Turkmenistan. An MOU signed. However this primarily is same proposal as detailed above for supply through Khost and Khandhar inter-connections*

Power import from China *offer to export 3000 MW from neighbouring Xinjiang province to Pakistan. The proposal is under study as the proposed route passes through the most difficult terrain in the world*

Regional Power Connectivity Can Lead To

- Large reallocation of generation investment across countries and technologies (especially but not only for hydro)
- More than 105,000 MW of transmission capacity by 2040 to support unlimited cross-border power flows
- USD 222 billion in net cost savings (USD 97 billion in present value at 5% discount rate)
- Fuel cost savings is the main source of benefits; these savings are more than five times the cost of additional investment

Source: The Benefits of Expanding Cross-Border Electricity Cooperation and Trade in South Asia, World Bank, June 2015

Barriers to Regional Connectivity

- Lack of physical interconnection capacity
- Challenges like terrain, regional political considerations, and financial resource constraints
- Lack of regional regulatory infrastructure for prioritizing and coordinating increased interconnection
- Domestic sector policies that discourage increasing interconnection or power transactions using existing capacity

Thank you