



DA AFGHANISTAN BRESHNA SHERKAT

افغانستان برېښنا شرکت



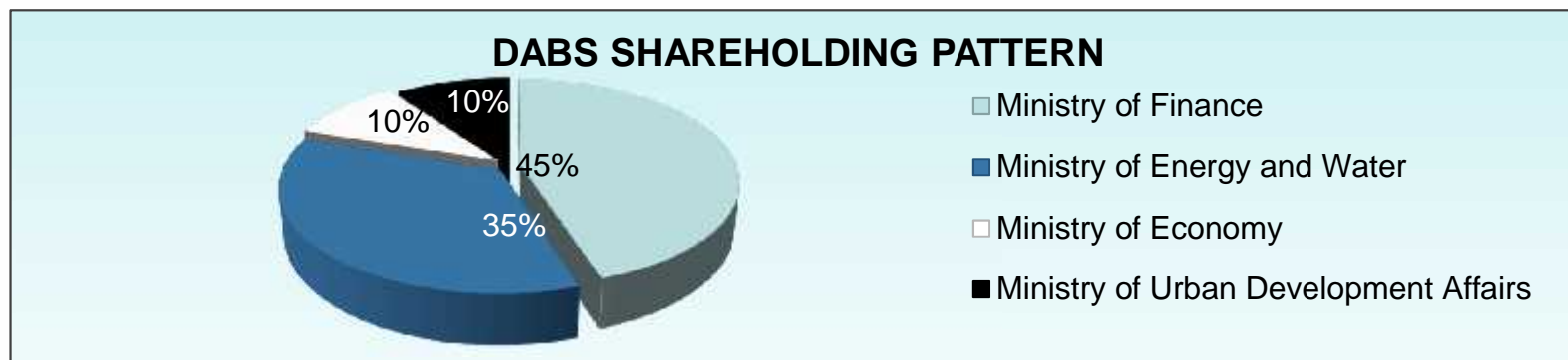
Progress in the Energy Sector of Afghanistan

September 02, 2015
Kabul, Afghanistan

Evolution of DABS



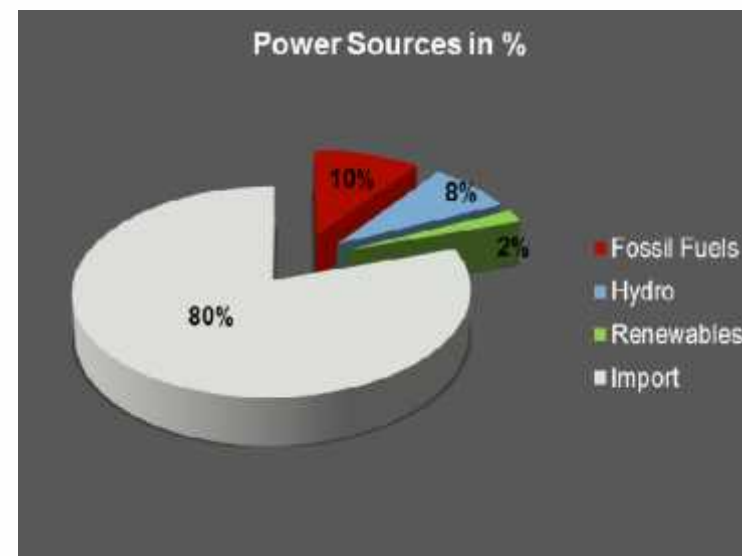
- DABS came into existence on May 04, 2008 (15 Saur 1387) after the Government of Afghanistan corporatized the National Electricity Service Department Da AFGHANISTAN BREESHNA MOSSASA (DABM) into an independent state owned utility.
- All assets, staff and other Rights and Obligations of (DABM) were thus transferred to (DABS).
- Today, DABS is an **independent and autonomous utility that is 100% owned by the Government.**
- DABS was established under The Corporations and Limited Liabilities Law of the Islamic Republic of Afghanistan (IROA).
- DABS is authorized to independently run its operations and appoint its staff in accordance with its Articles of Incorporation, and the Bylaws.
- DABS is a **professionally organized utility** managed by **qualified and experienced management team.** Its current **staff strength** is about **7000.**



Afghanistan - Power Sector Overview

- Existing power supply heavily dependent on power imports.
- Major focus of energy sector development efforts directed towards **transforming Afghanistan's electricity grid from isolated islands into an integrated national transmission grid.**
- In 2006 Afghanistan had 9 isolated electric grids. Today these have been consolidated into 3 major grids:**
 - North Eastern Power Grid (NEPS) with Kabul as the major load center*
 - South East Power Grid (SEPS) with Kandahar as the major load center*
 - Western Power Grid (WPG) with Herat as the major load center*
- Energy imports** in 2013-2014 represented **about 80%** of the total power supply.
- DABS **customers** connected to the National Grid have **increased by more than 60%** during the last **6 years**.

Current Sources of Power		
Sl. No.	Source of Power	Share in MW (%)
1.	Fossil Fuels (Diesel & Gas)	10%
2.	Hydro	8%
3.	Renewable Energy	2%
4.	Power Imports	80%
TOTAL		100 %

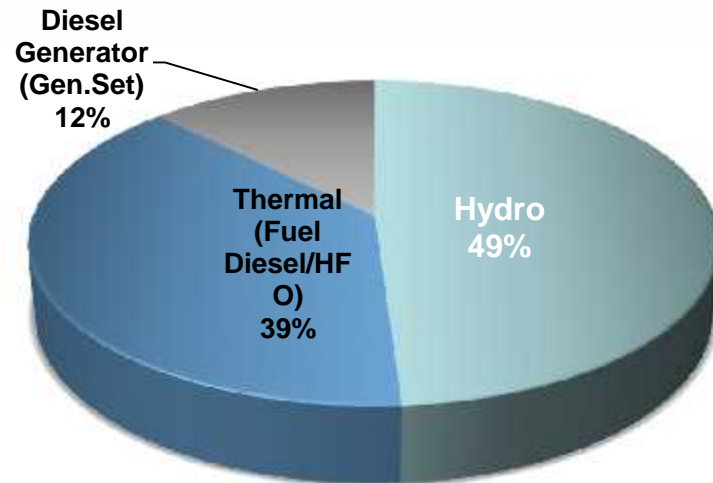


- Power imports are backed by long-term PPAs, but future challenges regarding continuity and tariffs remain.
- **In 2002 only 6% of Afghans had access to electricity. Today approximately 30% have access.**
- **Enhancing access to about 65% over the next 5 years** and meeting the growing demand of the existing load centers – high priority of the Government.
- Several provinces dependent on diesel generation resulting in extremely high cost of generation.
- Various **supply augmentation initiatives underway:**
 - CASA 1000
 - Turkmenistan – Afghanistan Interconnector.
 - Grid Integration between NEPS and SEPS.
 - Kajaki Hydroelectric Power Plant Unit 2 Rehabilitation (18.5 MW)
- Meeting the above goal requires harnessing additional power supply sources including those closer to the loads.

DABS - Generation and Transmission Profile

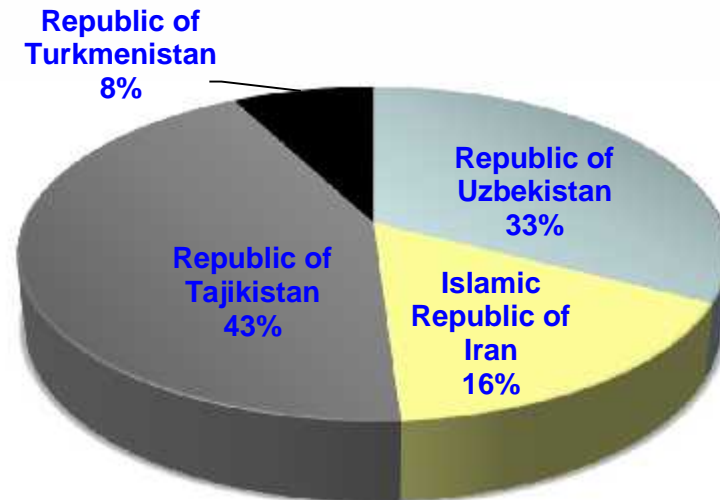


Afghanistan Installed Generation Capacity (MW)



Hydro	254
Thermal (Fuel Diesel/HFO)	200
Diesel Generator (Gen.Set)	65
Total	519

Transmission Capacity for Power Imports (MW)



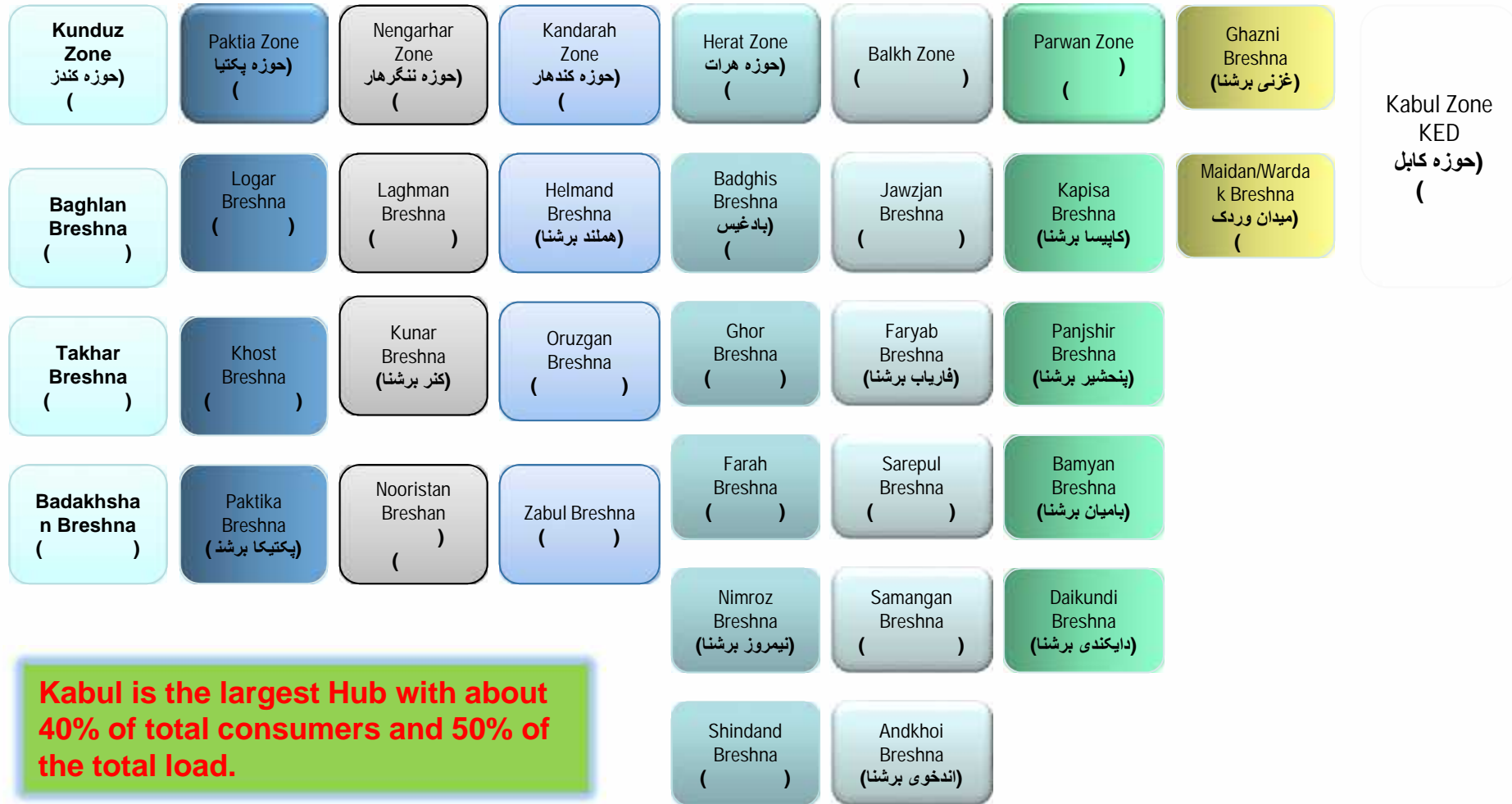
Republic of Uzbekistan	326
Islamic Republic of Iran	164
Republic of Tajikistan	433
Republic of Turkmenistan	77
Total	1,000

DABS - Tarakhil Power Plant - Challenges

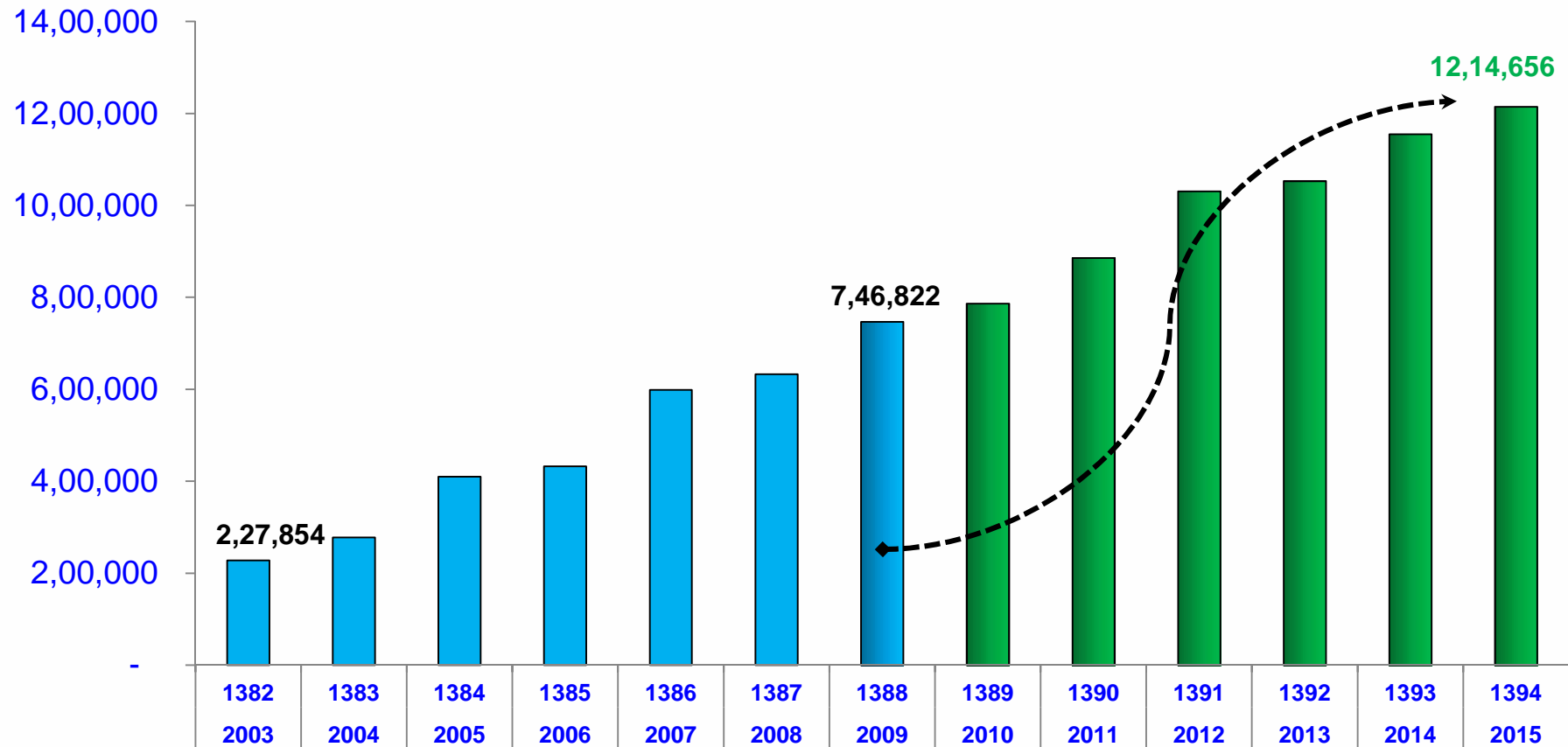
- **Optimal utilization and sustainable operation** of Tarakhil Power Plant is **a matter of concern** to DABS as much as to USAID.
- Even though Tarakhil was built as an emergency power plant for Kabul, it is **capable of operating as a base load station**.
- However, the **high cost of diesel and difficulties in procuring HFO** make its 24x7 operations unsustainable.
- An Option that could be considered:
 - ✓ **Operate the power plant as a base load station and supply high cost power to the High Profile Customers in Kabul.**
 - ✓ Power supply to some high paying capacity customers such as hotels and commercial establishments can also be explored.
 - ✓ However, this **would require provision of dedicated feeders.**



DABS - Operational Hubs



DABS - Growth of Consumers

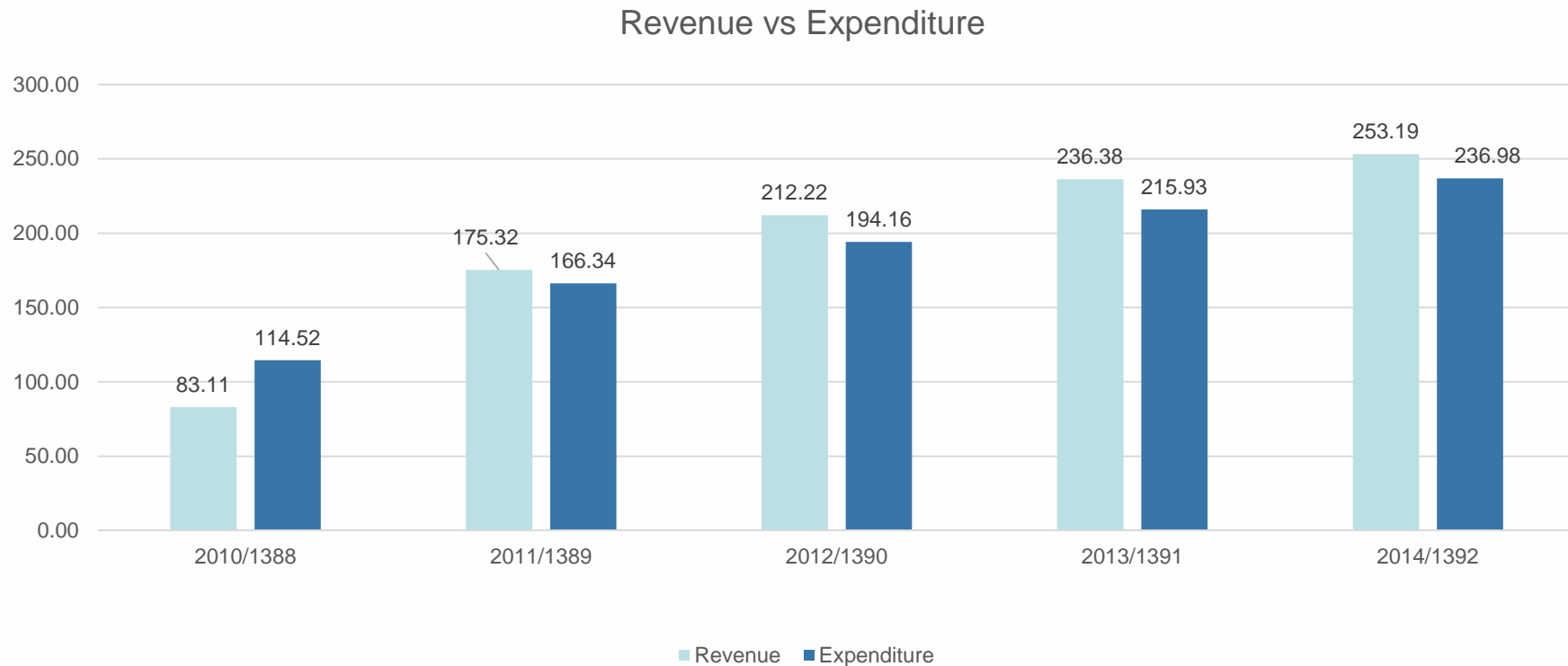


- From 2003 to 2014 the, **consumers have grown by over 400%**.
- While this has significantly enhanced access to power, it has also **increased the responsibilities and challenges of DABS manifold**.

DABS - Revenue vs. Expenditure



(All numbers in Million USD.)

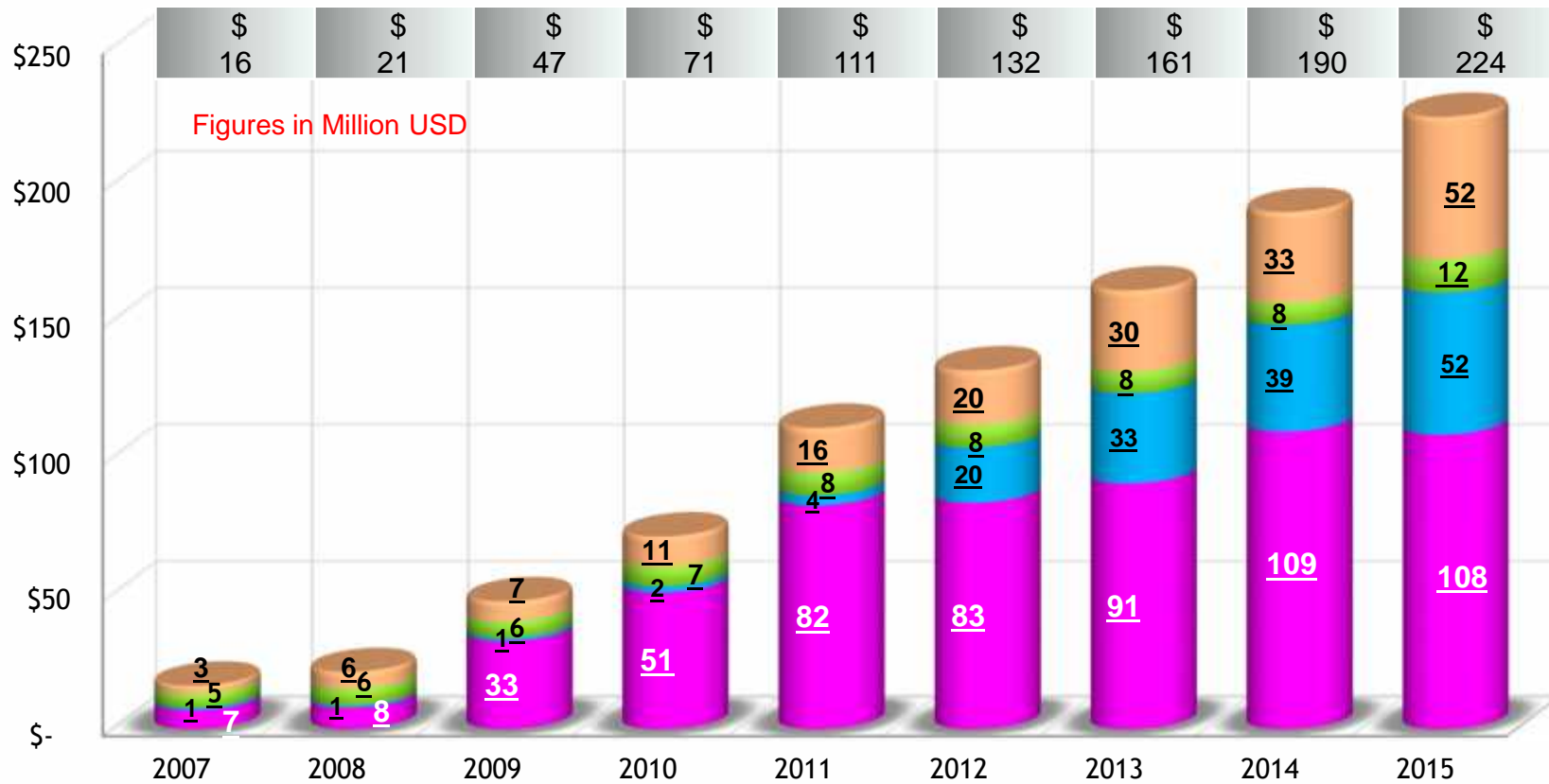


- Between 2010 and 2014, DABS **revenue has increased by almost 280%** .
- Revenue has exceeded expenses since 2011, making **DABS a profitable organisation**.

DABS - Cost of Imported Energy

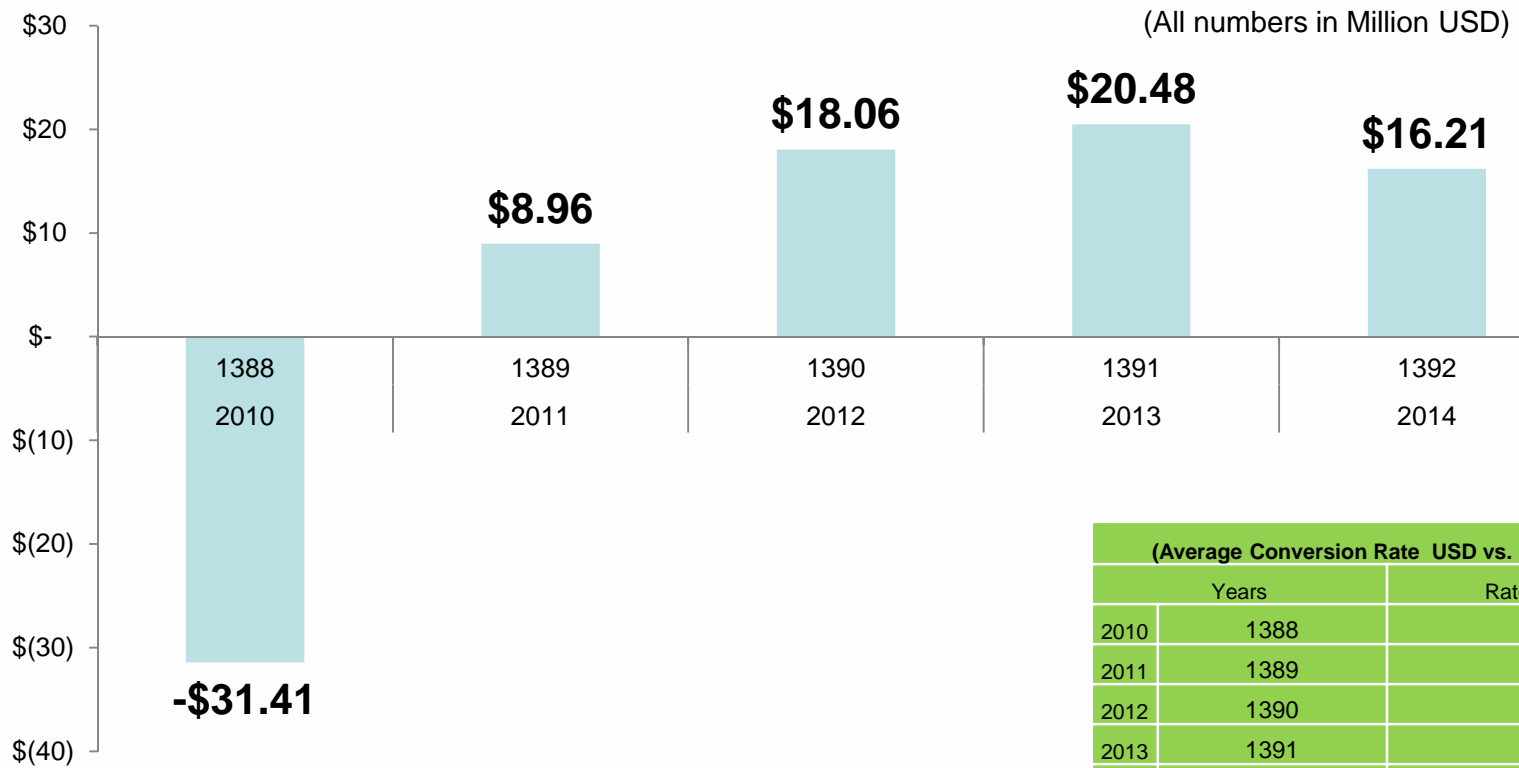


■ Republic of Uzbekistan ■ Republic of Tajikistan
■ Republic of Turkmenistan ■ Islamic republic of Iran



- Cost of imported energy **increased by about 1300%** from 2007 to 2015.

DABS - Profitability



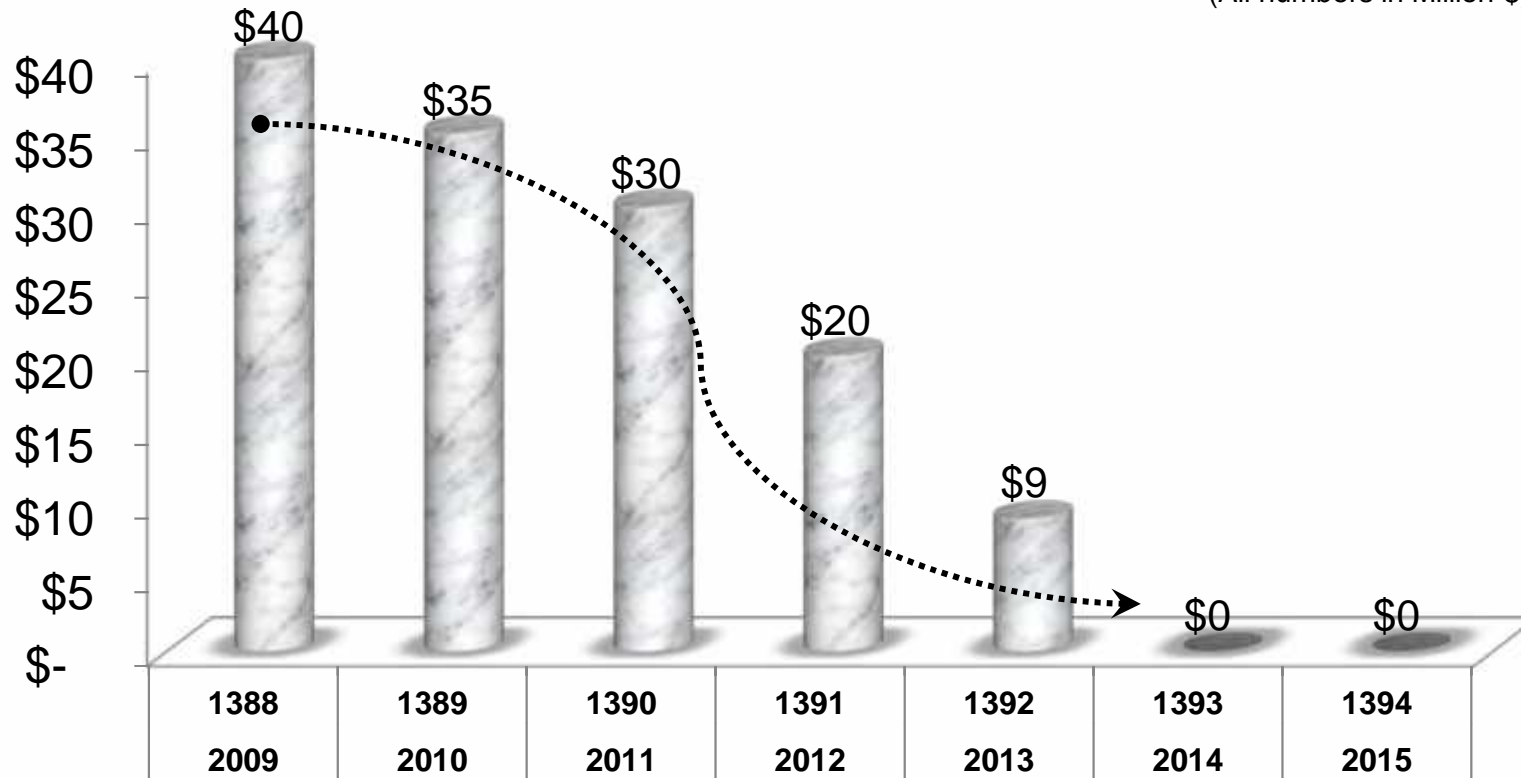
(Average Conversion Rate USD vs. AFA)		
	Years	Rate
2010	1388	46.00
2011	1389	47.00
2012	1390	51.00
2013	1391	56.00
2014	1392	58.00

- Between 2011 and 2014 DABS profits have increased by 120%.

DABS - Subsidy Support from the Government

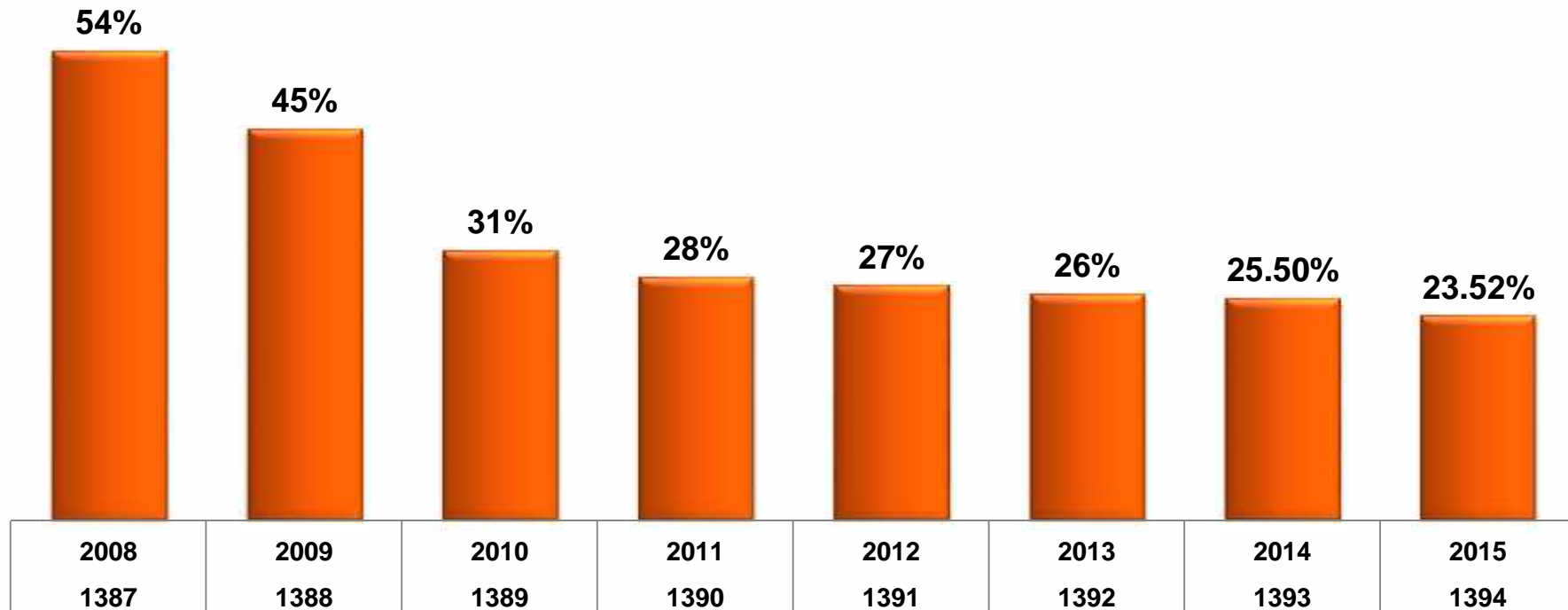


(All numbers in Million \$)



- **Subsidy support to DABS from the Government has rapidly declined since 2009.**
- **DABS no longer depends on any government subsidies for its operations.**

DABS – System Distribution Loss Reduction Trend



- The **System Distribution Losses** of DABS have **consistently reduced** over the years.
- T&D Losses have **come down to about 23.5%** in 2015 (First Cycle) from the level of 54% in 2008.
- DABS is continuously striving to bring down the losses further to international benchmark levels.

- **Installation of a third turbine generator at the Kajaki Hydro Power Plant (USAID funded)**
 - Turbine will increase capacity by 18.5 MW
 - Total installed capacity of Kajaki will increase to 51.5 MW
 - Will reduce reliance on diesel generation in Helmand & Kandahar and deliver up to an additional 10 MW of power to Kandahar



DABS – Future Growth Plans – Generation Projects



Kandahar Helmand Power Project (KHPP) (USAID)

- ❑ Scope includes:
 - ✓ Up-gradation of distribution system in Kandahar city.
 - ✓ Provision of 6.6 MW diesel generation at Shorandam Industrial Park.
 - ✓ Construction of the Durai Junction Substation, an essential hub in the SEPS transmission system.
 - ✓ Capacity building of DABS to manage additional 18.5 MW from Kajaki Unit II.
- ❑ Will promote growth, reliability and sustainability of Afghanistan's Southern Electric Power System (SEPS) funded by USAID.



Darunta Hydroelectric Power Plant Rehabilitation (Own Resources)

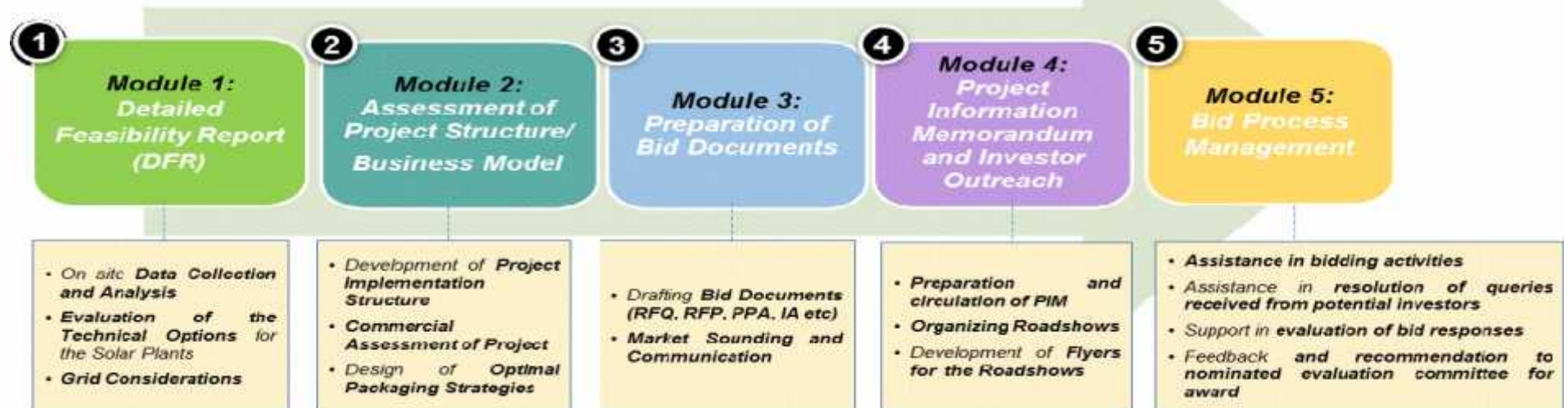
- ❑ Scope includes:
 - ✓ Rehabilitation & modernization of second of the three turbine generators.
 - ✓ Build local capacity through on-the-job training of local operators & technicians.
- ❑ Part of a multi-donor program for Afghanistan Government.
- ❑ Aims at providing reliable power to northern & eastern Afghanistan.

10 MW Kandahar Solar Power Project



- Govt. of Afghanistan approved USAID's proposal for development of a 10 MW Hybrid Solar PV Power Plant in Kandahar.
- The proposed programme is the first attempt, wherein a Renewable Energy project of such large capacity with **scalable model** is being implemented through IPP route in Afghanistan. **Proposed to be replicated at other locations in the country.**
- DABS and USAID with support from a consortium of companies viz. Phoenix, KPMG, Tractebel, Finnacle and RIAA LAW are working together for the development of a well designed and standardized program structure.
- The Solar Power Project will be a cost-effective supply option – **Project to significantly reduce diesel consumption.**

Work under progress before award of the project to a Developer:



DABS – Future Growth Plans – Transmission Projects



North-South Power Transmission Enhancement Project (ADB, AITF)

- ❑ Scope includes:
 - ✓ Construction of 500 KV transmission line from Dashte Alwan to Kabul.
 - ✓ Construction of 500/ 220 KV substation in Arghandy, Kabul.
 - ✓ Project Management and implementation support for DABS.
- ❑ Will **increase power supply from north to south & east of Afghanistan**, project cost of USD 220 million, USD 99 million as grant from ADB & USD 117 million as grant from Afghanistan Infrastructure Trust Fund (AITF).

Reactive Power Compensation for NEPS (USAID)

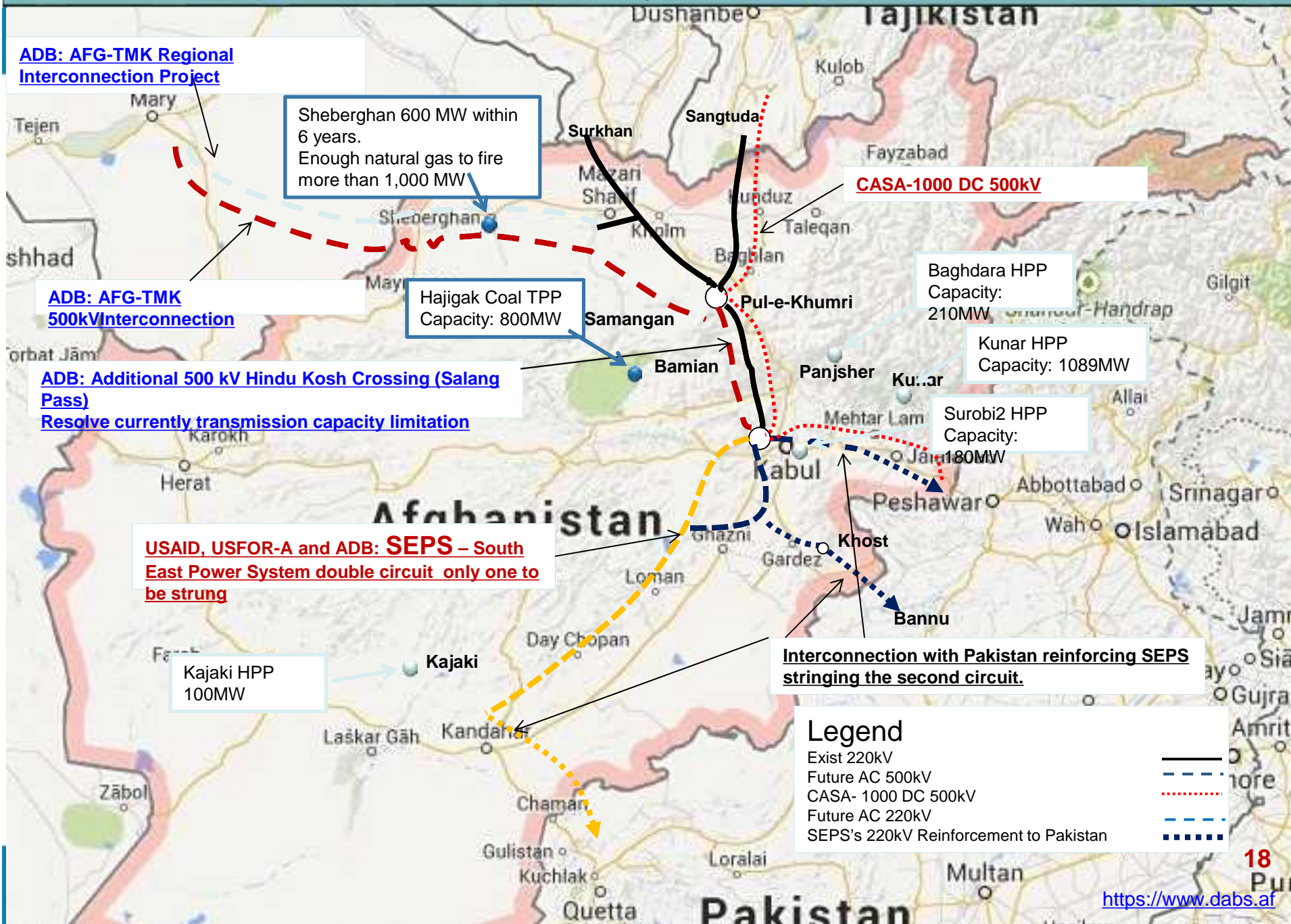
- ❑ Scope includes installation of capacitor & reactor banks at northern sites of Pul-e-Khumri substation & Naibabad switching stations & commissioning of capacitor banks at southern sites.
- ❑ Will **improve system voltage and operating stability, and control reactive power losses for imported power.**

Power Transmission Expansion & Connectivity Project (PTEC) (USAID & AITF)

- ❑ Scope includes:
 - ✓ Construction of 490 km transmission line connecting NEPS to SEPS.
 - ✓ Installation of utility management software at Kabul, Mazar-e-Sharif & Jalalabad to increase revenue collection & reduce power outages.
 - ✓ Construction of 10 MW solar power plant at Kandahar.
 - ✓ Rehabilitation of transmission system in Kabul.
 - ✓ Expansion of NEPS by constructing substation at Salang tunnel & transmission line from Jalalabad to Hesar-e-Shahi Industrial Park
- ❑ Will **widen national grid by connecting Afghanistan's North East Power System (NEPS) from Kabul to the Southern Electric Power System (SEPS) in Helmand and Kandahar.**
- ❑ Project cost of USD 814 million funded by USAID & AITF. Commissioning to be completed by December, 2018.

Afghanistan Transmission and Generation Expansion Plan - Possible Interconnection with Pakistan by Reinforcing SEPS' 220 kV

220 kV



ADB: AFG-TMK Regional Interconnection Project

Sheberghan 600 MW within 6 years.
Enough natural gas to fire more than 1,000 MW

CASA-1000 DC 500kV

ADB: AFG-TMK 500kV Interconnection

Hajigak Coal TTP Capacity: 800MW

Baghdara HPP Capacity: 210MW

Kunar HPP Capacity: 1089MW

ADB: Additional 500 kV Hindu Kosh Crossing (Salang Pass)
Resolve currently transmission capacity limitation

Surobi2 HPP Capacity: 180MW

USAID, USFOR-A and ADB: SEPS – South East Power System double circuit only one to be strung

Kajaki HPP 100MW

Interconnection with Pakistan reinforcing SEPS stringing the second circuit.

Legend

- Exist 220kV
- Future AC 500kV
- CASA- 1000 DC 500kV
- Future AC 220kV
- SEPS's 220kV Reinforcement to Pakistan

CASA-1000
(World Bank)

- ❑ Scope includes construction of 750 km 500 kV HVDC between Tajikistan (117km) through Afghanistan (562 km) to Pakistan (71 km) & construction of HVDC converter stations at Sangtuda (1300 MW), Kabul (300 MW) and Peshwar (1000 MW).
- ❑ Will enable trade of 1300 MW of hydropower from Central Asia (Kyrgyz Republic & Tajikistan) to South Asia (Afghanistan & Pakistan). Afghanistan will import 300 MW of power, with supply period from May to September. Project cost of USD 1170 million, funded by multiple multilateral agencies.
- ❑ Specific Benefits/Implications for Afghanistan:
 - ✓ Estimated annual revenue as transit fee from Pakistan: USD 45 million.
 - ✓ Tariff structure: Transmission-2.98 cents/unit, Energy- 5.15 cents/unit. Total of 8.13 cents.
 - ✓ Estimated project cost: USD 404 million (Afghanistan).
 - ✓ Additional 300 MW of power for North East region during May to Sep for 15 years.



- **Turkmenistan-Uzbekistan-Tajikistan-Afghanistan-Pakistan (TUTAP) Transmission Line (ADB funded)**
 - Construction of 500 kV line from the Turkmen border to Kabul and associated substations and DC/AC converter stations.
 - Will triple power availability to Afghanistan by allowing the import of up to 1,000 MW from Turkmenistan at low cost.
- **Kabul to Kandahar Transmission Line (USAID funded)**
 - Construction of a 490 km 220 kV line from Arghandi to Kandahar including seven substations and reactive power compensation.
 - Will connect the NEPS grid with the SEPS grid and provide access to abundant low-cost power to residents of southern Afghanistan.
 - Will displace high-cost diesel generation in Kandahar.



DABS – Future Growth Plans – Expansion of Distribution Network



Energy Sector Development Investment Project (ESDIP) (ADB)

- ❑ Scope includes:
 - ✓ Extension of 220 kV double circuit line from Kunduz to Taluqan substation
 - ✓ Development & rehabilitation of networks for 45000 household in Kunduz & Baghlan cities
 - ✓ Procurement of emergency equipment for 220 kV NEPS.
 - ✓ Extension of Chimtala substation.
 - ✓ Hiring of consulting services to assist DABS for Tranche 1 & 2.
- ❑ Will provide sustainable & reliable grid connected power supply in north east Afghanistan. Funding of USD 138.6 million approved by ADB (as a grant to Government of Afghanistan).

Energy Sector Development Investment Project (ESDIP) (ADB)

- ❑ Scope includes:
 - ✓ Connectivity for 50 villages in South-West Kabul – 44000 new connections in Year 1 & 124000 up to end of the project life.
 - ✓ Construction of double circuit line from Chimtala south S/S to Kabul south S/S.
 - ✓ Construction of substation at Chimtala.
 - ✓ Construction of low & medium voltage overhead distribution lines in Dashte Barchi & Arghandi.
 - ✓ Installation of 100 distribution transformers in Kabul.
- ❑ Will ensure sustainable & reliable grid connected power supply in north east Afghanistan. Funding of USD 81.5 million approved by ADB (Total project cost: USD 86.5 million).

DABS – Future Growth Plans – Expansion of Distribution Network

Contd...



Energy Sector Development Investment Project (ESDIP) (ADB)

- ❑ Scope includes rehabilitation & modernization of Girshik hydro power project & distribution system.
- ❑ Will provide better power supply to areas of Girshik district in Helmand province. Estimated project cost: USD 75.4 million – USD 43 million being provided by ADB as grant.

Energy Sector Development Investment Project (ESDIP) (ADB)

- ❑ Scope includes transmission sub-projects in north-west Afghanistan to extend network and connect to Turkmenistan system; and to extend distribution network to south-east and down south-east of Kabul.
- ❑ Will increase regional power trade and energy supplies in Afghanistan. Estimated Project cost: USD 203 million – USD 200 million being provided by ADB and rest of the funds provided by donor agencies.

Energy Sector Development Investment Project (ESDIP) (ADB)

- ❑ Scope includes construction and commissioning of 500/220 kV substation at Dashte Alwan to connect to a 500 kV transmission line traversing Hindukush mountains via Salang Pass, and augmentation of 300 MW transmission between north & south Afghanistan by 1000 MW to allow indigenous production as well as imports.
- ❑ Will provide better and cost-effective power supply to all customers in Afghanistan. Estimated project cost: USD 53 million – USD 49.1 million being provided by ADB as grant.

Capacity Building in O&M of Generation, Transmission and Distribution Functions

- ❑ Improved O&M practices in the Entire Value Chain:
 - **Annual Maintenance Plan:**
 - Will help in adopting a structured approach for O&M Planning.
 - Will enhance reliability of power supply.
 - **Standard Operating Practices:**
 - Will result in adoption of Best Practices in the O&M function.
 - Will minimise outages and rectification time by early detection of faults.
 - Will reduce life cycle costs of equipment.
 - Will improve personnel and equipment safety.
 - **Training and Certification Program for DABS O&M staff.**
 - Will identify training needs and help in structure Capacity Building.
 - **Oversight and Capacity Building for O&M of Tarakhil Power Plant.**
- ❑ Revenue Protection:
 - Customer Relationship Management Plan for **improved customer services.**
 - Development of monitoring tool for identifying abnormal consumer behaviour to control revenue leakages.
 - **Bulk Metering Plan** for **efficient Energy Audit** at Major Load Centres.
- ❑ Support for Kandahar Management:
 - **Fuel Management** and capacity building in Generation O&M.
 - Distribution System Improvement.
 - **Loss Reduction.**
 - Financial Accounting and Reporting.

Corporate Management Support

- ❑ DABS Corporate Governance:
 - Improved policies and procedures for accounting, management reporting, financial management, fund and asset, management will significantly improve management and governance function and bring in a culture of accountability.
- ❑ Financial Management:
 - Establish effective financial, cash and asset management system.
 - Will facilitate adoption of International Financial Reporting Standards.
 - Introduction of prudent budgetary practices.
 - Annual accounting statements completed on schedule.
- ❑ Personnel Policies and Procedures
 - Progressive HR Policies to improve overall work culture.
 - Improvement of Payroll Systems as per the USAID DABS Risk Management Framework.
- ❑ Procurement and Purchasing System
 - Implementation of improved Procurement Management System.
 - Timely preparation of RFPs, tender evaluation and award of work.
- ❑ Business Planning
 - Development of short term, mid term and long term business strategies and goals for DABS in line with sector objectives.
 - Business Model for five Load Centers for projection of Revenue, Expenses and Profitability will support Long Term Business Planning.
 - Preparation of Corporate Charter and Corporate Planning Procedures Manual.
- ❑ ERP Implementation

Automation for Inventory, Asset and Maintenance Management

- ❑ Computerised Maintenance Management System (CMMS):
 - Will **automate Inventory Management, Asset Management and Maintenance Management.**
 - Better management and control of inventory.
 - Proper recording and accounting of Assets.
 - Efficient system for Asset tracking and outage management.
 - Schedule maintenance activities.
 - Will facilitate budget preparation for all O&M activities.

Automatic Meter Reading, Billing and Collection

- ❑ Introduction of **Spot Billing, Spot Payment, Asset Indexing** to improve Billing & Collection.
- ❑ **Efficient and cost effective solution** for **processing, printing & distribution of bills.**
- ❑ mPower mobile app to be used as a software to enter meter readings, processing and printing of bills at consumer premises.
- ❑ Smart mobiles to be used by all meter readers along with blue tooth thermal printer.
- ❑ Monthly billing cycle proposed once process is streamlined.
- ❑ Payments can also be made at customer premises using the smart app & mobiles thus improving collection.
- ❑ **To be implemented across all provinces.**

- Kandahar demand for electricity of 130 MW far out-strips the 46.6 MW of available generation capacity:
 - ✓ Between 10-12 MW comes from Kajaki Hydro Power Plant.
 - ✓ 36.6 MW comes from diesel generators.
- U. S. Military subsidized fuel for 20 MW diesel generators but these subsidies end this month.
- Current tariffs do not provide DABS with full cost recovery for diesel fuel. So, operation of these generators is not sustainable. DABS is currently providing 3 MW of diesel generation from its own funds.
- DABS is working with the Governor of Kandahar and the Provincial Council to develop consensus on increasing tariffs to allow full fuel cost recovery.
- USAID is incentivizing IPPs to install and operate a 10 MW solar power plant to reduce the amount of diesel DABS will need to purchase.
- The issues will be resolved when the Kabul to Kandahar and TUTAP transmission lines are completed in late 2018.

DABS – USAID Cooperation for improvement of Afghanistan Energy Scenario



- ❑ DABS and USAID are working closely for the last several years to improve the power infrastructure in Afghanistan.
- ❑ USAID is providing financial support to DABS for implementation of numerous generation, transmission and distribution projects. USAID is also supporting projects for institutional capacity development in corporate management, commercialisation and IT implementation.
- ❑ The consumer base in Afghanistan has increased manifolds during the last decade. While this has brought about significant improvements in the overall power supply situation, it has also resulted in increasing the responsibilities and challenges of DABS.
- ❑ DABS is introducing international best practices in its operations every day and is striving to bring about excellence in its performance. DABS is poised to become a world class utility in the next five years.
- ❑ DABS is grateful to the US Government, and particularly to the USAID, for its continued support.
- ❑ DABS hopes to work with the USAID in close cooperation in the future, with the objective of improving the quality of power supply to the consumers of Afghanistan.



Thank You

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