USAID
FROM THE AMERICAN PEOPLE

INTERNATIONAL TRENDS IN CROSS BORDER ELECTRICITY TRADE

THE USAID POWER CENTRAL ASIA ACTIVITY

ALLEN EISENDRATH

6 OCTOBER 2021

IEA FOUND THAT CROSS BORDER POWER TRADE:

- Allows economies of scale in supply and demand
- Enables larger resources to be developed
- Provides countries with access to cheap source of supply
- Improves energy security & lowers costs of balancing.

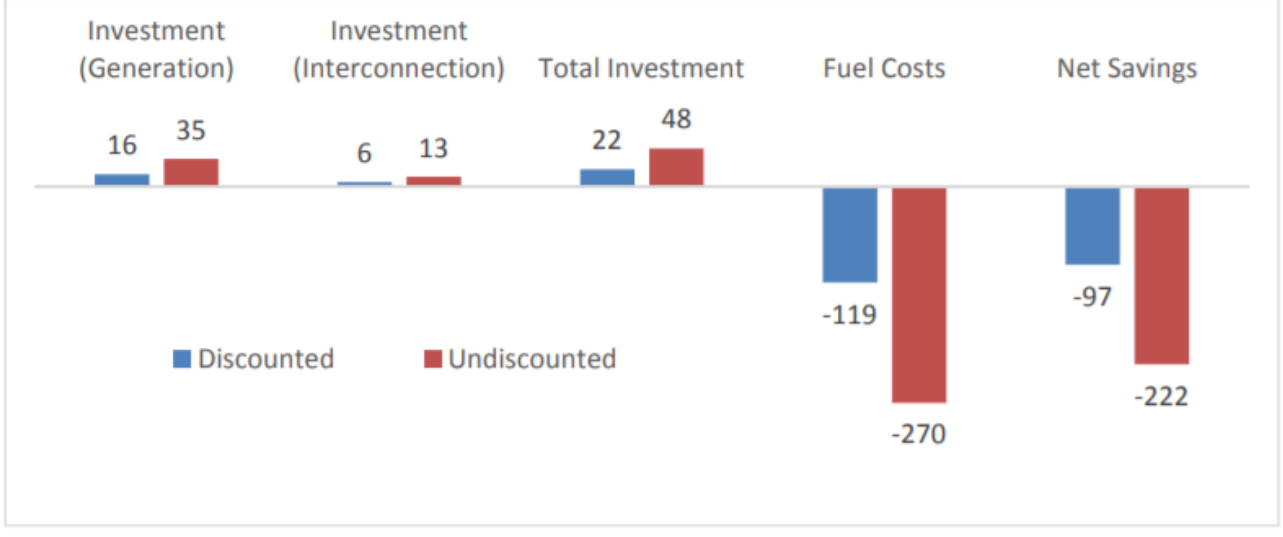
OFGEM'S "THE VALUE OF INTERNATIONAL ELECTRICITY TRADING" STUDY

- CBET improves efficiency of day ahead trading
- Commercial benefits are large compared to costs
- Arbitrage revenue for capacity trading with France & Netherlands > euro 300 million/year
- Total commercial value of Great Britain's largest interconnectors with France & Netherlands is euro 505 million/year
- Single Market of Ireland coupled with Great Britain in October 2018; efficiency of use of interconnection has improved. Earlier, power flows were in the wrong direction 50% of the time.

MANY STUDIES SHOW LARGE NET SAVINGS FROM CROSS BORDER ELECTRICITY TRADE (CBET)

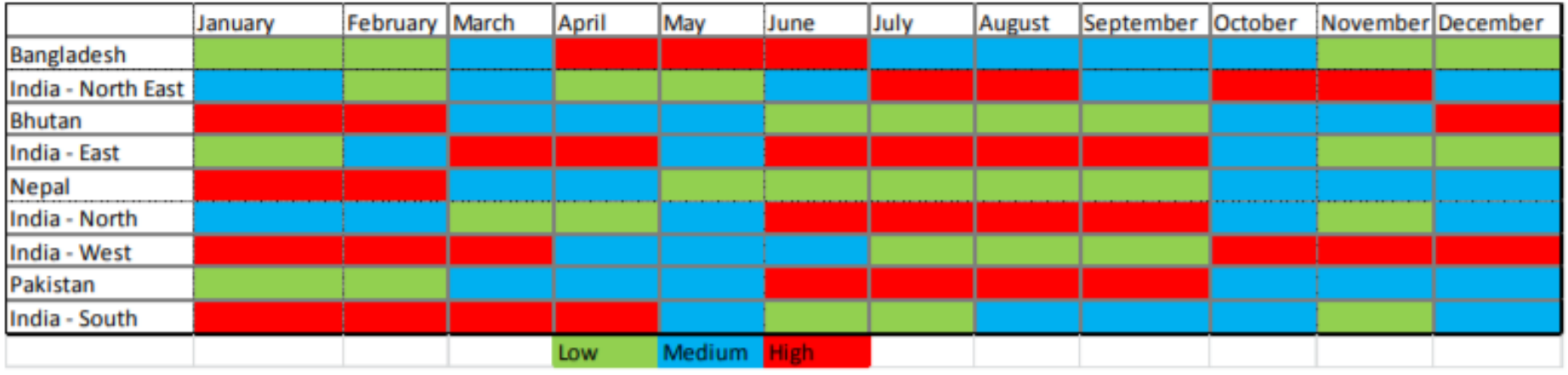
World Bank: How Much Could South Asia Benefit from Regional Electricity Cooperation and Trade?

Figure 3: Change in cumulative costs from the baseline due to regional trade over the 2015-2040 period (Billion US$)



COUNTRIES OFTEN HAVE LOAD PROFILES THAT ARE SEASONALLY COMPLEMENTARY

Figure 1: Seasonal complementarity in power systems in South Asia – Monthly Electricity Load Profiles across South Asian Grids



Sources: Authors' calculation based on CEA (2014) (India); Ali, Iqbal and Sharif (2013) (Pakistan); Kunwar (2014) (Nepal); Bangladesh Power Development Board (2013) (Bangladesh).

https://openknowledge.worldbank.org/bitstream/handle/10986/22224/How0much0could0peration0and0trade00.pdf?sequence=1&isAllowed=y

BENEFITS IN LATIN AMERICA

- World Bank found CBET between 20 LAC countries would increase trade by 29% and provide a $2 billion economic gain
- SIEPAC regional transmission system found investment savings of $1.4 billion; increase in regional CBET of 15%

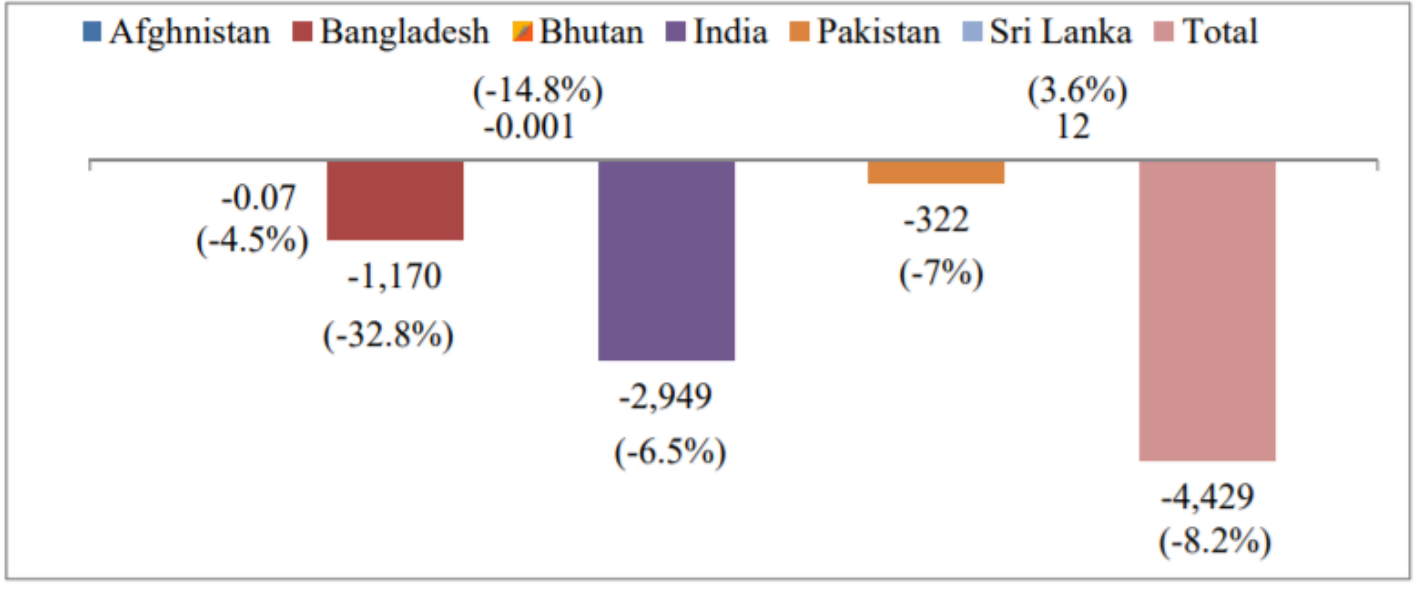
Source: Global Infrastructure Connectivity Alliance

Source: wita.org/atp-research/latin-America-cross-border-electricity

CBET CAN ALSO REDUCE CARBON EMISSIONS

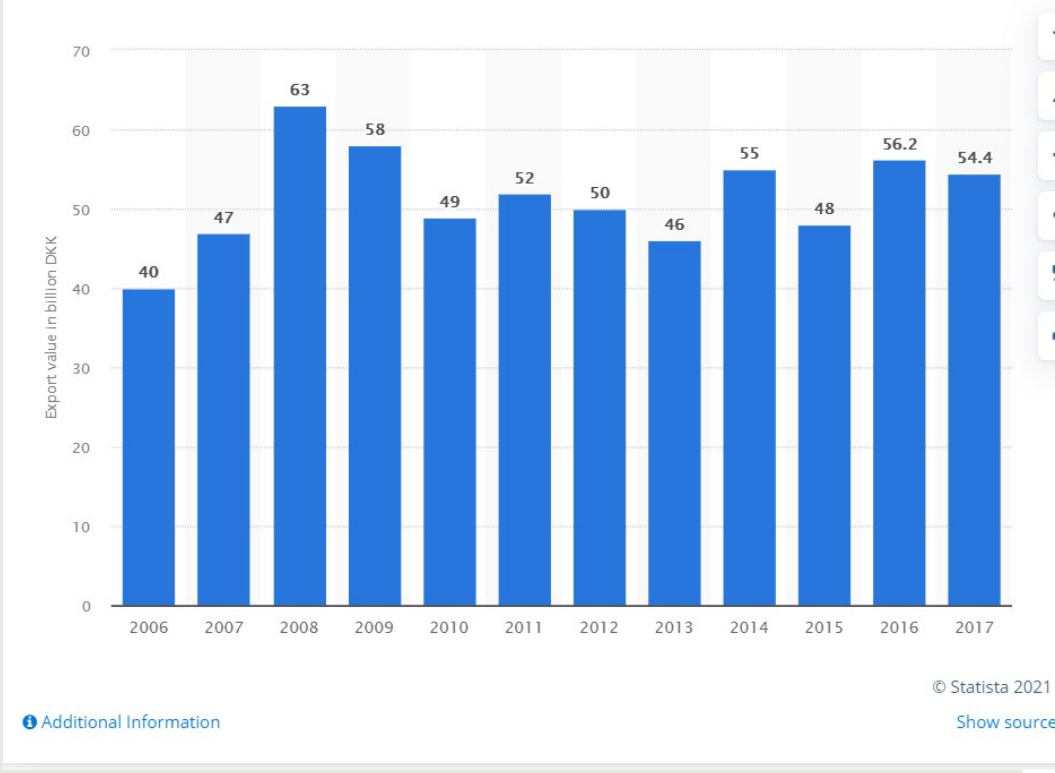
World Bank: How Much Could South Asia Benefit from Regional Electricity Cooperation and Trade?

Figure 5: Change in total CO_2 emissions due to the full regional trading over the 2015-2040 period, expressed in million tons and percentage



CBET ALLOWS OPTIMIZATION OF LOCAL RESOURCES: THE SWISS & DANISH EXAMPLES

- Switzerland has a summer production surplus of 1.8 to 7.3 TWh & winter deficit of 0.6 to 9.8 TWh. Summer production is exported; winter deficit is imported.
- Switzerland uses cheap night energy from Europe to fill pumped storage reservoirs.
- Hydro plants can provide high value flexibility services to neighbors
- Denmark's wind energy reached 135% of demand in 2013, and now a large percentage of wind generation is exported to neighbors
- In 2017, electricity exports were US$ 8.4 billion



Danish wind export revenues; Source: statista

WHY ARE RENEWABLES DRIVING CBET?

- Export of low-cost wind and solar
  - Solar reached US $13/MWh in recent UAE auction, and US $17 in Uzbekistan's auction
  - Average price in Chile's "round the clock" technology neutral auction was $23.8/MWh
  - Average settlement price for Danish wind power in 2019: DKK 0.265 (US$0.0396/EUR 0.0355) per kWh
- Need for more balancing energy & larger balancing areas
- Best resource locations often have more generation potential than local demand

Abu Dhabi solar plant; Source: Financial Tribune

FINAL THOUGHTS ON CBET & CLEAN ENERGY

- Allows trade in balancing & ancillary resources
- High value resources can provide large scale cheap energy
  - Wind from Kazakhstan
  - Solar from Uzbekistan &Turkmenistan
  - Hydro energy from Tajikistan & Kyrgyz Republic
- Makes resources available where they are more valuable
  - Hydro generation for flexibility
  - Wind for winter energy deficits
  - Solar for better reservoir management

ENI wind plant in Kazakhstan;
Source: ENI

THE USAID POWER CENTRAL ASIA ACTIVITY

ALLEN.EISENDRATH@TETRATECH.COM

USAID
FROM THE AMERICAN PEOPLE