PPPs in ASEAN and CAREC and the Scope for PPPs in Renewable Energy Projects

Unlocking Private Investment in Sustainable Infrastructure in Asia: Lessons from Central Asia

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(David and Causevic, 2020)

Introduction

- Currently, 70% of GHGs emissions come from infrastructures
  - such as electricity generation, transportation, industry, and buildings
  - building low-carbon and climate-resilient (LCR) infrastructure is crucial
- >$93 trillion required until 2030 to meet infrastructure needs
  - across transport, energy, telecommunications and others
  - $13.5 tril (0.9 tril/year) additional LCR infra investment (Bhattacharya et al., 2015)
- Such investments will “lock-in” future emission levels
  - Though public funds required for re-allocation and mobilizing private funds
  - Private sector investments will take the largest share, esp. project developers
- ASEAN and CAREC countries face shortage of climate finance
  - Aims to look at public sector to leverage private participation in green PPPs
  - CAREC countries since 1997 (ADB) and ASEAN member states (AMS)

(David and Causevic, 2020)

Background

- For ASEAN economic growth and demography drive energy demand
  - Many are revaluating their energy policy – higher electricity prices, risk from fossil fuel, falling costs of renewables, endowed natural resources
  - PPPs in hydropower followed by solar power projects current trend
  - Challenges still include public sector coordination, greening the financial sector, making clean energy prices competitive vis-à-vis fossil fuels
- CAREC members targeting a reliable and affordable electricity market
  - While RE adoption has been slower, gradual increase in PPP projects
  - Diverse group of countries mean quite different levels of policy and regulation
  - Given gas is abundant in the region, it is expected to serve as a transition fuel, until more RE projects
- Crucial determinants of RE markets in these regions:
  - Constrained public funding and not enough to crowd in private and PPPs
  - Improvements in legal and regulatory environment for PPPs (esp. CAREC)
  - Policy direction such as subsidies for oil, coal and natural gas vs. RE

(David and Causevic, 2020)

ASEAN installed and targets – RE in power

Country	Target Year	RE Targets	Most RE Technology Preference	RE Installed in 2014 (MW)	How far?
Brunei Darussalam	2025	954 GWh (*	Solar Energy (954 GWh)	1.67 (**	0.2%
Cambodia	2020	2,241 MW (*	Hydropower (2,241 MW)	952	42%
Indonesia	2025	46,307 MW	Hydropower (21,300 MW)	6,680 (*	16% (*
Lao PDR	2025	951MW (*	Small hydro (534 MW)	3,348	5% (*
Malaysia	2050	21,370 MW	Solar Energy (18,700 MW)	6,286	29%
Myanmar	2016	472 MW (*	Small hydro (472 MW)	3,204	N/A
Singapore	2020	350 MWp (*	Solar Energy (350 MWp)	33.1 (*	9% (*
the Philippines	2030	15,236 MW [2]	Hydropower (8,937 MW)	5,898	38%
Thailand	2036	19,684 MW	Solar Energy (6,000 MW), Biomass (5,570 MW)	7,901	40%
Vietnam	2030	45,800 MW	Hydropower (27,800 MW)	17,140	37%

Source: (Pranadi, 2016)

(David and Causevic, 2020)

CAREC installed and targets in RE power

Selected Country	Target year	RE Target
Afghanistan	2030	30% renewables as a share of total electricity generation capacity
Azerbaijan	2020	20% of electricity consumption must be met by electricity generated from renewable energy sources
China	2030	20% non-fossil fuels in primary energy consumption
Kazakhstan	2050	50% of renewable power (including nuclear) generation until 2050
Mongolia	2030	30% renewables as a share of total electricity generation capacity
Pakistan	2030	30% renewable energy in total power generation
Tajikistan	2030	10% renewables as a share of total electricity generation capacity
Uzbekistan	2025	20% renewables as a share of total electricity generation capacity

Source: IEA 2020 and LSE 2020

(David and Causevic, 2020)

PPP in RE and study methods

- RE projects have particular challenges and public finance is crucial
  - RE require a high up-front investment, private sector capital, technology, and innovation
  - So PPPs can be used to crowd-in private finance with limited public funds
- As many of these countries are developing or middle-income
  - They have a lower infrastructure base with their citizens' limited ability to pay for their services
  - So the government cannot raise the needed funds through taxation
- provide policymakers with an integrated review of PPPs
  - Associated public policy interventions in these two regions that have been heavily reliant on coal and other carbon-intensive energy source to RE through PPPs
  - Data from World Bank Group’s Private Participation in Infrastructure (PPI database 1995 - 2018)

(David and Causevic, 2020)

PPPs and investment in various sectors/regions

PPPs investments by sub-sector (top) globally, 1995–2018

Primary sector	Subsector	Number	US$ Million
Energy	Electricity	4393	860,668
Transport	Roads	1067	305,644
Transport	Railways	249	114,221
Information and communication technology (ICT)	ICT	413	113,772
Transport	Airports	200	106,538
Transport	Ports	542	82,696
Energy	Natural Gas	560	71,682
Water and sewerage	Water Utility	446	48,065

Authors calculation from PPI Database 2019

Est. Infrastructure Investment Needs 45 DMCs, 2016–2030

Sector/Region	Baseline est. ($bill 2015 prices)	Climate- adjusted est. ($bill 2015 prices)
Power	11,689	14,731
Transport	7,796	8,353
Telecommunications	2,279	2,279
Water and Sanitation	787	802
Total	**22,551**	**26,166**

Central Asia	**492**	**565**
East Asia	13,781	16,062
South Asia	5,477	6,347
South East Asia	2,751	3,147
Total	**22,551**	**26,166**

ADBI, 2017

(David and Causevic, 2020)

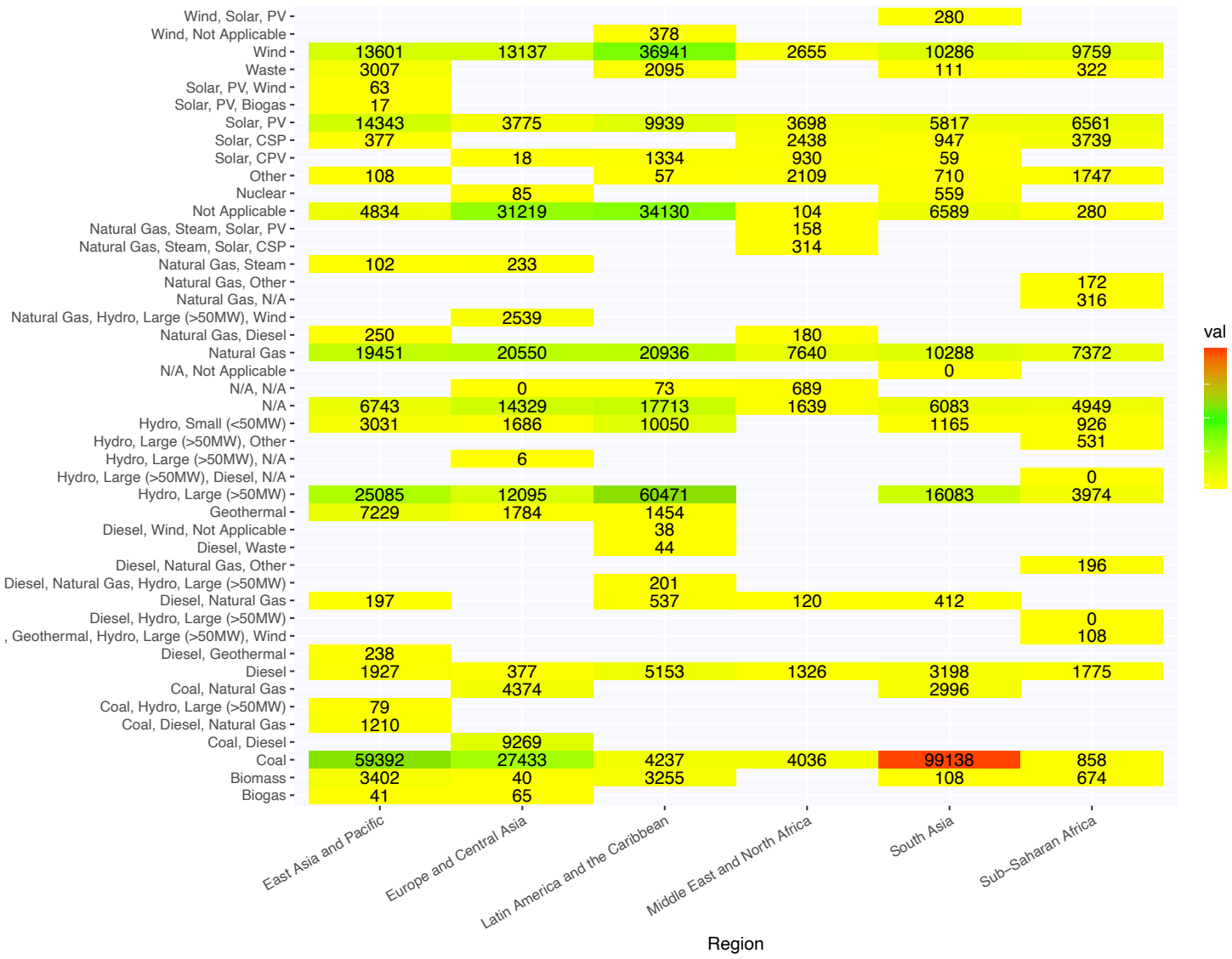
Worldwide PPP trends in RE by tech and region - 2000–2018 ($ million)

Largest private-public partnership investments go to hydro, solar, and wind technology-based electricity generation projects

PPPs in many RE technologies gaining prominence in many regions, especially in the last five years

South Asia has received the largest share of PPP investments in the previous 18 years, reaching $ 99.1 billion, followed by East and the Pacific, which received US$ 59.4 billion cumulatively, while CAREC received only US$ 26.7 billion.

Source: Authors calculation from PPI Database 2019, World Bank



(David and Causevic, 2020)

ASEAN energy PPP project, by tech and country – 2000–2018 ($ million)

Interestingly ASEAN countries have also entered the renewable energy race

With governments also providing policy support to RE investments and supply.

E.g. Vietnam's government has raised the feed-in tariffs paid for wind power exported to the grid and plans to introduce the same tariffs for solar energy projects soon

But in even in ASEAN countries, hydro, has attracted the most project-based financing

Source: Authors calculation from PPI Database 2019, World Bank

(David and Causevic, 2020)

ASEAN energy PPP project by tech – 2000–2018 ($ million)

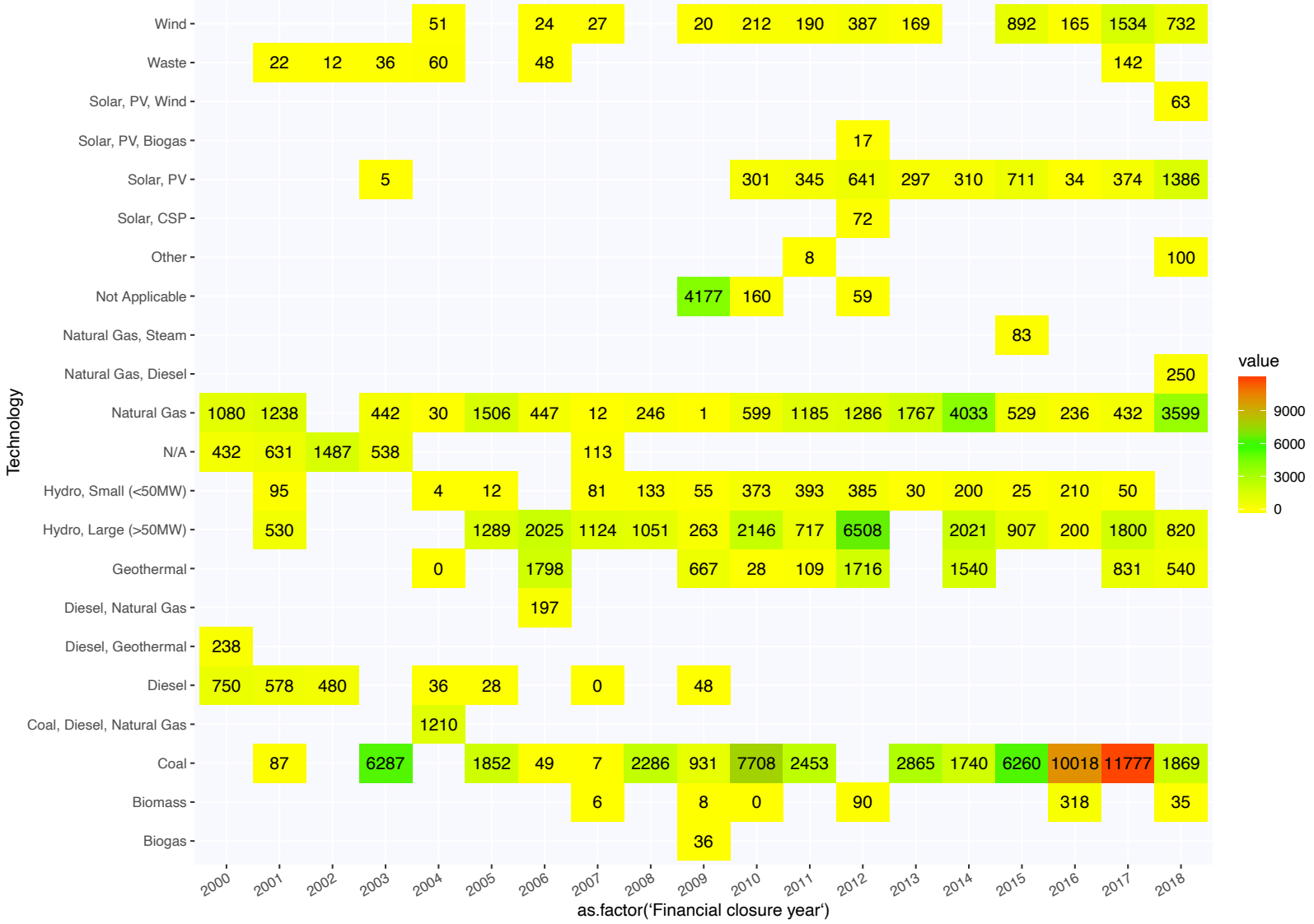
PPP wind energy investments started in 2004 and solar PV since 2010, they have been increasing consistently, with Vietnam, Thailand, and Malaysia leading

Indonesia's though heavily reliant on coal has also been investing heavily in hydro and geothermal RE as it located in volcanic regions

Thailand has established subsidies and tax incentives for various waste-to-energy power generation projects, including biomass and biogas

Laos heavily reliant on large hydro

Source: Authors calculation from PPI Database 2019, World Bank



(David and Causevic, 2020)

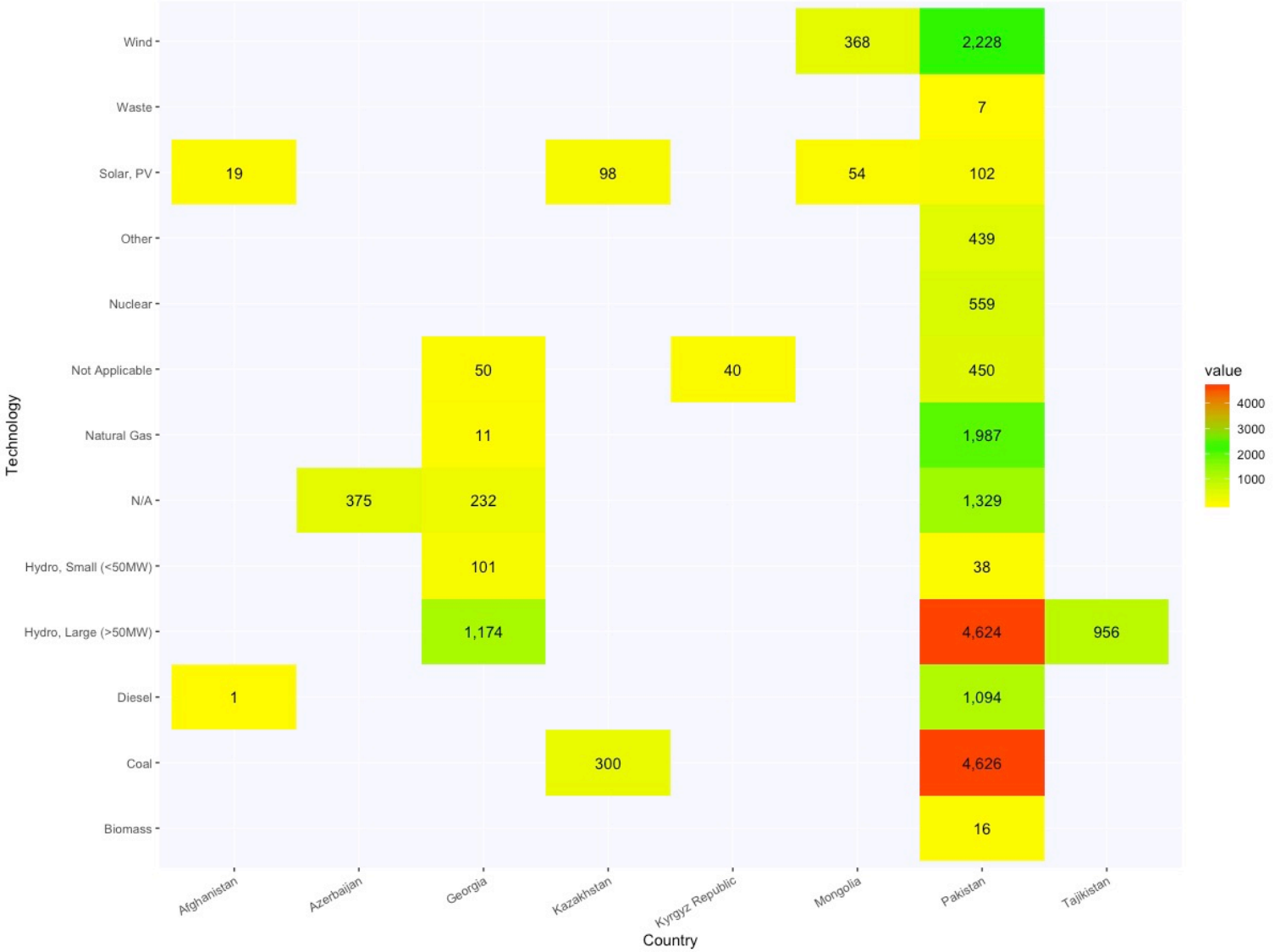
CAREC energy PPP project by country – 2000–2018 ($ million)

Pakistan dominates electricity PPP projects investments across technologies and particularly in coal and large hydro, followed by wind and even natural gas. Coal PPP projects esp - US$ 4.6 billion

Other countries with a large proportion of PPP investments in large hydro have been Georgia and Tajikistan.

Wind PPPs have only been implemented in Pakistan, taking the lion's share, followed by Mongolia. Solar PV PPPs are only taking off in Kazakhstan (US$ 98 million) and Mongolia (US$ 54 million)

Source: Authors calculation from PPI Database 2019, World Bank



(David and Causevic, 2020)

CAREC energy PPP project by tech – 2000–2018 ($ million)

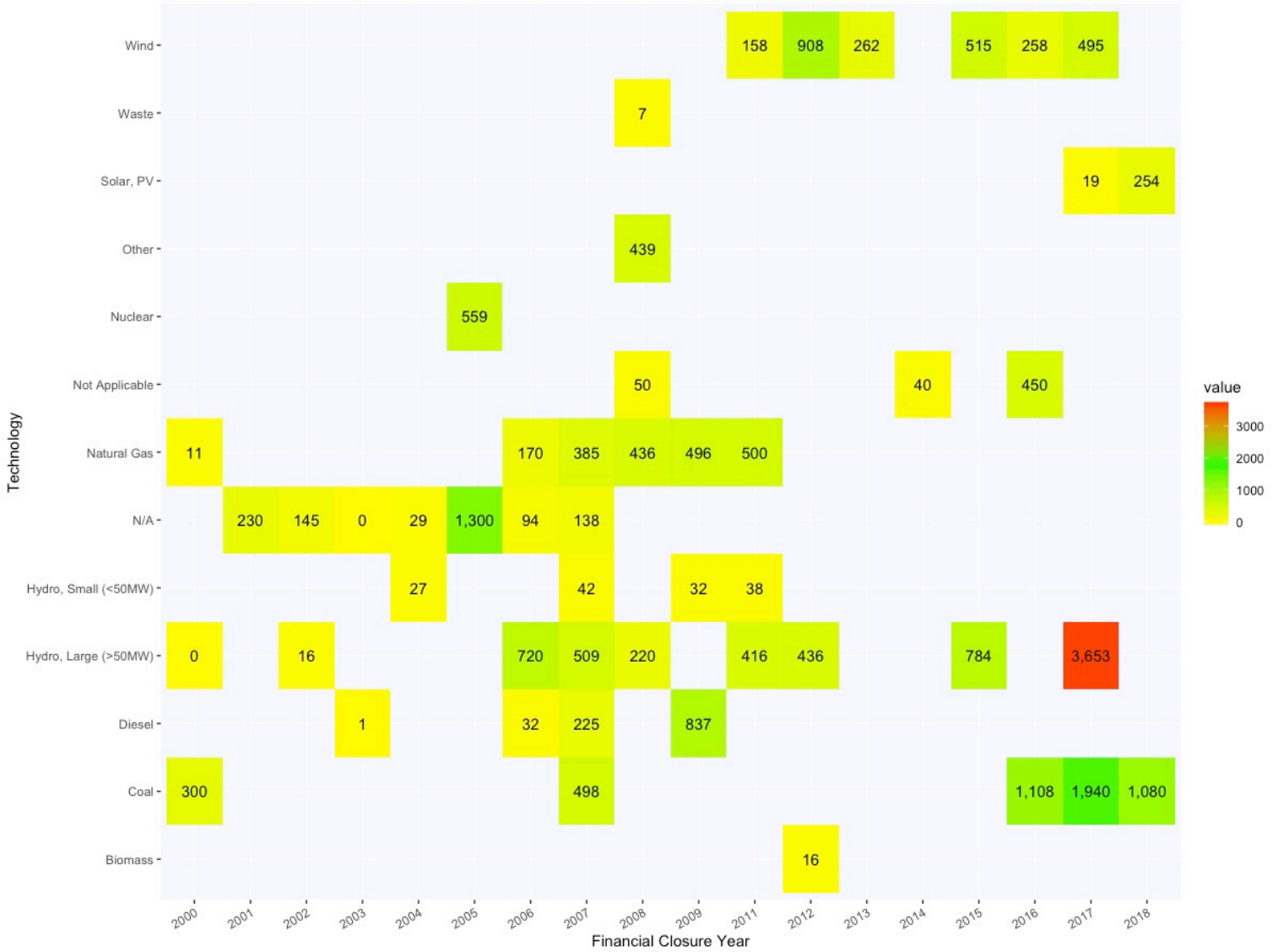
Solar PV is only yet to take off with most of the investments only coming in 2018, US$ 254 million

Wind peaked in 2012 and has yet to see its investments again

Hydro has seen it levels peak recently in 2017

Coal is PPP investments rise again recently which not a good trend

Source: Authors calculation from PPI Database 2019, World Bank



(David and Causevic, 2020)

Conclusion:

- We also analysed top 3 projects by technology and region
  - In ASEAN interestingly Laos PDR dominates in large hydro (3/3), while Pakistan and Tajikistan dominated in CAREC
  - In ASEAN solar PV, Vietnam, Malaysia and even Myanmar saw large investments, in CAREC it was Pakistan, Mongolia and Kazhakstan
  - In ASEAN wind, Thailand and Vietnam dominate the size of investments, while in CAREC it was Pakistan all the way (3/3)
- Technology disruption is gradually changing global energy landscape
  - Stranded asset risk still remain, other risks are due to regulation such as off-taker risk, currency risk, policy risk, and liquidity and scale risks
  - Many countries subsidize and provide FDI allowances for coal projects
- Financing from overseas and regional coordination has helped
  - Chinese and Thai investments playing a significant role in ASEAN, Chinese in CAREC esp. in Pakistan
  - Low-carbon energy systems with local supply will provide cheaper costs and energy security
  - Energy grid coordination – 5 Central Asian countries and greater Mekong subregion

(David and Causevic, 2020)

- PPP in RE project investment based on endowment esp. for energy security
- Hydro in resource poor countries in ASEAN and CAREC
- Regulation and legal protection for PPPs and policy signals
- Increasing PPPs in solar and wind especially in ASEAN and Pakistan
- Regional cooperation and external investments in RE for power sector

Broader themes emerging from the research

(David and Causevic, 2020)