



CLEAN ENERGY INVESTMENT ACCELERATOR

*Commercial and Industrial Rooftop Solar PV:
Vietnam Market Overview and Update*

17 April 2019



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Clean Energy Investment Accelerator (CEIA)



is an innovative public-private partnership focused on improving opportunities for corporate clean energy purchasing

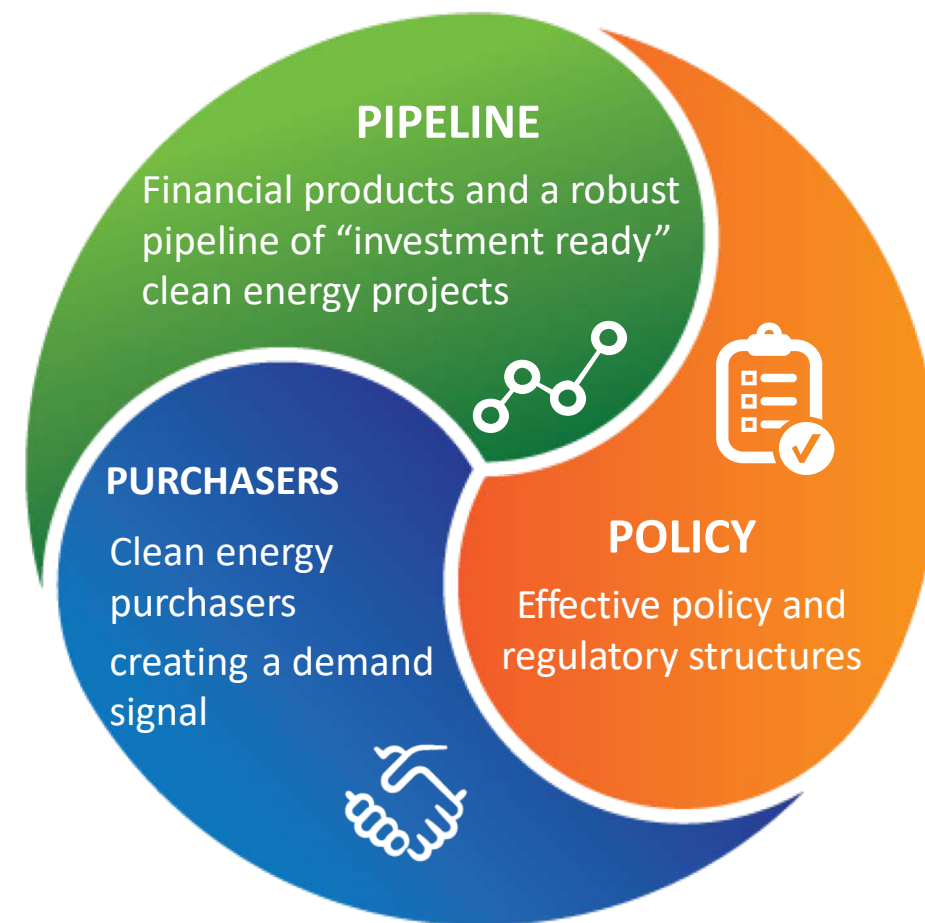
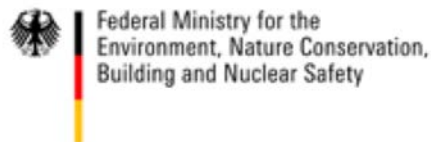
The CEIA is co-led by:

- **World Resources Institute (WRI),**
- **Allotrope Partners**
- **U.S. National Renewable Energy Laboratory (NREL)**

We work across emerging markets, including Mexico, Colombia, Vietnam, Indonesia, and the Philippines.



The CEIA is funded and supported by key partners, including:



CEIA Approach and Activities



Dialogue and engagement with market participants, i.e. RE Buyers Working Group



Supporting policy and regulatory development, i.e. DPPA and RTS



Direct technical and transaction support to corporate buyers through RE project feasibility assessments and procurement/RFP assistance



Technical assistance to other market stakeholders, i.e. banks

CEIA aims to improve and increase opportunities for corporate procurement and usage of clean energy in Vietnam.

Agenda

Corporate Rooftop Solar PV:

- A. Market Activity and Updates – Evan Scandling, CEIA
- B. Policy and Regulatory – Dr. Quynh Chi Trinh, CEIA

Q&A – 15 minutes

Direct Power Purchase Agreement:

- A. DPPA Pilot Program Overview and Next Steps – Gary Zieff, USAID V-LEEP

Q&A – 15 minutes

Vietnam Power Sector Transition

6-7%
GDP growth

55-60%
electricity demand from
C&I segments

3.7, 10 and 12 billion
kWh projected supply
shortage (2021-2023)

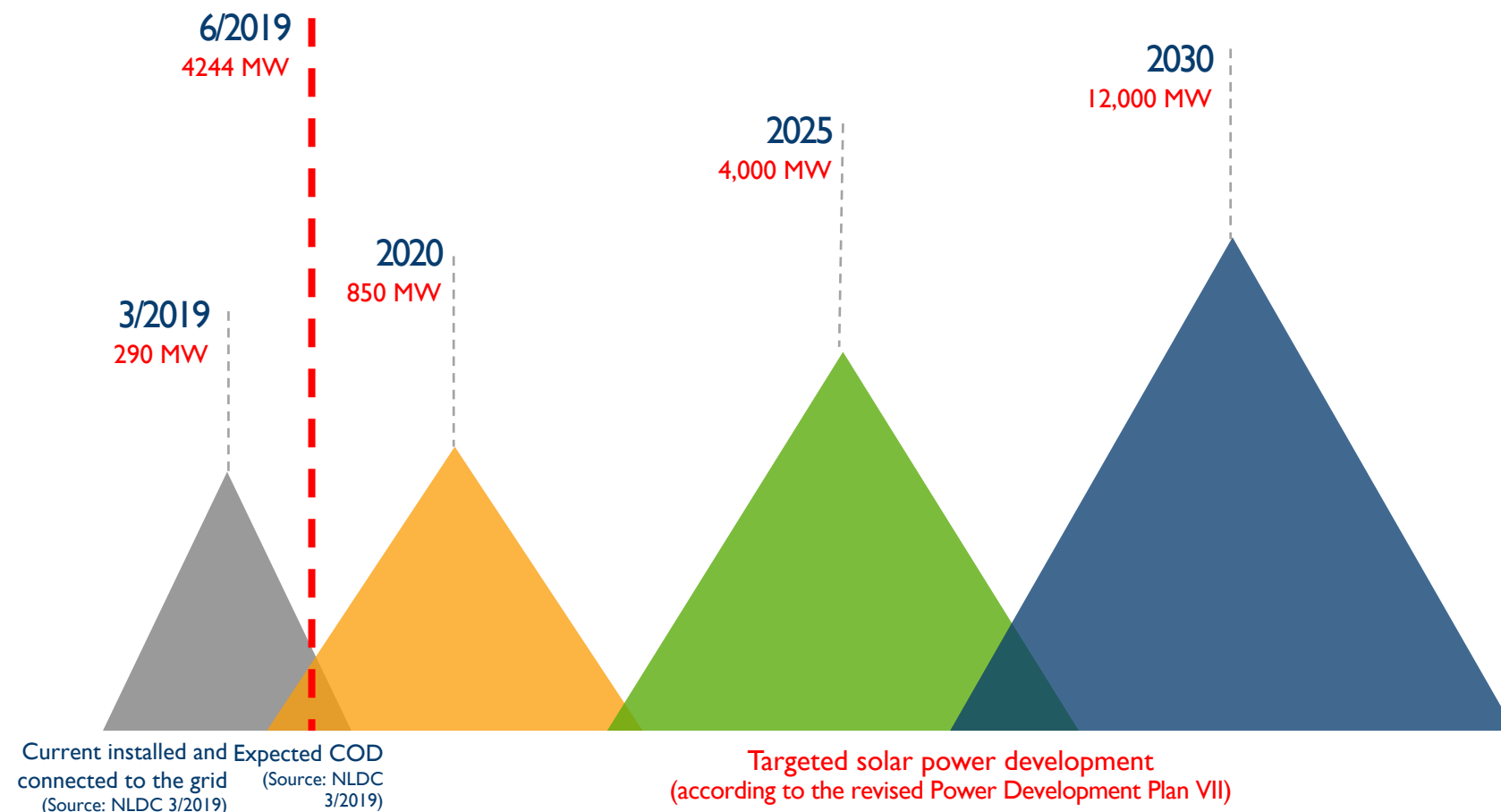
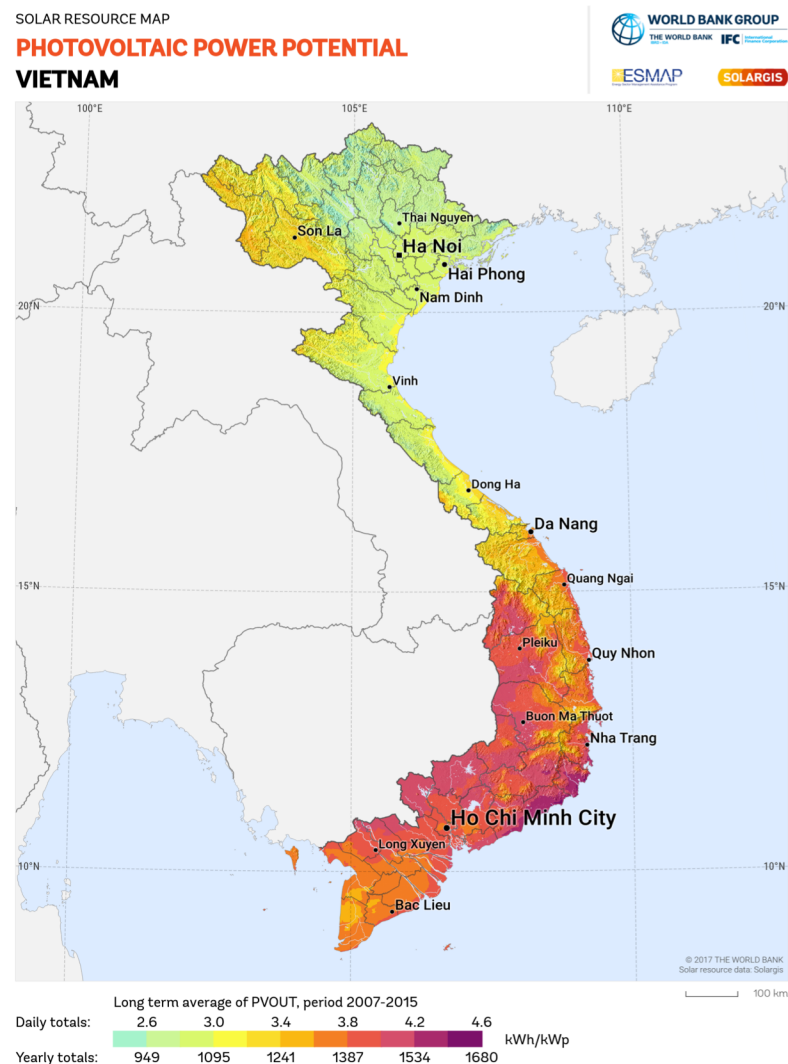
8-10%
Electricity annual
demand growth

50 GW → 130 GW
installed capacity by 2030

\$150 billion
investment by 2030

Electricity Market Liberalization

Vietnam Solar PV Market Potential & Targets



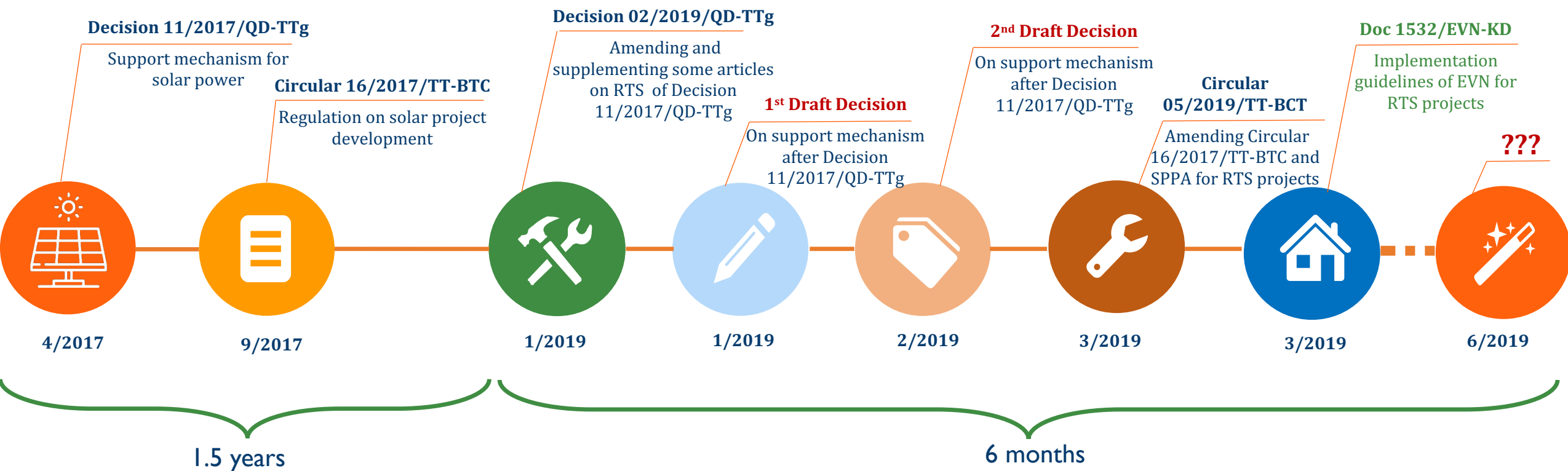
This map is published by the World Bank Group, funded by ESMAP, and prepared by Solargis. For more information and terms of use, please visit: <http://efobalsolaratlas.info>

Rooftop Solar Market Growth

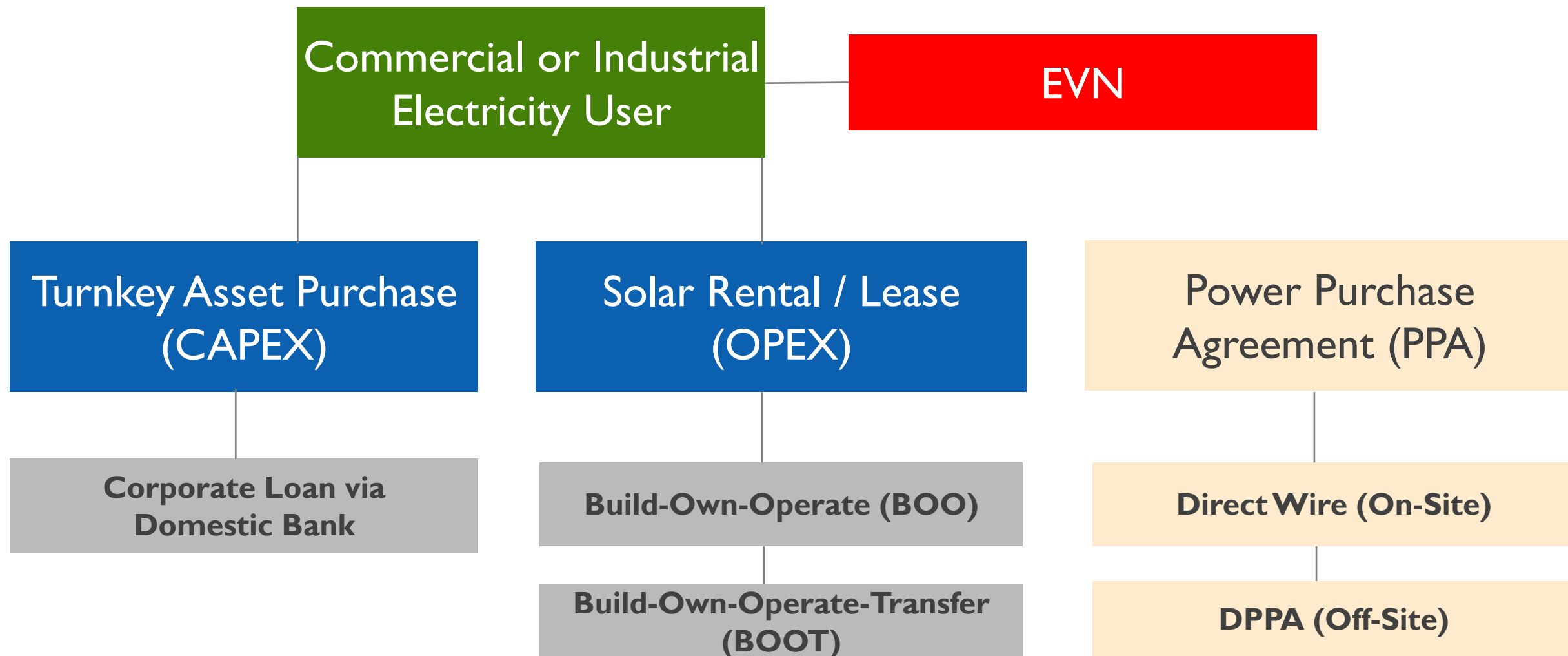
	2017-2018	Jan-June 2019	July 1 (“FIT 2”)
Support Mechanism	Net-metering, COD by 30/6/19	Net-billing, COD by 30/6/19	4 models, effective 1/7/2019
FIT Level	9.35 US/kWh	9.35 US/kWh	Zonal FITs (4 zones)
Capacity Limit	1 MW	1 MW	1 MW
National RTS Installed Capacity	17.5 MW	> 30 MW - 50 MW	
Number of RTS Consumers	1,510	1,800	
Main Market Segment	Households	Commercial & Industrial	Commercial & Industrial
Third-Party Financing	Unclear	Unclear	Possible
Primary Contract Models	Leasing, CAPEX	Leasing, CAPEX	Leasing, CAPEX, PPA
Excess PV Payment	Stuck due to tax issues	2 separated flows and taxed	2 separated flows and taxed

EVN Retail Tariff Increase on 1st April 2019: ~ 7% increase for industrial energy users during daylight hours

Solar Policy: In Transition



Available C&I Rooftop PV Contract Models



C&I Rooftop Solar Contract Features

- In lieu of PPA availability, long-term leases are prevalent
- Long-term leases, i.e. 15-25 years
- “Lease-to-own” / “BOOT” options oftentimes available at the end of the contract
- Operating leases and financial leases, depending on customers and investor
- VND or USD
- “Meet or beat” current EVN prices for “industrial” ratepayers
- Strong business cases for “commercial” ratepayers

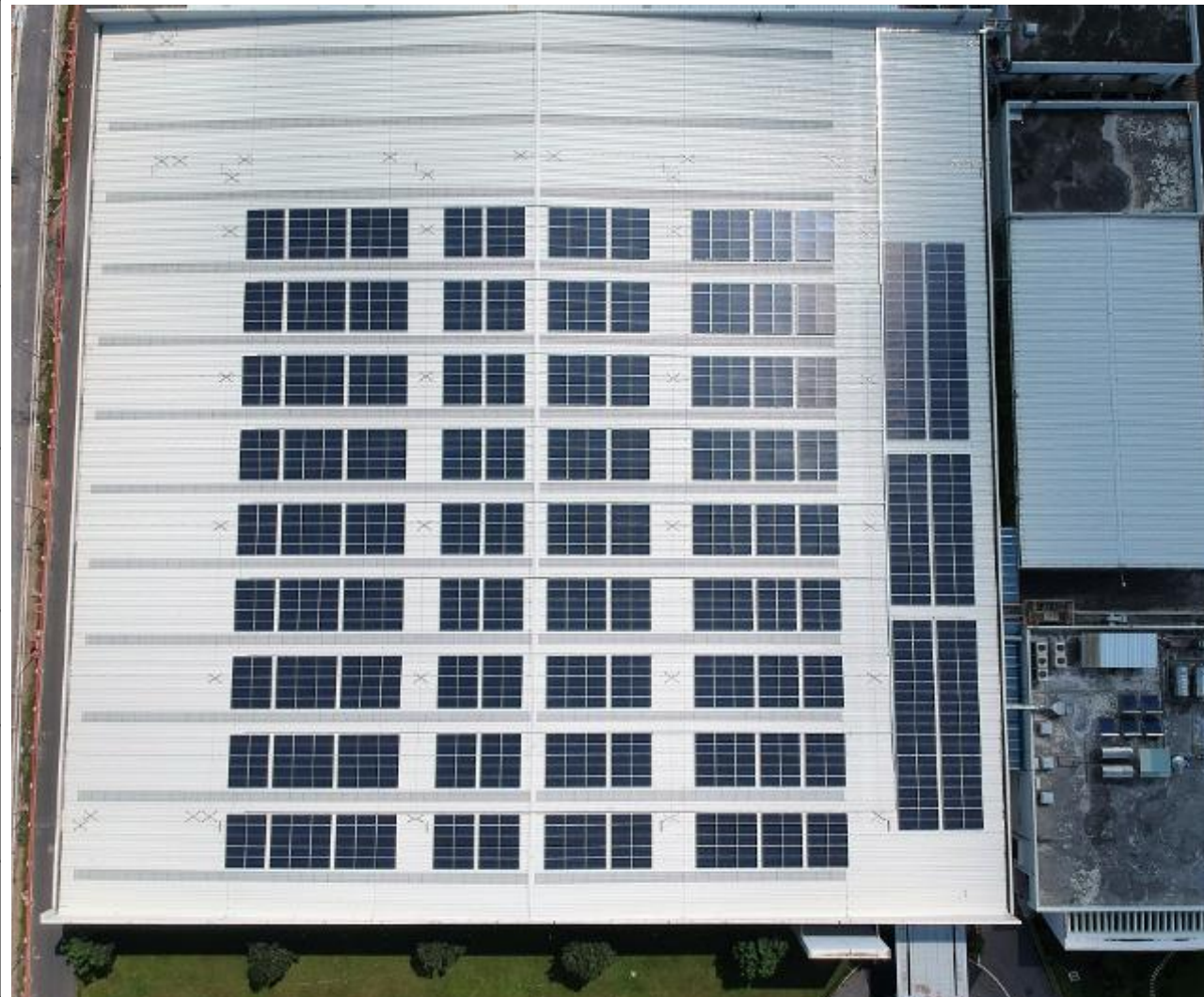
Snapshot: Factory Rooftop Solar – Long An

Customer	Dinsen (apparel manufacturer) <ul style="list-style-type: none"> ▪ Adidas supplier
Capacity	999 kWp
Usage	Self-consumption; Excess sold to EVN at \$9.35 US cents/kWh
Contract Type	20-Year Operating Lease (BOOT)
Developer	Indefol Engineering
Equity Investor	Skylight Power
Lender	HD Bank
CO2 Reduction	25,000 tons of CO2 during 25 year lifetime



Snapshot: European MNC Manufacturing – HCMC

Customer	European MNC “SMART” Factory
Capacity	422 kWp
Annual Production (Estimated)	538 MWh
Usage	Self-consumption
Contract Type	15-Year Lease
Developer / Investor	Cleantech Solar
CO2 Reduction	6,700 tons across contracted period



A market in transition – Overcoming barriers



Legal and Regulatory

- 1 Limited communication and dissemination on solar power development
- 2 EVN and PCs cannot sign the PPA with consumers due to the lack of official guidelines on electricity settlement
- 3 EVN is the sole buyer
- 4 Permitting and licensing requirement for over IMW RTS projects



Financial incentives

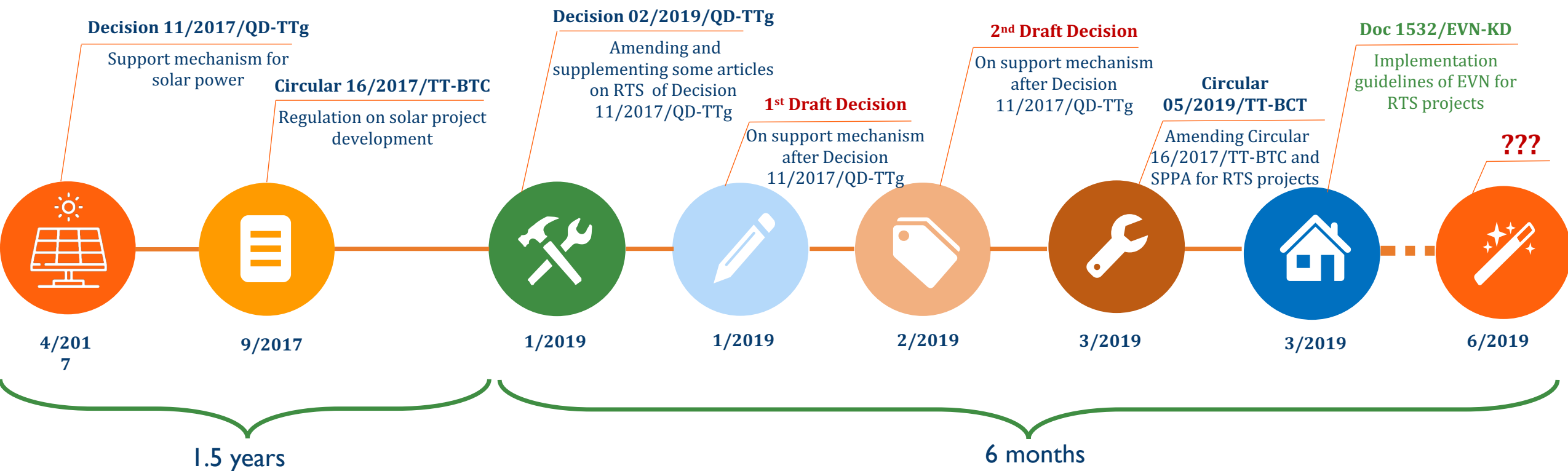
- 1 Lack of rooftop solutions, investment models
- 2 Lack of regulations for investors (third party) to invest in solar power facilities
- 3 Cost of solar power facility is high and does not encourage consumers in investment



Technical

- 1 Lack of national technical standards on solar power equipment and facilities
- 2 Lack of regulation on construction, roof structure load for rooftop installations
- 3 Lack of information on product quality, installation agency, operational mode, equipment warranty

Solar Policy: In Transition



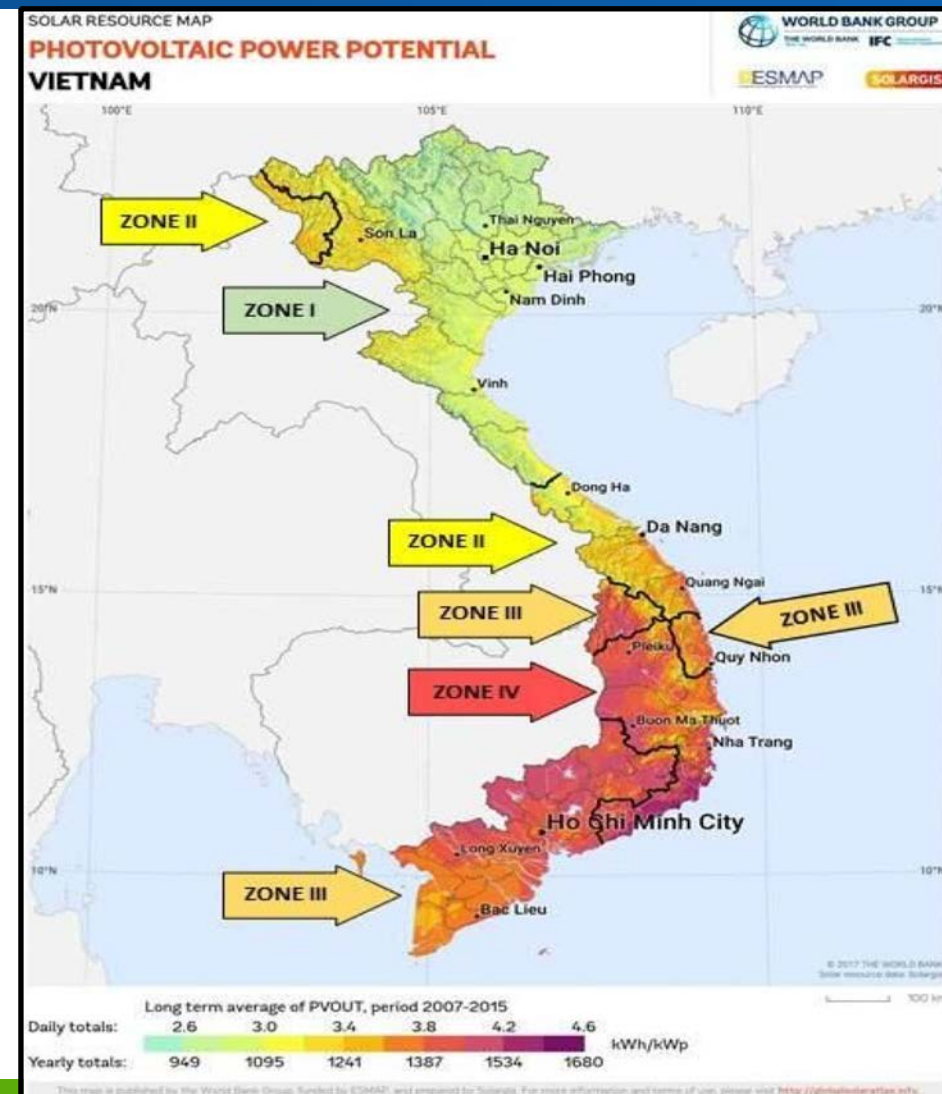
Draft Decision: Main Features for Rooftop Solar

Four (4) zones to determine feed-in-tariff / net billing

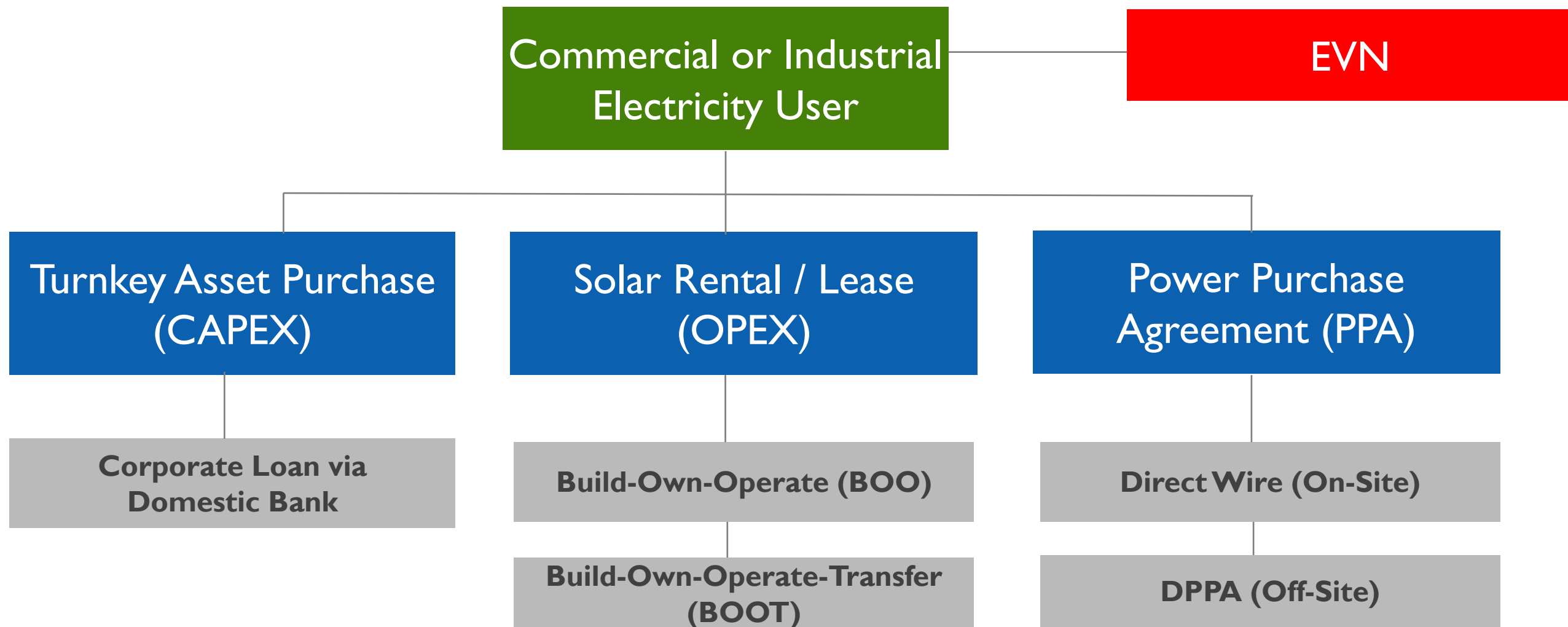
Anticipated Net Billing Payment Levels

(in U.S. Dollar Cents)	Zone I	Zone II	Zone III	Zone IV
Starting July 2019	¢ 10.87/kWh	¢ 9.36/kWh	¢ 8.38/kWh	¢ 7.89/kWh

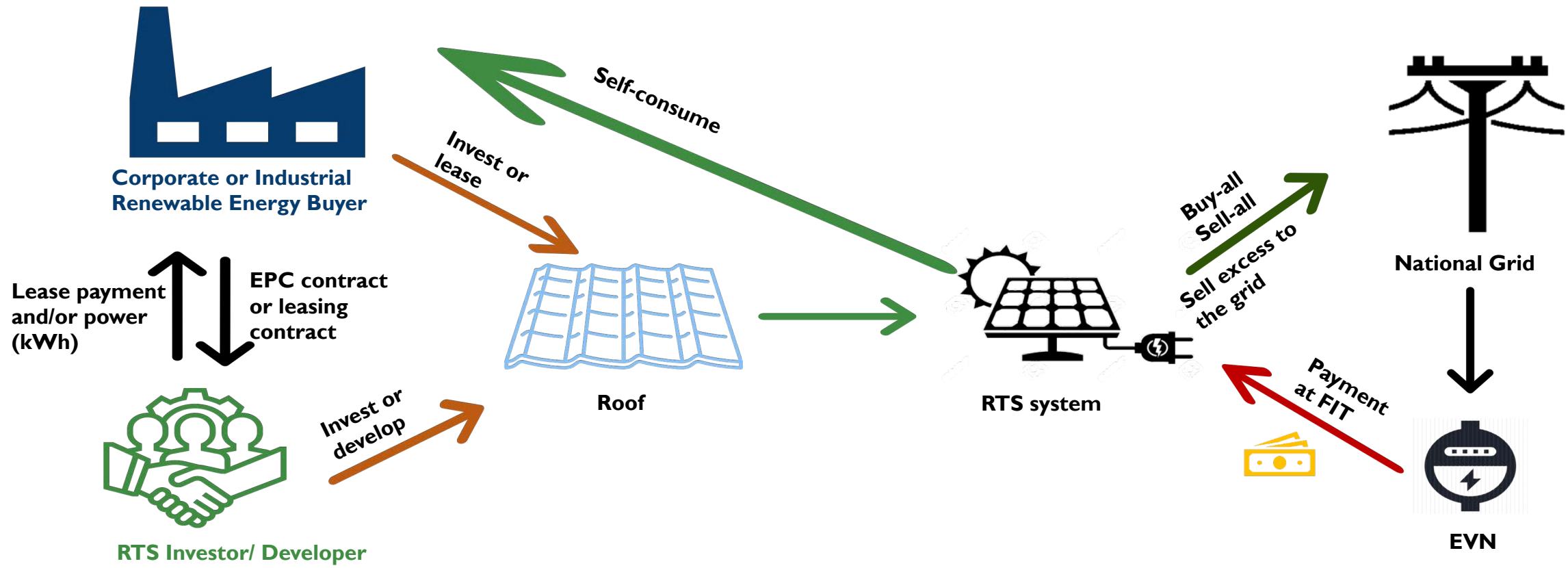
- Payment levels highest for lower quality solar resource regions
- Designed to drive deployment in those areas where solar is less competitive
- More RTS business models, open for activeness of various stakeholders



Possible C&I Rooftop PV Contract Models



Possible RTS models for Corporate Buyers



To expect...

RTS for C&I buyers



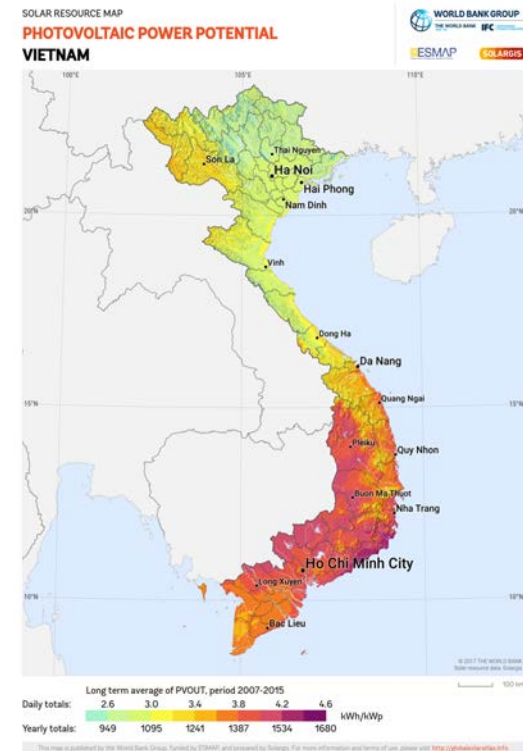
Dinsen Long An Project

Direct PPA without EVN grid usage
(Industrial zones)



Source: Blue Oak Energy

More RTS
investment up-
North



Takeaways

- RTS market showing strong growth in late-2018 and 2019
- RTS is a strategic focal point of GVN and EVN to satisfy increasing power demand and combat supply shortages with limited transmission and distribution capacity
- July 1st 2019 to be significant milestone in RTS market transition
- Moving toward more attractive project financials and procurement/contract options