2022 South Korea

RE Invest Indonesia
Indonesia Solar Outlook 2022

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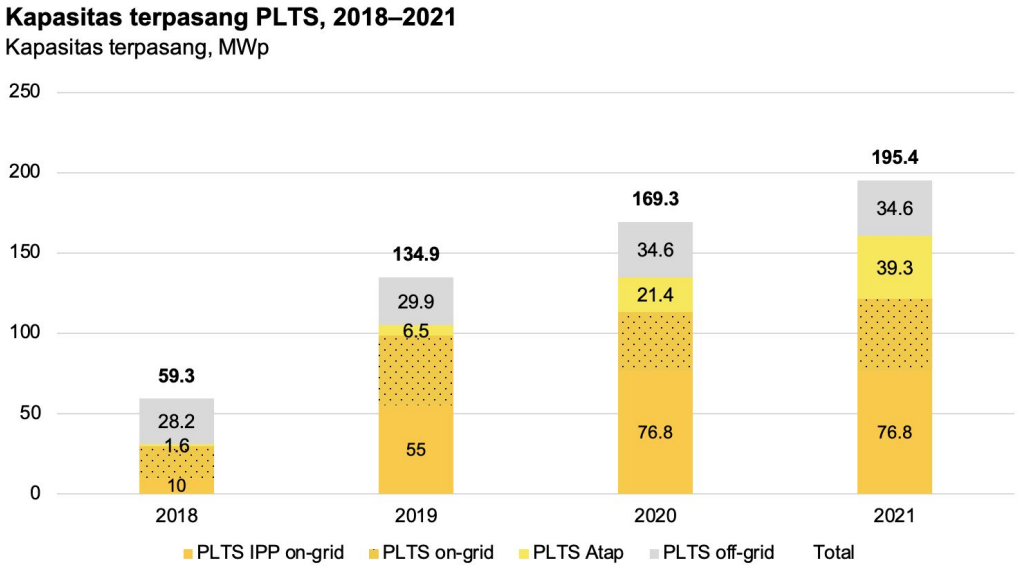
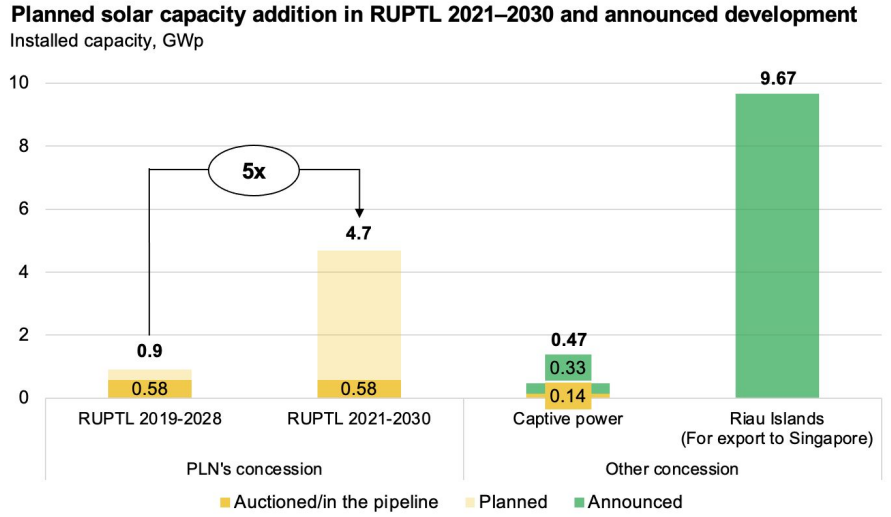
However, by the end of 2021, Indonesia has only installed ~200 MWp of solar capacity



- **In 2021, almost all growth came from rooftop solar** due to no utility-scale solar projects being commissioned

Source: IESR. (2021). Indonesia Energy Transition Outlook 2022. Note: Breakdown is taken from MEMR's HEESI 2020.

That said, solar outlook has started to look different since last year:

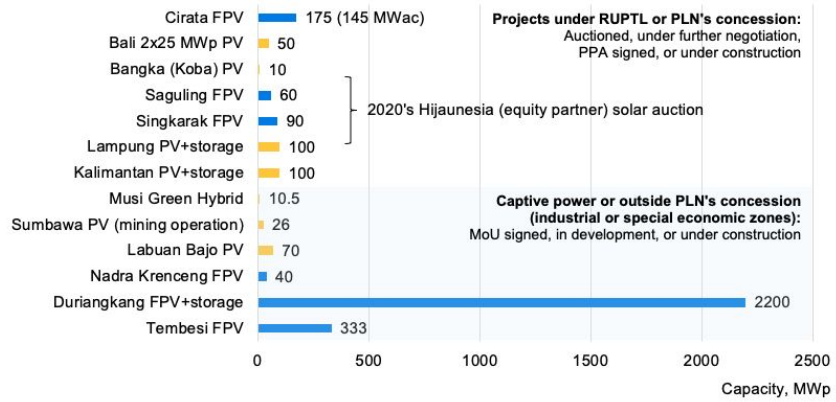


- **Increased planned solar capacity addition in RUPTL 2021–2030: 4.7 GWp** (5x the previous RUPTL 2019 at 0.9 GWp)
- **Announced development for electricity export to Singapore in the Riau Islands province (~10 GWp)**
- **Project pipeline from C&I rooftop solar sector (~250 MW in 2021**, with a projected 500 MW annually until 2025)
- **Rooftop solar target in national strategic projects (PSN): 3.6 GWp by 2025**
- **Rooftop solar's net-metering scheme revision to 1:1** (MEMR 26/2021)

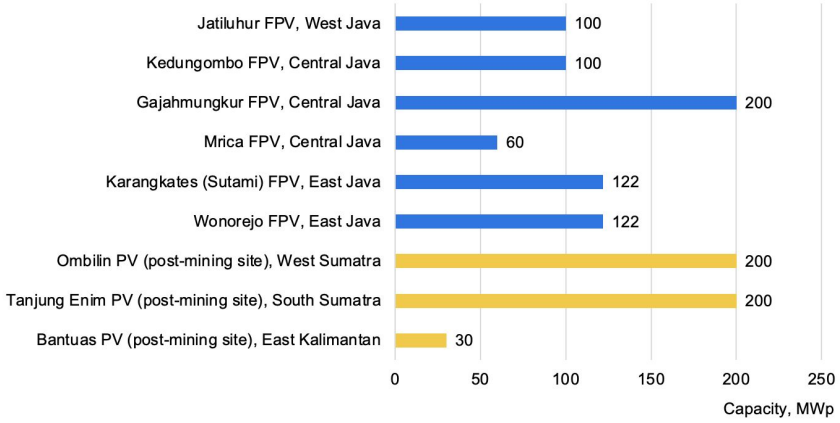
Source: IESR. (2021). Indonesia Energy Transition Outlook 2022. Notes: Captive power is defined as power supply that is generated by an individual firm for its own use (via an operational license), or by a "Wilayah Usaha" holder other than PLN—a private power utility (PPU)—to be ultimately sold to its tenants (in an industrial estate or a special economic zone).

Utility-scale solar development, particularly floating solar, has been gaining traction due to its site (land) selection advantage

Announced utility-scale solar project pipeline in Indonesia



Potential utility-scale solar projects in RUPTL 2021–2030

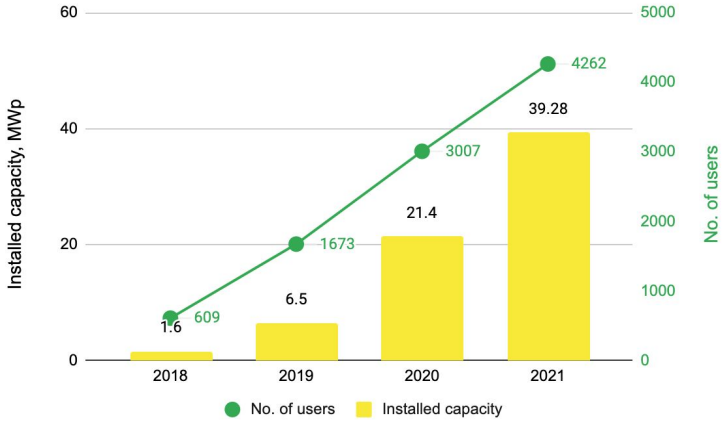


- **In 2021**, **three new floating solar development (2.6 GWp) came from outside PLN's business concession** (***wilayah usaha***)
- **Under RUPTL 2021–2030**, **there are at least 6 location (projects) listed as potential development** (**totalling 704 MWp**)
- **There are also development potential from post-mining sites (430 MWp) from just one state-owned mining company**

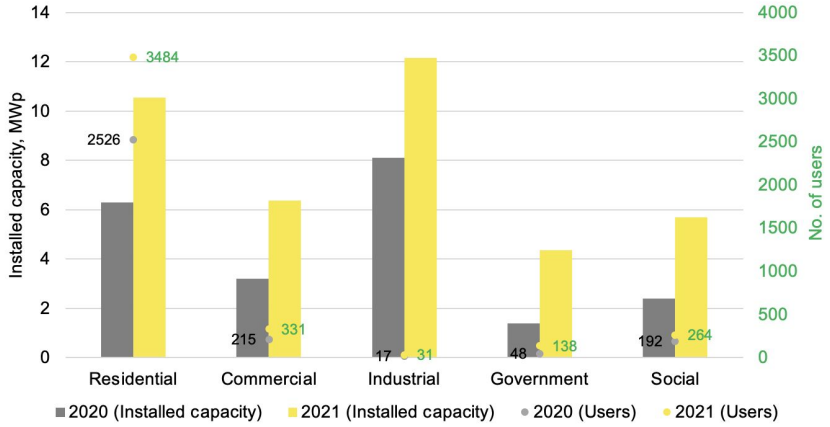
Source: IESR. (2021). Indonesia Energy Transition Outlook 2022.

Rooftop solar also continues to grow, becoming the main contributor to solar growth in 2021

Rooftop solar installed capacity and user growth, 2018–2021



Rooftop solar growth by segment, 2021

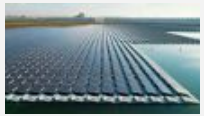


- **Commercial and industrial sector** remains the main contributor (~50%) to capacity addition in 2021
- **Residential sector** remains the largest contributor to user growth (at ~1000 new users per year)

With **MEMR 49/2018 revision** → **MEMR 26/2021** (**net metering scheme: 1:0.65** → **1:1**), **rooftop solar is expected to grow faster in the coming years**

Source: IESR. (2021). Indonesia Energy Transition Outlook 2022.

Overall, opportunities in solar may amount to 20 GWp by 2025 across various use cases & markets

	Grid-connected				Mini-grid / off-grid	
	Centralized		Distributed		Centralized	Distributed
	Utility-scale (IPP)		**Rooftop solar,** although not limited to		**Off-grid systems,** usually coupled with battery energy storage. Depending on sizes can be centralized or distributed. Mainly contracted by MEMR or PLN as EPC project.	
	Ground-mounted	Floating	C&I	Residential		
						 
Typical size rng.	**5 MW ~ 500 MW**		**20 kW ~ 10 MW**	**Up to 20 kW**	**100 kW ~ 1 MW**	**1 kW ~ 100 kW**
Characteristics	Requires a PPA with a power utility		Behind the meter for self-consumption	Behind the meter (net metering)	Powers rural areas	Powers rural areas
Segmentation:	IPP projects with PPA to PLN		PLN: C&I, Gov bldgs	PLN: Residential, small biz	Rural electrification	Rural electrification
	Other business concession, "*Wilayah Usaha*" (non-PLN)		Non-PLN: Captive power			
Market outlook:	**Key market** for the *next five years* (at least **3.9GW** + **~10GW* outside PLN**)		**Govt target: 3.6 GW** by 2025		**Moderate**, but has **600 MWp** up to **4 GWp** of diesel conversion potential in the next five years	

*For export to Singapore

Source: IESR analysis.

So what has been hindering Indonesia's solar development?

Utility-scale solar (IPP)

1. **Not quite ambitious power system planning in previous RUPTLs**
   - ➢ RUPTL 2019-28: 908 MW PLTS
   - ➢ RUPTL 2021-30: **4.68 GW PLTS** (5x)
2. **Nonoptimal procurement practice: sporadic auction (tender), infrequent*, and relatively small auction volume**

**Note: due to minimum planned addition (low auction demand)*

3. **Limited project development**
   - ➢ **Land (site) selection** coupled with **market/auction uncertainty** often remains a big risk and challenge
4. **Regulations that are hindering development:**
   - ➢ **Local content rules:** Not in accordance with industry readiness (in terms of scale and quality), at least for solar PV module
5. **Lack of (a fairly allocated risks) PPA standard**

In a **competitive bidding scheme**, the **ceiling price** is only an initial benchmark, **not a prerequisite** for a competitive (cheap) bid to occur.

Auction design such as **auction volume** (demand) and **supportive regulations** would be key to achieving the most competitive bid price and large-scale deployment

Rooftop solar:

In general:

- Relatively low ***public awareness***
- Still a relatively **nascent market, although fast-growing**

In residential segment:

- **Rooftop solar economics:**
  - ➢ **Fundamentally, electricity tariffs in Indonesia are relatively cheap** (10 cents/kWh), **hence are more difficult to get maximum** (cost savings) **benefit** compared to in developed markets/countries (can reach 20~25 cents/kWh)—this does not mean that it cannot be attractive, however
  - ➢ *Previous* **net metering scheme** was suboptimal (**now 1:1**)

In commercial & industrial segment:

- In general, **viable business model exists** for C&I sector (with leasing scheme, for instance)
- However, **still often hit by red tape for industrial consumers** in some areas (with large capacity)

In government segment: limited budget allocation

Thank You

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