



PLN

Outlook and Update of Smart grid implementation in Indonesia

Dr. Zainal Arifin

Executive Vice President of Engineering and Technology



2022 Japan

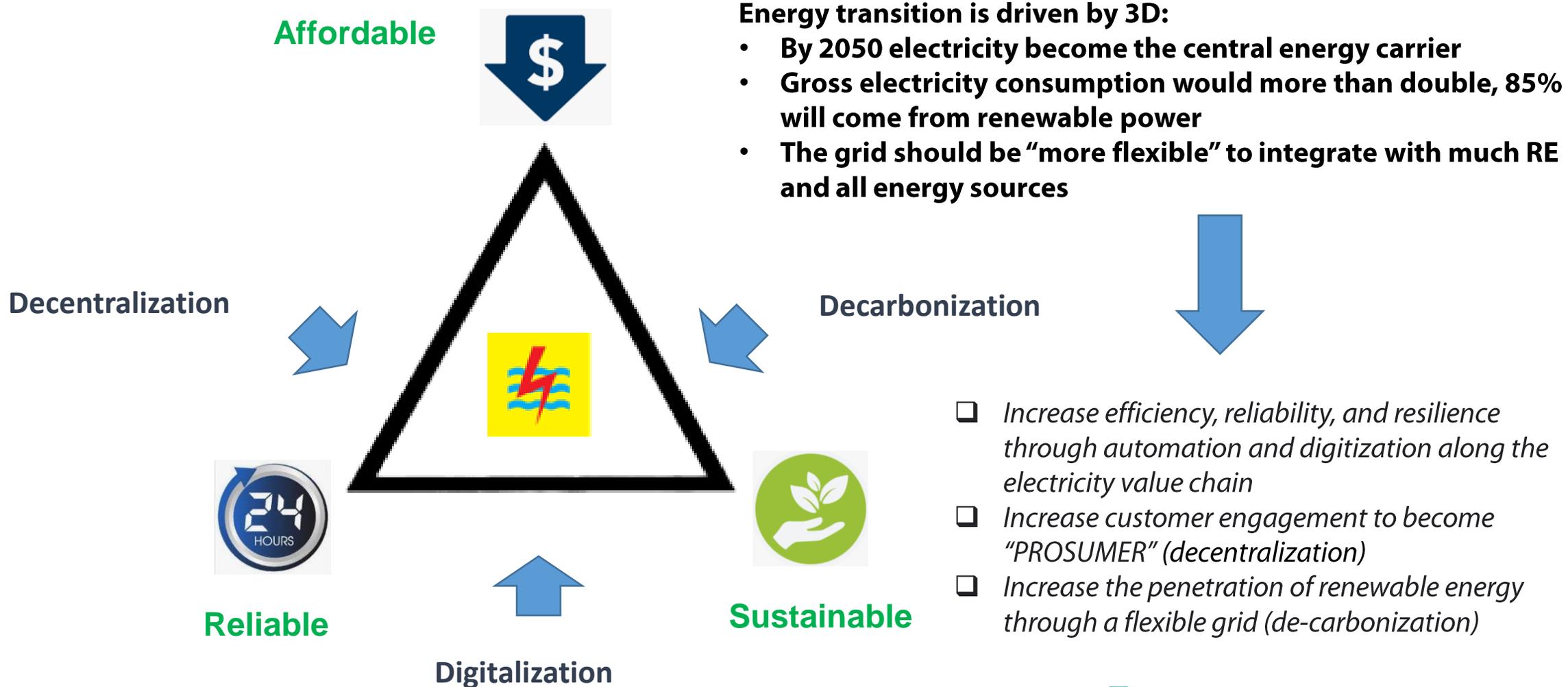
RE Invest Indonesia

Renewable Energy Investment Forum

PLTS Pulau Messa, Nusa Tenggara Timur

www.pln.co.id

Smart Grid for Energy Transition

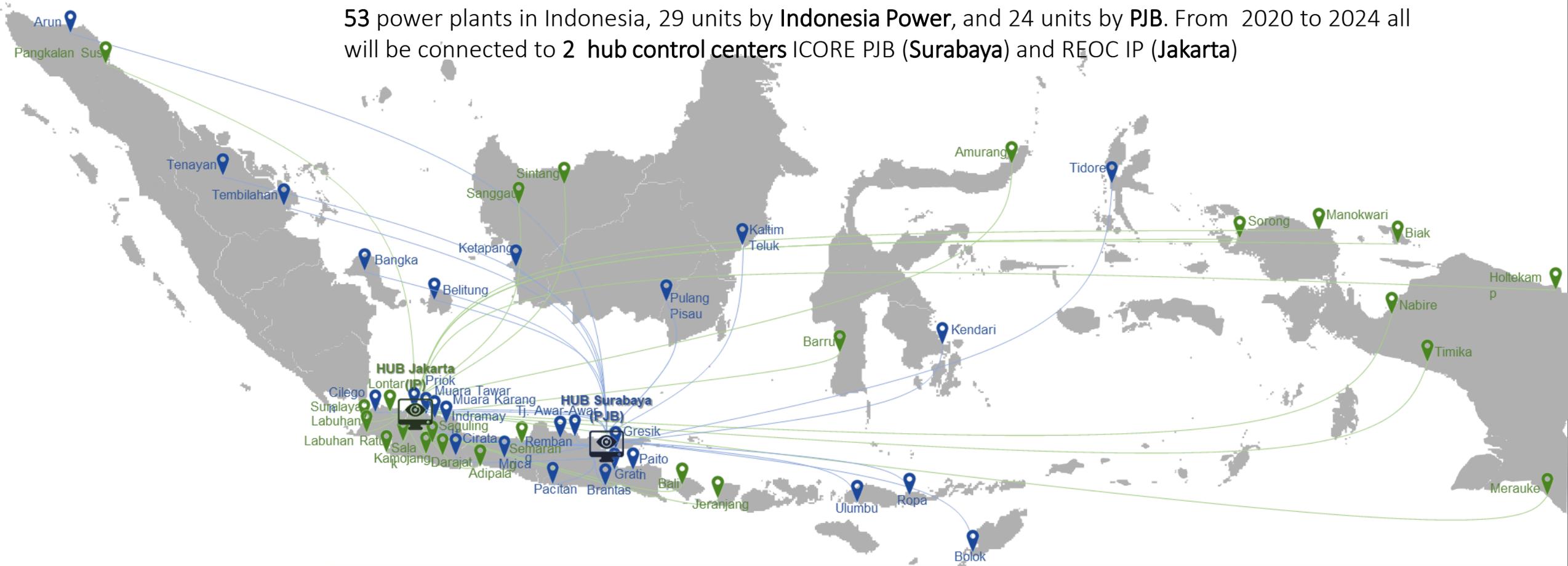


Indonesia Smart Grid Roadmap

	2021-2025	2026 →
Purposes	Reliability, efficiency, customer experience and grid productivity	Resiliency, customer engagement, sustainability and self healing
Main Initiatives	<p>Power plant Digitalization for improving efficiency</p> <p>Sub-Station Automation and Digitalization selectively for improving power quality</p> <p>Distribution Grid Management for improving reliability and faster respond</p> <p>EV Charging Station and e-mobility for EV ecosystem development</p> <p>Smart Micro Grid for increasing RE penetration and decreasing LCOE at some isolated areas</p> <p>AMI implementation by clustering approach for revenue assurance</p>	<p>Upgrading SCADA to <i>Wide Area Monitoring, Protection and Controlling System (WAMPAC)</i> for improving the system resiliency</p> <p>Interconnecting Distributed Energy Resources to the grid</p> <p>Integrating Energy Storage for VRE penetration and system stability</p> <p>Implementing Dynamic Line Rating for improving the system resiliency and self healing capability</p> <p>Demand response for customer engagement to increase the system efficiency</p>

Connection Map - Digital Power Plant

53 power plants in Indonesia, 29 units by Indonesia Power, and 24 units by PJB. From 2020 to 2024 all will be connected to 2 hub control centers ICORE PJB (Surabaya) and REOC IP (Jakarta)



5 Strategic Program



Digital Control Room



Predictive Maintenance



Advanced Data Analytics



IoT Automated Sensor

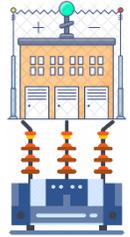


Digital O&M

**Total Investment
IDR 381 B**

Distribution Grid Management

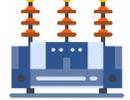
Digitalization of Transmission and Distribution assets by EAM



826 Substations



528.000 distribution trafos with capacity **56.161 MVA**



2.123 units transformers with capacity **144.408 MVA**



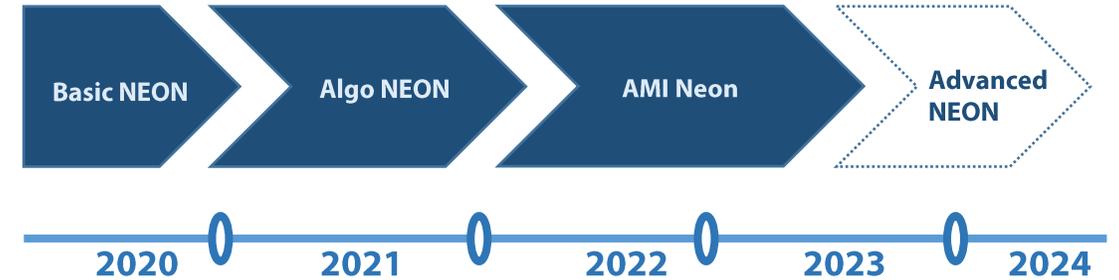
13.520 feeder lines with length **425.673 kms**



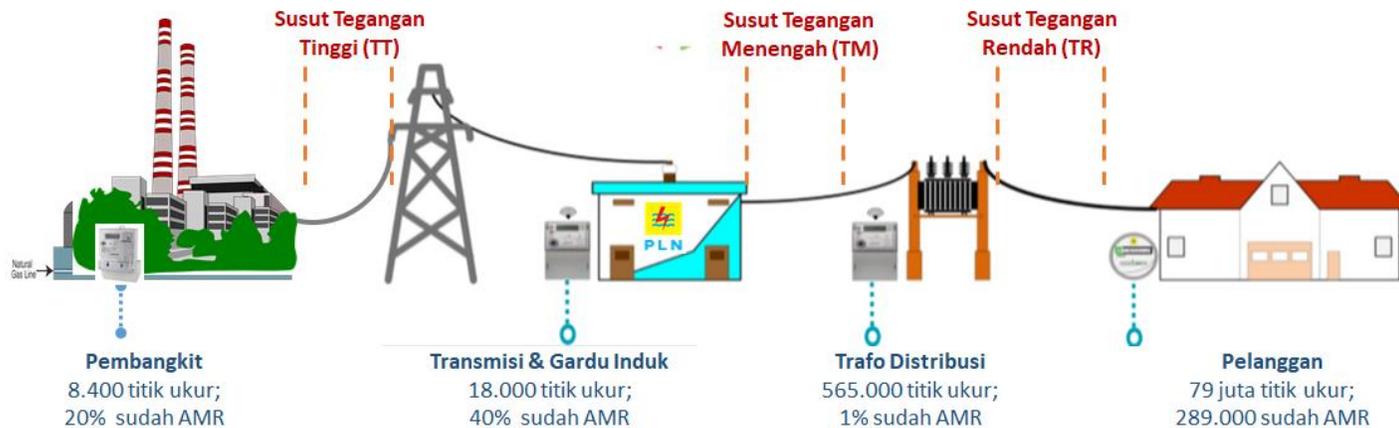
58.959 kms transmission lines



Over **80 millions** customers



Online Monitoring Losses (OML) for real-time metering at all transaction points



Progres Pilot Project

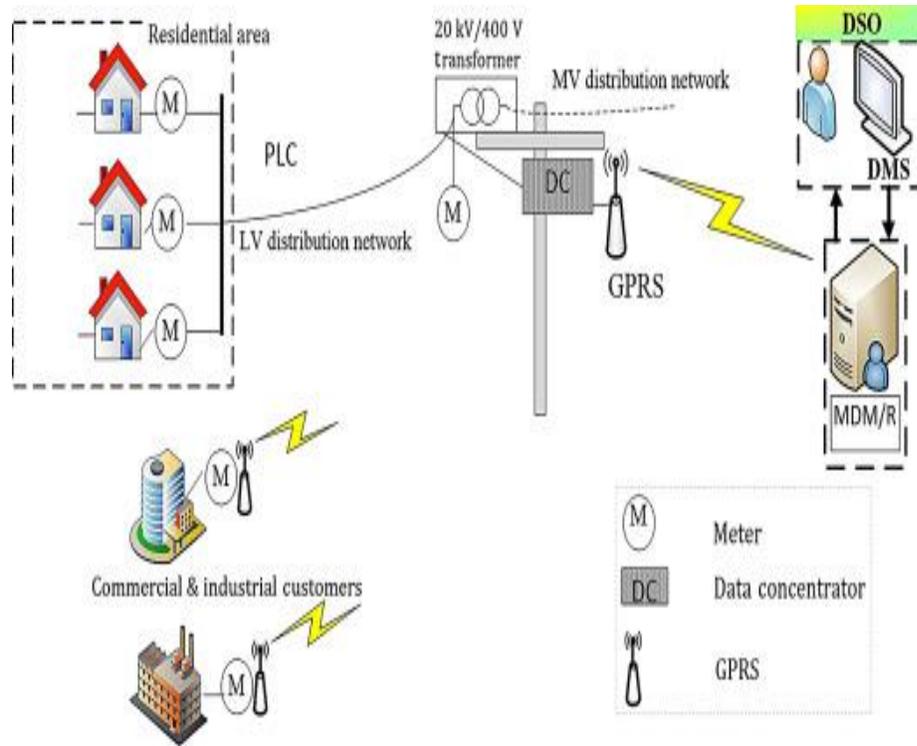
NEON
 Lokasi: Kalimantan & Sulawesi
 Aplikasi: Fitur Pengambilan data harian
 Meter Pembangkit & Transmisi: 1.088 dari 26.400 (4,1%)

EAM
 Lokasi: Sulawesi, Nusatenggara, Maluku, Kalimantan
 Aplikasi: Health Index
 Aset Registered: 6,4 juta dari 8,5 juta tiang (75%)

NEON/OML development up to 2025:

- Estimated CAPEX = IDR 177,6 B
- Estimated OPEX = IDR 79,3 B

Advanced Metering Infrastructure (AMI)



- Installed target **1.200.000** customers
- Location:
 1. Jawa – Bali :700.000
 2. Sumatera & Kalimantan : 300.000
 3. Sulawesi & West Nusa Tenggara : 200.000
- COD: **December 2023**
- Contract scheme:
 1. Payment based on **OPEX** for 10 years
 2. Managed services, plus FO infrastructure
- Estimated Investment: **IDR 2,1 T**

Based on PLN road map, roll out AMI from 2024 to 2034 will be **5 Million** customers/year with an estimated investment IDR 8,96 T/year

November 2021

March 2022

Commercialization

- AMI *pre-commercial* procurement
- Migration AMR to AMI

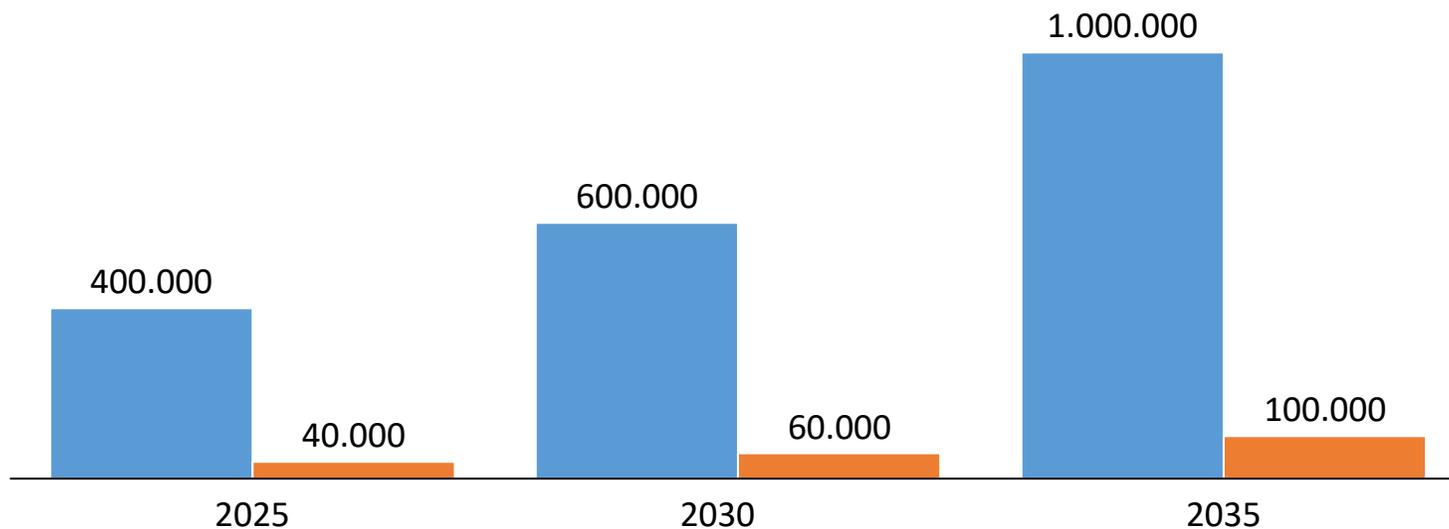
AMI system integration and Commissioning
100.000 meters at 3 locations

e-Mobility and EV Charging Infrastructure

Based on PLN roadmap, the development of EV infrastructure (SPKLU) is already exceeded its target (**140%**) in 2021. While the EV population is still below the target (**95%**) or 1.768 of 1.865 units.

Until December 2021, there is **267 unit** SPKLU at 224 locations (DJK ESDM) around Indonesia. **PLN owns 97 unit** SPKLU (**36%**) at 74 locations.

■ 4 wheelers EV
■ SPKLU



60,000 SPKLU needed to support Indonesia's 2030 target



EVCS partnership online:

<https://layanan.pln.co.id/partnership-spklu>



0.6-1M 4W electric vehicle on the road by 2030



5-6M 2W electric vehicle on the road by 2030

\$60 - 100M

Total investment required until **2025**

Takeaways

1. Smart grid implementation in Indonesia to support Energy Transition by:

- 1) *Increasing efficiency, reliability, and resilience through automation and digitization along the electricity value chain*
- 2) *Increasing customer engagement to become “PROSUMER” (decentralization)*
- 3) *Increasing the penetration of renewable energy through a flexible grid (de-carbonization)*

2. PLN Smart grid roadmap consists of two stages:

- 1) **Short-term** *for improving reliability, efficiency, customer experience, and grid productivity*
- 2) **Long-term** *for increasing resiliency, customer engagement, sustainability, and self-healing*

3. Several ongoing Smart grid projects:

- 1) *Power plant Digitalization*
- 2) *Grid Distribution Management*
- 3) *e-Mobility and Electric Vehicle Infrastructure*
- 4) *AMI (Advanced Metering Infrastructure)*
- 5) *Smart micro grid for replacing Diesel power stations*

