



# Storage, the Game Changer

# About our company

Power Electronics



Since 1987 offering solutions for [industrial automation processes](#).



We are #1 manufacturer of [solar inverters](#) in America, Oceania and Europe.



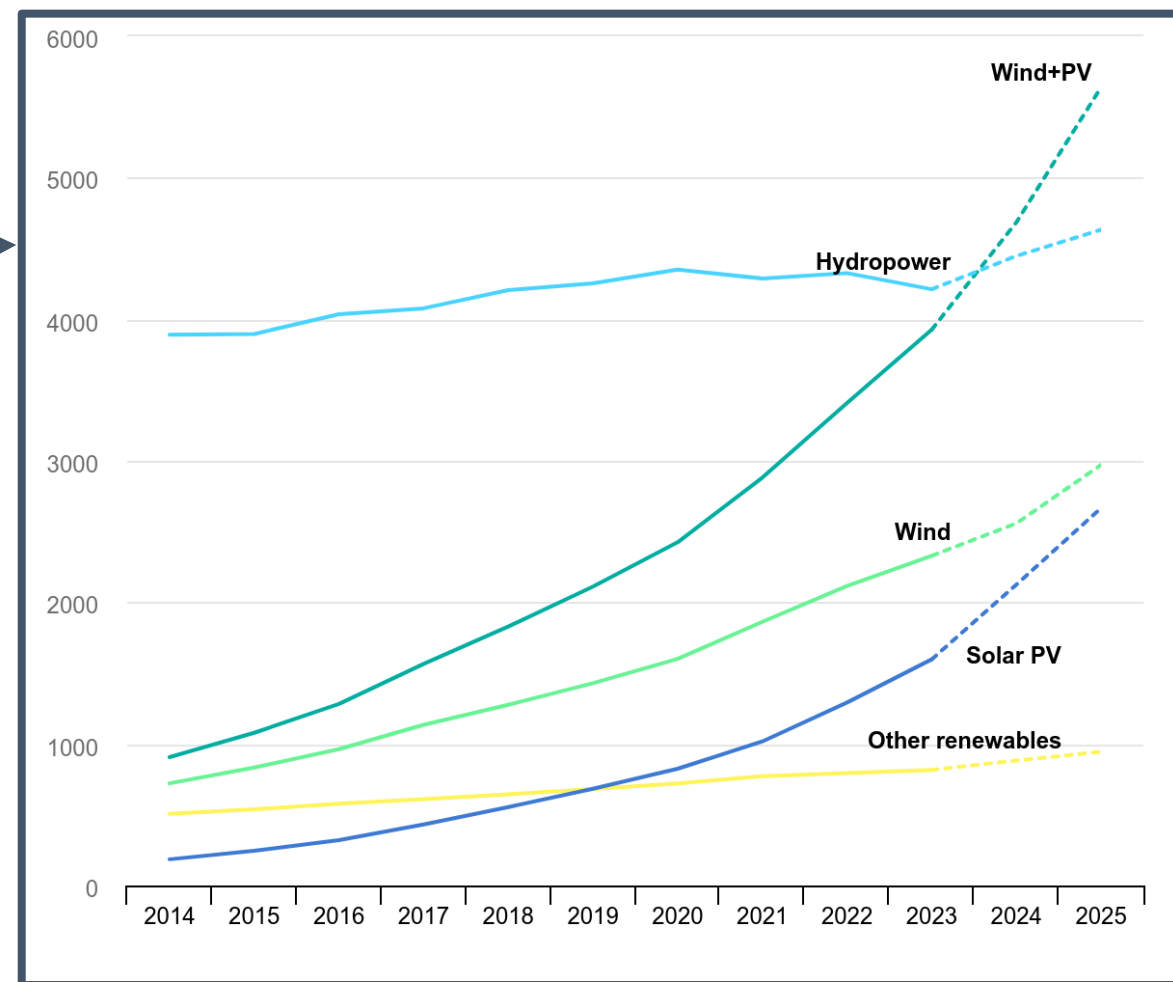
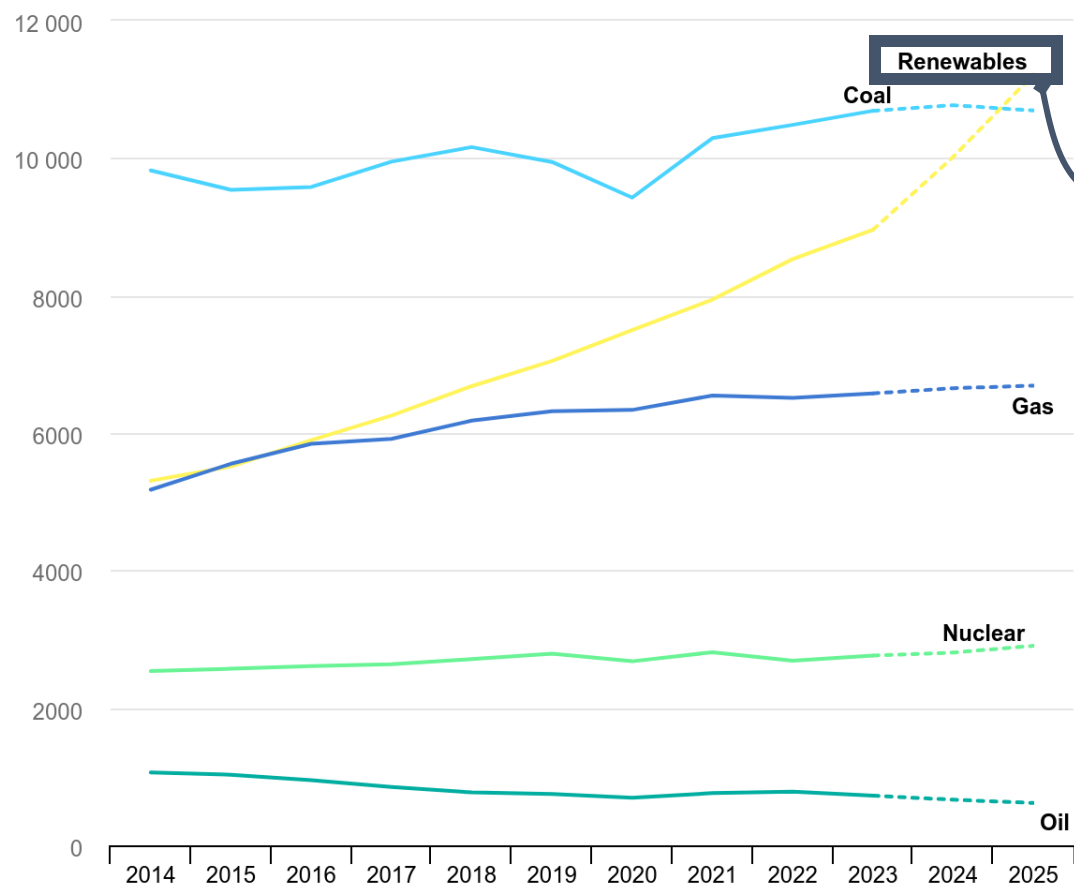
World's leading manufacturer of [energy storage](#).



Innovative solutions for [charging electric vehicles](#).

# Growth of Renewables and the Need for Energy Storage

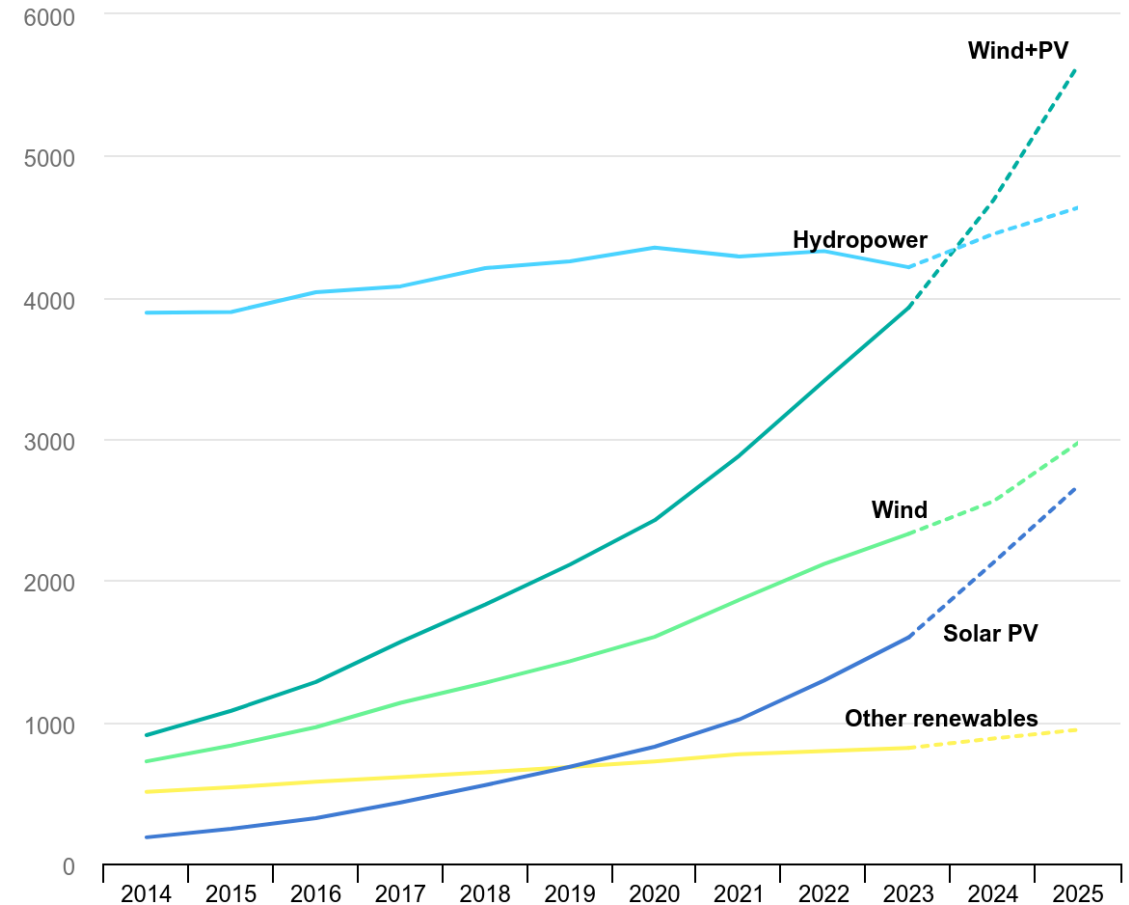
# Growth of Renewables



Source: [2]

# Growth of Renewables

- Government Policies and Targets.
- Financial Incentives.
- Technological Advancements made renewable energy more competitive.
- Environmental Awareness.
- Energy Security.
- Economic Benefits.
- Reduced development time.



Source: [2]

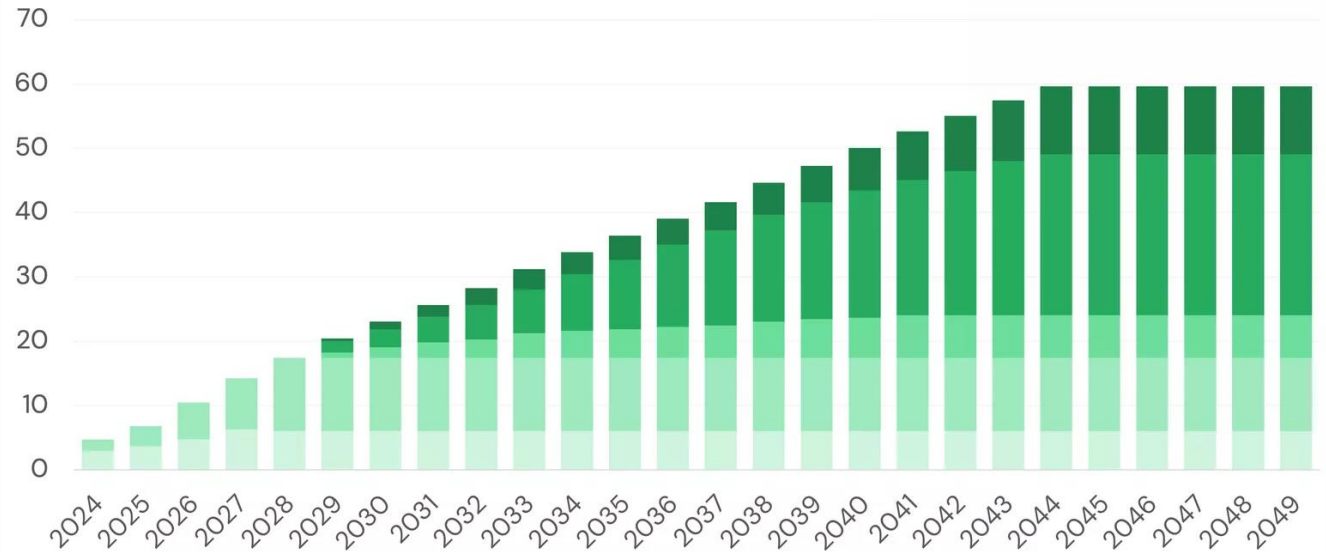
# Need for Energy Storage

- **Balancing Supply and Demand.**
- **Enhancing Grid Stability.**
- **Reducing Reliance on Fossil Fuels and Improving Energy Security.**
- **Economic Benefits.**
- **Supporting Decentralized Energy Systems.**

BESS Capacity reaches **50 GW** by 2040, as **average duration increases** from one to five hours

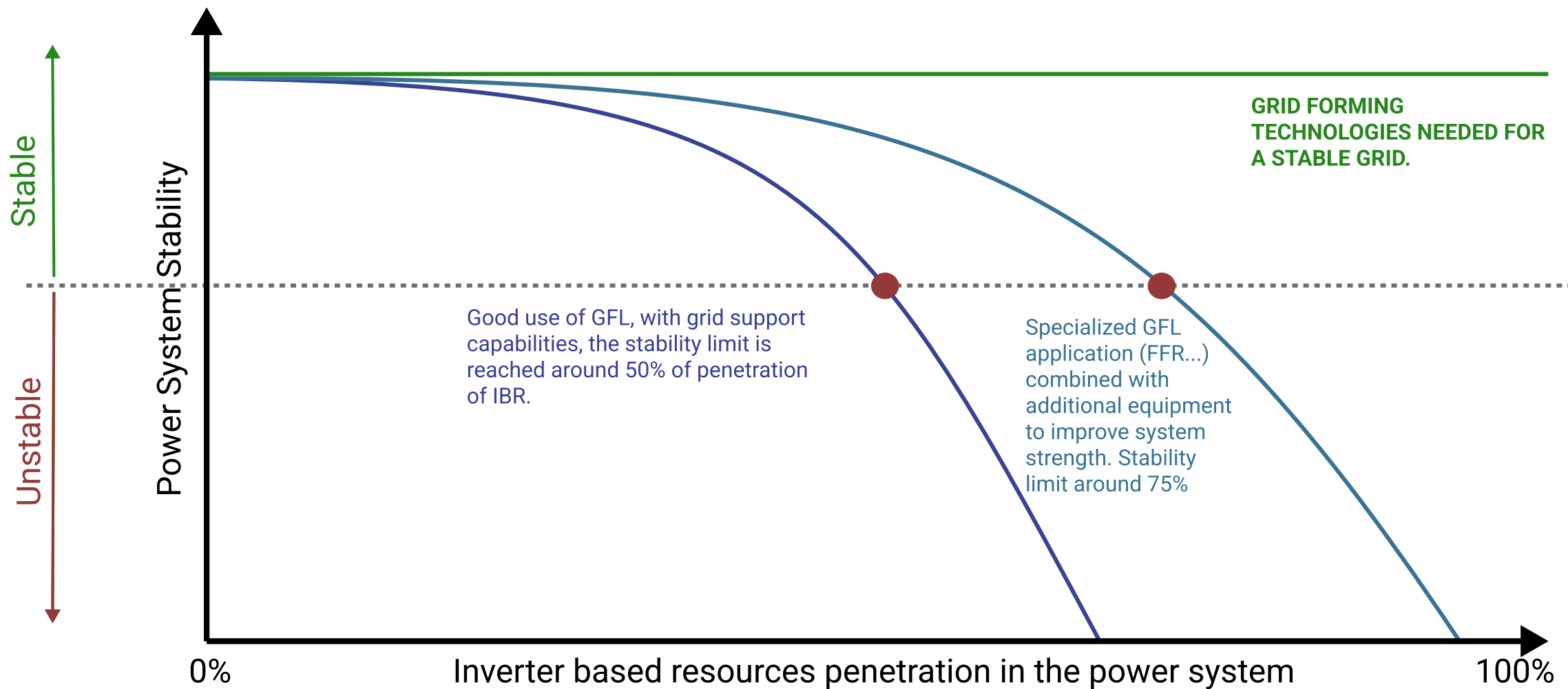
Installed BESS Capacity (GW)

1hr 2hr 4hr 6hr 8hr



Source: [1]

# Need for Energy Storage



Source: [3]

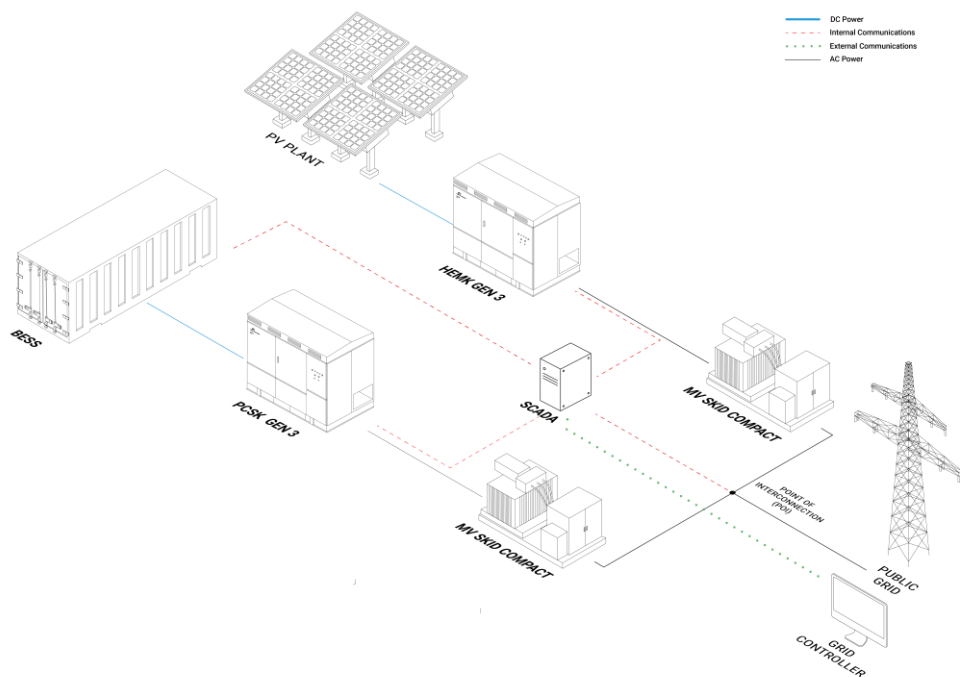


# Hybridization Solutions



# Traditional Hybrid Solution

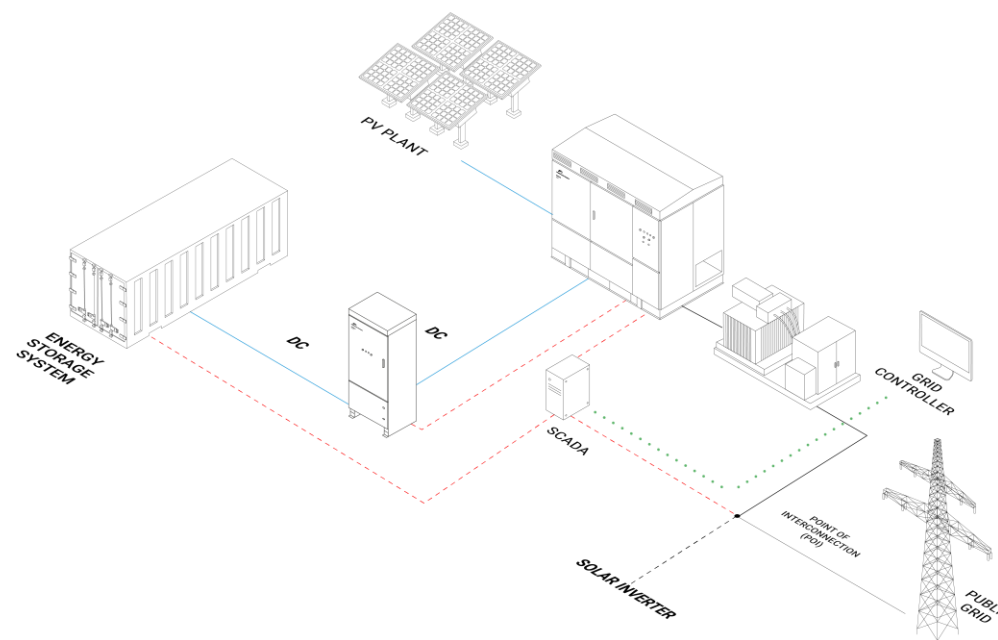
## AC COUPLING



**AC coupling system:**

- **Freesun HEMK + MV SKID COMPACT**
- **Freemaq PCSK + MV SKID COMPACT**

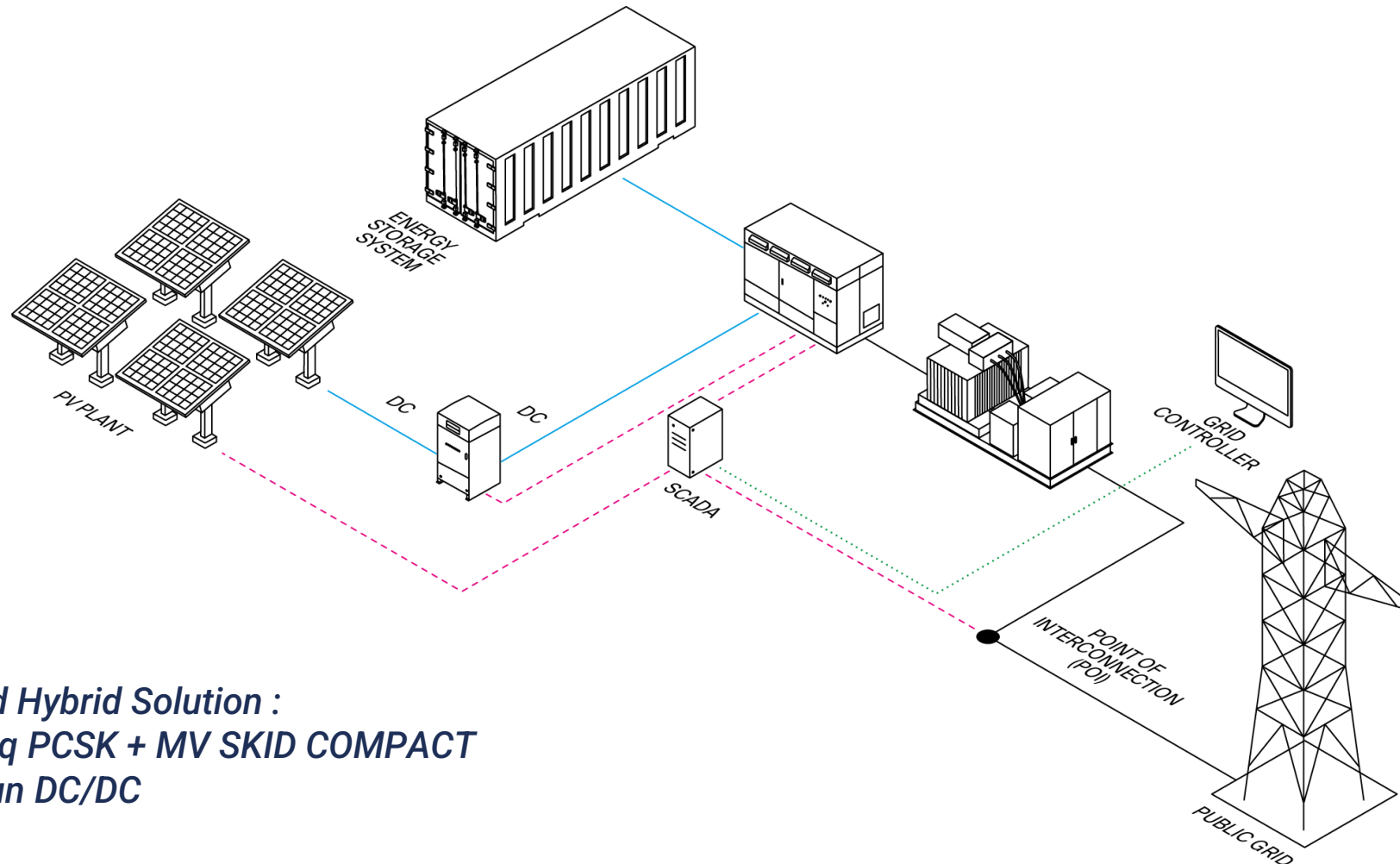
## DC COUPLING



**DC coupling system:**

- **Freesun HEMK + MV SKID COMPACT**
- **Freemaq DC/DC**

# Advanced Hybrid Solution

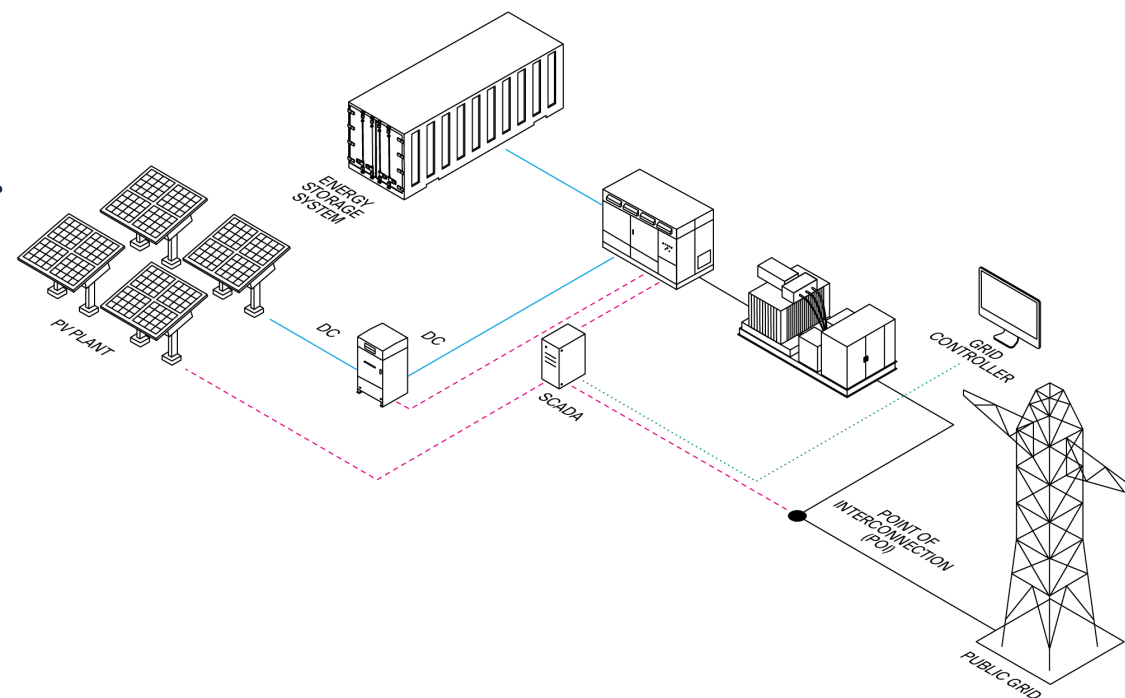


**Advanced Hybrid Solution :**

- **Freemq PCSK + MV SKID COMPACT**
- **Freesun DC/DC**

# Advanced Hybrid Solution

- Storage, the main character.
- Best LCOE thanks to PV production.
- Grid Forming Capability thanks to the PCSK.
- Participation in all the services.
  - Stability Services (Inertia and SCL).
  - Restoration Services.
  - Frequency Services.
  - Etc.



# Advanced Freesun DC/DC

*Utility Scale DC/DC PV Converter*

- **Modular solution of 1.20 MW up to 35 °C.**
- **Maximum power up to 1500 Vdc.**
- **Maximum power point tracking (MPPT).**
- **Max. efficiency 98.9% (preliminary).**
- **Bi-directional.**





Is our motivation for leading the renewable energy generation

# Unlimited Energy

It is the search for product  
and service perfection.

It is our vision of a clean and sustainable world  
for our children and future generations.



# Bibliography

- [1] MODO Energy, [Online]. Available: <https://modoenergy.com/research>
- [2] International Energy Agency, "IEA," [Online]. Available: <https://www.iea.org/>.
- [3] Energy System Integration Group, "Grid Forming Technology in Energy Systems Integration," 2022.