

SOLAR ENERGY STORAGE SOLUTIONS



Main Topics of the Webinar

– Solar Energy Storage Solutions



Power Group Companies



POWER ELEKTRONIK



POWER SOLAR



POWER ENGINEERING



ELEKTRON

ABOUT US

Power Elektronik Industry and Trade Inc. was established in 1999 and became a powerful brand afterward in Turkey.

Power Solar is committed to the highest level of quality. That's why we select the best components and industry-leading performance models to ensure your system will produce optimally. Our highly-trained installation crews take pride in delivering beautiful well-made solar arrays. From the panels to the bolts on the roof, we'll deliberately consider every piece of your installation so you can rest easy throughout its many years of service.

GOAL

To be one of the leading companies.

MISSION

To manage reliable, adequate, quality production and customer relations correctly.

QUALITY POLICY

- To be a well-known company all over the world.
- To gain the trust of customers by improving quality management
- To maintain good relations with customers by supporting them with their problems.
- To follow the innovations and invest in the necessary issues.
- Increasing production efficiency.

Achievements

We are moving forward to reach our goal by completing our missions very confidently.

22

Year

10000+

Customer

500+

Project

45

Dealers

70

Employment

13

Quality
Certificates

P O W E R E L E K T R O N I K P O W E R S O L A R

- 15 Engineers
- 26 Technical Personnel
- 14 Project Team
- 15 Technicians

01

HUMAN
RESOURCES

02
R & D Central

Thanks to our qualified R&D department, we make completely new designs.

03

Sertifications

- ISO 9001, ISO 45001, ISO 14001, ISO 27001
- TSE and EN Documents
- Service Qualifications Documents
- Product final quality and Routine tests
- Factory and field acceptance tests

04

AFTER SALES
TECHNICAL
SUPPORT

Power Elektronik continues its activities by observing customer satisfaction.

- 24/7 Service support
- Competent Technical Services
- maintenance service
- satisfaction measurement

Ar-Ge
Merkezi



TEKNOLOJİYE YATIRIM GELECEĞE YATIRIM

Tasarım
Merkezi



K T R O N İ
S O L A R



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POWER SOLUTIONS



UPS



RACK UPS



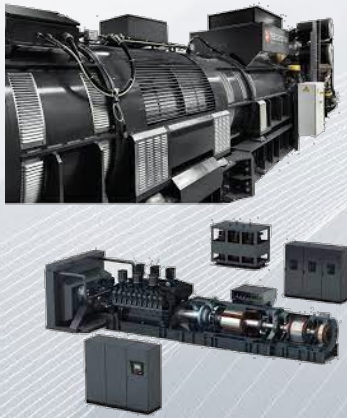
RECTIFIER



BATTERY



VOLTAGE REGULATOR



DYNAMIC UPS



EV CHARGE STATIONS



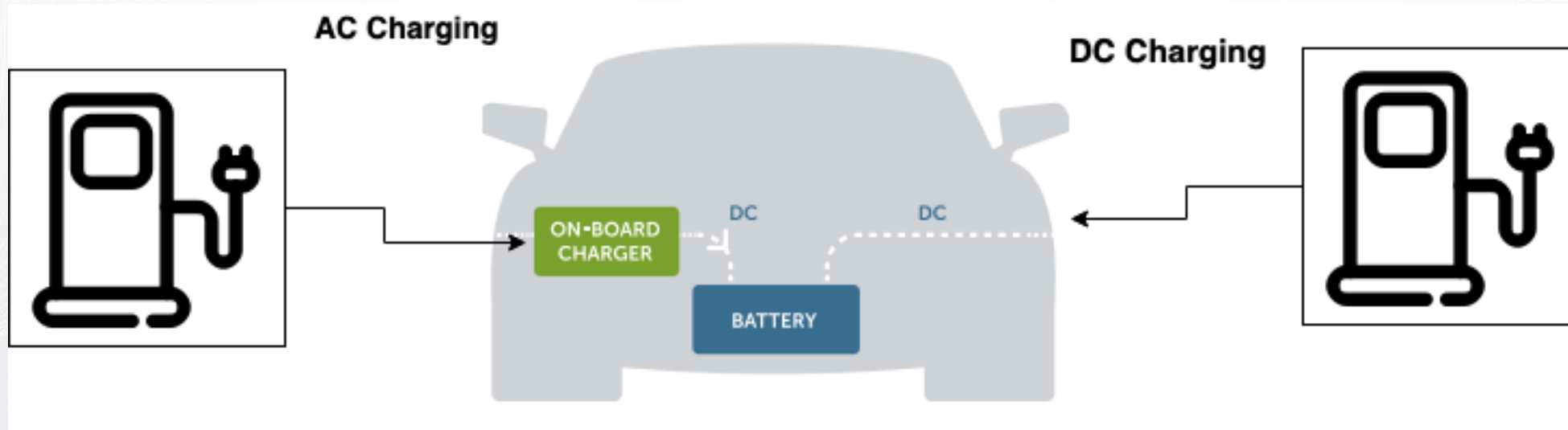
SOLAR ENERGY SYSTEMS

EV CHARGING SOLUTIONS

- Home & Public
- Charging Management System
- DC Fast Charge
- Renewable Energy Systems
- Technical Services



AC CHARGERS VS DC CHARGERS



AC

- USES EV'S ON-BOARD-CHARGER
- CHARGEING TIME DEPENDS ON OBC POWER
- REQUIRES LOW POWER SO THAT YOU CAN USE AT HOME

DC

- USES RECTIFIERS IN DC STATION
- CHARGING TIME DEPENDS ON CHARGER STATION POWER
- REQUIRES HIGH POWER SO THAT IT NEEDS HIGH POWER GRID TRANSFORMATORS

Model: Public

N-power



C-power



H-power



TECHNICAL SPECS

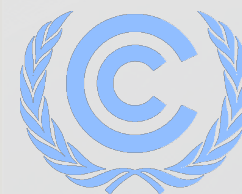
- 2.3kW – 22kW Optional Power
- TYPE 2 Connector
- 10A, 16A or 32A Adjustable Output Current
- Residual Current Protection
- Over Current Protection
- Public use with competitive price with OCPP1.6J
- LED Indicators
- Start/Stop charging by RFID card or optional QR Code
- Wall-mount or floor-stand installation

Climate change



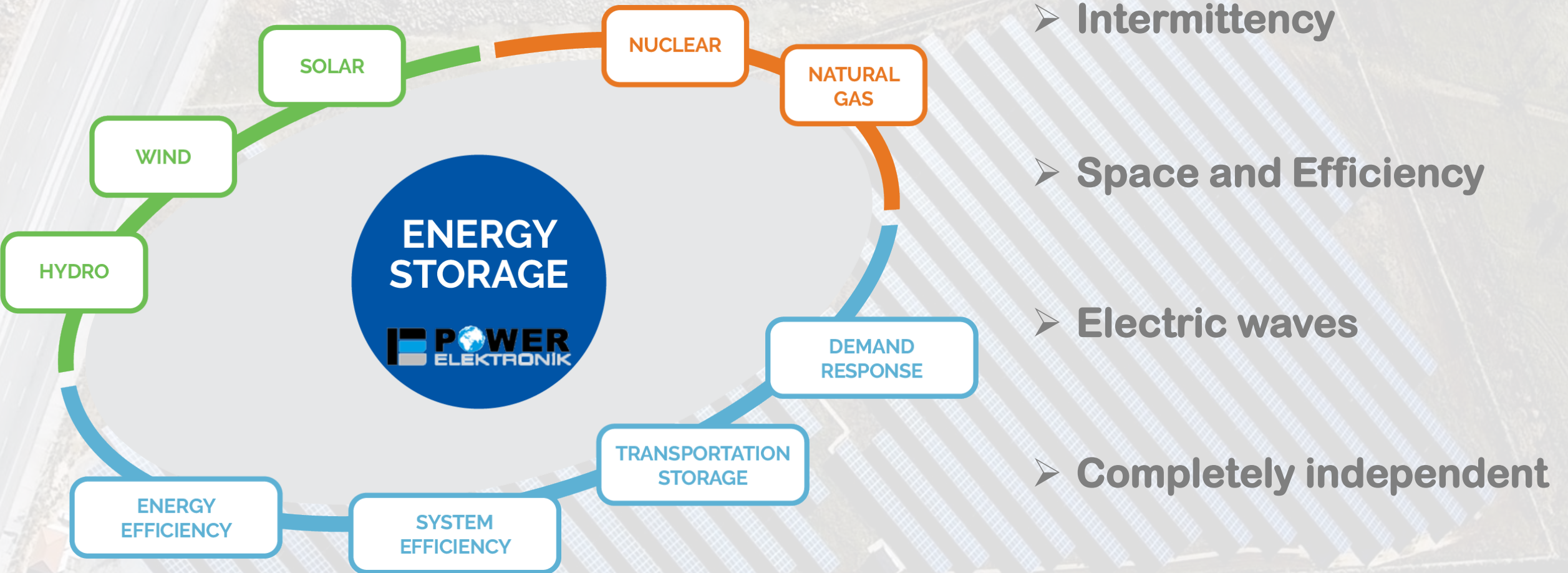


**GLASGOW CLIMATE
CHANGE
CONFERENCE –
OCTOBER-
NOVEMBER 2021**

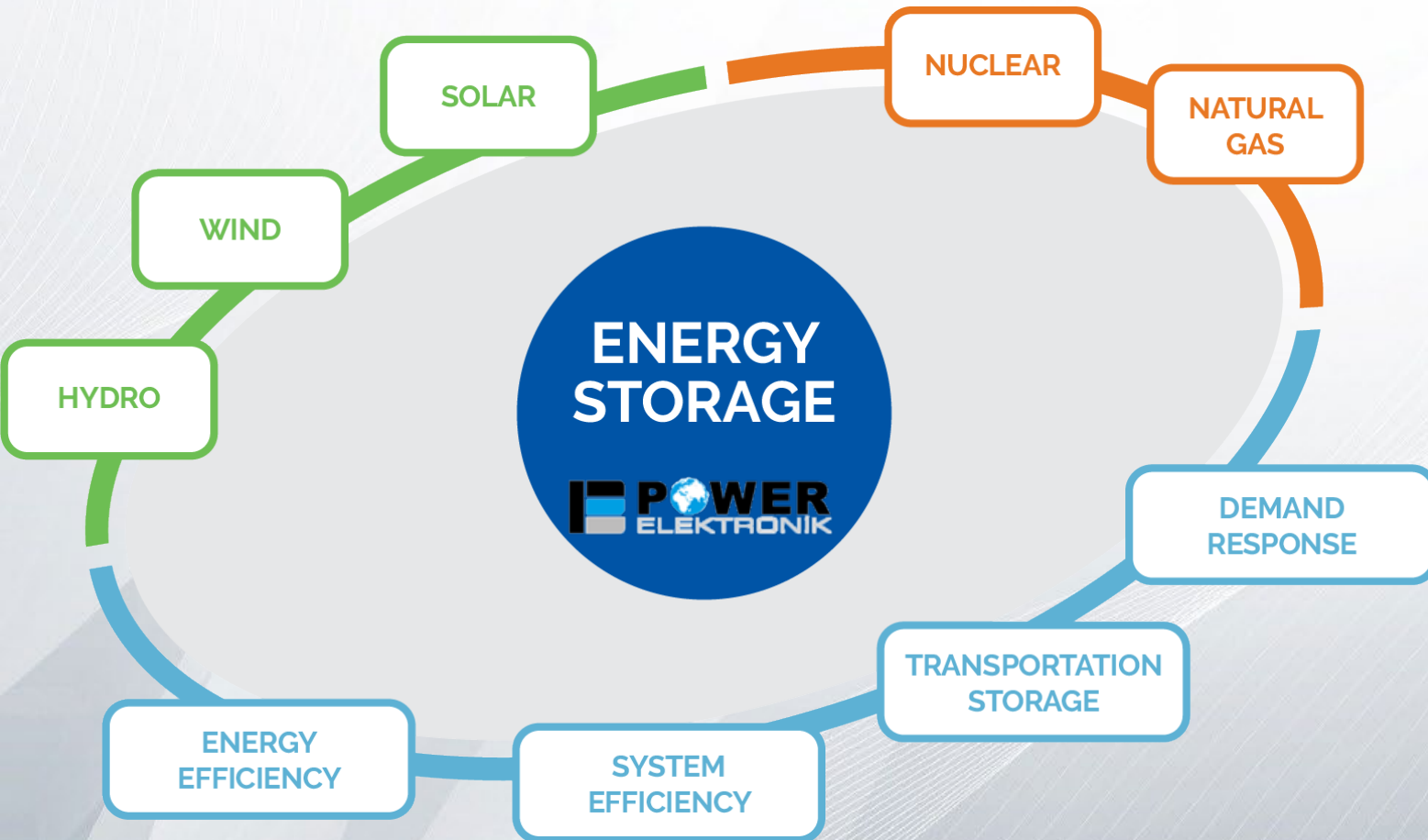


**United Nations
Climate Change**

The Problem With Renewable Energy



The Problem With Renewable Energy



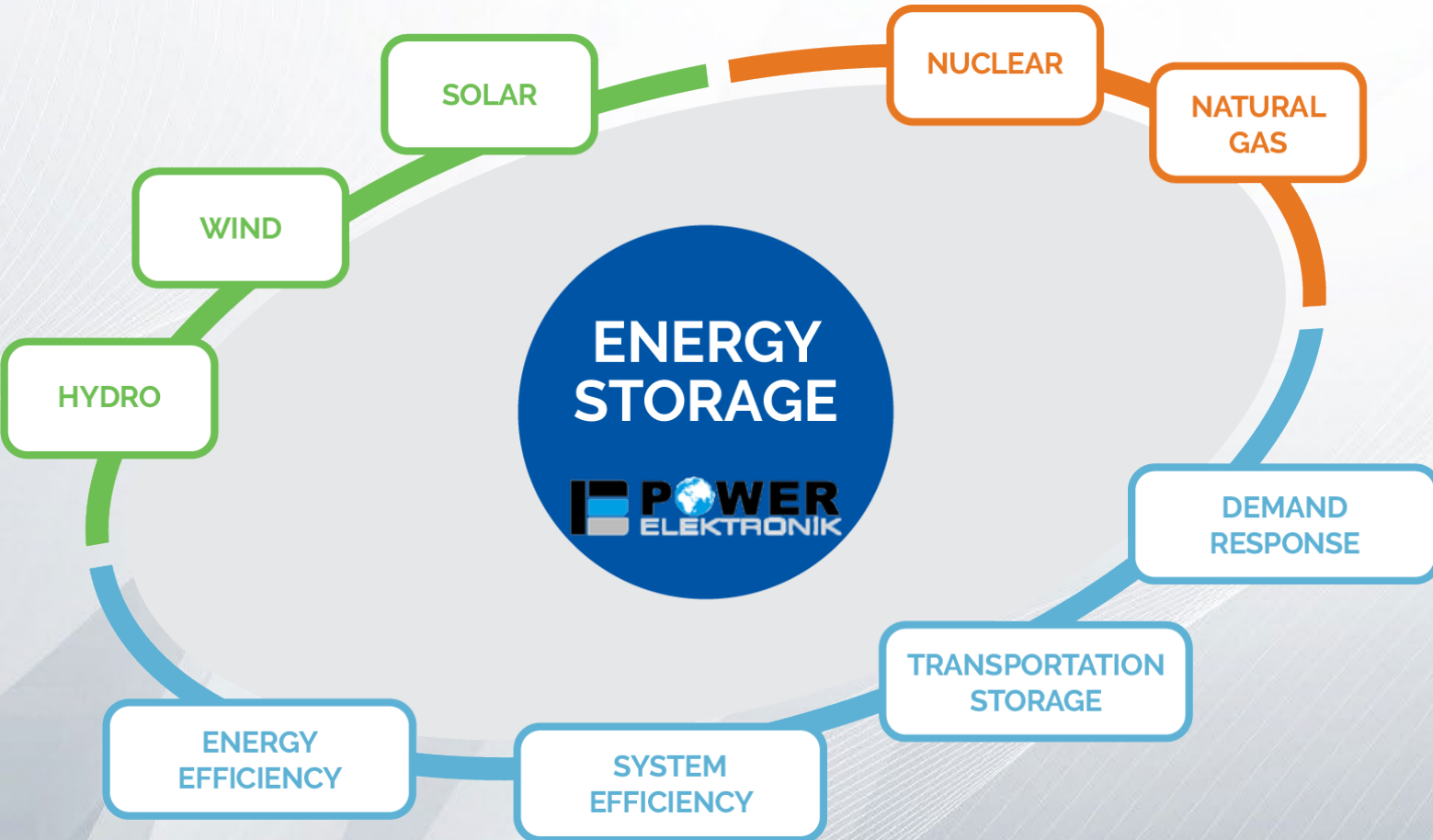
➤ **Intermittency**

➤ Space and Efficiency

➤ Electric waves

➤ Completely independent

The Problem With Renewable Energy



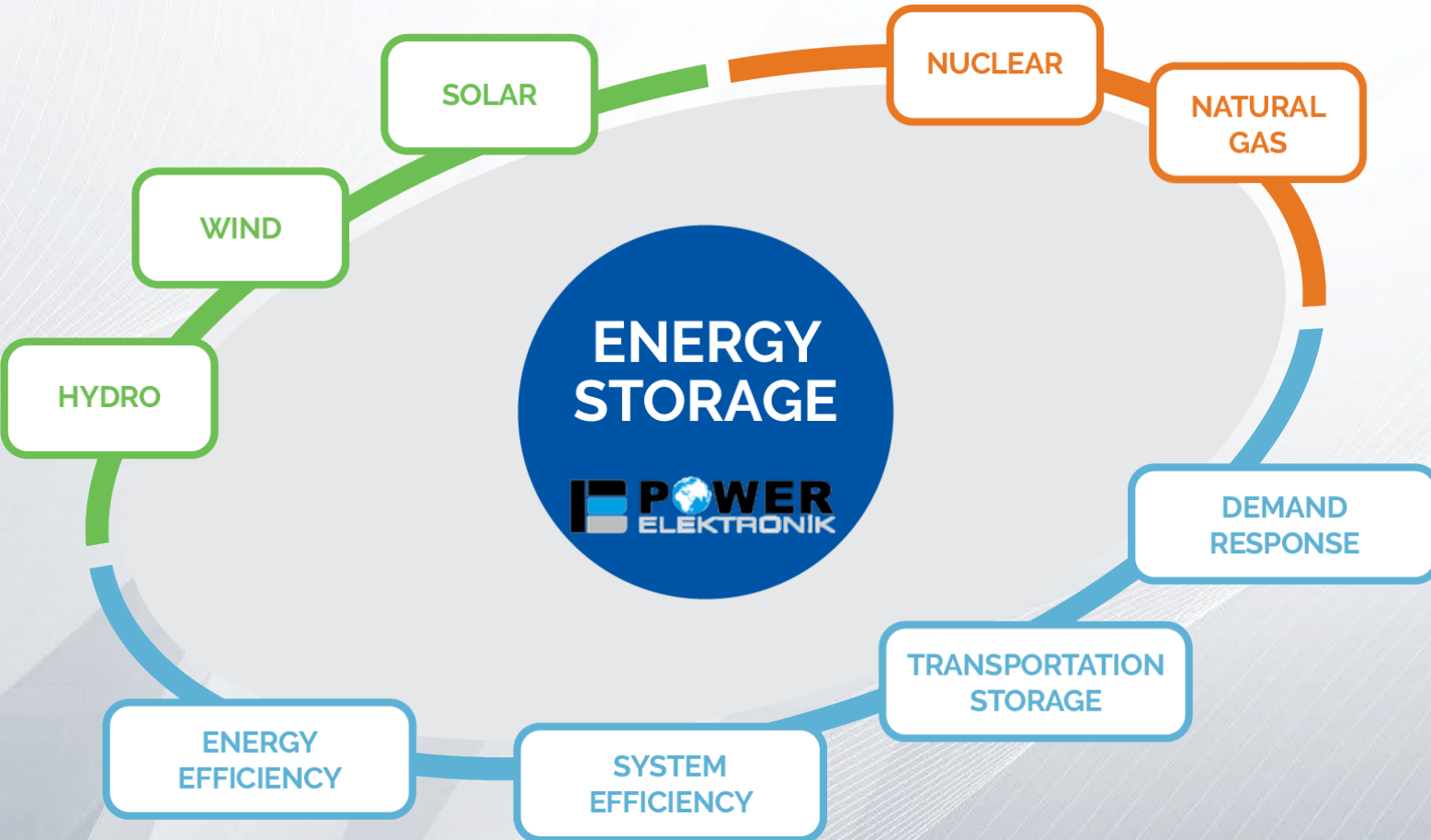
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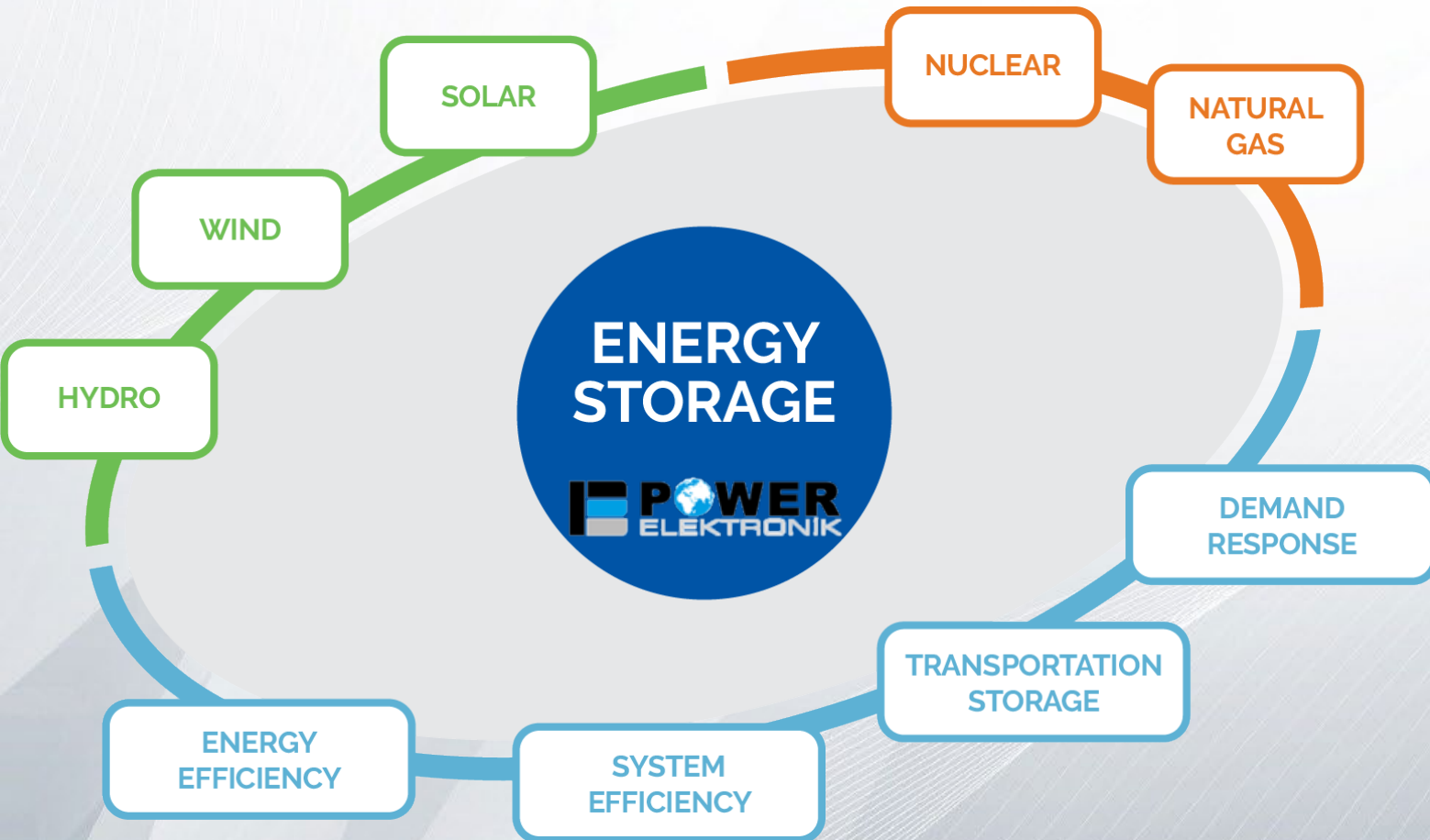
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The Problem With Renewable Energy



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About Energy Storage

Energy Storage Systems(ESS)



About Energy Storage

Energy Storage Benefits

❖ Five groups of Energy storage benefits

- Renewables integration with Grid
- Higher Grid Efficiency
- Improved and reliable electric supply
- Electrical grid infrastructure
- Overall Savings in Money



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Energy storage and the grid



Benefits of introducing energy storage to the grid

- Reduces the variability of renewable energy production by providing a buffer
- Can store renewable generation peaks for use during demand peaks when they do not align
- Immediate demand peak response without increasing generation to reduce stress on grid equipment
- Providing infrastructure support for volatile electric vehicle charging
- Potential to decrease or eliminate the power fees related to short time peak loads

About Energy Storage

Energy storage system (ESS)

Classification of the principal energy storage systems.

Transportation application

- Batteries
- Flywheel
- Ultracapacitor

Emergency application

- Thermal energy storage
- Flywheel
- Batteries
- Ultracapacitor
- Compressed air in vessels
- Hybrid systems

Large scale application

- Battery energy storage systems (BESS)
- Compressed air energy storage (CAES)
- Flywheel energy storage system (FESS)
- Pumped hydroelectric
- Superconducting magnetic energy storage (SMES)
- Ultracapacitor

Where and how each technology is used in the energy value chain

Segment

Generation



Transmission



Distribution



End Users



App

Centralized storage

Renewable integration

T&D network storage

Distributed energy storage

Industrial back-up & power quality

Residential & commercial

Electromobility

Type

Pumped hydro, CAES, batteries

CAES, batteries

Thermal storage, batteries

Batteries, flywheels, FC, SMES

E-mobility

Purpose

Large centralized storage for ancillary services and energy shifting

Large centralized / decentralized storage for time-shifting renewable generation aligning peak with demand

Energy storage, both stationary and portable at T&D network to support grid stability

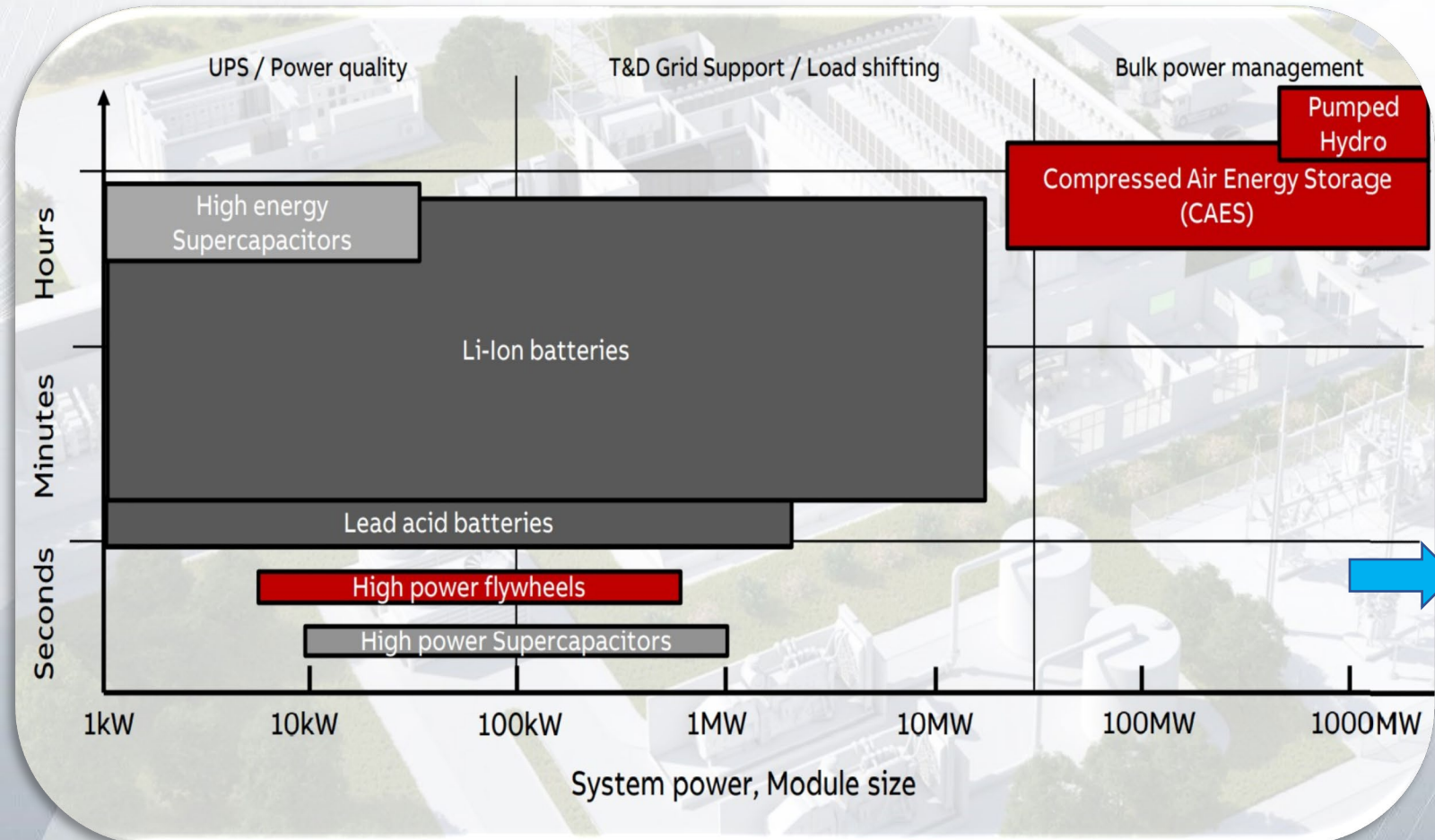
Energy storage at distribution network to provide small scale energy generation and energy management

Back-up or high quality power for commercial and industrial consumers with demand peak management

Small scale storage for residential and commercial use to provide back-up power and peaking capacity and/or reduce energy costs

Small scale storage for electrification of transportation to provide back-up power and peaking capacity

Types of technologies used for energy storage

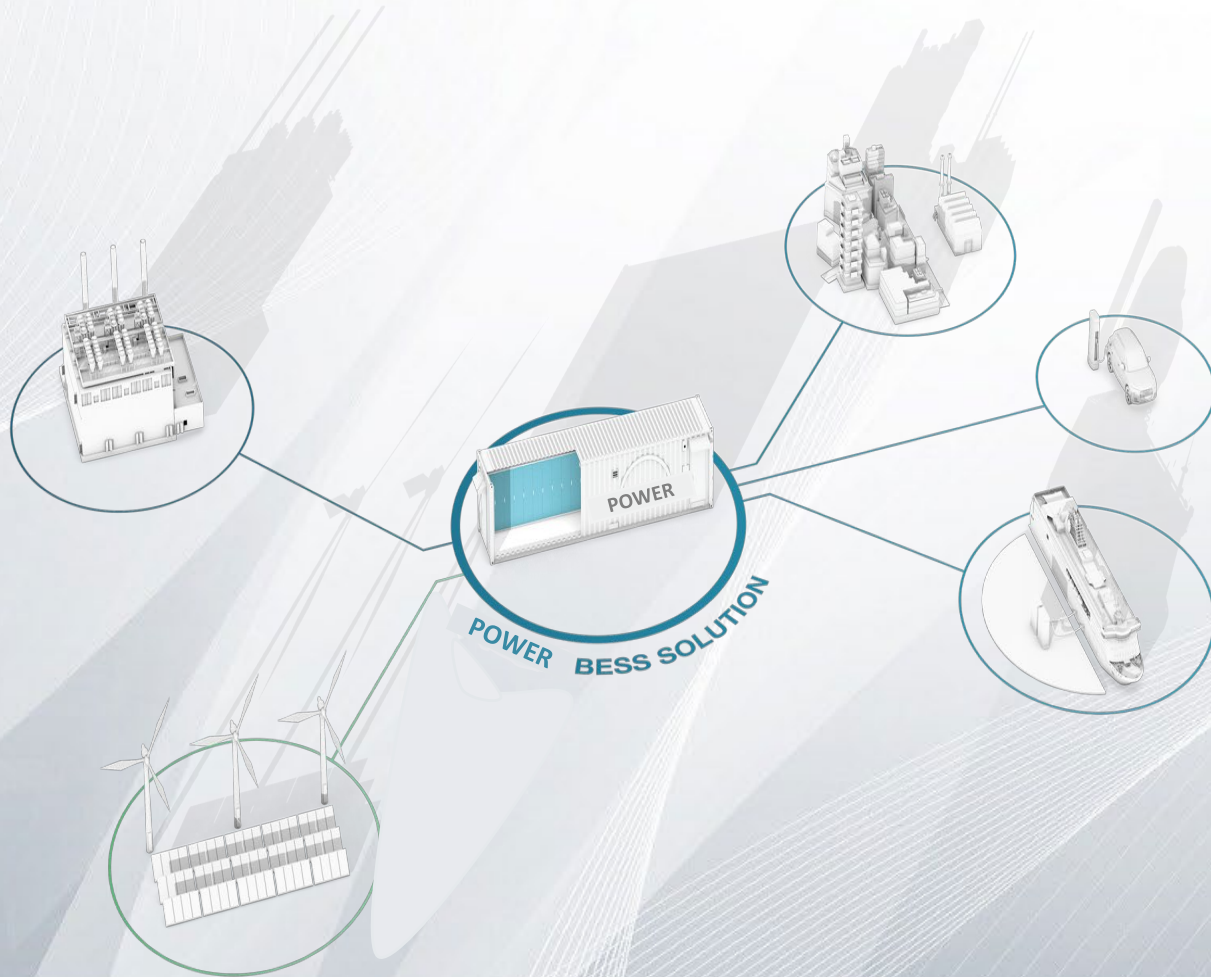


Differentiating Characteristics of Different Battery Technologies

	Maximum Power Rating (MW)	Discharge Time	Max cycles or Lifetime	Energy Density (watt-hour per liter)	Efficiency
Pumped Hydro	3,000	4h - 16h	30 - 60 years	0.2 - 2	70 - 85%
Compressed Air	1,000	2h - 30h	20 - 40 years	2 - 6	40 - 70%
Molten Salt (Thermal)	150	hours	30 years	70 - 210	80 - 90%
Li-ion Battery	100	1 min - 8h	1,000 - 10,000	200 - 400	85 - 95%
Lead-acid Battery	100	1 min - 8h	6 - 40 years	50 - 80	80 - 90%
Flow Battery	100	hours	12,000 - 14,000	20 - 70	60 - 85%
Hydrogen	100	mins - week	5 - 30 years	600 (at 200 bar)	25 - 45%
Flywheel	20	secs - mins	20,000 - 100,000	20 - 80	70 - 95%

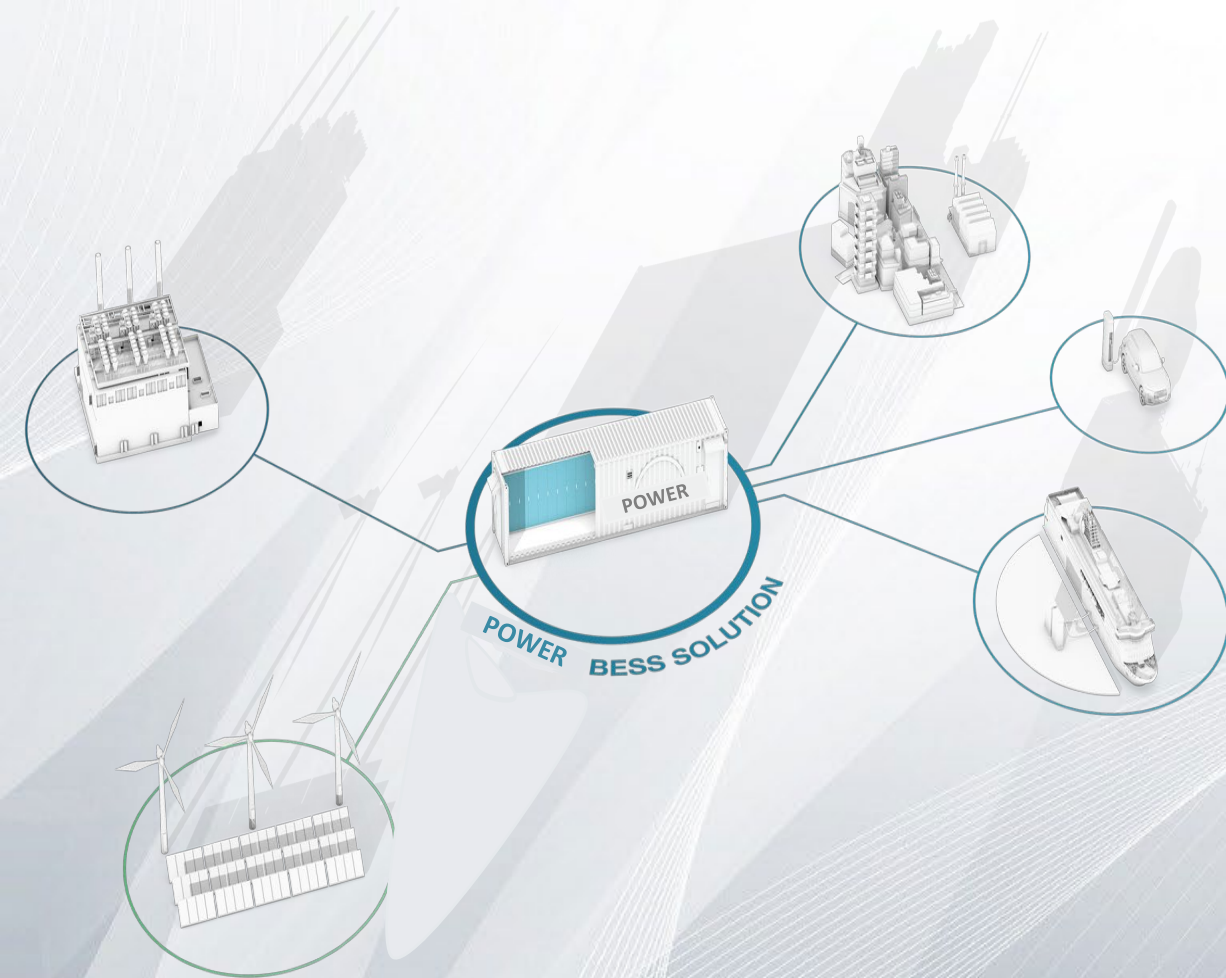
(source: eesi.org)

Battery Energy Storage Systems (BESS)



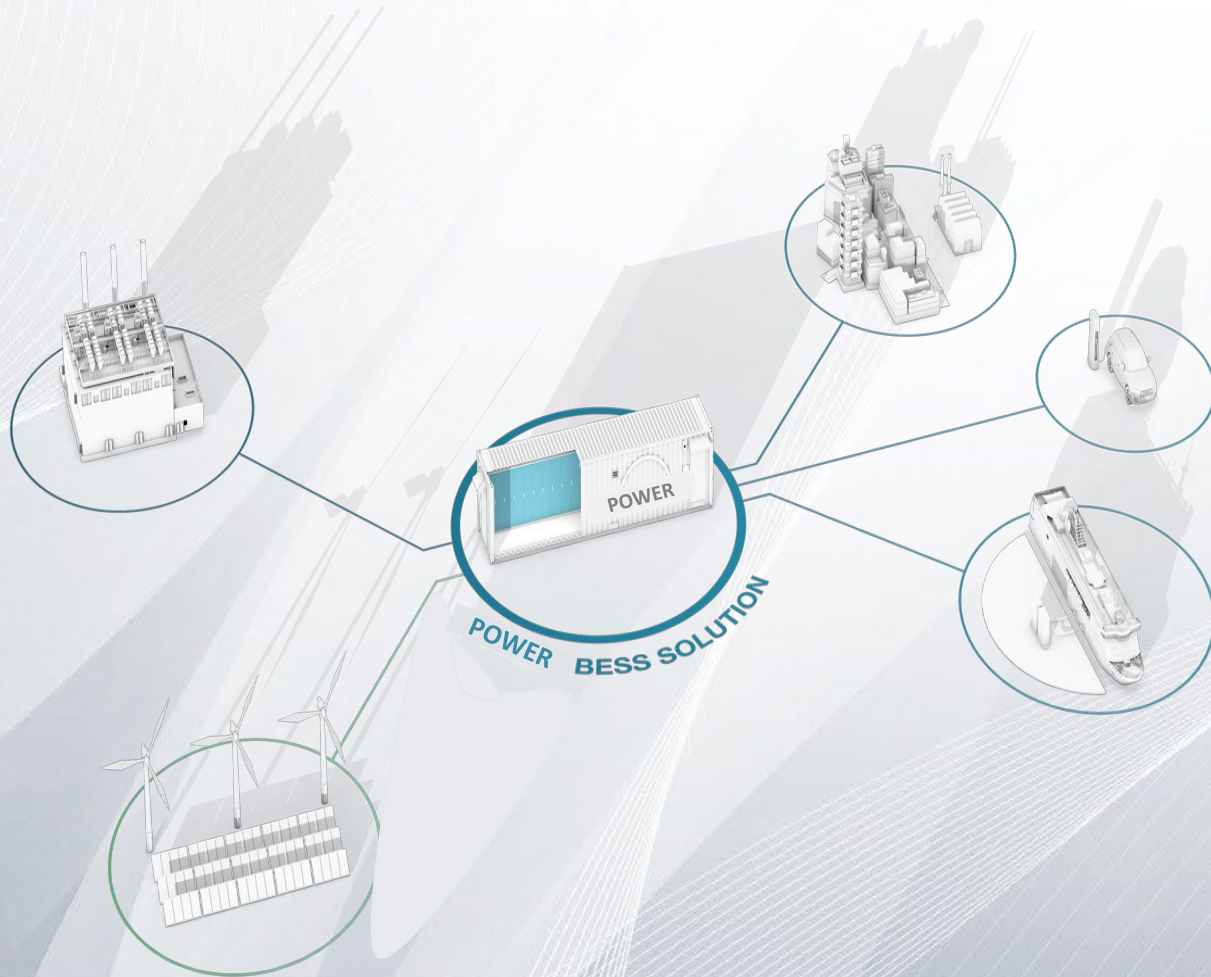
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- ✓ A typical system is comprised of batteries, a battery management system, an inverter, switchgear, transformer, protection and a control system.

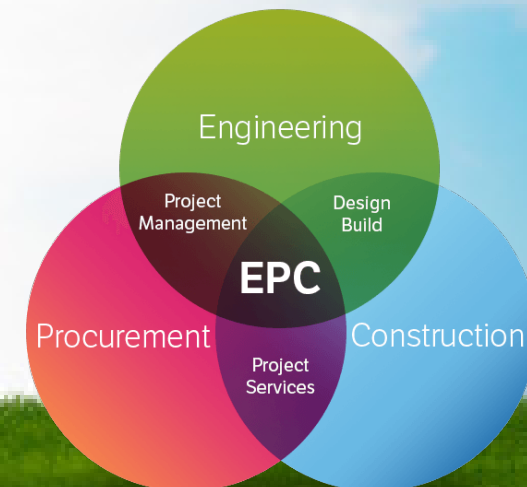
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- A typical system is comprised of batteries, a battery management system, an inverter, switchgear, transformer, protection and a control system.
- ✓ Often renewable energy sources are combined with a BESS to store the renewable energy during peak production time and then the energy is used when it is needed.

Power Solar and Power Engineering Group

- ✓ Feasibility Services
- ✓ Application according to distribution companies standards
- ✓ Product Supply Services
- ✓ Engineering and Application Services
- ✓ Operation and Maintenance Services



REFERENCES

Thank you



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