

autar^{sys}

Energy Storage Systems (ESS)



Wir machen die erneuerbare Energieversorgung von Morgen schon heute

Kurzvorstellung Autarsys GmbH

Die Firma Autarsys entwickelt und produziert modulare Energiespeicher mit Energiemanagement.

Die Batteriespeichersysteme der Autarsys GmbH machen die Stromversorgung mit erneuerbaren Energien sicherer, effizienter und kostengünstiger .

Unsere Technologie ermöglicht es den Anteil an erneuerbarer Stromerzeugung auf 100% zu erhöhen.

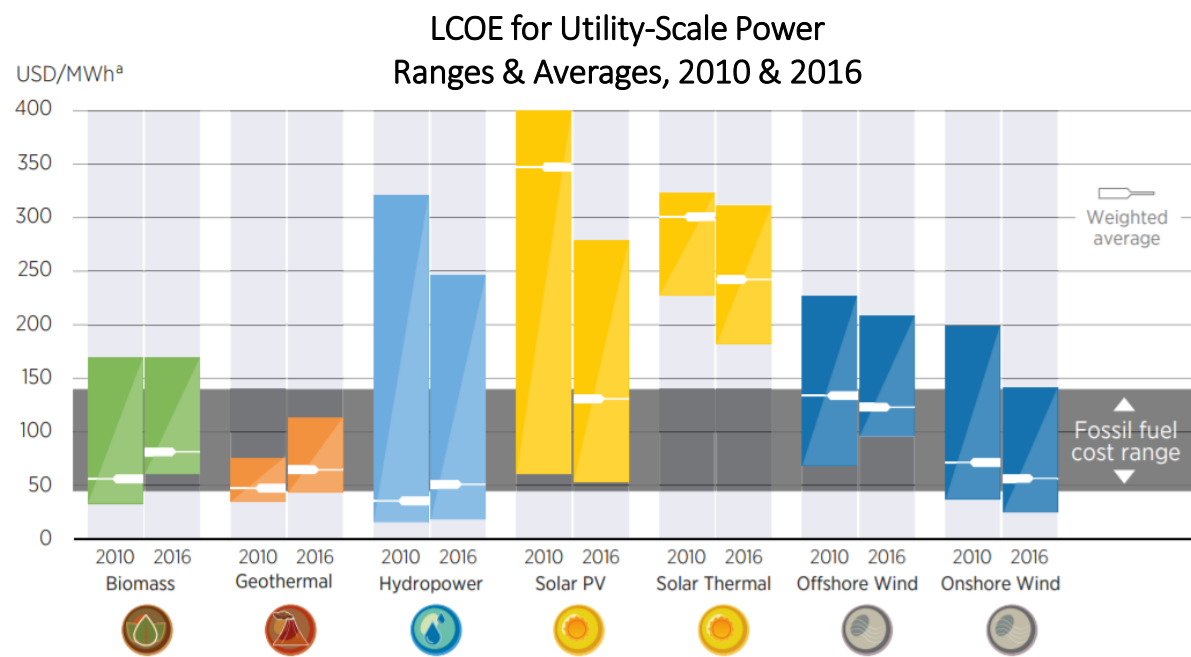
Unsere Kunden sind aus folgenden Sektoren:

- Öffentliche Energieversorgung
- Ländliche Elektrifizierung
- Kommerzielle und industrielle Anwendungen (C & I)



Autarsys won Alliance for Rural Electrification's 2018 award in the category of *Private Sector in Australia, Europe & North America.*

Energy Generating Technologies and Corresponding LCOE (levelized costs of electricity)



Note: a) MWh: megawatt-hour
 b) All costs are in 2016 USD. Weighted Average Cost of Capital is 7.5% for OECD and China and 10% for Rest of World

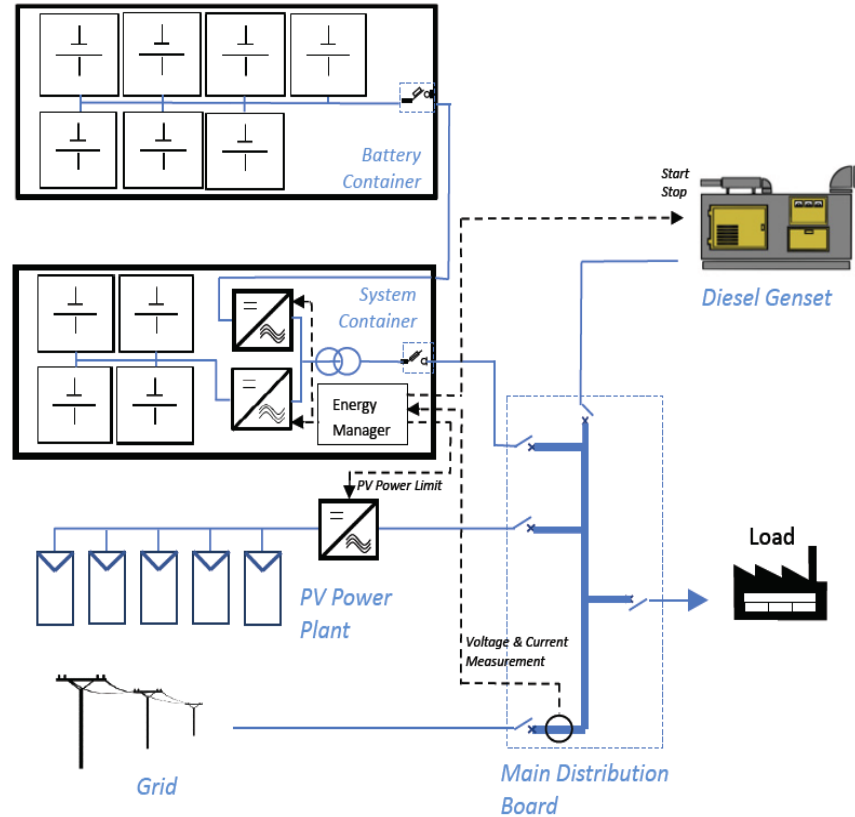
Source: IRENA, Rethinking Energy 2017

Ein Netz mit dezentraler Erzeugung



Bestandteile eines Netzes mit DER

- Regenerative Erzeugungseinheiten
- Constante Erzeugungseinheiten
- Variable fossile Generatoren
- Verbundnetzanschluss
- Die zu versorgenden Verbraucher





Wozu braucht man Energie-Speicher im Stromversorgungssystem?

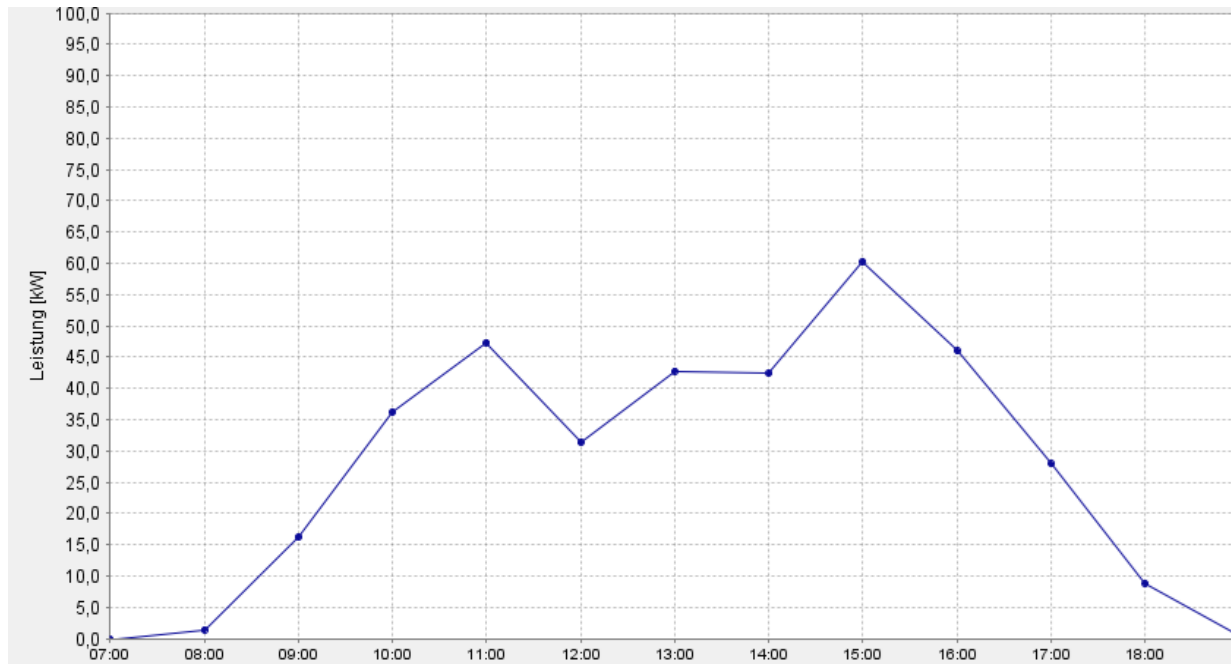
Nachteile:

- Erzeugen keine Energie
- Teuer
- Brauchen Wartung
- Sicherheitsrisiko

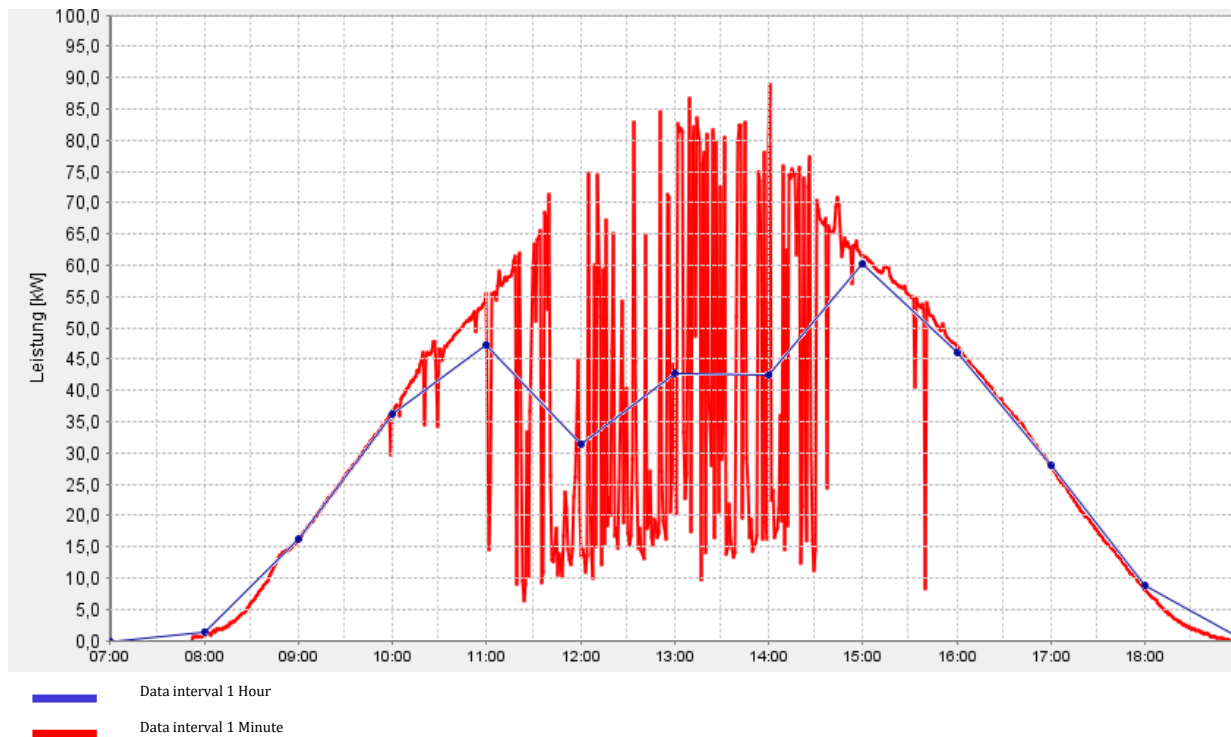
Vorteile:

- Stabilisieren die Stromversorgung
- Erhöhen den Eigenverbrauch
- Können auch bei Stromausfall die Versorgung übernehmen
- Können die Leistung aufnehmen und abgeben

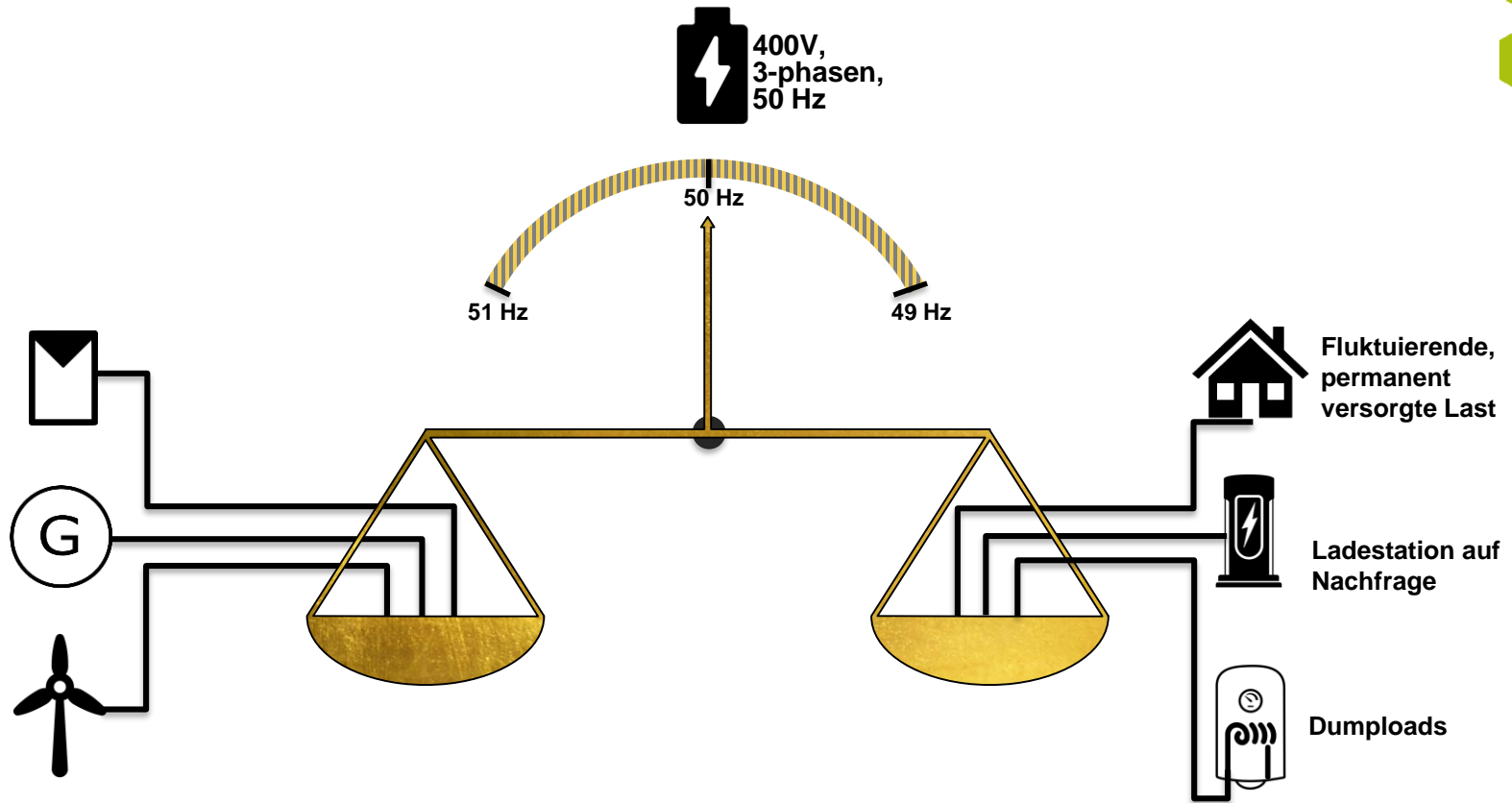
Messwerte der Fluktuationen einer mittleren PV-Anlage in Südfrankreich (100 kWp)



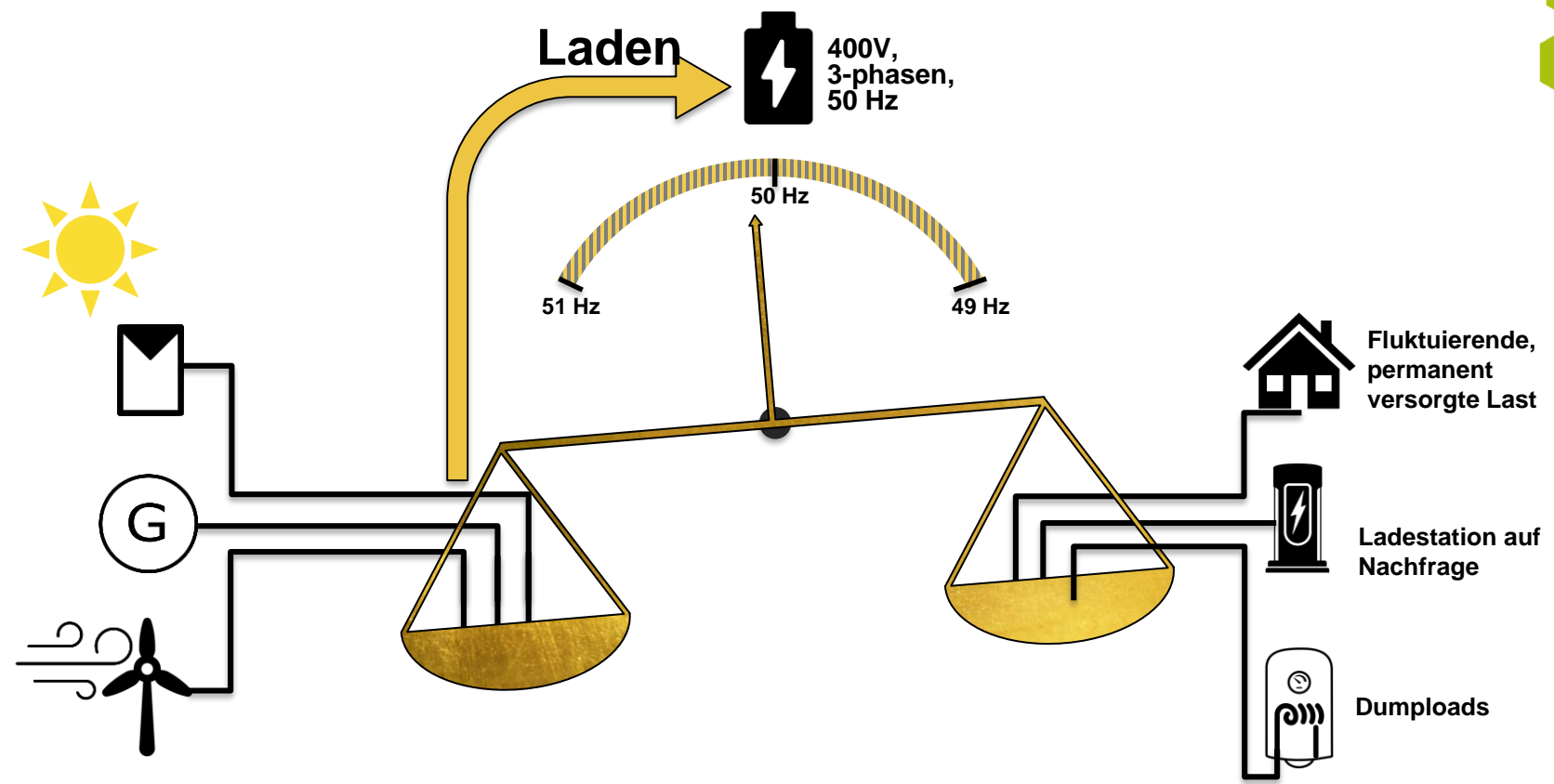
Messwerte der Fluktuationen einer mittleren PV-Anlage in Südfrankreich (100 kWp)



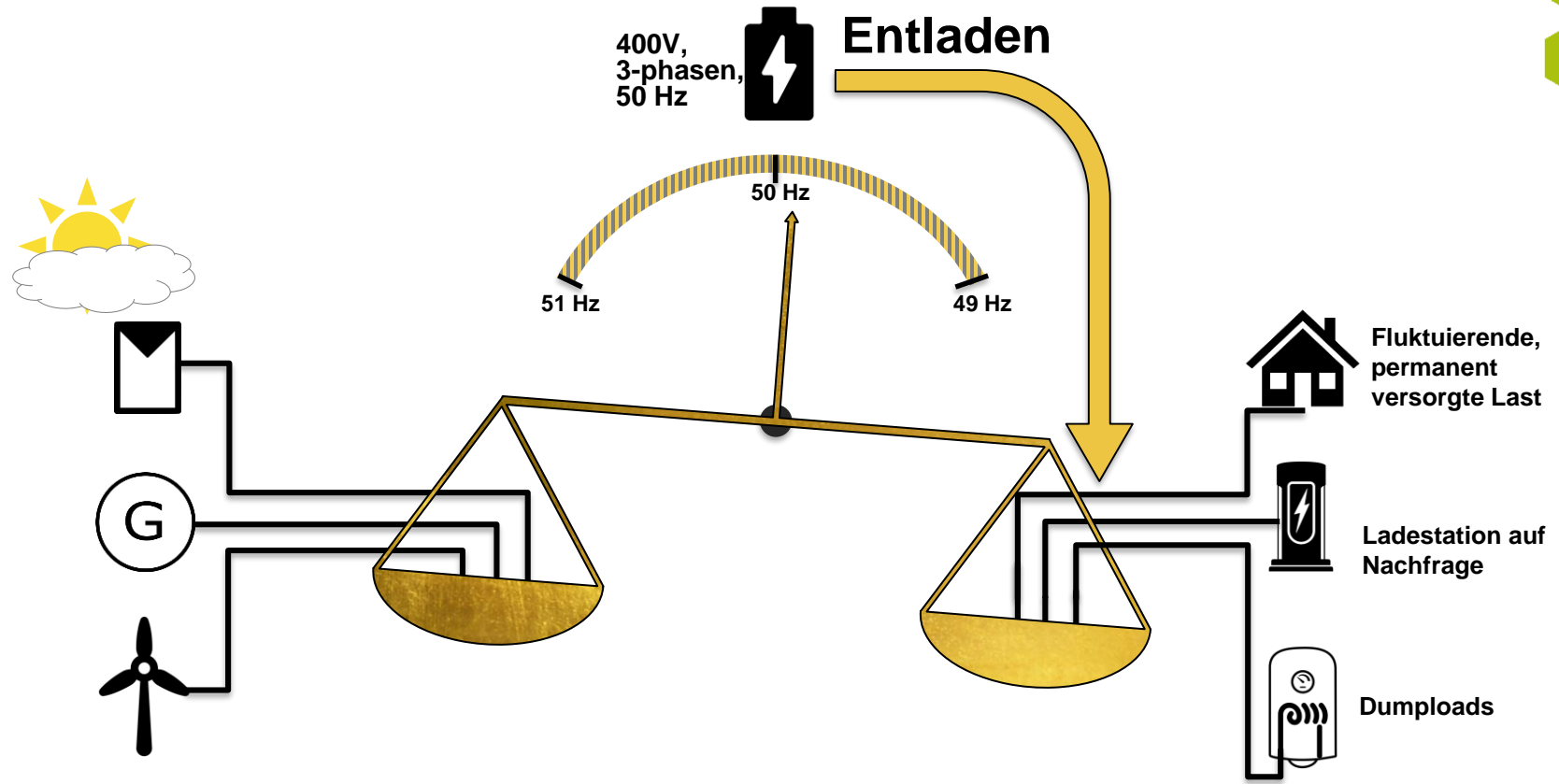
Energie-Bilanz



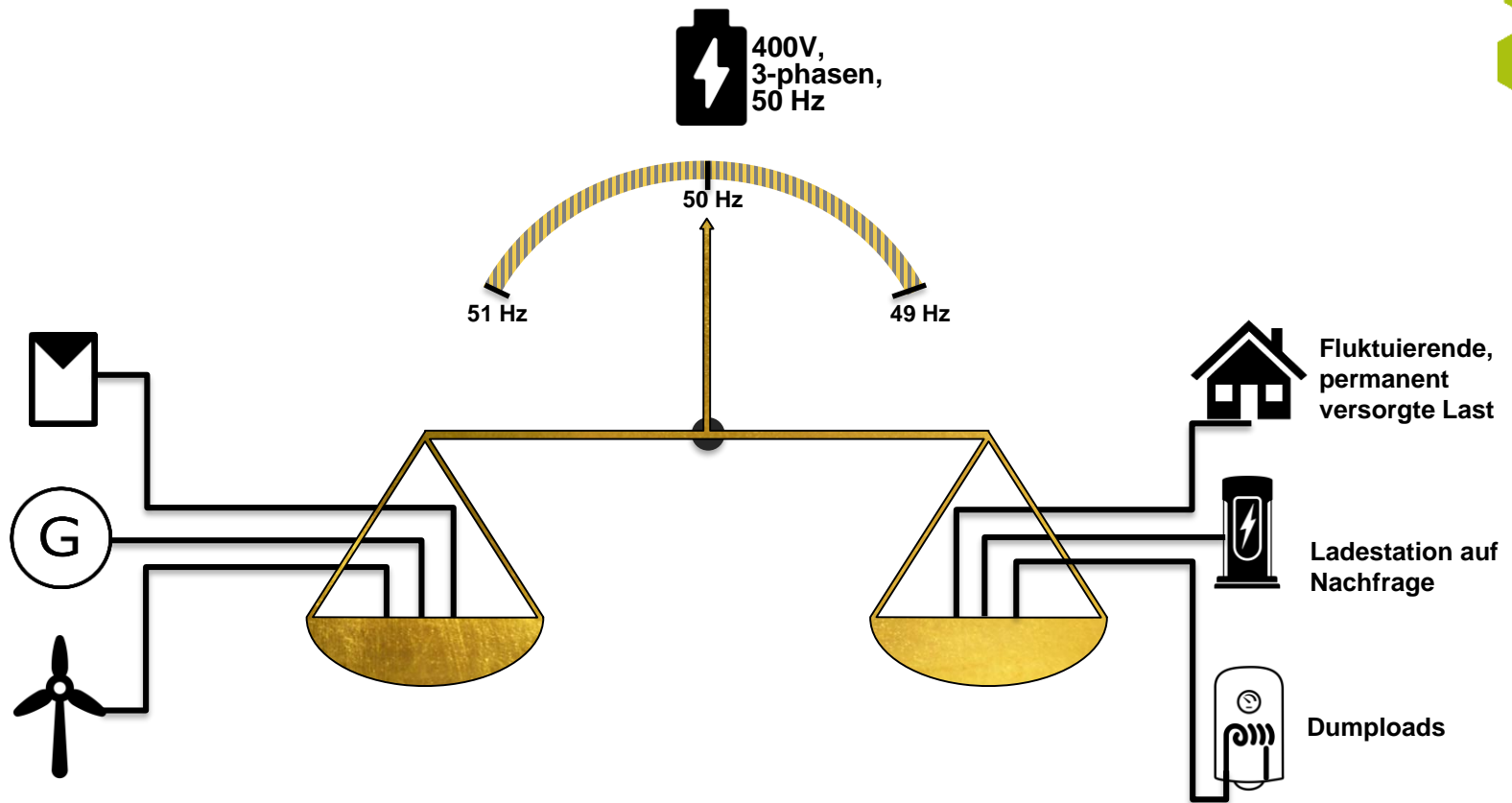
Energie-Bilanz



Energie-Bilanz

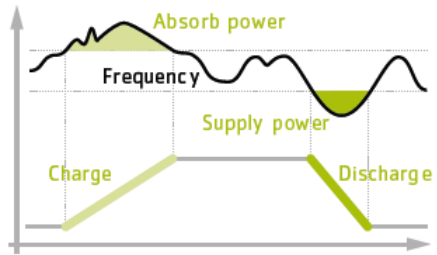


Energie-Bilanz

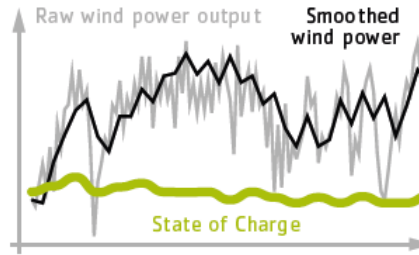


Stabilizing Grids & Reducing CO₂ Emissions

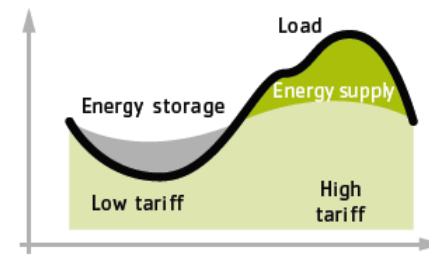
Frequency Regulation • Renewable Ramp Rate Control • Energy Arbitrage



Frequency Regulation

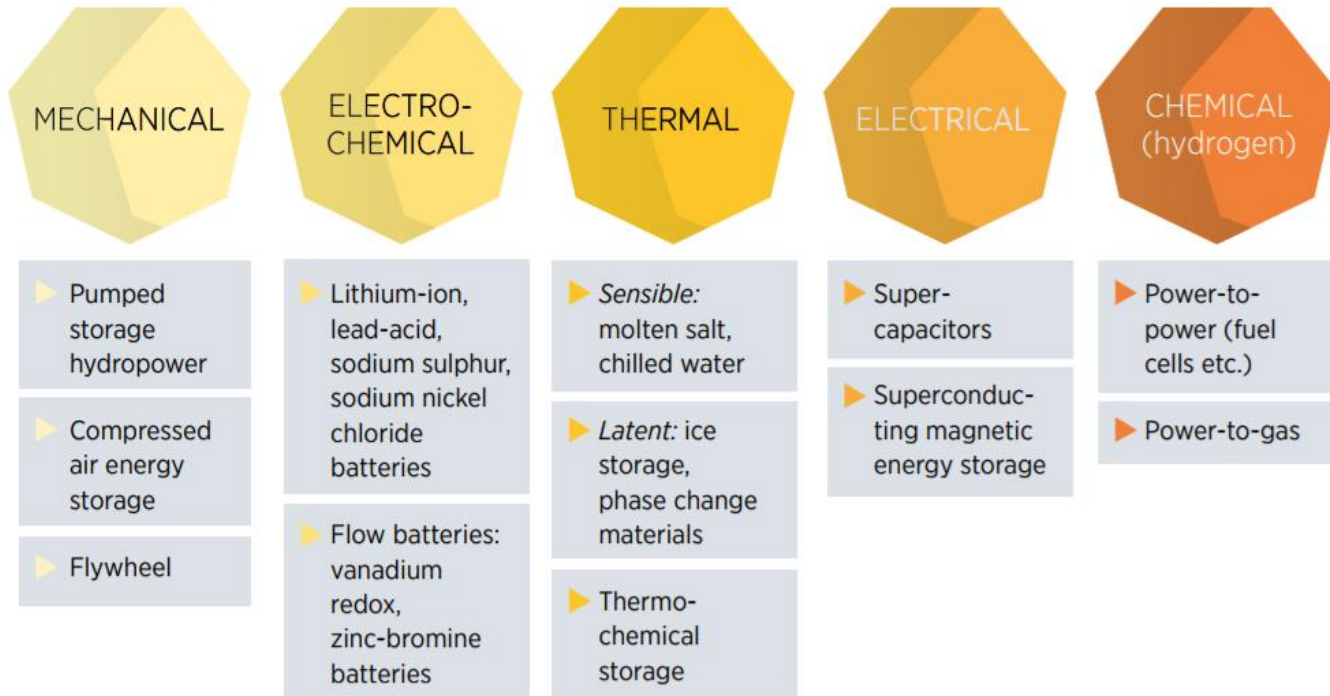


Solar/Wind Ramp Rate Control



Energy Arbitrage

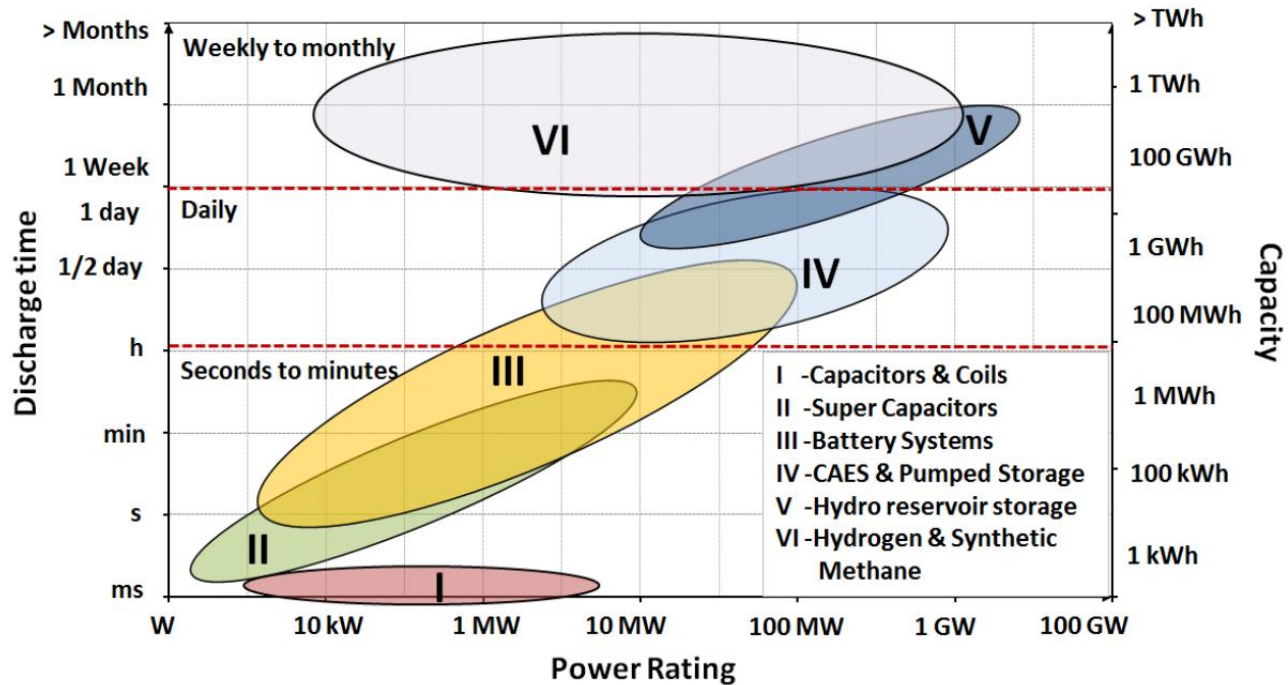
Types of Energy Storage



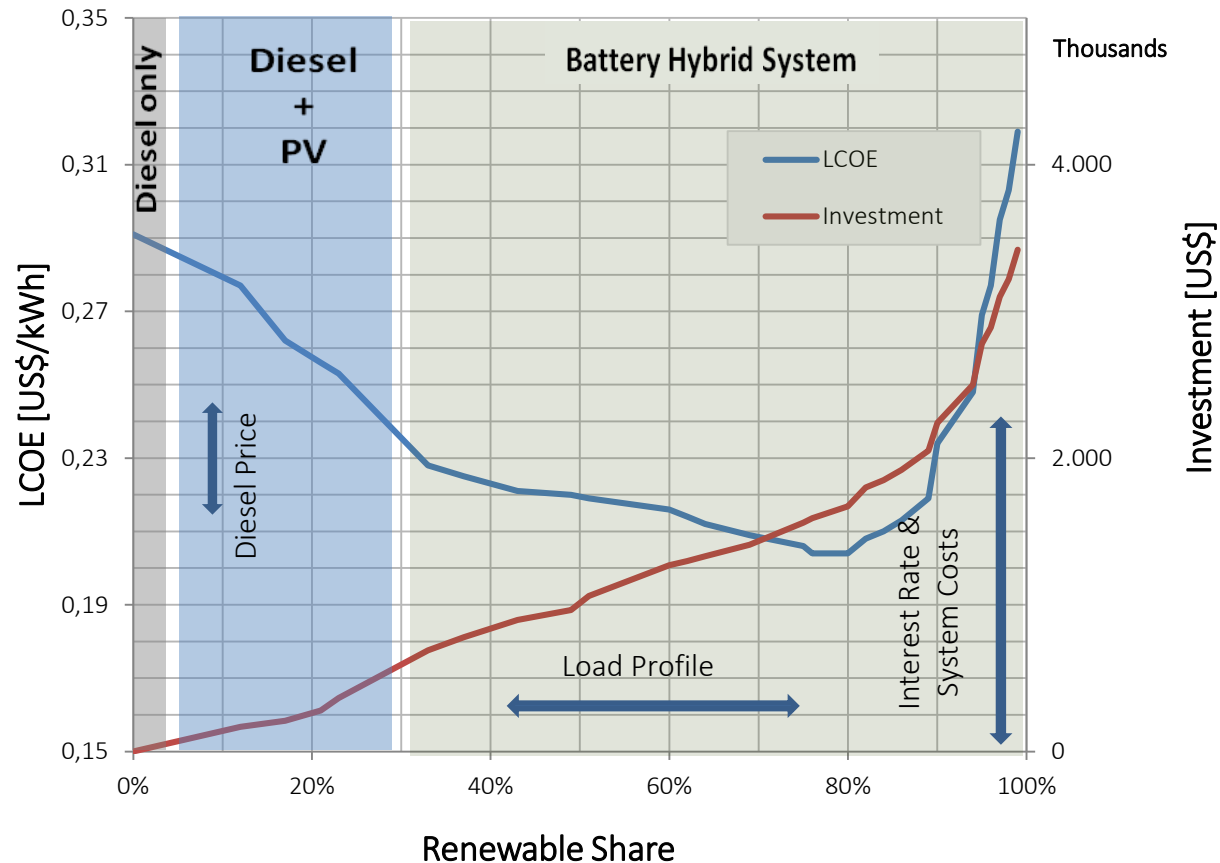
Source: State of Massachusetts, 2016

Energy Storage: Technical Characteristics

Discharge Time According to Power Rating

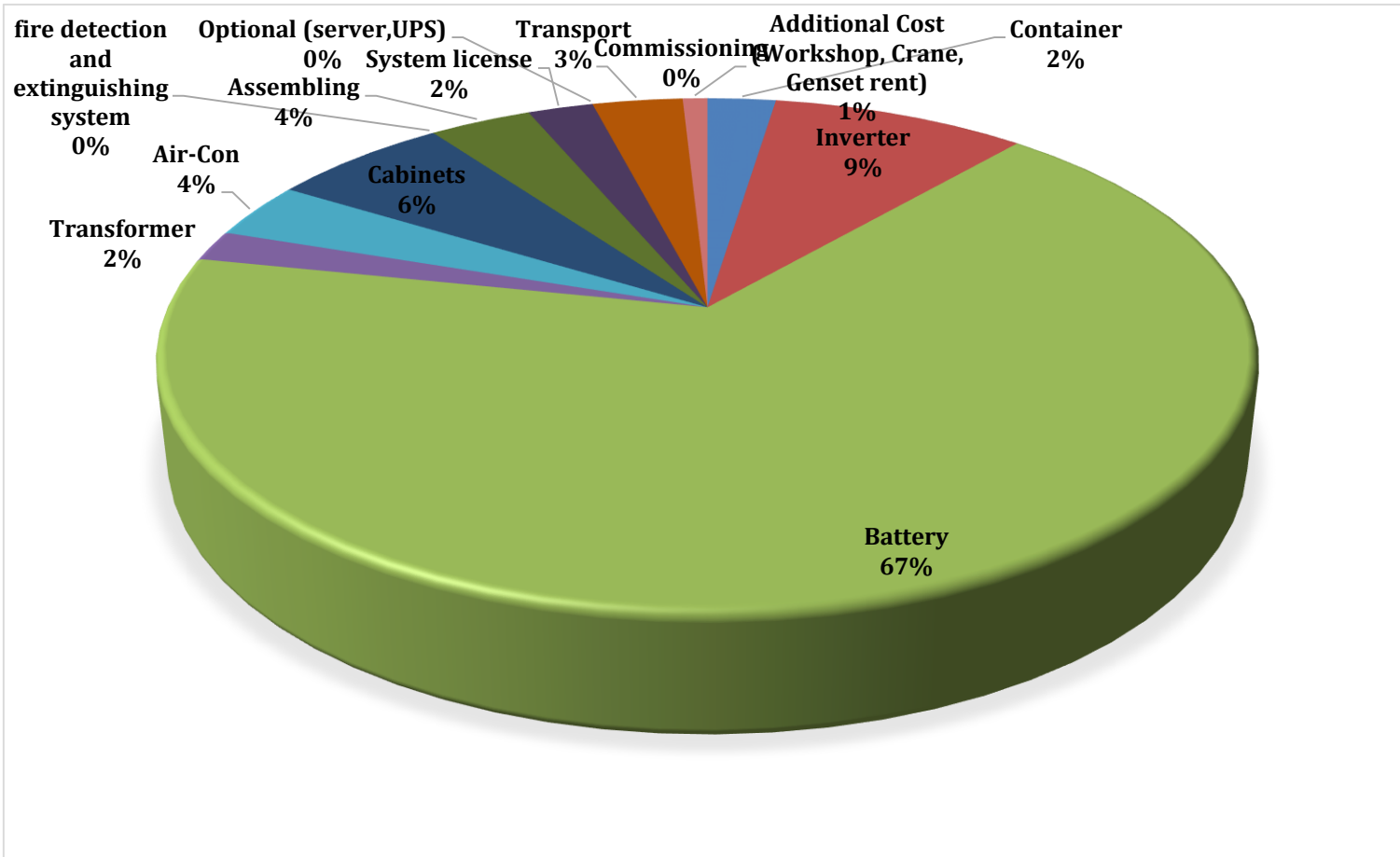


Energy Management for Off-Grid Hybrid Systems: Reducing Levelized Costs of Electricity (LCOE)



Was sagen die Kosten für einen Energiespeicher aus?

Kostenanteile eines Speichers mit 100 KVA Leistung und 700 kWh.Energie

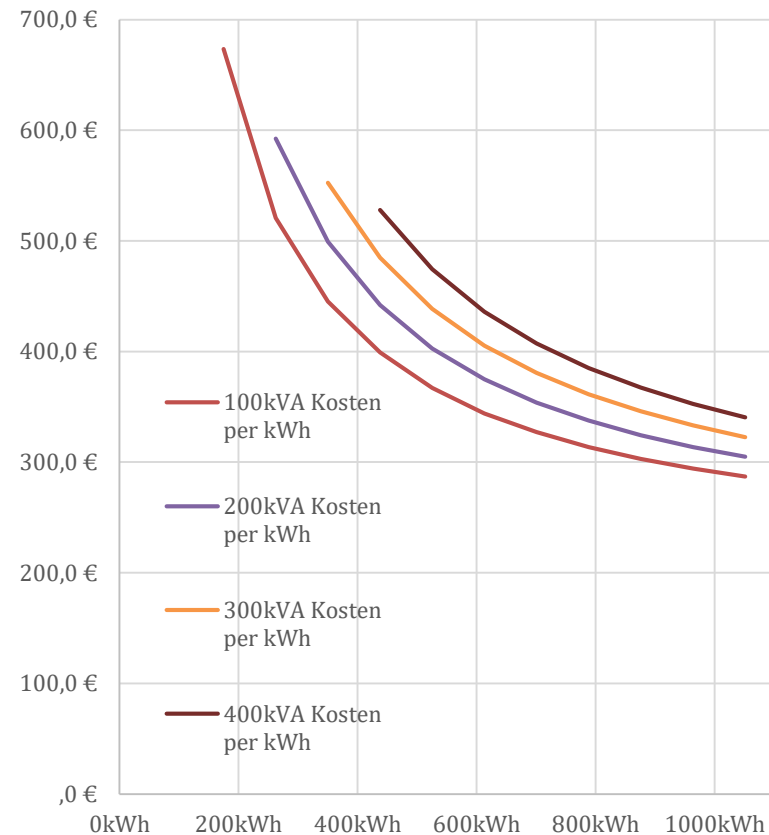


Was sagen die Kosten für einen Energiespeicher aus?

Kosten eines Speichers bezogen auf die Leistung



Kosten eines Speichers bezogen auf die gespeicherte Energiemenge





Mini – Autarsys ESS

Nominal AC Power	30 – 90 kVA
Energy Capacity	33 – 274 kWh
Output Voltage	3 Ø 230/400 V
Output Current	43.5 – 130.5 A
Frequency	50/60 Hz
System Efficiency	96%
Ambient Temperature	10 to 50 °C
Dimensions (l × b × h)	2.44 × 2.20 × 2.26 m ³
Guarantee*	10 years
Lifetime*	20 years

ESS Features and Capabilities

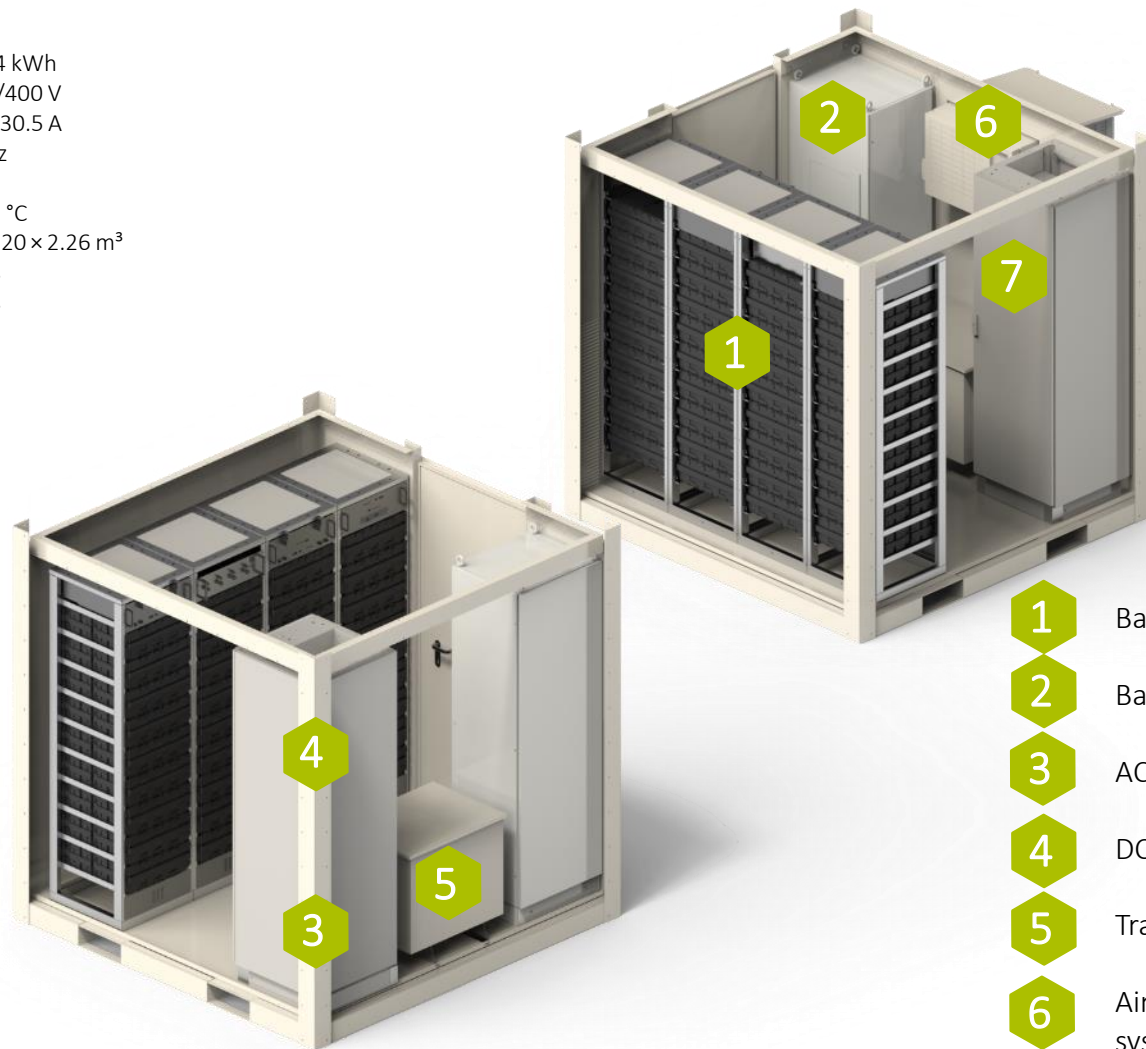
- On-Grid & Off-Grid Ready
- Online UPS
- SWERnet Integration
- Fuel Save
- Diesel Generator Control
- Energy Management
- Dynamic Grid Support
- Reactive Power Compensation
- Blackstart

ESS Communication Interface

- Touchscreen Display
- Data Monitoring (SCADA)
- Ethernet Support
- Modbus
- GPRS/Satellite Communication

ESS Product Certifications

- EN 61000-6-2, EN 61000-6-4,
- IEC62040, AS4777, CE Conformity



- 1 Battery racks
- 2 Battery inverter
- 3 AC Connection
- 4 DC Connection
- 5 Transformer
- 6 Air Conditioning system
- 7 Control interface

The guarantee and lifetimes mentioned are under specific standard conditions of operation of the ESS. Actual product specifications and layout may vary depending upon the application.

Solutions – Autarsys Medium ESS

Nominal AC Power	87.5–350 kVA
Energy Capacity	150–900 kWh
Output Voltage	3 Ø 480 V
Output Current	125–500 A
Frequency	50/60 Hz
System Efficiency	96%
Ambient Temperature	–10 to 50 °C
Dimensions (l × b × h)	6.06 × 2.44 × 2.90 m ³
Guarantee*	10 years
Lifetime*	20 years

ESS Features and Capabilities

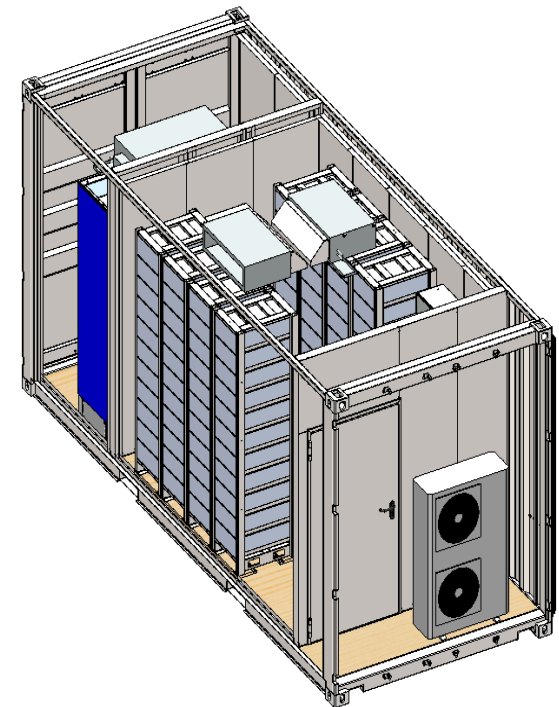
On-Grid & Off-Grid Ready, UPS, Fuel Save, Diesel Generator Control, Energy Management, Dynamic Grid Support, Reactive Power Compensation, Blackstart, Solar PV/Wind Ramp Rate Control

ESS Communication Interface

Touchscreen Display
Data Monitoring (SCADA)
Ethernet Support
Modbus
GPRS/Satellite Communication

ESS Product Certifications

EN 61000-6-2, EN 61000-6-4,
IEC62040, AS4777, CE Conformity



- 2 Battery inverter
 - 3 PV inverter (optional)
 - 4 Control panel (outside)
- 5 AC connections
 - 6 Air Conditioning system
 - 7 DC connections

*The guarantee and lifetimes mentioned are under specific standard conditions of operation of the ESS. Actual product specifications and layout may vary depending upon the application.

Solutions – Autarsys Large ESS

Grid Stability for Large Scale Solar/Wind Power Plants

Nominal AC Power	Up to 1.52 MVA (20' container and scalable) Up to 2.28 MVA (40' container and scalable)
Energy Capacity	Up to 1.68 MWh (20' container and scalable) Up to 3.36 MWh (40' container and scalable)
Output Voltage	3 Ø 480 V
Frequency	50/60 Hz
System Efficiency	96%
Ambient Temperature	-10 to 50 °C
Guarantee*	10 years
Lifetime*	20 years

ESS Features and Capabilities

On-Grid & Off-Grid Ready, Frequency Regulation, Load Leveling, Peak Shaving, Energy Management, Solar PV/Wind Ramp Rate Control, Blackstart, Dynamic Grid Support, Reactive Power Compensation

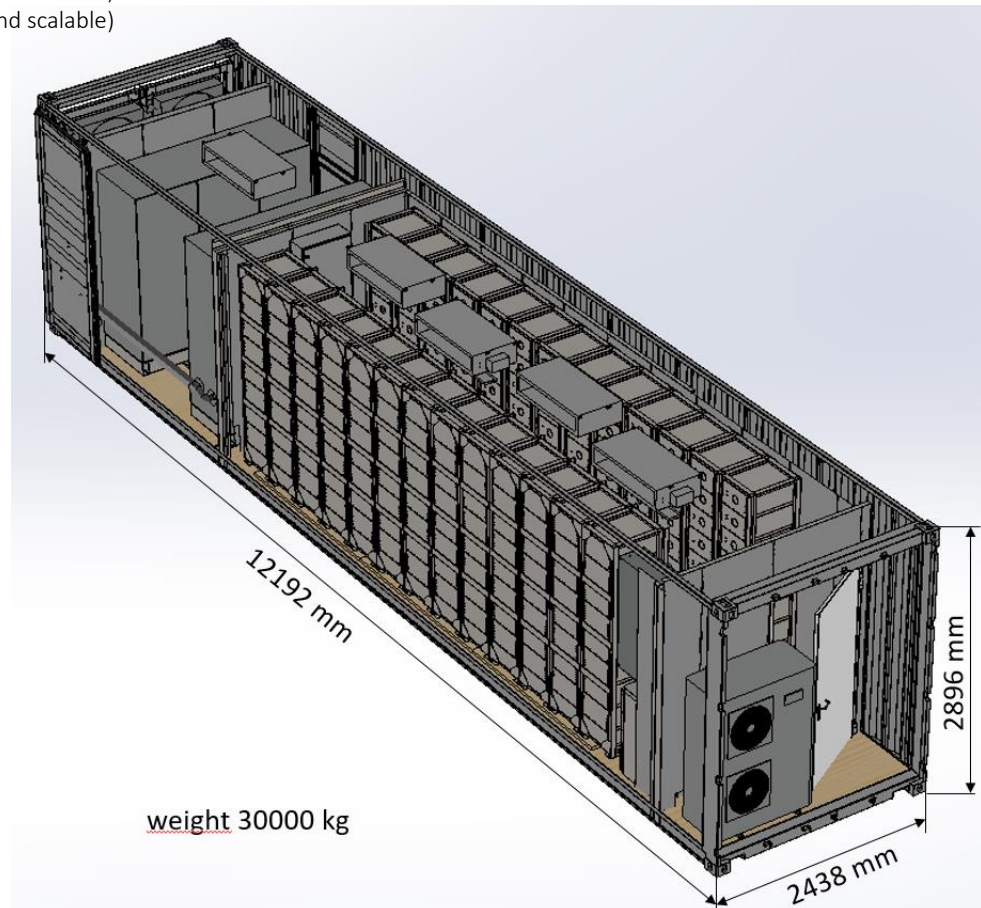
ESS Communication Interface

Touchscreen Display
Data Monitoring (SCADA)
Ethernet Support
Modbus
GPRS/Satellite Communication

ESS Product Certifications

EN 61000-6-2, EN 61000-6-4,
IEC62040, AS4777, CE Conformity

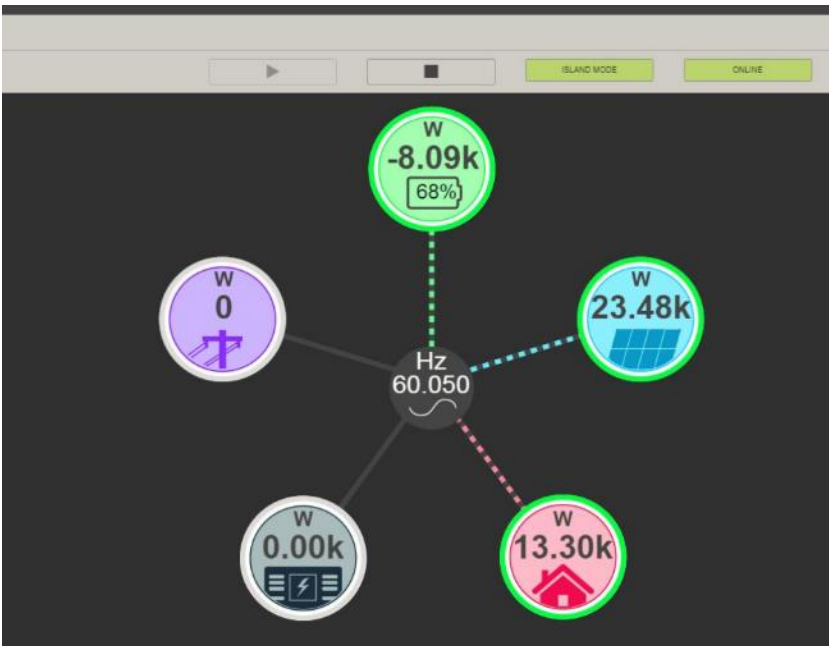
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User-Friendly HMI

(Human Machine Interface)

Intuitives und benutzerfreundliches webbasiertes Layout zur Überwachung und Steuerung



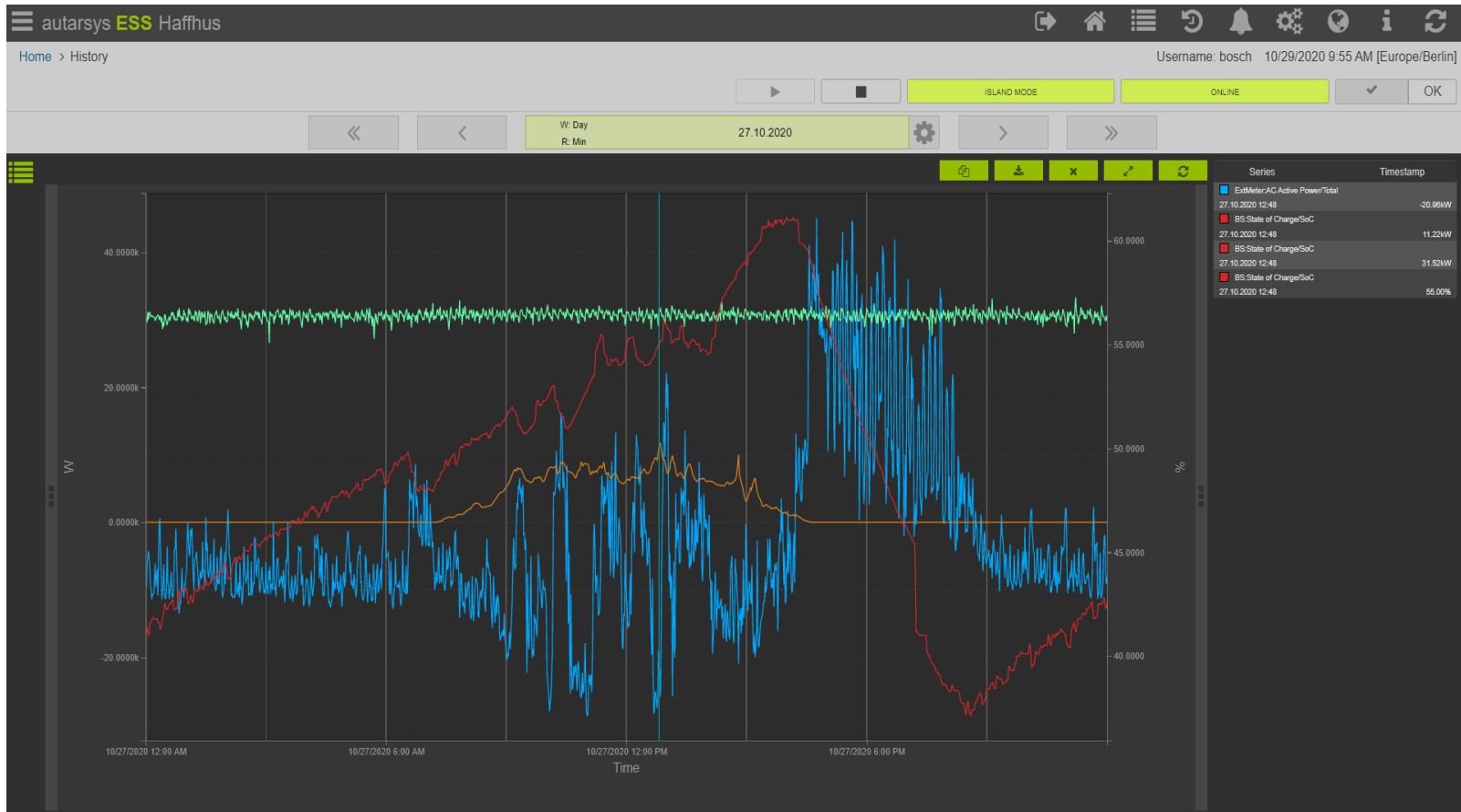
Merkmale:

Plattform-übergreifender Zugriff. Ähnliche Ansichten in lokalen und mobilen Anwendungen

Fernzugriff über VPN

Sicherheit durch Alarmkette - Informationssicherheit. Lokale Datenspeicherung

Energy Management for Off-Grid Hybrid Systems:



Reference Projekte

Under Comissioning

Tanandava, Madagascar 60 kW | 248 kWh

Under Construction

- Befandriana, Madagascar 30 kW | 124 kWh
- Ejeda Madagascar 60 kW | 248 kWh
- Belamoti Madagascar 30 kW | 124 kWh
- Tombobori Madagascar 30 kW | 124 kWh
- Fotadrevo Madagascar 30 kW | 124 kWh
- Neuenhagen Germany PRL 70 MW / 55 MWh
- Strübbel Germany PRL 50 MW / 40 MWh

Comissioned

Ld, Australia 1.4 MW | 5.3 MWh

Qi Resort, Philippines 30 kW | 124 kWh

New Ibjay, Philippines 60 kW | 248 kWh

St. Anthony's, Philippines 30 kW | 124 kWh

Nicosia, Cyprus 30 kW | 83 kWh

Mayo-Baléo, Cameroon 218 kW | 227 kWh

Le Plan, France 30 kW | 124 kWh

Mam Rasham, Iraq 174 kW | 127 kWh

Ueckermünde, Germany 166 kW | 496 kWh

Manombo, Madagascar 30 kW | 124 kWh

Antanimieva, Madagascar 30 kW | 124 kWh

Lio Villas, Philippines 30 kW | 124 kWh

Vellago, Philippines 30 kW | 124 kWh

Tyram Lakes, UK 173 kW | 502 kWh

Sibaltan, Philippines 60 kW | 248 kWh

Energieautarkie Hof Grabenmeier 84 kW | 143

Cauayan, Philippines 100 kW / 500 kWh

Man Rasham II Irak 400 kW/522 kWh

Europe
Autarsys GmbH

Berlin, Germany

Cameroon,
Maroua

Nairobi, Kenya

Madagascar,
Antananarivo

Manila, Philippines





Thank you!
Let's work together.

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