



# MESY

Mobility and Energy storage Systems

T H E P O W E R - T O - G A S G R O U P

## MESY GmbH

### Company Presentation



# Index

1. Company
  1. History
  2. Markets
  3. Organisation
  4. Product overview and integration into standards
2. Product details of IaRET<sup>©</sup>
3. Product details of eIES<sup>©</sup>
4. Product details of blueSKY<sup>©</sup>



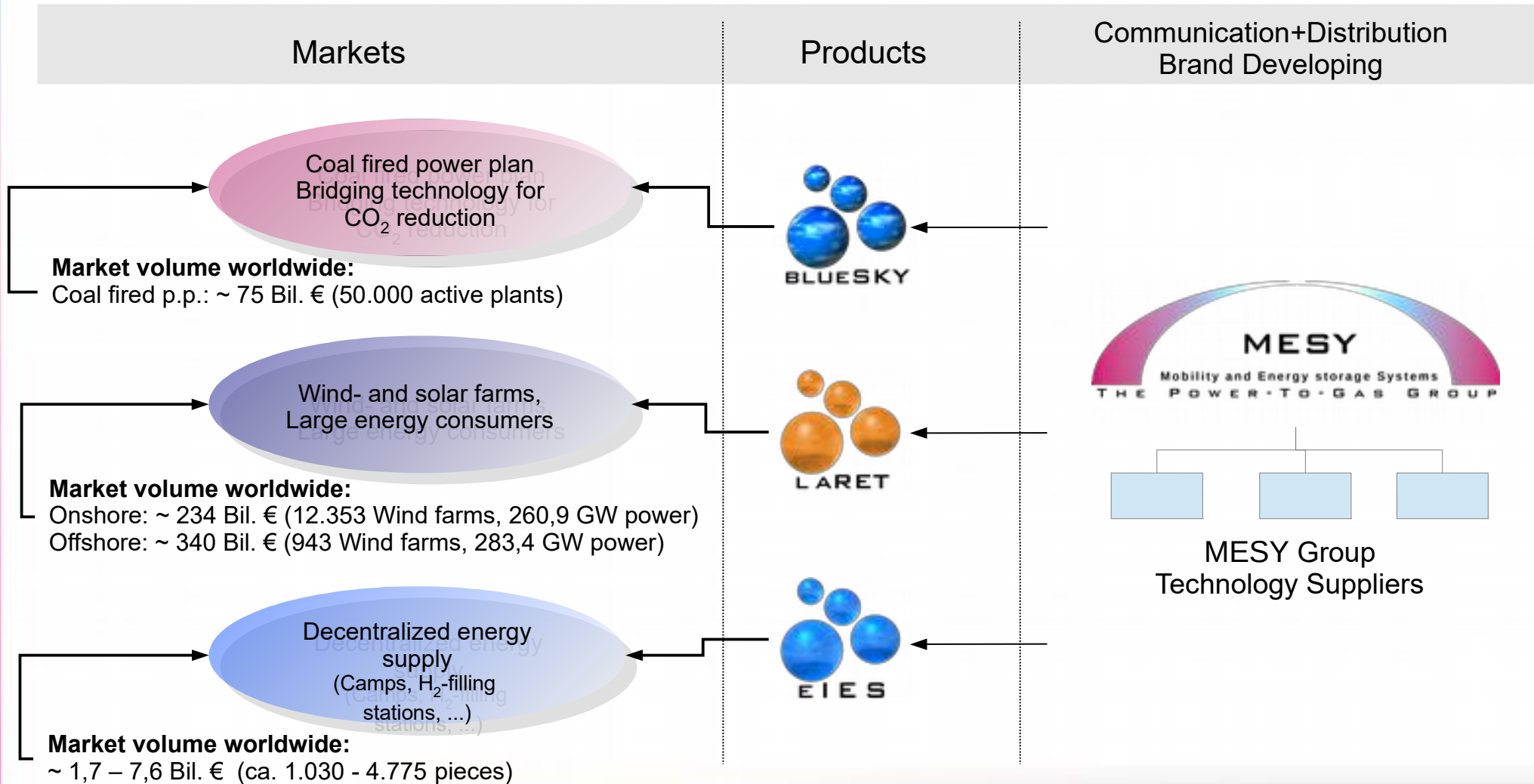
# History

## Steps of developing:

- ✓ **2009 Analysis** for expansion of renewable energies in Bolivien on behalf of the new government.
  - **Result:** Found no merchants offering complete solutions worldwide or missing complete.
  
- ✓ **2011-2012** Worldwide market analysis and strategy development. Needs assessment of customer potential and determine the necessity of customers.
  - **Result:** Market volume for laRET: 13.000 wind farms above 1 MW.  
Market volume for eIES: 1.030 - 4.775 container.  
Market voluem for blueSKY product line: 50.000 active coal fired power plants.
  
- ✓ **2013**
  - **January:** Beginning of the acquisition of various customers in Germany, Europe, USA and Middle East. Evaluation of the results and deciding whether a group of companies and a product concept to be developed. Fundamental decision for or against the future MESY Group.
  - **July:** in-depth discussions with customers.
    - **Result:** The product offering has integrating and orienting effect on the customer. Great interest in the products and system solutions of the MESY Group.
  - **August:** Acquisition of companies along the technology chain. Acquire all of the companys for the core of MESY Group.
  - **December:** Funding of MESY and MESY Group.
  
- ✓ **January 2014:** MESY presents itself to the market.
  - February: Beginning of the work of MESY.



# Market volumes and products



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# Markets in several countries with different priorities

Australia	Iceland	Norway
Brazil	India	new Zealand
China	Italy	USA
Germany	Japan	European Union
France	Canada	Great Britain
Taiwan	South Korea	Denmark

Venezuela	Chile	Argentina
Mexico	Arab States	Finland
South Africa	Singapore	Russian Federation
Malaysia		



# Target market priorities

Energy Market: successor technology for wind and solar farms	Priorität 1
Energy supply of industrial and conventional power plants for CO <sub>2</sub> reduction	Priorität 1
Supply independent areas	Priorität 2
Municipal utilities (city power plants)	Priorität 2
Use and supply of special vehicles	Priorität 3
Public transport	Priorität 3
House Energy	Priorität 4



# Unique selling points

- Unrivaled customer-oriented system offer by our alliance partners.
- Presentation of a complete system offer, high quality and unrivaled performance areas for professional clients.
- Full system chain from energy transformation, storage, distribution and re-powering (Gas-To-Electricity), also for use in stand-alone infrastructure or weak areas.
- No own integration performance of various system elements and different technologies are needed by the user/customer.
- Lead Education, accompanying and trailing Service to control system performance to relieve the service staff.
- Optional integrated project financing services.



# Exportable business model

- ✓ Conversion of excess electricity from wind and sun in H<sub>2</sub> gas. Regardless of the available infrastructure such as electricity grids or gas networks. Thus, use of excess energy and no energy dissipation.
- ✓ Distributed generation of H<sub>2</sub> gas in the vicinity of onshore and offshore energy parks. No long power grids are necessary.
- ✓ Large-scale distribution of wind and solar power without expensive power line infrastructure possible. Distribution over good value gas pipes.
- ✓ Long-term storage of wind and solar power in gas storage caverns or gasometer for reconversion on low-energy days (low wind, cloudy days, etc.).
- ✓ Supply the industry with H<sub>2</sub> gas as a substitute for natural gas. Reduction of CO<sub>2</sub> emissions.
- ✓ Supply of coal power plants for CO<sub>2</sub> reduction.
- ✓ Supply of hydrogen refueling stations for electric mobility in the catchment area.
- ✓ Supply by private users (hospitals, apartment buildings, police, firefighters, small business, etc.) for self-sufficient energy supply.
- ✓ Use of waste heat for customers (heating, process heat, etc.).
- ✓ Optional: reducing / offsetting of CO<sub>2</sub> certificates.





# What is our task

## Tasks and priorities of MESY project company

- Permanent identification of customer needs
- Definition of Products
- Innovation Planning
- Customer Acquisition
- Combination of suitable corporate partners along the technology chain
- Management of the Enterprise
- Presentation of the Enterprise
- Representation in public, public relations
- Preparation and submission of bids
- Contract completion of projects as general contractor
- Management und Controlling of Projects
- Cash flow management
- Project reporting to the customer / manufacturer

Representation of the technology chain as ONE system offer!



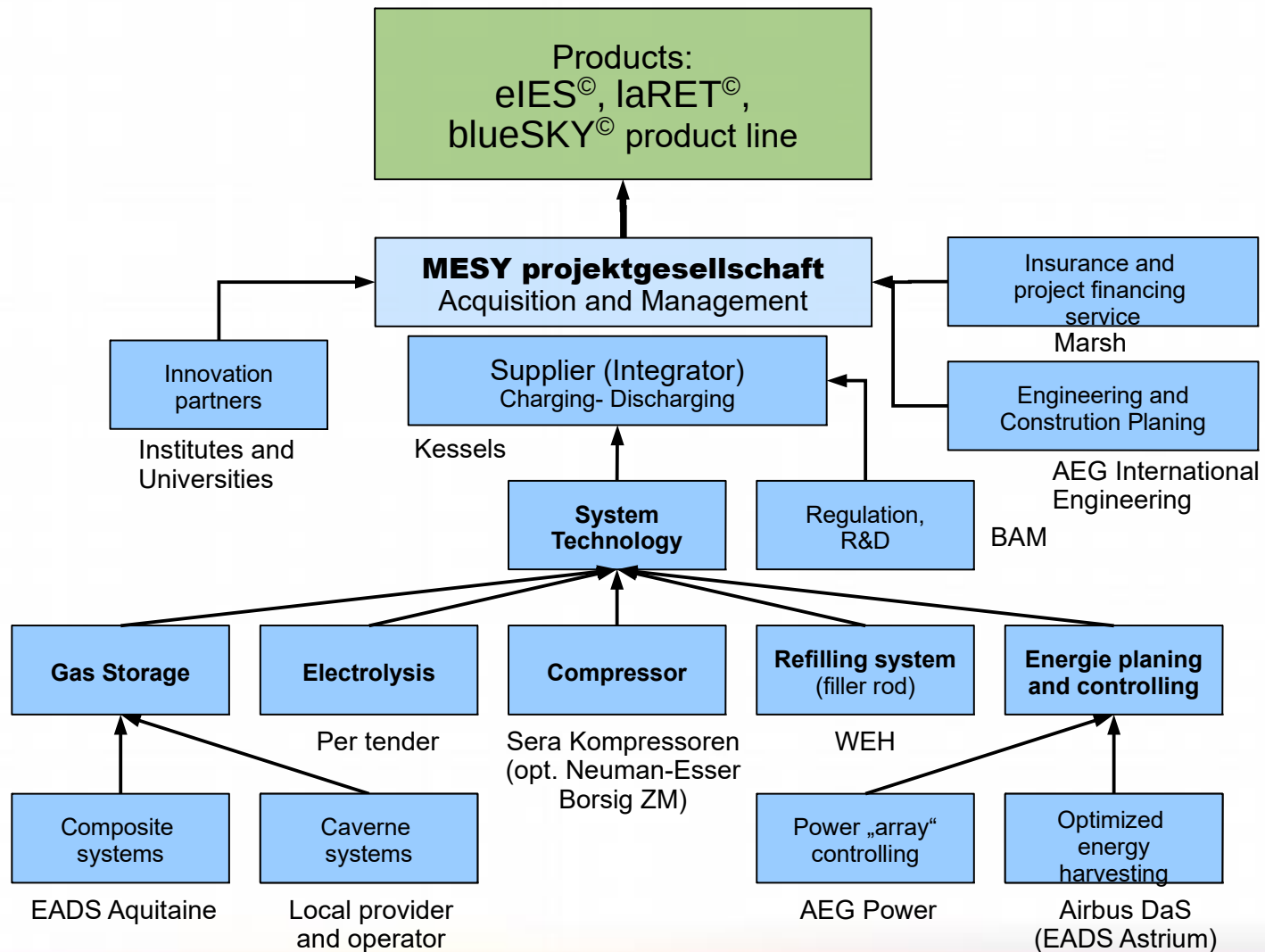
# The MESY Group



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# Organisation of MESY Group



Product technology bricks manufacturer

# Product overview of **MESY** Group



- **laRET<sup>®</sup>: Large Renewable Energy Transformer**

- transform electricity from renewable energy sources into hydrogen and oxygen.  
**It's stationary.**



- **eIES<sup>®</sup>: Electrolysis based Independent Hydrogen Energy Storage systems**

- transform electricity from renewable energy sources into hydrogen and oxygen.  
**It's mobile.**

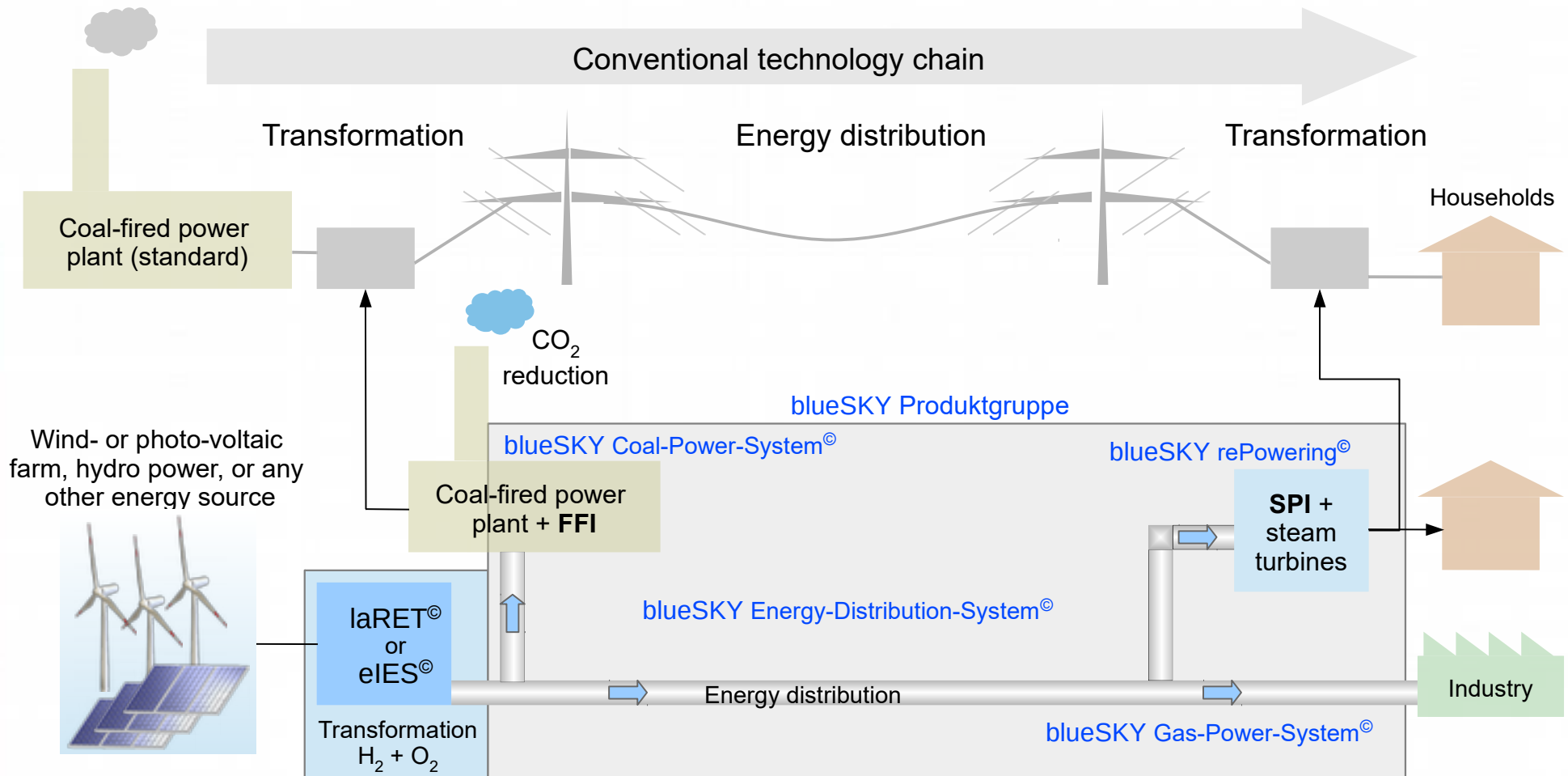


- **blueSKY<sup>®</sup> product line**

- **blueSKY Energy-Distribution-System<sup>®</sup>**
  - the System to transport the transformed energy to the customer
- **blueSKY Coal-Power-System<sup>®</sup>**
  - reduce CO<sub>2</sub> emission of fossil fuel power stations
- **blueSKY Gas-Power-System<sup>®</sup>**
  - green energy for the industry
- **blueSKY RePowering<sup>®</sup>**
  - transforme hydrogen and oxygen into electricity base on standard steam turbines.

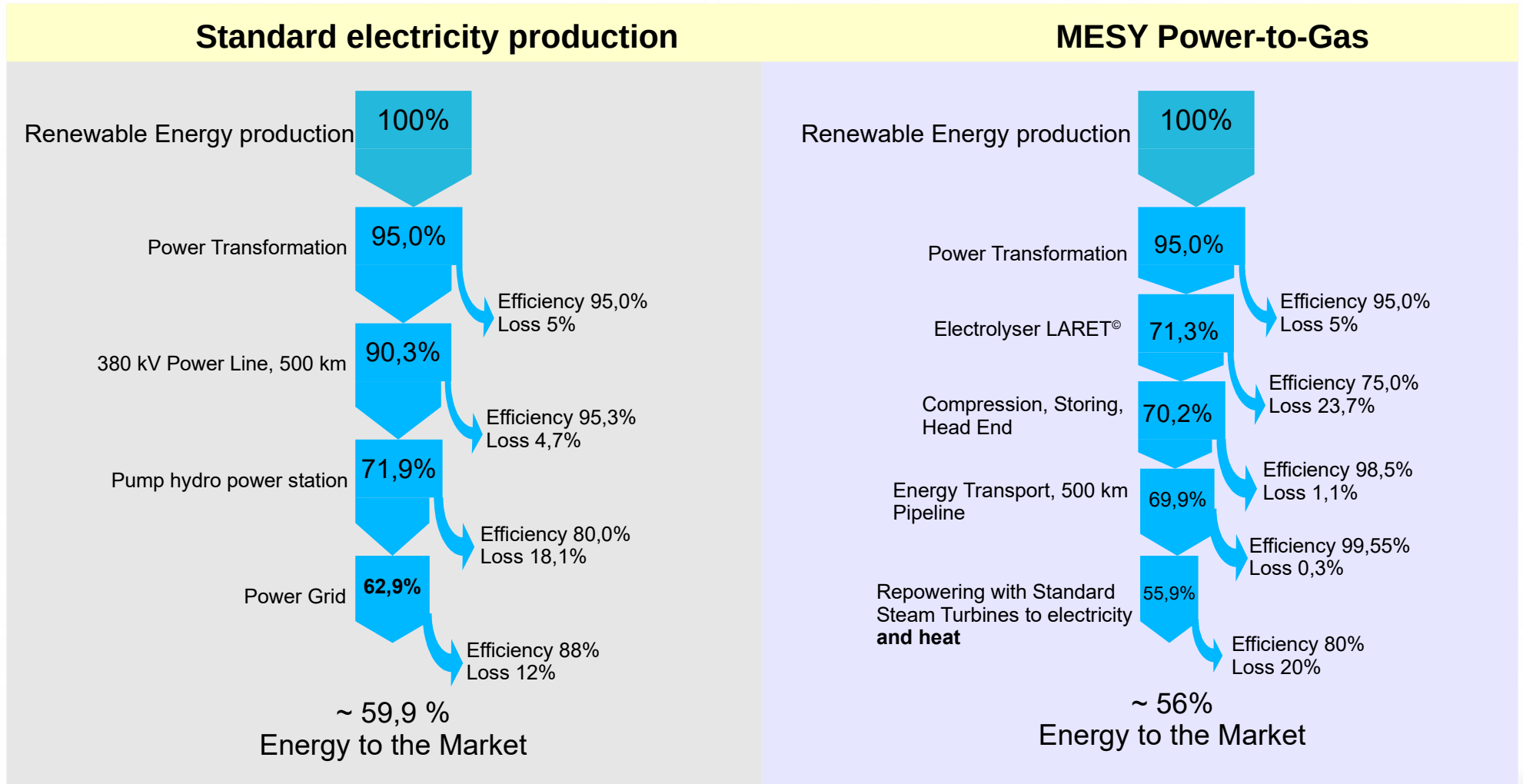
# MESY Group product integration

## Integration of our technology into standard frame works



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# Compare Efficiency of Conventional Energy Transport versus MESY solution



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## Products in details

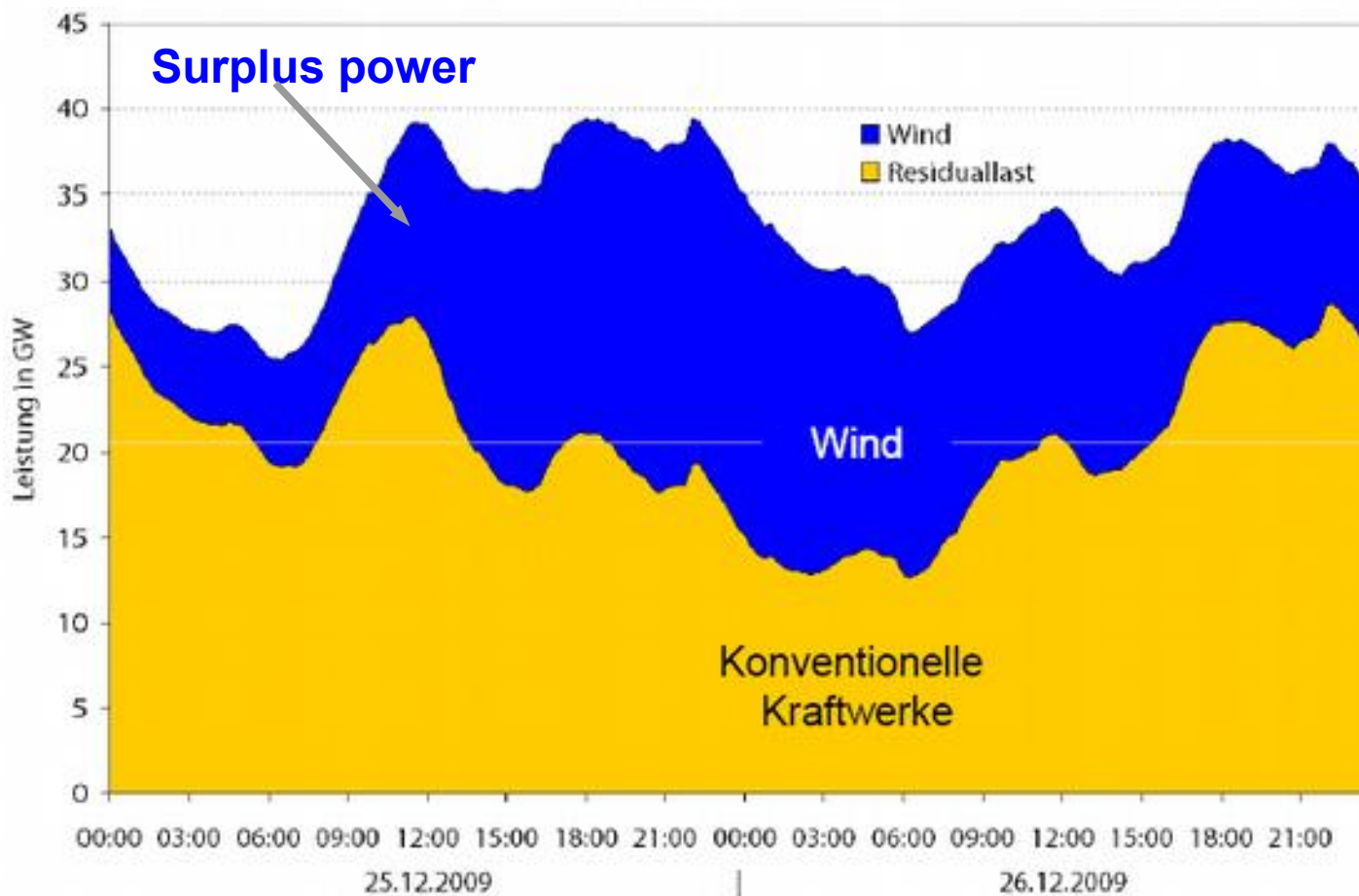
# System product laRET<sup>©</sup>

*Large Renewable Energy Transformer*



# Use of surplus energy

Too much energy from renewable sources is produce and not used



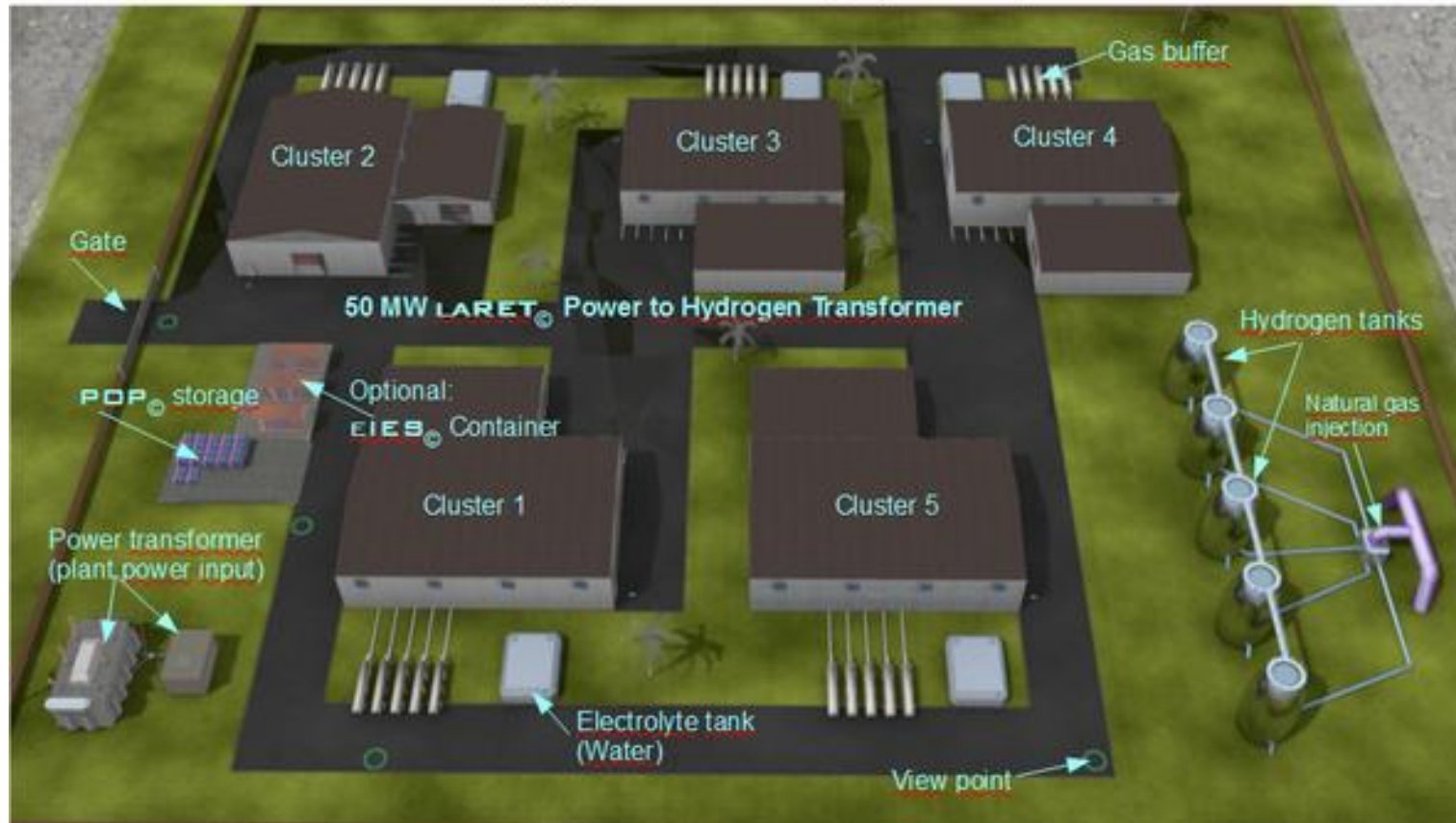


# System laRET<sup>©</sup>

## „Large Renewable Energy Transformer“

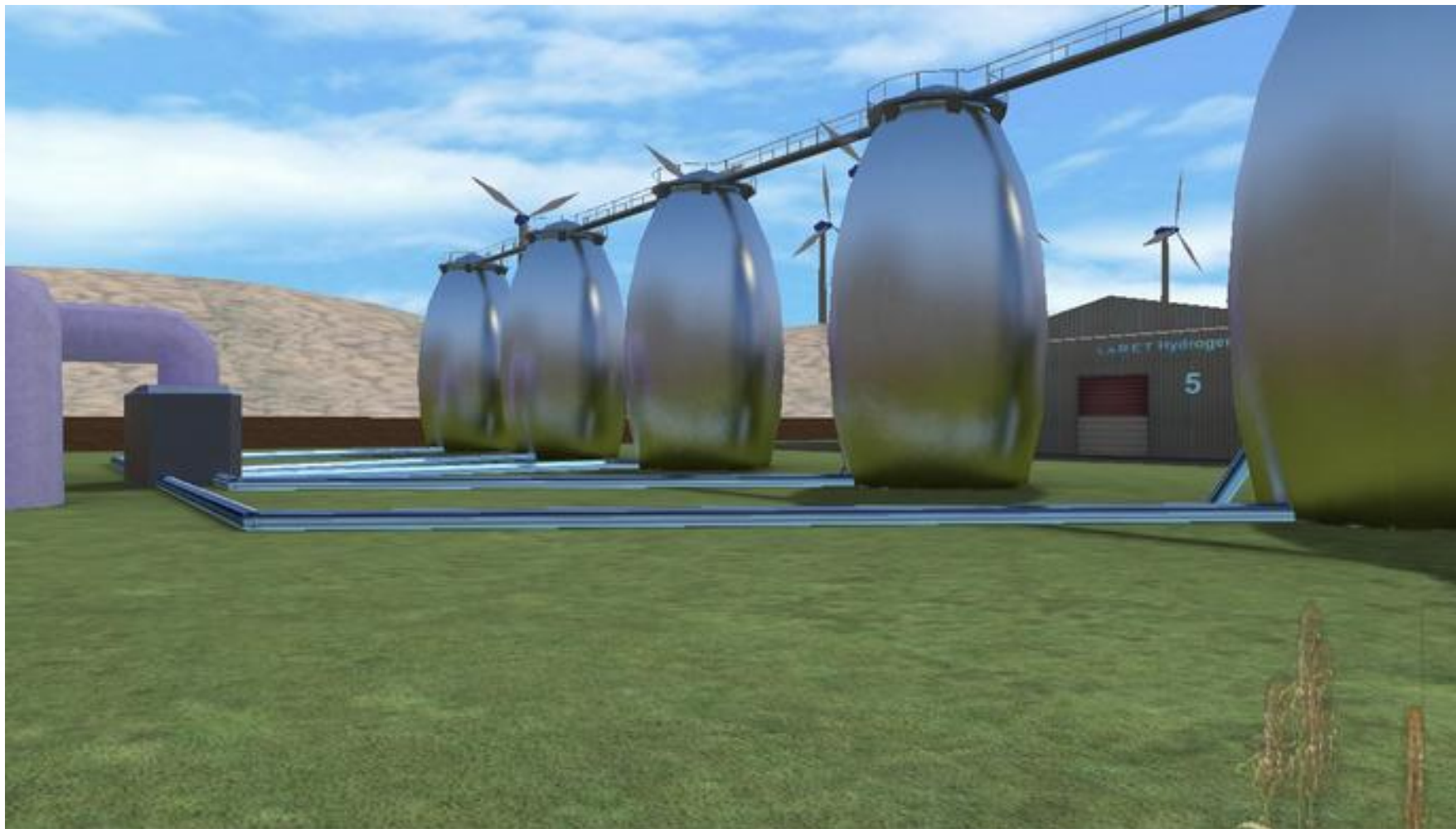
### Excample site plan for the project 50 MW

LARET<sup>©</sup> Plant Overview  
 (Copyright © 2013, MESY Projektgesellschaft)





# Head end of **laRET**® into **blueSKY**® hydrogen distribution pipeline



laRET®

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# Overview of technical data (example installation)

## „Large Renewable Energy Transformer“ (laRET<sup>©</sup>)

- Input: laRET<sup>©</sup> connected load: ~ 52 MW
- Electrolysis connection power (nominal): ~ 49 MW
- Electrolysis efficiency: > 80%
- Degradation of reference plants: over 18 years ca. 8% (!!)
- Cluster scalable Installation: a 1300 - 2200 Nm<sup>3</sup>/h (9.1–12.3 MW)
- Total H<sub>2</sub> gas production performance (max.): ~ 11000 Nm<sup>3</sup>/h
- Total O<sub>2</sub> gas production performance (max.): ~ 5500 Nm<sup>3</sup>/h
- Load-dependent gas feed: 150 - 16500 Nm<sup>3</sup>/h
- Output: blueSKY<sup>©</sup> gas pipeline transmission: > 100 km
- Electrolysis array consisting of: 25 Electrolysis-Units
  - 5 Cluster with 5 Electrolysis-Units per Cluster
  - ancillary facilities
  - gas feed
- Optional:
  - Four eIES<sup>©</sup> System-Container (Electrolysis-Unit's) for decentralized supply of H<sub>2</sub> filling stations and private users (Discharge Stations) on POP's (Power Packs); see techn. descriptions. 4 x 100 Nm<sup>3</sup>/h

All data are examples and depending on the real installation.





## Products in details

# System product eIES<sup>©</sup>

*Electrolysis based Independent hydrogen Energy storage Systems*



# What is „eIES<sup>©</sup> System“

- "Infrastructure" technology for energy supply
- Flexibility, independence and energy self-sufficiency
- „Air outlet“



# Integrated modules of system **eIES**®



*Energy and System Management Module **ESMM***  
with satellite-based Global Renewable  
Energy Information System (GREIS)  
(Independent optimal energy availability)

*Mobile Renewable Energy  
Harvest System Module  
(**MEHM**)*



*Power Pack System  
Module  
(**PPSM**)*

Mobile Use Case



Stationary Use Case



## Use in ... (target groups)

- Military camps
- Military bases
- Mining camps
- Construction camps
- Municipals
- Oil rigs and pipelines
- Areas accessible only by air
- Environmental emergencies
- Foreign relief missions
- Temporary municipal services (after hurricanes, earth quakes, etc.)
- Supply of large-scale events (Olympia, Summit Meeting, World Championchips, etc.)

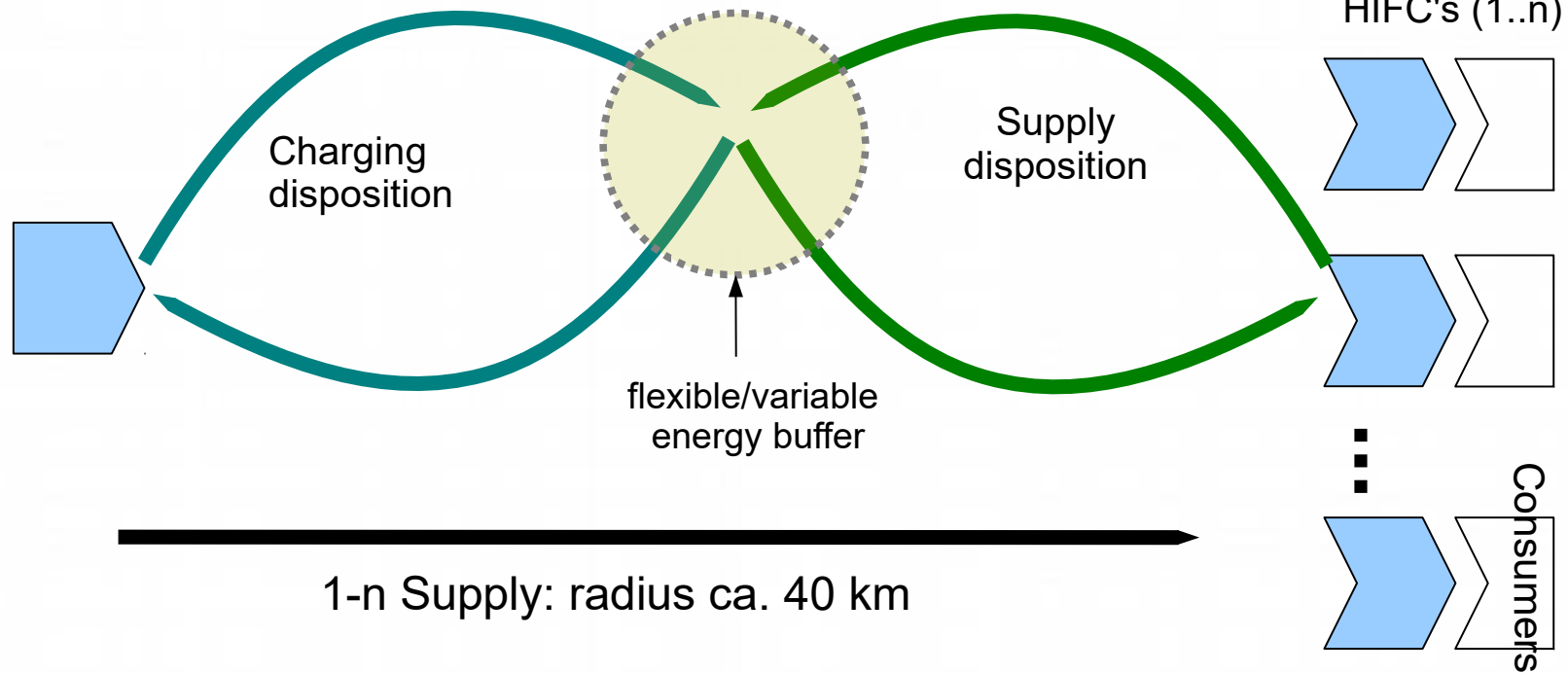


# The principle of eIES<sup>©</sup>

## Supply of several consumers Integrated 1 to n supply

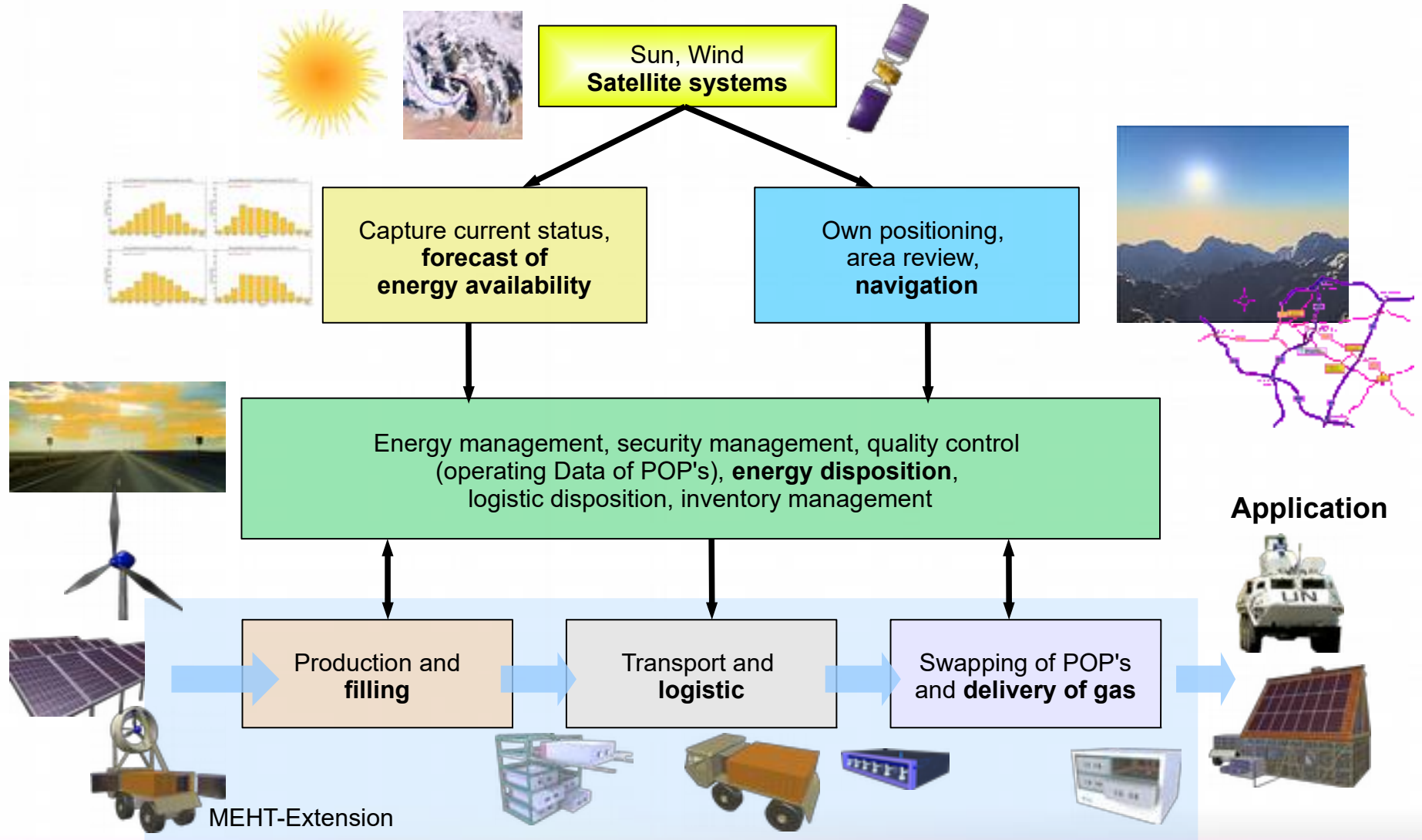
eIES automatic filling  
(HFST)

Many discharge stations  
(HIFC's)





# Technology levels of eIES<sup>©</sup> System



# All elements of product

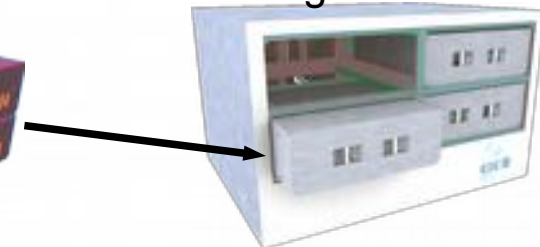
Transportable filling station for „Multy Power Pack loading“  
40 Feed Container Transportation Unit (CTU).  
*Contents: Power Interface, Electrolysis, Compression,  
Flight Sensing.*



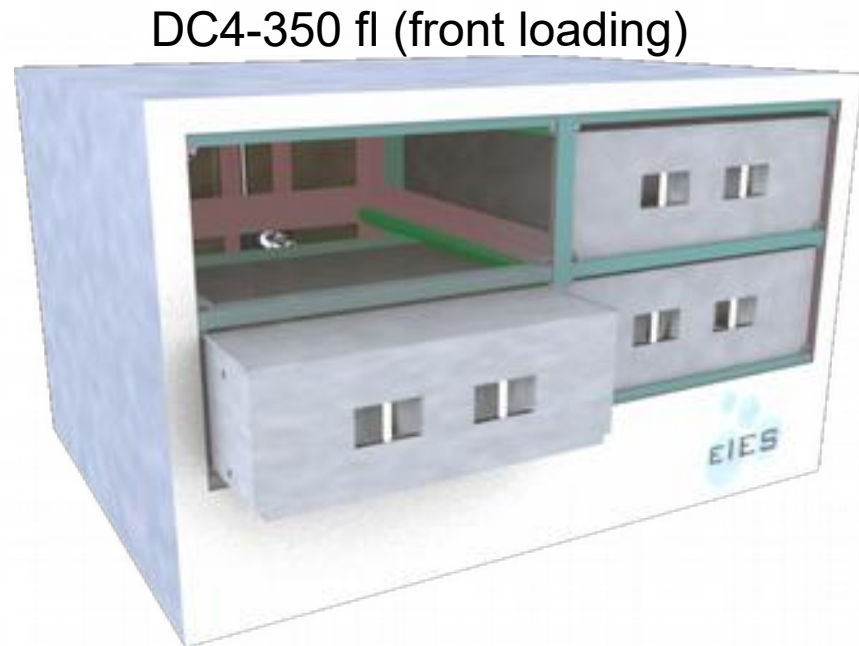
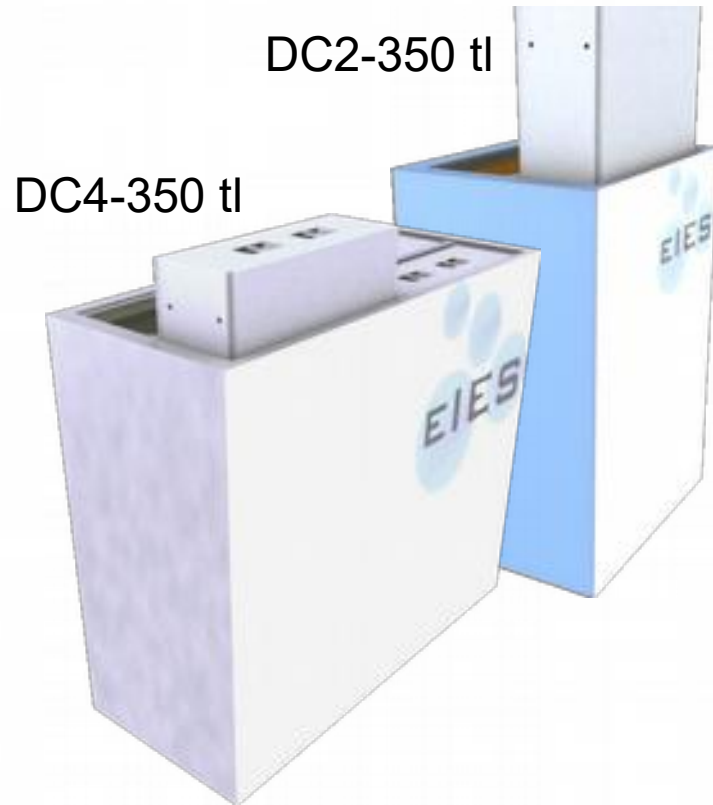
Power Packs



Discharge station DC4



# Discharge stations for independent energy users



# Vision: Independent energy supply for camps and bases



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## Products in details

# System product blueSKY<sup>©</sup>

*Key technology for  
reducing CO<sub>2</sub> emission in conventional power plants,  
backup conventional power grids with hydrogen pipelines,  
repowering stored renewable energy into MW range.*



# Parts of Product **blueSKY** - Overview

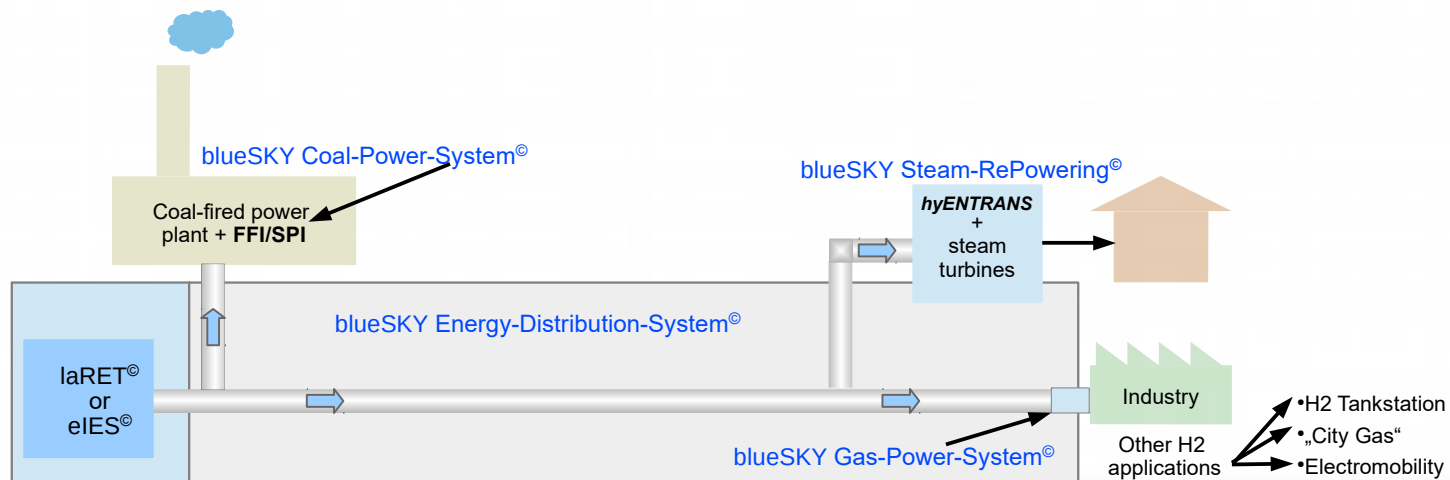
blueSKY Coal-Power-System<sup>©</sup> (CPS)

blueSKY Steam-RePowering<sup>©</sup> (SRP)

blueSKY Hydrogen-Energy-Transformation-Facility<sup>©</sup> (hyENTRANS<sup>©</sup>)

blueSKY Energy-Distribution-System<sup>©</sup> (EDS)

blueSKY Gas-Power-System<sup>©</sup> (GPS)



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# Market Opportunity

## Market demand:

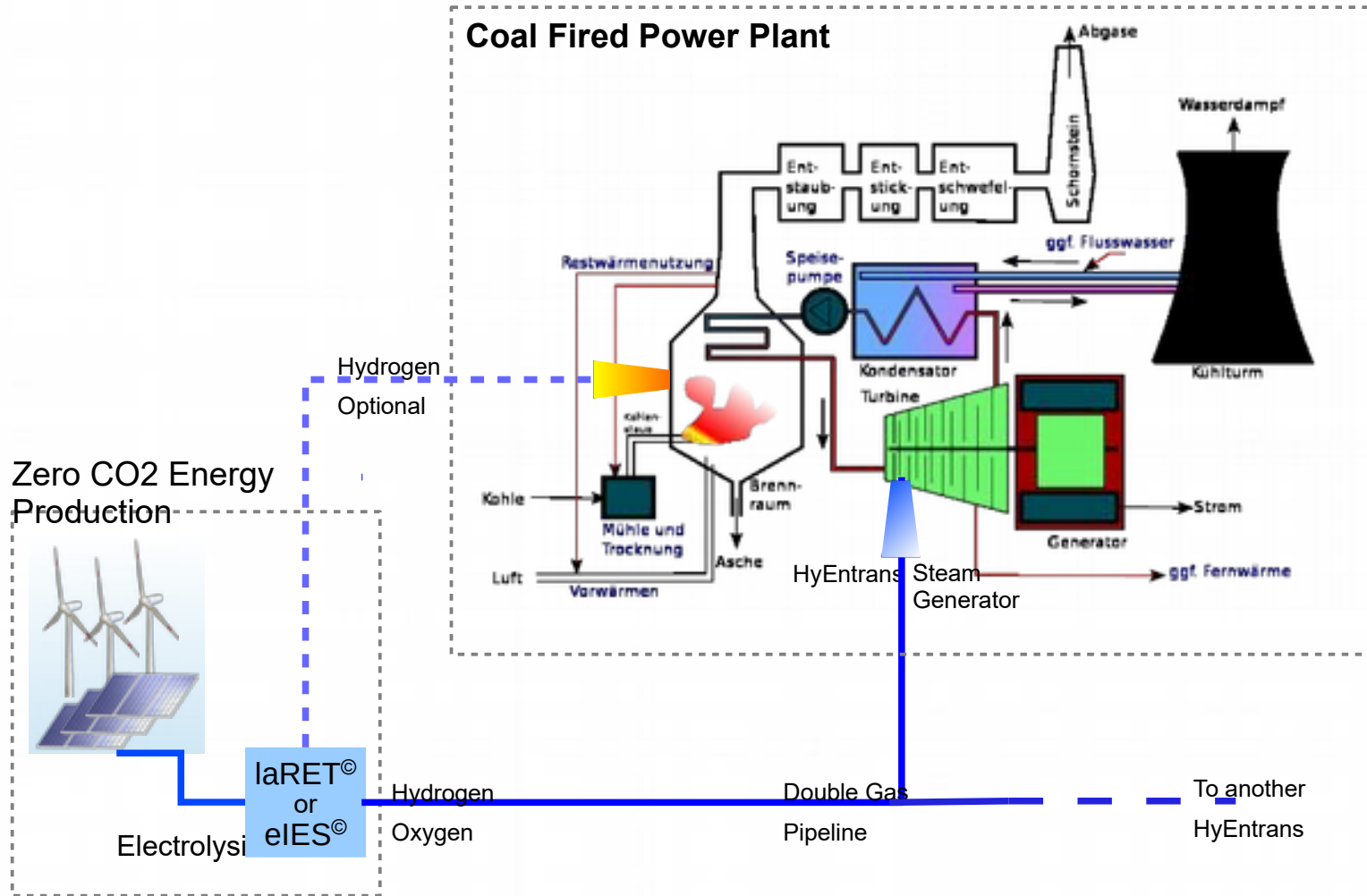
- The need for the contemplated bridge technology for existing fossil fuel power plants is increasing from year to year. The market potential for relevant technology products is very large. The innovation for the market is the combination between conventional energy production and the production by renewable energies.

## Energy sources:

- According to current estimates approximately 34 GW (depending on country) of wind power are not produced and consequently not fed into the power grid. This energy is available as a source for the supply of specific emission-saving technology for installed coal power plants.

# Example for CO<sub>2</sub> and fuel reduction for fossil fuel power plants.

bluesky®





# Product verification

## Test bench: 25 MW Steam Power Injection (HyEntrans<sup>®</sup>)

A single Steam Power System is available up to 150 MW<sub>thermal</sub>

If you want to know more, please get in touch with us.



# Example: High compact solution based on a Container SPI + 5 MW Turbine + Generator (eIES Option)

Input:  
Hydrogen Gas +  
Oxygen Gas



Generator Interface  
Output:  
Electricity



# The 150 MW<sub>term</sub> High Power Solution (IaRET Option) Example with me (Kay Golze) and our partners



150 MW Example  
to show how it works

Test bed for steam generator up to 150 MW  
Outlet and supply



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# Example of a set of steam turbine and generator for the power industry from Siemens, Power up to 50 MWe (SST-300)

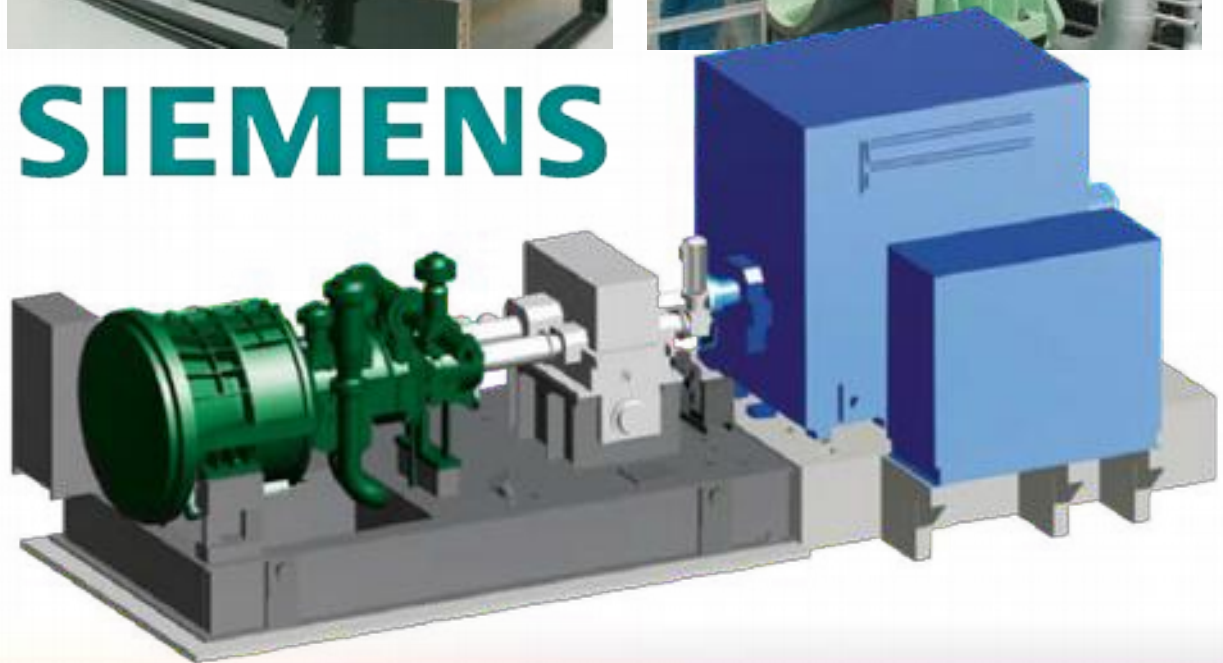
## Technical data

- Power output up to 50 MW
- Speed up to 12,000 rpm
- Live steam conditions  
Pressure up to 120 bar / 1,740 psi  
Temperature up to 520 °C / 968 °F
- Bleed: Pressure up to 60 bar / 870 psi
- Controlled extraction (single or double)  
Pressure up to 45 bar / 655 psi  
Temperature up to 400 °C / 750 °F
- Exhaust steam pressure  
Back pressure up to 16 bar / 232 psi  
District heating up to 3 bar / 43 psi  
Condensing up to 0.3 bar / 4.4 psi

(All data are approximate and project-related.)



# SIEMENS



# Example for use in existing coal fired power plant or gas power plants, for the reduction of pollutant emissions.

Mainly water vapor with hyENTRANS

When using our technology hyENTRANS, a conventional power station is a low emission power plant. This produces no residues such as the CO2 capture.



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