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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.

   • Result: Market volume for laRET: 13.000 wind farms above 1 MW.
     Market volume for eIES: 1.030 - 4.775 container.
     Market volume 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

<table>
<thead>
<tr>
<th>Markets</th>
<th>Products</th>
<th>Communication+Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coal fired power plan</strong>&lt;br&gt; Bridging technology for CO₂ reduction</td>
<td><strong>MESY Group</strong>&lt;br&gt; Technology Suppliers</td>
<td><strong>Brand Developing</strong></td>
</tr>
<tr>
<td><strong>Market volume worldwide:</strong>&lt;br&gt; Coal fired p.p.: ~ 75 Bil. € (50,000 active plants)</td>
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<tr>
<td><strong>Wind- and solar farms, Large energy consumers</strong></td>
<td><strong>BLUESKY</strong>&lt;br&gt; (E)nergy &amp; Storage Systems</td>
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<tr>
<td><strong>Market volume worldwide:</strong>&lt;br&gt; Onshore: ~ 234 Bil. € (12,353 Wind farms, 260,9 GW power)&lt;br&gt; Offshore: ~ 340 Bil. € (943 Wind farms, 283,4 GW power)</td>
<td><strong>LARET</strong>&lt;br&gt; L (E)nergy R (E)covery &amp; Transmission</td>
<td></td>
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<tr>
<td><strong>Decentralized energy supply</strong>&lt;br&gt; (Camps, H₂-filling stations, ...)&lt;br&gt; <strong>Market volume worldwide:</strong>&lt;br&gt; ~ 1,7 – 7,6 Bil. € (ca. 1,030 - 4,775 pieces)</td>
<td><strong>EIES</strong>&lt;br&gt; E (E)nergy I (N)formation &amp; Storage</td>
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</table>
## Markets in several countries with different priorities

<table>
<thead>
<tr>
<th>Country</th>
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<tbody>
<tr>
<td>Australia</td>
<td>Iceland</td>
<td>Norway</td>
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<tr>
<td>Brazil</td>
<td>India</td>
<td>new Zealand</td>
</tr>
<tr>
<td>China</td>
<td>Italy</td>
<td>USA</td>
</tr>
<tr>
<td>Germany</td>
<td>Japan</td>
<td>European Union</td>
</tr>
<tr>
<td>France</td>
<td>Canada</td>
<td>Great Britain</td>
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<tr>
<td>Taiwan</td>
<td>South Korea</td>
<td>Denmark</td>
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<tr>
<td>Venezuela</td>
<td>Chile</td>
<td>Argentina</td>
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<tr>
<td>Mexico</td>
<td>Arab States</td>
<td>Finland</td>
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<tr>
<td>South Africa</td>
<td>Singapore</td>
<td>Russian Federation</td>
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<tr>
<td>Malaysia</td>
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</tbody>
</table>
## Target market priorities

<table>
<thead>
<tr>
<th>Priority</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priorität 1</td>
<td>Energy Market: successor technology for wind and solar farms</td>
</tr>
<tr>
<td>Priorität 1</td>
<td>Energy supply of industrial and conventional power plants for CO₂ reduction</td>
</tr>
<tr>
<td>Priorität 2</td>
<td>Supply independent areas</td>
</tr>
<tr>
<td>Priorität 2</td>
<td>Municipal utilities (city power plants)</td>
</tr>
<tr>
<td>Priorität 3</td>
<td>Use and supply of special vehicles</td>
</tr>
<tr>
<td>Priorität 3</td>
<td>Public transport</td>
</tr>
<tr>
<td>Priorität 4</td>
<td>House Energy</td>
</tr>
</tbody>
</table>
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 H₂ 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 H₂ 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 H₂ gas as a substitute for natural gas. Reduction of CO₂ emissions.

✔ Supply of coal power plants for CO₂ 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 CO₂ 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

(Airbus Defence & Space)
Product overview of MESY Group

- **laRET**: Large Renewable Energy Transformer
  - transform electricity from renewable energy sources into hydrogen and oxygen.
  - It's stationary.

- **eIES**: Electrolysis based Independent Hydrogen Energy Storage systems
  - transform electricity from renewable energy sources into hydrogen and oxygen.
  - It's mobile.

- **blueSKY** product line
  - **blueSKY Energy-Distribution-System**: the System to transport the transformed energy to the customer
  - **blueSKY Coal-Power-System**: reduce CO₂ emission of fossil fuel power stations
  - **blueSKY Gas-Power-System**: green energy for the industry
  - **blueSKY RePowering**: transform hydrogen and oxygen into electricity base on standard steam turbines.
MESY Group product integration
Integration of our technology into standard frame works

Conventional technology chain

Transformation

Energy distribution

Transformation

Coal-fired power plant (standard)

Transformation

Energy distribution

Transformation

Wind- or photo-voltaic farm, hydro power, or any other energy source

Coal-fired power plant + FFI

H2 + O2

CO2 reduction

blueSKY Produktgruppe

blueSKY Coal-Power-System®

blueSKY rePowering®

SPI + steam turbines

blueSKY Energy-Distribution-System®

blueSKY Gas-Power-System®

Households

Industry

Conventional technology chain
## Compare Efficiency of Conventional Energy Transport versus MESY solution

<table>
<thead>
<tr>
<th>Standard electricity production</th>
<th>MESY Power-to-Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Renewable Energy production</strong></td>
<td>100%</td>
</tr>
<tr>
<td><strong>Power Transformation</strong></td>
<td>95,0%</td>
</tr>
<tr>
<td>380 kV Power Line, 500 km</td>
<td>90,3%</td>
</tr>
<tr>
<td>Efficiency 95,0%</td>
<td>Loss 5%</td>
</tr>
<tr>
<td>Pump Hydro power station</td>
<td>71,9%</td>
</tr>
<tr>
<td>Efficiency 80,0%</td>
<td>Loss 18,1%</td>
</tr>
<tr>
<td>Power Grid</td>
<td>62,9%</td>
</tr>
<tr>
<td>Efficiency 88%</td>
<td>Loss 12%</td>
</tr>
<tr>
<td>~ 59,9% Energy to the Market</td>
<td></td>
</tr>
</tbody>
</table>

### Energy Transport, 500 km Pipeline
- Compression, Storing, Head End: 71,3% Efficiency, 5% Loss
- Efficiency 75,0%, Loss 23,7%
- Efficiency 98,5%, Loss 1,1%

### Repowering with Standard Steam Turbines to electricity and heat
- Efficiency 99,55%, Loss 0,3%
- Efficiency 80%, Loss 20%

- ~ 56% Energy to the Market

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Products in details

System product laRET©

*Large Renewable Energy Transformer*
Use of surplus energy
Too much energy from renewable sources is produce and not used

Surplus power
System laRET©

„Large Renewable Energy Transformer“

Example site plan for the project 50 MW
Head end of laRET© into blueSKY©
hydrogen distribution pipeline
**Overview of technical data (example installation) „Large Renewable Energy Transformer“ (LaRET©)**

- **Input:** LaRET© 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 Nm³/h (9.1–12.3 MW)
- **Total H₂ gas production performance (max.):** ~ 11000 Nm³/h
- **Total O₂ gas production performance (max.):** ~ 5500 Nm³/h
- **Load-dependent gas feed:** 150 - 16500 Nm³/h
- **Output:** blueSKY© 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© System-Container (Electrolysis-Unit’s) for decentralized supply of H₂ filling stations and private users (Discharge Stations) on POP’s (Power Packs); see techn. descriptions.

All data are examples and depending on the real installation.
Products in details

System product eIES©

Electrolysis based Independent hydrogen Energy storage Systems
What is „eIES© System“

- "Infrastructure" technology for energy supply
- Flexibility, independence and energy self-sufficiency
- „Air outlet“
Integrated modules of system eIES©


Mobile Renewable Energy Harvest System Module (MEHM)

Power Pack System Module (PPSM)

Mobile Use Case

Stationary Use Case

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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®
Supply of several consumers
Integrated 1 to n supply

- eIES automatic filling (HFST)
- Many discharge stations (HIFC's)
- HIFC's (1..n)
- Supply disposition
- Consumers
- Charging disposition
- Supply disposition
- flexible/variable energy buffer

1-n Supply: radius ca. 40 km
Technology levels of eIES© System

Sun, Wind
Satellite systems

Capture current status,
forecast of
energy availability

Own positioning,
area review,
navigation

Energy management, security management, quality control
(operating Data of POP’s), energy disposition,
logistic disposition, inventory management

Production and
filling

Transport and
logistic

Swapping of POP's
and delivery of gas

MEHT-Extension

Application
All elements of product

Transportable filling station for „Multy Power Pack loading“
40 Feed Container Transportation Unit (CTU).
Discharge stations for independent energy users

DC2-350 tl

DC4-350 tl

DC4-350 fl (front loading)
Vision: Independent energy supply for camps and bases
Products in details

System product blueSKY©

Key technology for reducing CO₂ 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© (CPS)
blueSKY Steam-RePowering© (SRP)
blueSKY Hydrogen-Energy-Transformation-Facility© (hyENTRANS©)
blueSKY Energy-Distribution-System© (EDS)
blueSKY Gas-Power-System© (GPS)
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$_2$ and fuel reduction for fossil fuel power plants.
Product verification

Test bench: 25 MW Steam Power Injection (HyEntrans©)

A single Steam Power System is available up to 150 MW

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$_{\text{term}}$ 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

Auslassturm des Dampferzeugers

Dampfkanal des Dampferzeugers (150 MW)
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.)
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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