The European Engine Power Plants Forum 2017

Microgrid Solutions – Integration of Engine Power Plants

Cologne, June 28th 2017 Dr. Marcel Zürn

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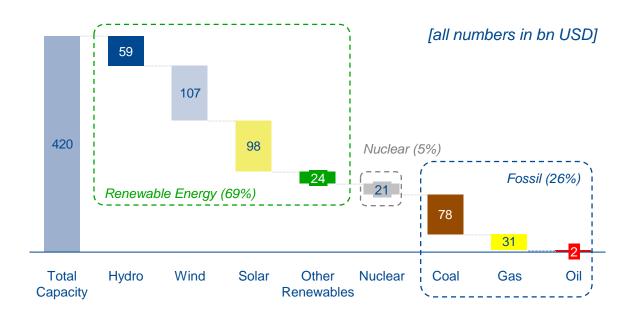
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Microgrid Solution

Rationale | Global Power Generation Investments 2016



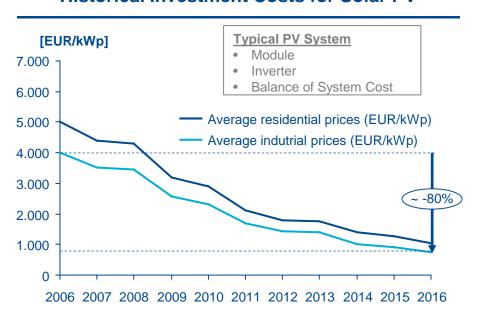
- 420 bn USD global power generation investments in 2016
- Already 69% are renewable energy sources, mainly wind and solar
- Only a share of 26% is generated by fossil sources, mainly coal fired capacity in India and China



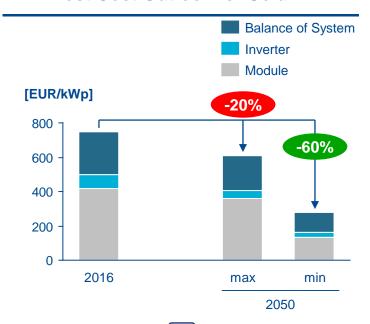
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Rationale | Historic Cost Development of Solar PV

Historical Investment Costs for Solar PV



Invest Cost Outlook for Solar PV

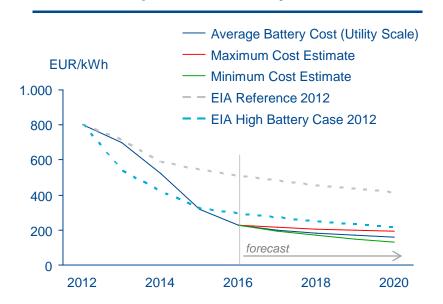




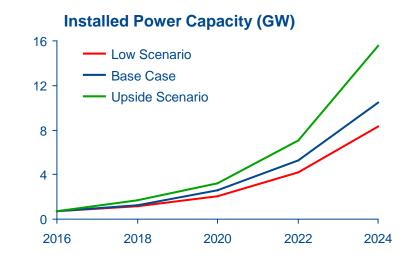
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Development of Battery Costs and Installed Capacity

Development of Battery Cell Cost



Global Utility-Scale Battery Storage Outlook





Microgrid Solutions Definition and Typical Features

Typical Set-up of a Microgrid



Definition of a Microgrid

A Microgrid

- ...combines multiple power generation sources including renewables, energy storage and fossil generation with local loads
- ...can operate connected to the centralized electricity grid or in island mode in remote areas
- ...can run disconnected and autonomously as physical or economic conditions dictate

Example Applications



Remote Areas



Big Industry





Rural Electrification



Microgrid Solutions Growth Drivers





Microgrid SolutionsReference Case

- Gamesa is currently testing such an hybrid power plant near Zaragoza, Spain
- Launched in May, 2016
- Equipped with wind turbines, solar PV systems, batteries and three MTU diesel systems series 1600
- This combination guarantees green but also reliable energy supply



