SIEMENS
Ingenuity for life

Energiewende in der Industrie

Alexander Peschl, Siemens AG Österreich

Unrestricted © Siemens AG Österreich 2018

siemens.at/future-of-energy

3D – Decarbonization, Decentralization and Digitalization

The current energy world is being heavily disrupted

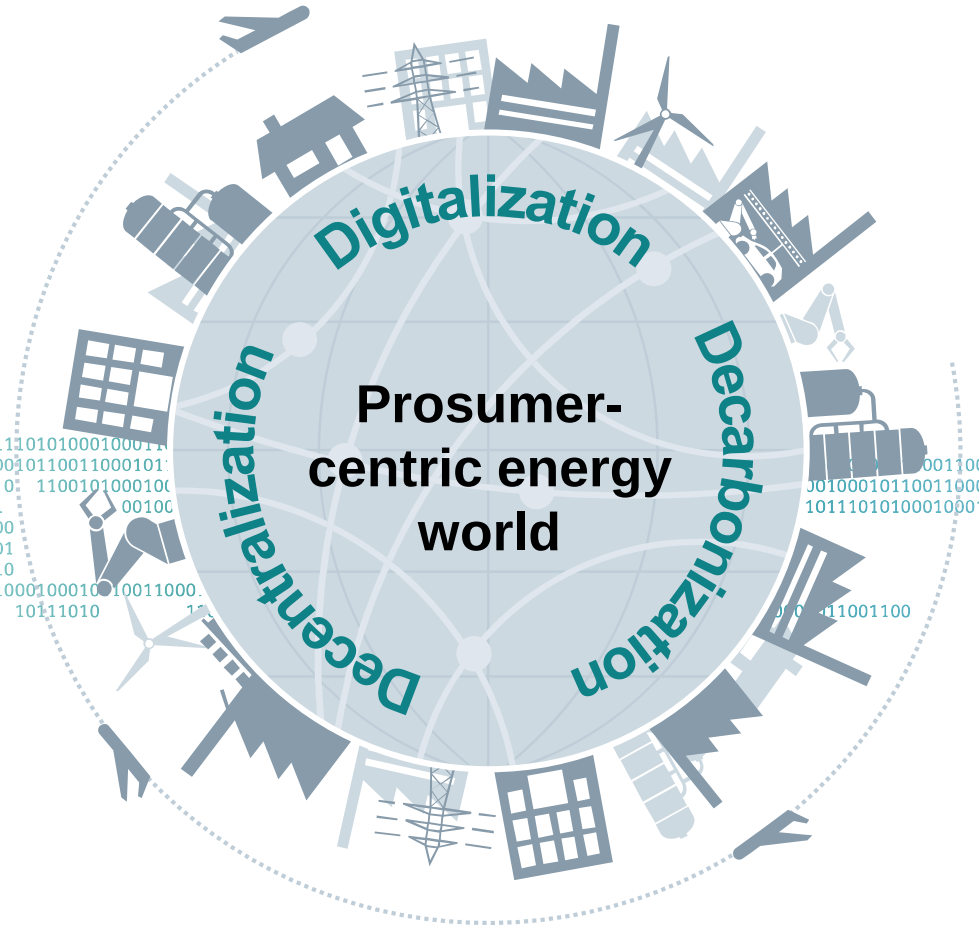
SIEMENS
Ingenuity for life

From

Predominantly fossil

Centralized energy production

Vertically integrated utility



To

Renewables + storage
(security of supply)

Consumers become prosumers
(energy meets IoT)

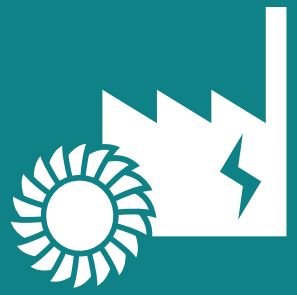
Energy trading platforms = digital utilities
(digital twins and bizModels)

Intern © Siemens AG Österreich 2018. All rights reserved.

The decarbonization will transform the entire energy value chain – with strong growth rates and a complete electr(on)ification

SIEMENS
Ingenuity for life

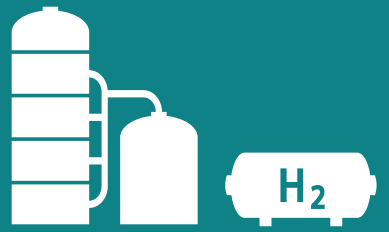
Strong demand for highly efficient power plants, flexibility and lower emissions



Massive trend towards distributed generation and renewables

Digitalization as new driver for technology progress and new business models

Energy storage innovation shaping the future power industry landscape



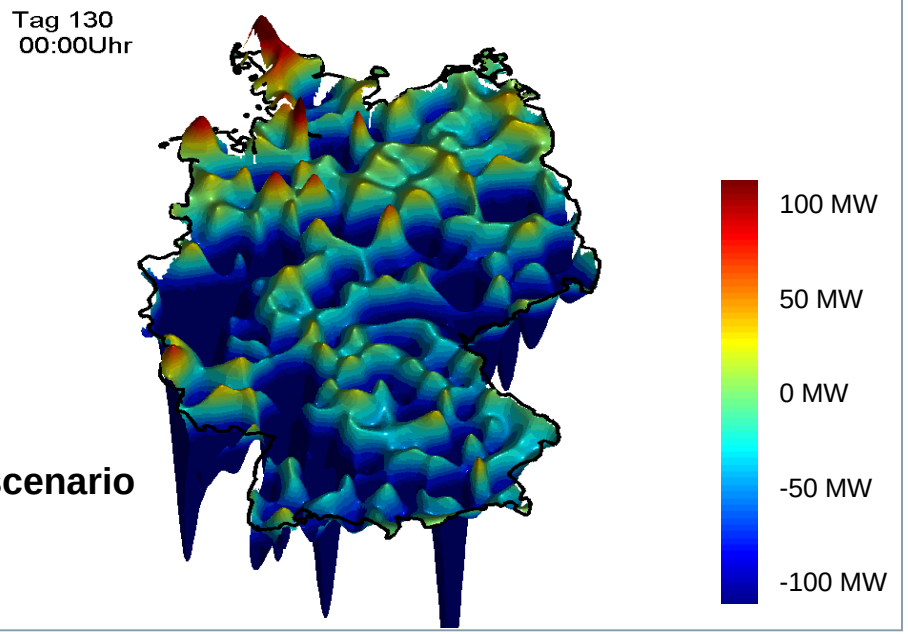
Electrification of applications, especially in the transport sector

Intern © Siemens AG Österreich 2018. All rights reserved.

The new energy world: fully electrified, more complex and with renewable energy provision that is decoupled from consumption

SIEMENS
Ingenuity for life

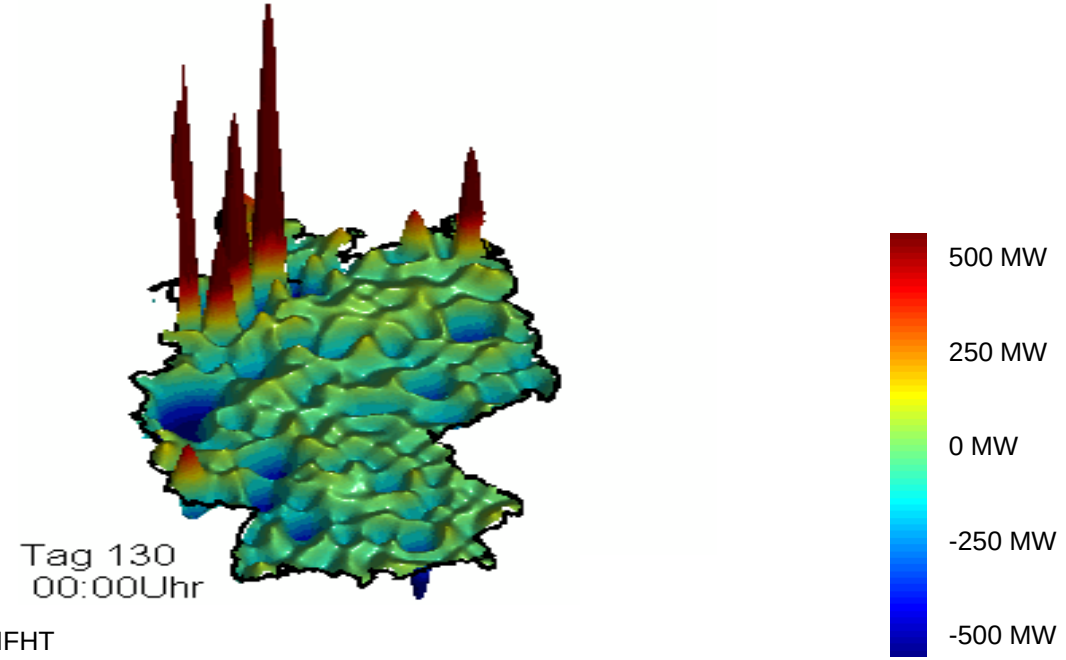
(PV) + (Wind) – (Consumption) = **(Residual Load) = f(t)**



Most likely scenario for 2024

© IFHT

80% share of renewables 2035+



© IFHT

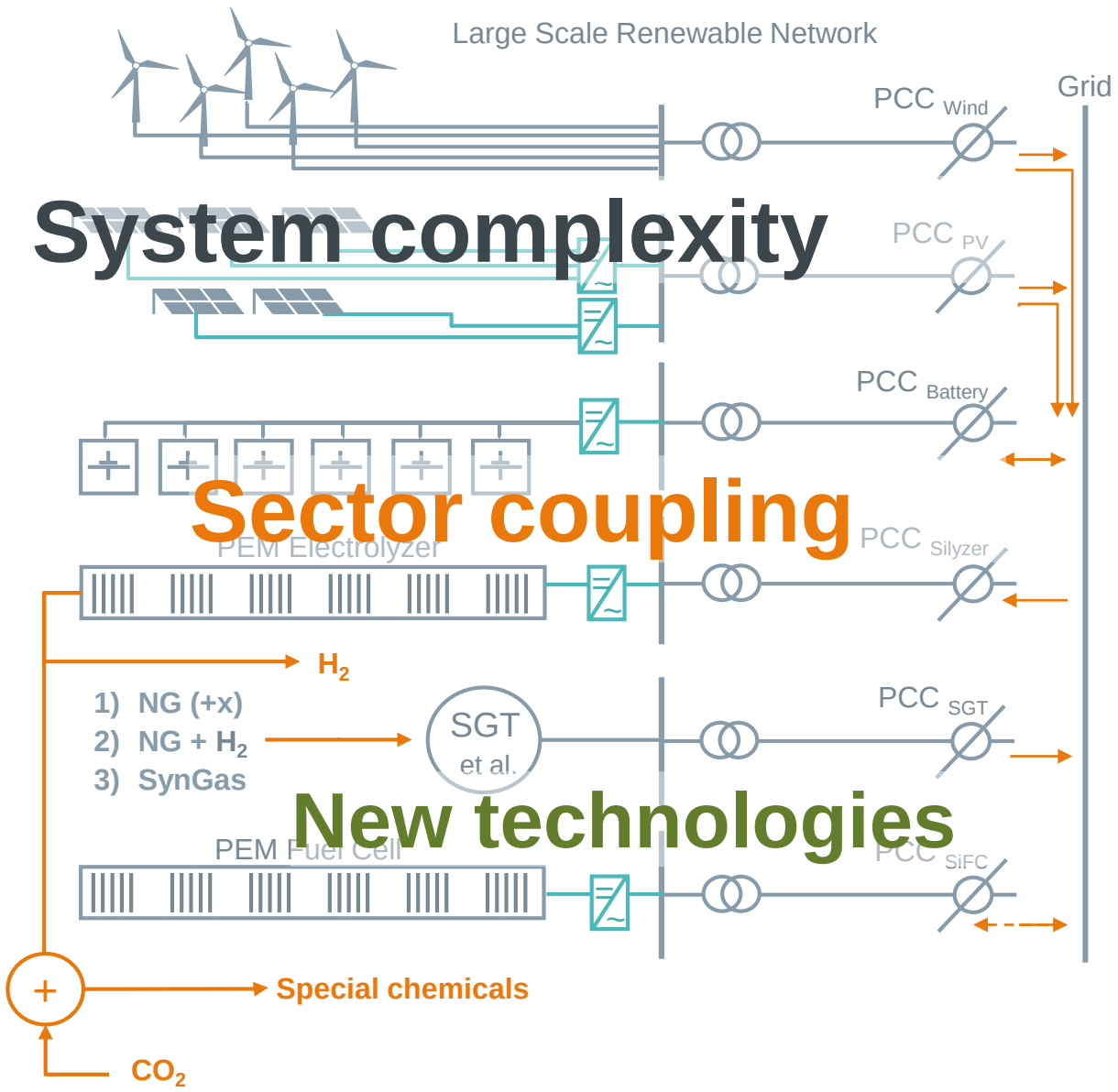
Past:
Production follows consumption

Today:
Consumption / production mismatch

Future
Production decoupled from consumption

Source: German Power Network Development Plan

Intern © Siemens AG Österreich 2018. All rights reserved.



SIEMENS
Ingenuity for life

The Challenge of all nations is to manage **security of supply** of green energy at **acceptable cost**!

» How to finance decarbonization for the industry sector ?

Intern © Siemens AG Österreich 2018. All rights reserved.

SIEMENS
Ingenuity for life

Linz, Austria
World's largest H2 pilot plant

Hydrogen production using electricity from renewables and water

Joint collaboration of Siemens, VERBUND, voestalpine, Austrian Power Grid, K1-MET and ECN

Customer value:

- Planned capacity: **6 MW capacity**
- **1,200 cubic meters** of H2 per hour
- Production start of **green hydrogen in 2018**
- **Start up time** from cold stand-by **< 10 sec**

SIEMENS
Ingenuity for life

Austria – Utility & Local level

Living Lab Aspern

Holistic analysis and optimization of the interplay between smart user/ building/ grid in the new Vienna district, Aspern

Joint collaboration of Siemens with Wien Energie and Wiener Netze

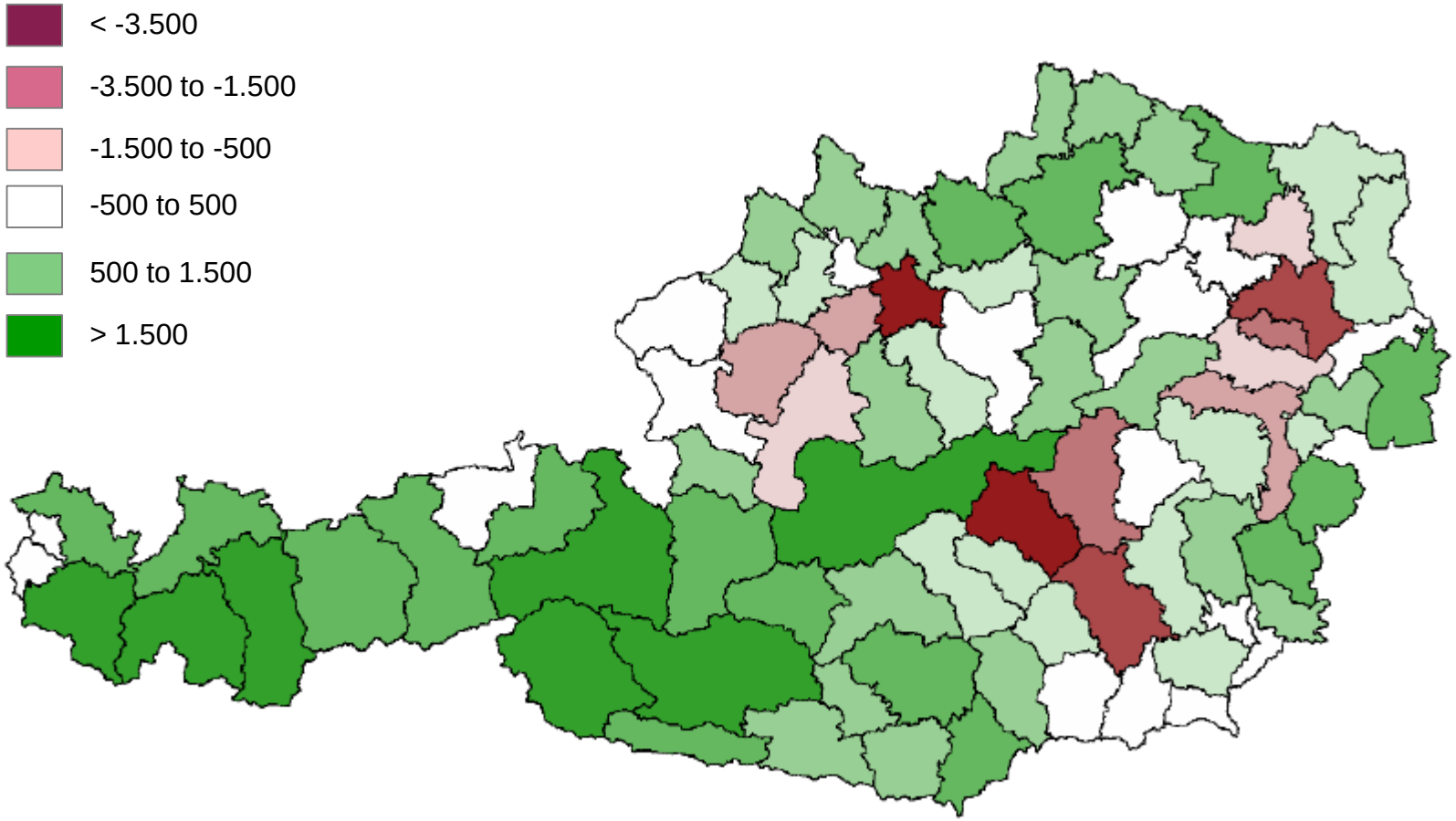
Customer value – project objectives:

- **Reliability of supply** through system integration and intelligent control of renewable and low voltage grid
- **Energy savings** with intelligent control of distribution networks and buildings

Grid reinforcement, distributed energy solutions and improvement of efficiency required for 100% renewables in industry

SIEMENS
Ingenuity for life

Energy balance AT (potential minus consumption) [GW/year]



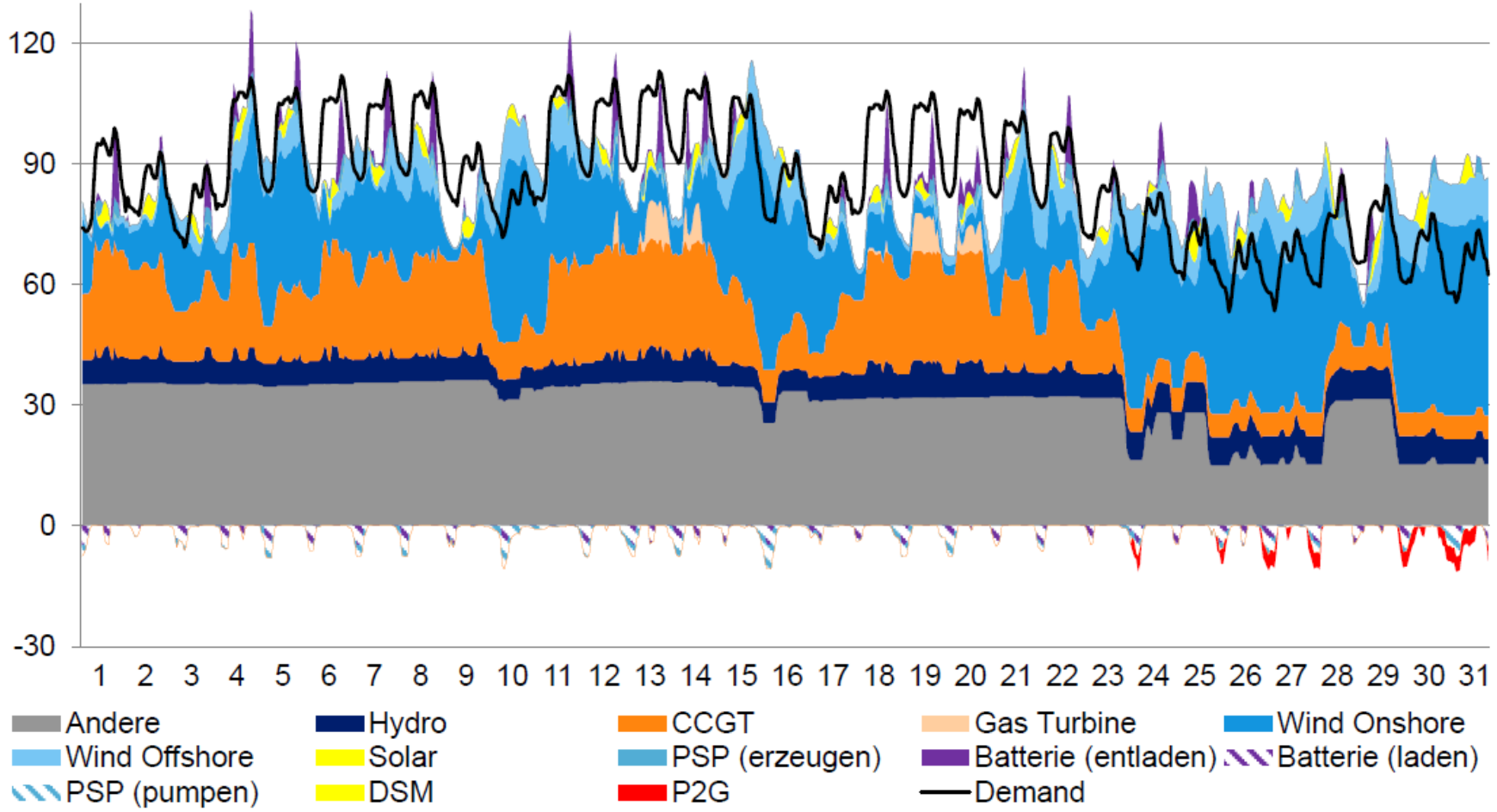
Source: MU Leoben

Intern © Siemens AG Österreich 2018. All rights reserved.

Security of supply needs significant generation flexibilities, sector coupling and various energy storage possibilities

SIEMENS
Ingenuity for life

Electricity Generation AT + DE (December 2030) [GW]



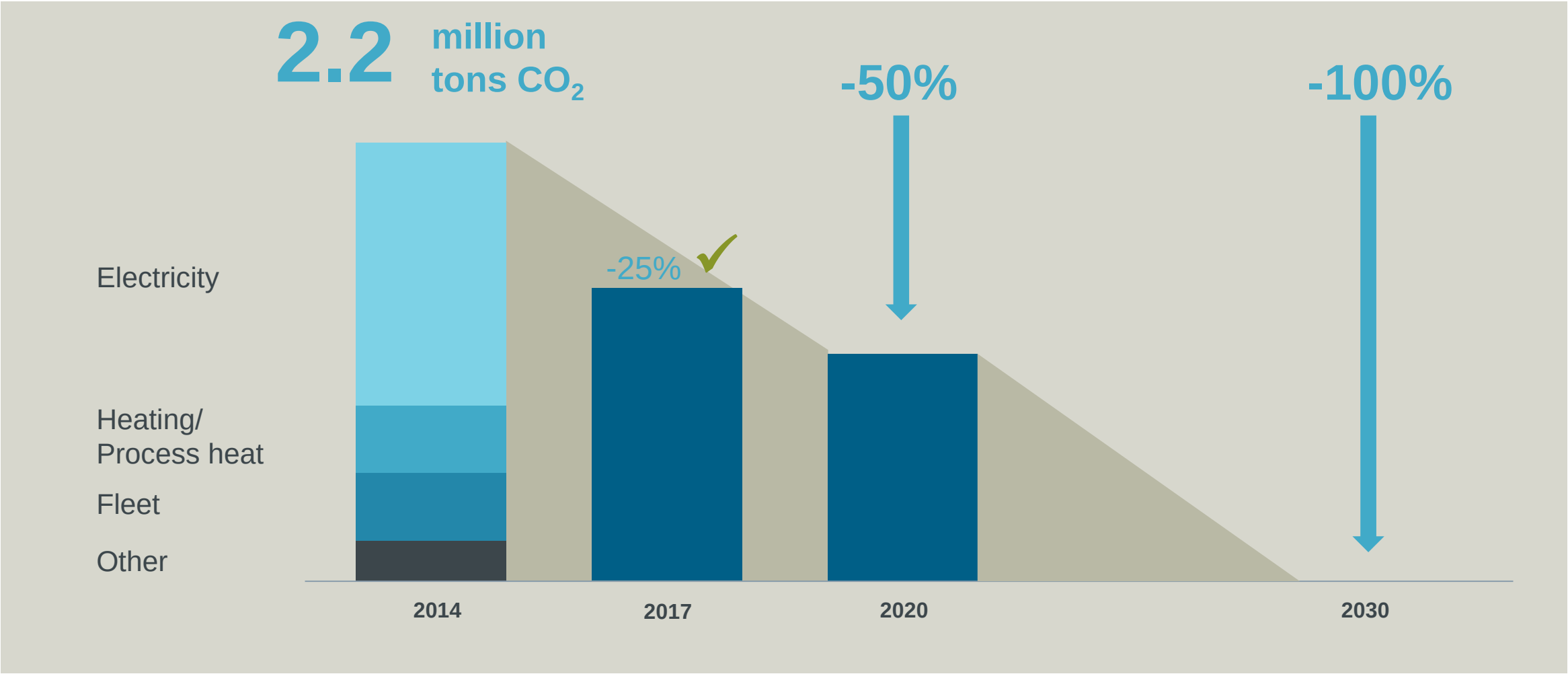
Source: Pöyry 09/2018

- Flexible generation capacities
- Further extension of electricity grids
- Utilization of gas grids and sector coupling
- Pushing storage capacities
- Further incentives for research and development in according technologies

Intern © Siemens AG Österreich 2018. All rights reserved.

Siemens strategy to become carbon neutral

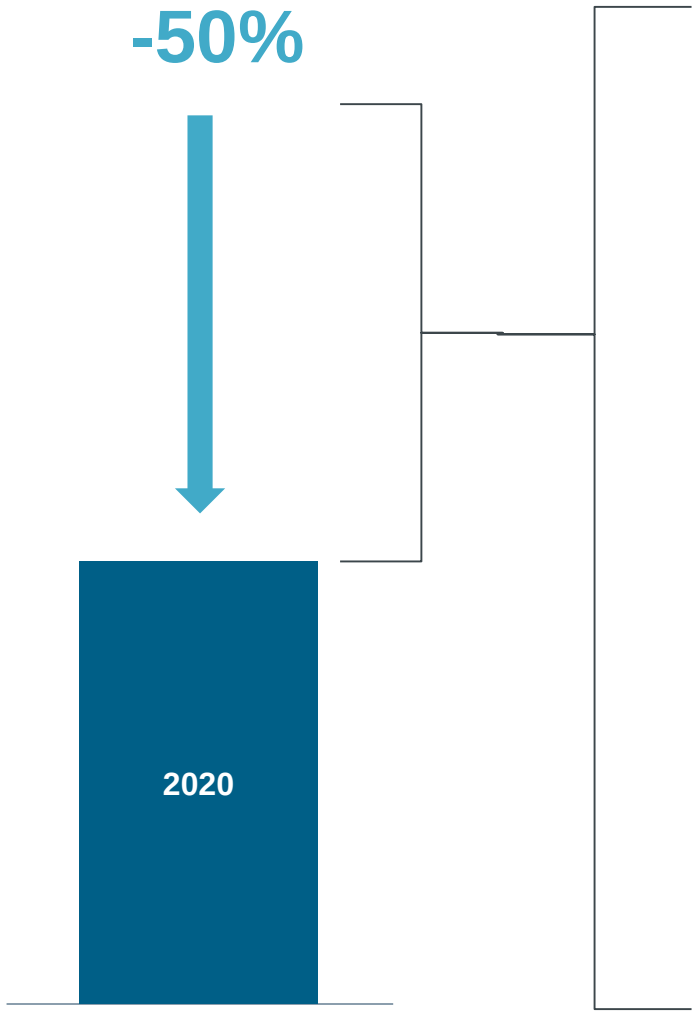
SIEMENS
Ingenuity for life



Intern © Siemens AG Österreich 2018. All rights reserved.

Four steps to reduced emissions – How Siemens is cutting ist worldwide CO_2 emissions in half

SIEMENS
Ingenuity for life



Drive Energy Efficiency Program

Increase energy-efficiency in existing factories as well as sustainable new constructions

Leverage Distributed Energy Systems

Optimize energy costs and leverage beneficial CO_2 footprint of decentralized systems

Reduce Fleet emissions

Systematically utilizing potential of low emission cars in fleet, including E-car potential

Purchase Green Energy

Move towards a significantly cleaner power mix with a strong focus on renewable energies and high efficient gas

Intern © Siemens AG Österreich 2018. All rights reserved.

Ratings and Rankings

SIEMENS
Ingenuity for life

MEMBER OF Dow Jones Sustainability Indices In Collaboration with RobecoSAM

- 86 points; Member of DJSI World Index
- DJSI is the leading global sustainability index, following a best-in-class approach

CDP DRIVING SUSTAINABLE ECONOMIES

- Rating Score: A -
- Siemens responds to the climate change and supply chain request and discloses how greenhouse gas emissions are being reduced and climate change risks mitigated

Forbes 2017 GLOBAL TOP REGARDED COMPANIES 2000

- #1 of the worlds top regarded companies 2017 Considering trustworthiness/honesty, social conduct, the company as an employer and the performance of the company's product/services.

Corporate Knights

- #1 at 2017 Global 100 Most Sustainable Corporations in the World
- Annual ranking based on 14 KPI's, covering resources, employee, financial management, and supplier performance.

CLEAN200™

- #1 on the 2017 Carbon Clean 200 list
- Based on Bloomberg's New Energy Financial (BNEF) database to rank companies according to their clean energy revenues.

MSCI ESG Research

- Included in the MSCI World Index[1)] for the first time in 2017.
- The MSCI World is a market cap weighted stock market index of 1,653 stocks from companies throughout the world.

FTSE4Good

- Included in FTSE4Good series
- FTSE4Good is the pioneering global responsible investment index that demonstrates strong Environmental, Social and Governance (ESG) practices of companies.

SUSTAINALYTICS

- 77,3 points
- Included in Bloomberg ESG Terminal, primary audience are investors

Corporate Responsibility Prime rated by oekom research

- Score: Prime Label
- Oekom qualifies shares on the stock market for an investment from an ecological and social perspective.

ecovadis SUPPLIER SUSTAINABILITY RATINGS

- 57 points, "Silver recognition level"
- EcoVadis operates a collaborative platform providing supplier Sustainability Ratings for global supply chains.

1) Formally: Morgan Stanley Capital International

Intern © Siemens AG Österreich 2018. All rights reserved.

Thank you !

SIEMENS
Ingenuity for life

siemens.at/future-of-energy

Intern © Siemens AG Österreich 2018. All rights reserved.