

SIEMENS



The Smart Grid - Constant Energy in a World of Constant Change

Energy meets Intelligence

Energy systems worldwide are changing...

**There is nothing
permanent except change**



Renewable and distributed generation is growing worldwide...

Global Changes are Local Challenges



Capacity problems are posing economic risks...



And aging infrastructure is threatening security of supply...



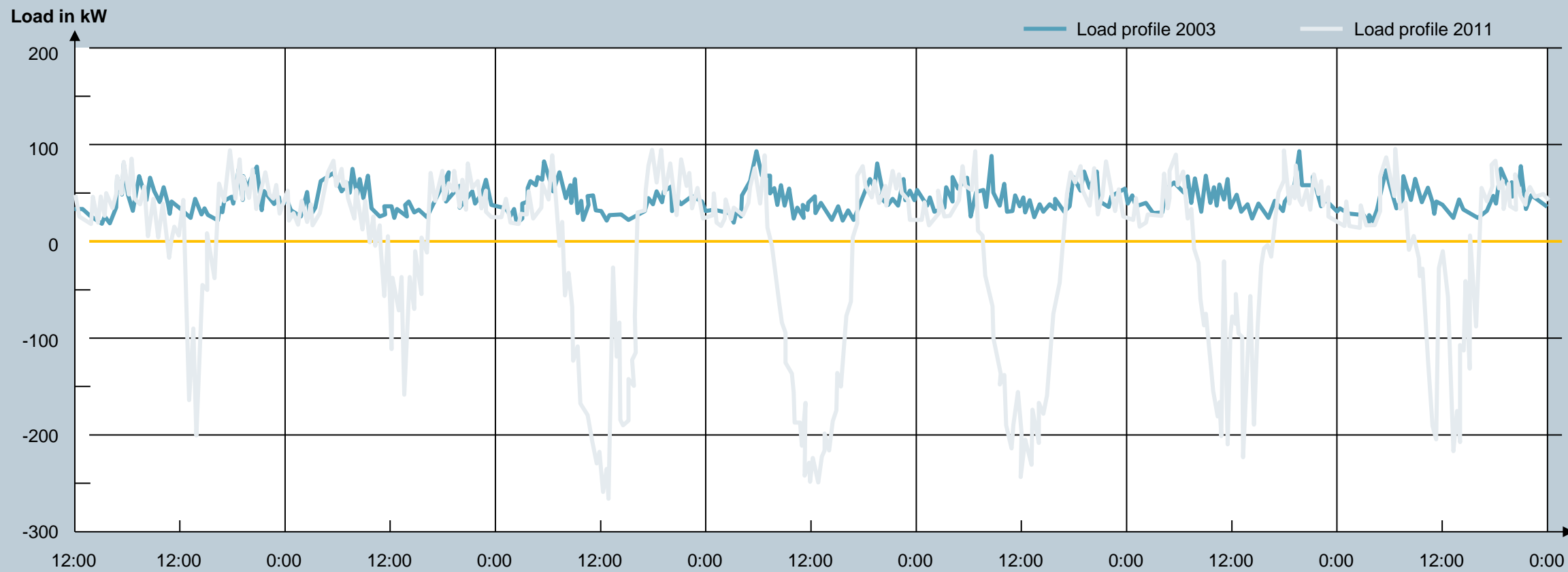
The Smart Grid by Siemens is part of the answer.

Constant energy in a world of constant change



Changing infeed patterns are challenging existing grid infrastructures

Weekly loading of a transformer station in the rural area of LEW-Verteilnetz GmbH – 2003 and 2011

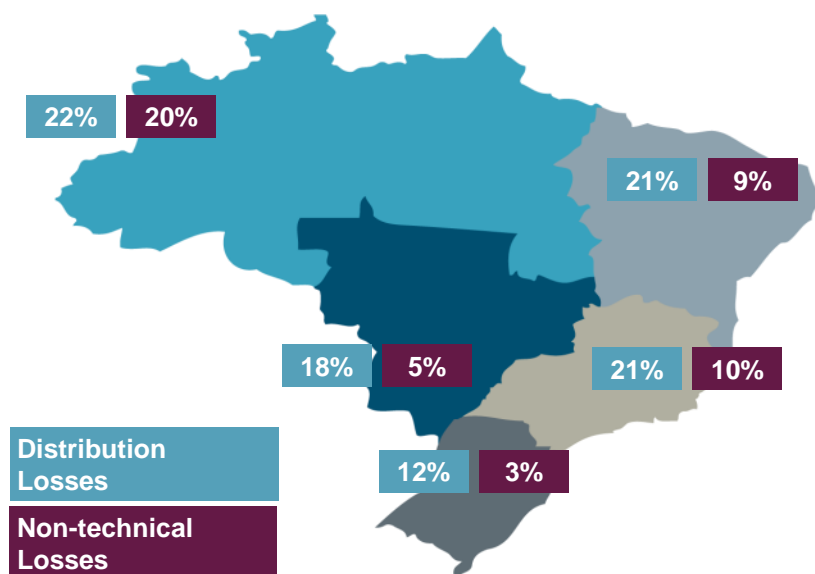


Source: LEW

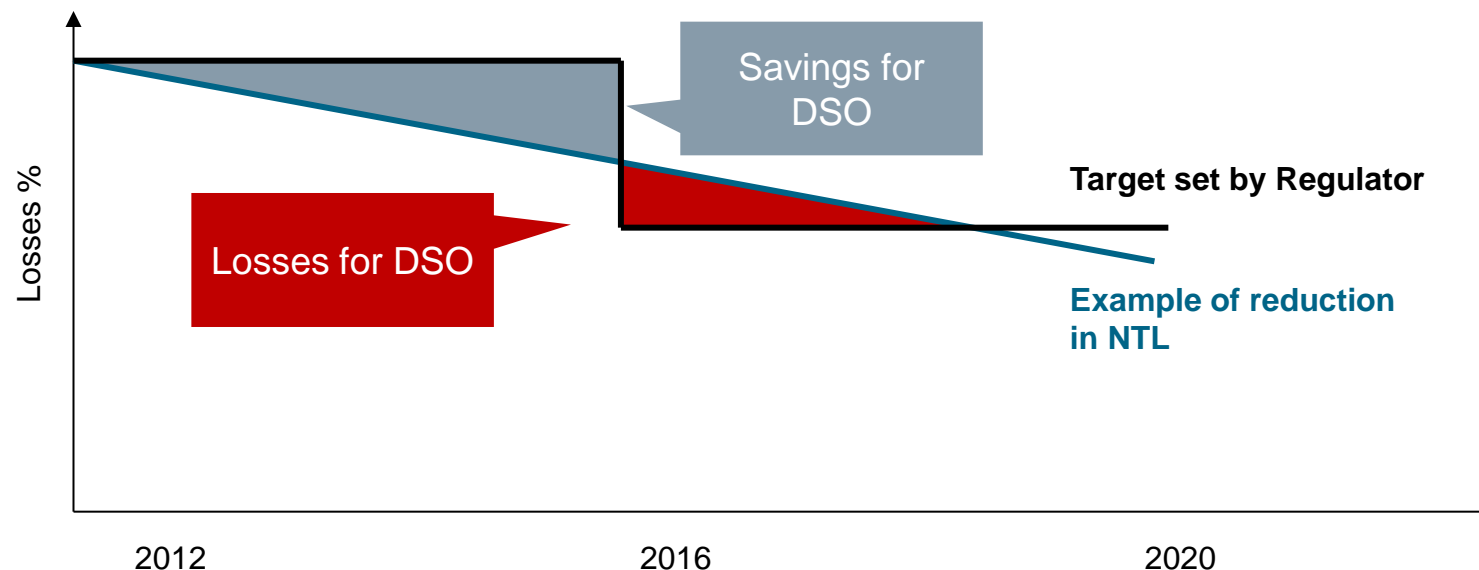
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Loss reduction is one answer in times of increasing prices

Network losses in % per region



The non technical loss (NTL) business case for DSO is driven by regulation in Brazil



Brazilian energy distribution network suffers non-technical losses (NTL) of 23 TWh p.a. (5.8 % of total output)

€ 1' ' p.a. lost revenue to the DSOs accrues.

Regulator ANEEL established new regulations governing network efficiency and demands 30% NTL reduction every 4 years.

Utilities' business frameworks are changing – Customer specific solutions

System Requirements

Affordability

Climate protection

Efficiency

Reliability



Technology trends

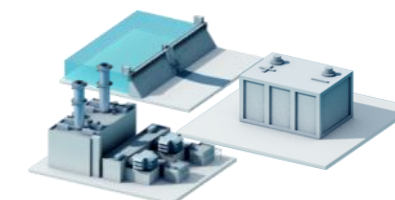
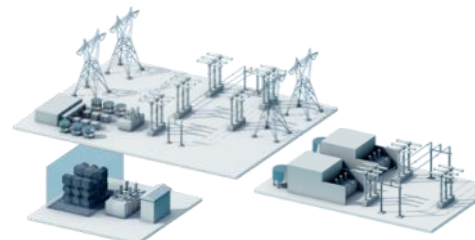
Large and flexible generation Distributed generation



ICT

New grid technologies

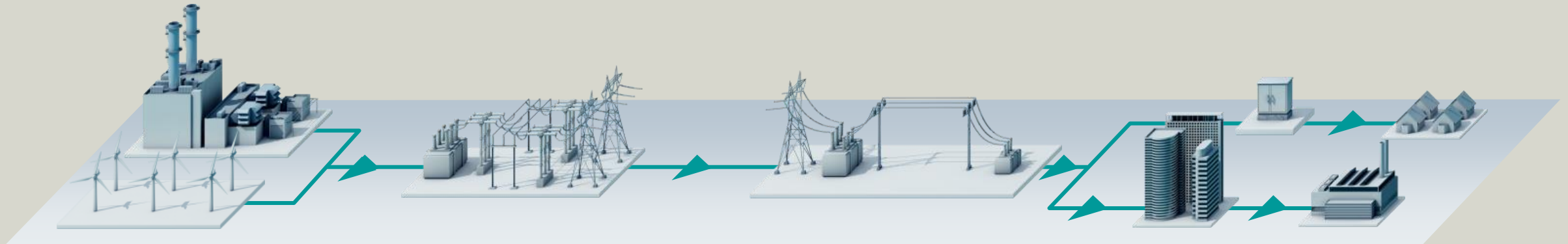
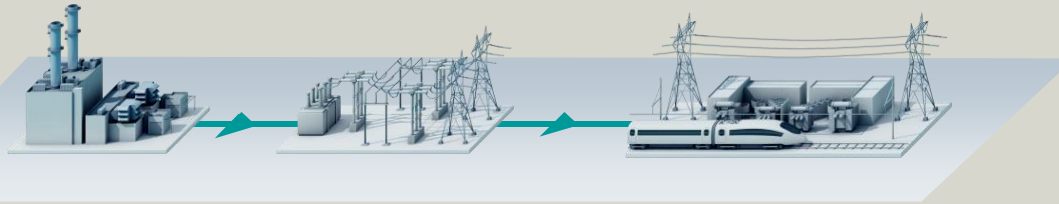
Storage, new consumer
Intelligent buildings



Smart Grid is an integral part of the solution set

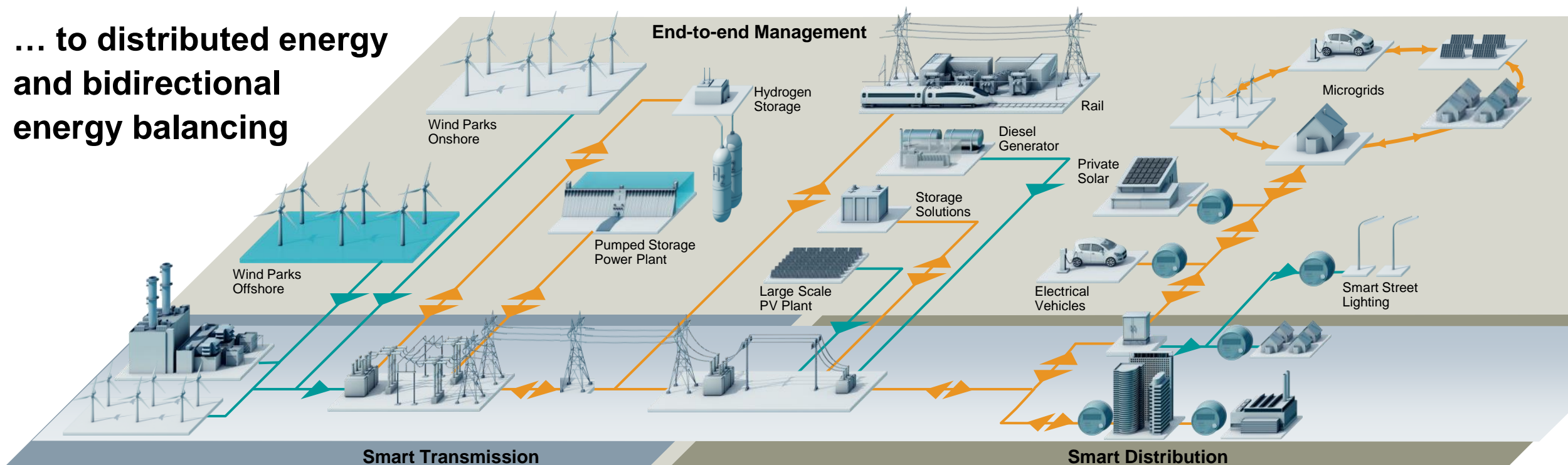
Significant changes in energy systems...

From centralized, unidirectional grid ...



Significant changes in energy systems...

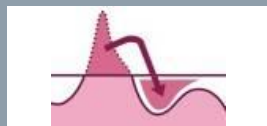
... to distributed energy and bidirectional energy balancing



Balancing of generation & consumption



Load management & peak avoidance



Resiliency through automatic outage prevention & restoration



CO₂ avoidance & cost curtailment



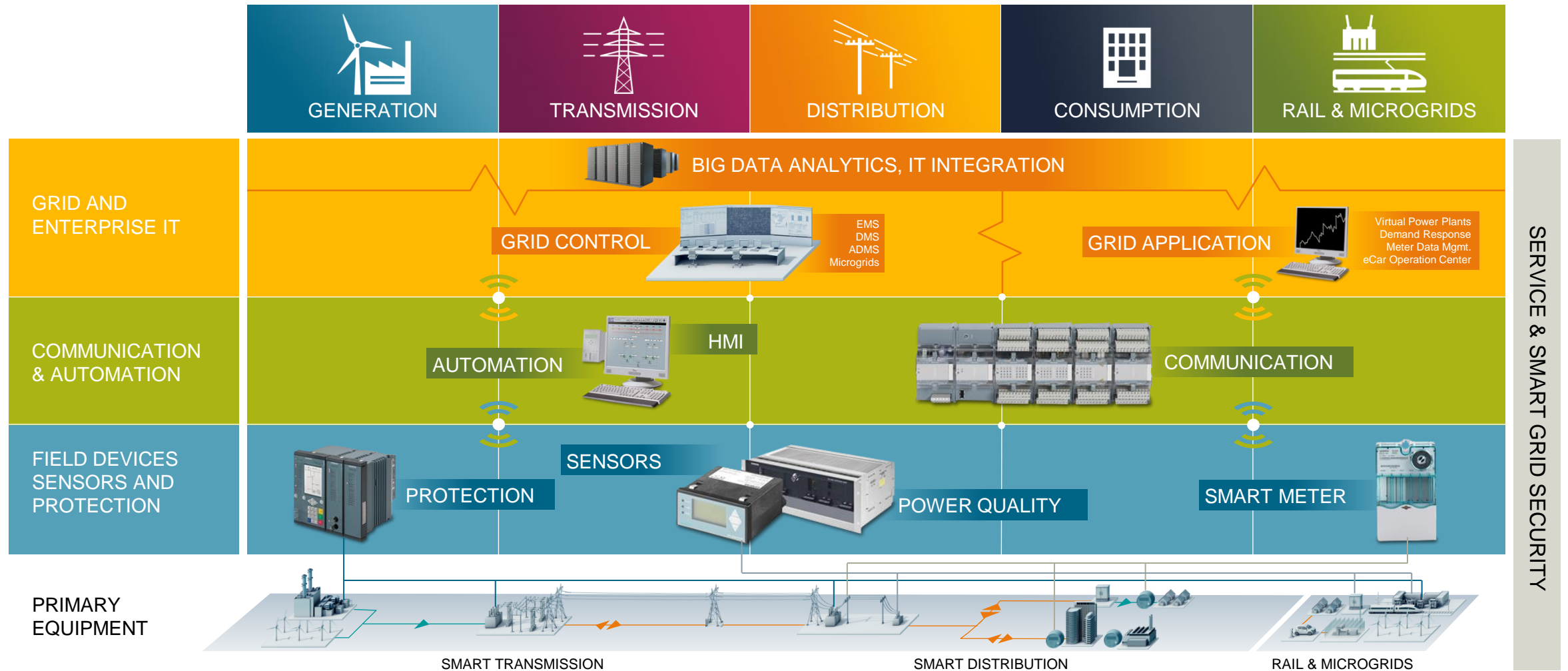
Avoidance of non technical losses



Cost optimization and improved security of supply



The Siemens Smart Grid Suite – The industries most comprehensive solution set





Successfully implemented –
today.