

AALBORG **2015**
Denmark

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Microgrids Digital Transformation

Maher Chebbo, PhD Energy
General Manager Energy for EMEA
SAP
Maher.chebbo@sap.com
President of ESMIG
ETP SmartGrids "Demand" & Digital Chair





1

**The
Microgrids
Equation**

2

**Digital
Energy**

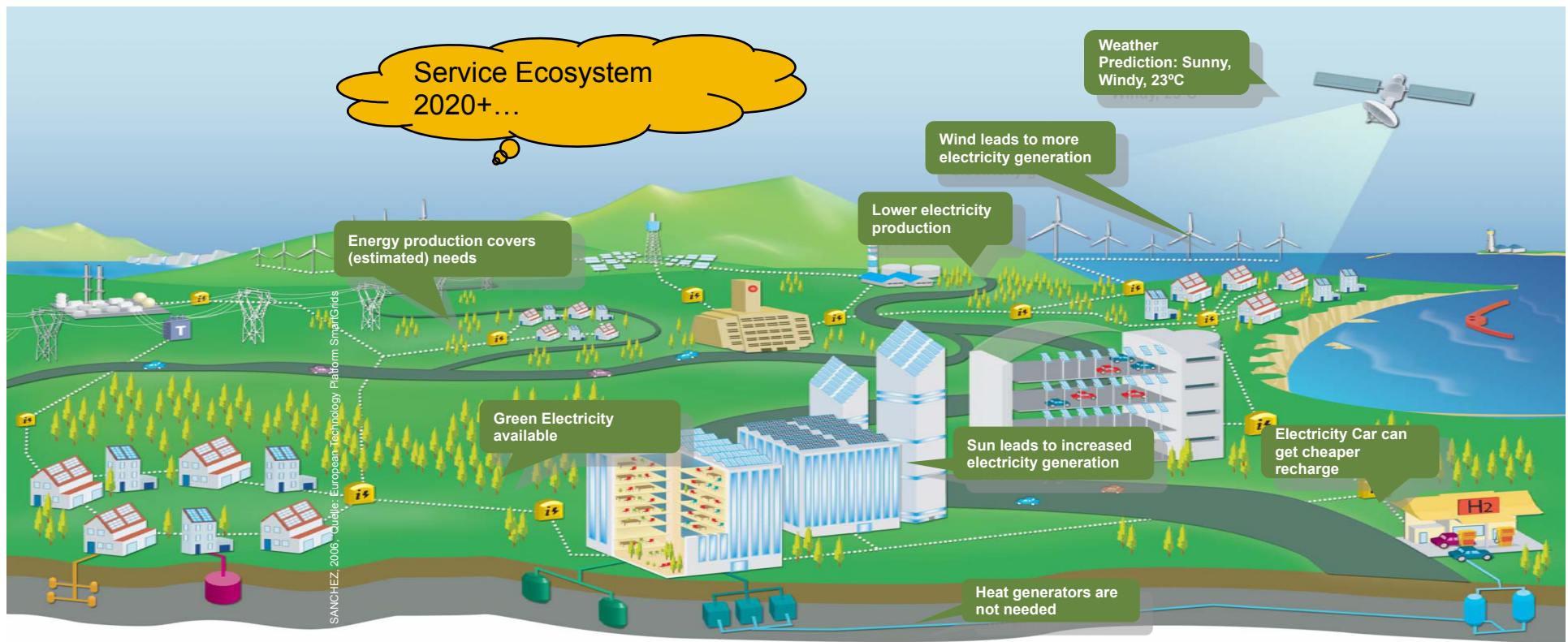
3

**Microgrids
Digital
Intelligence**

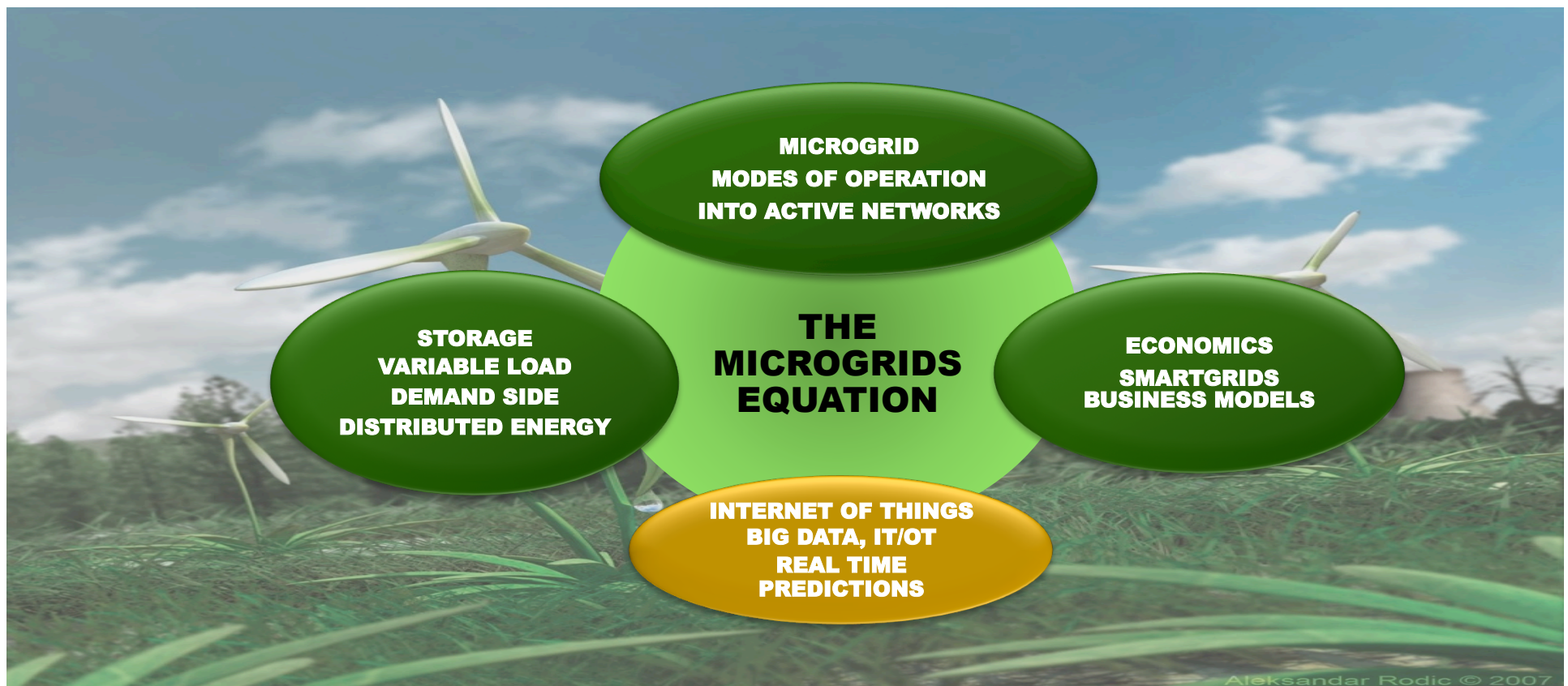
4

Conclusion

SmartGrids and Microgrids : Real Time, Internet of Things, Big Data and Digital Transformation needed



The Microgrids Equation





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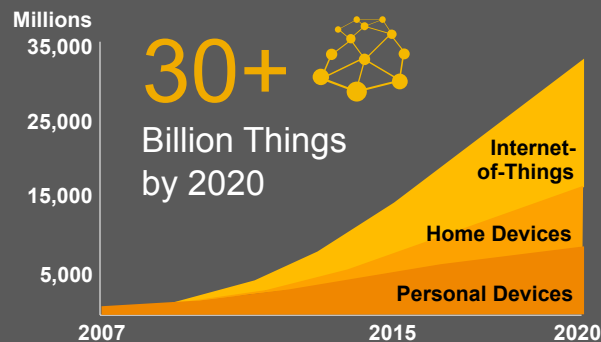
3

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Conclusion

Big data brings new business opportunities, innovation, transformation and growth



Strategy Analytics, October 2014

44 trillion gigabytes (44ZB)
of data will be generated in
2020... data creation is more
than doubling every two years

<http://www.emc.com/leadership/digital-universe/2014iview/executive-summary.htm>

60% increase in operating
margin in retail companies
using Big Data as a **new
resource**

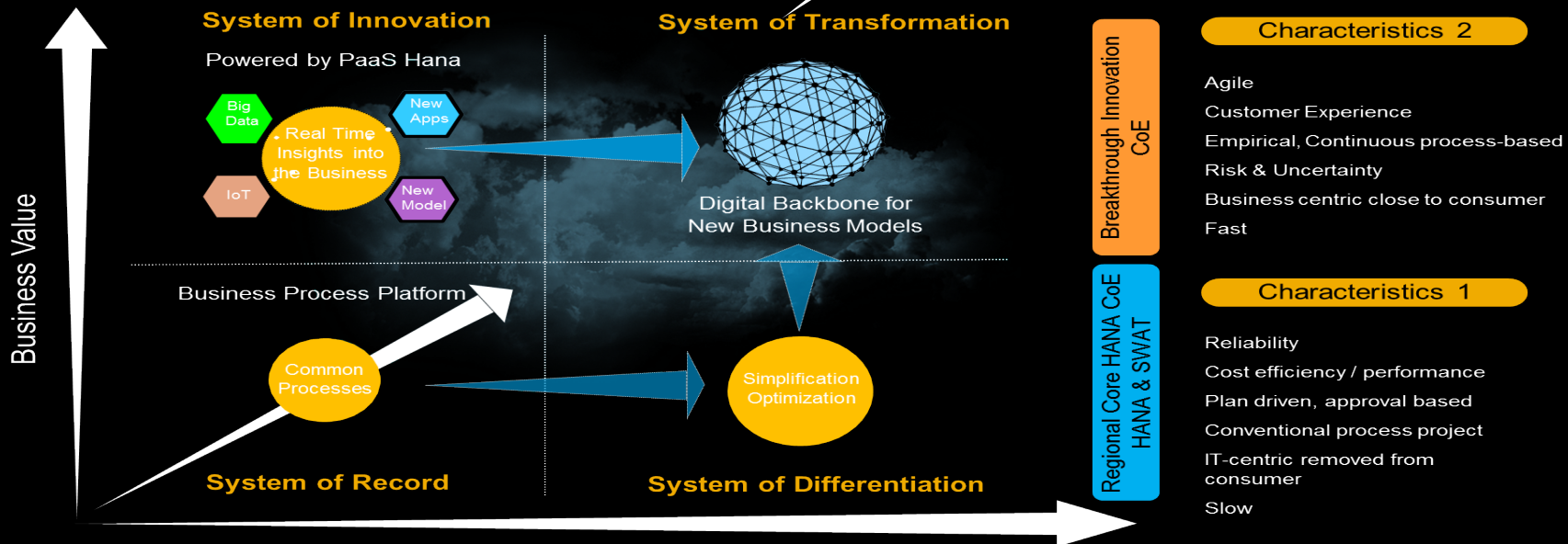
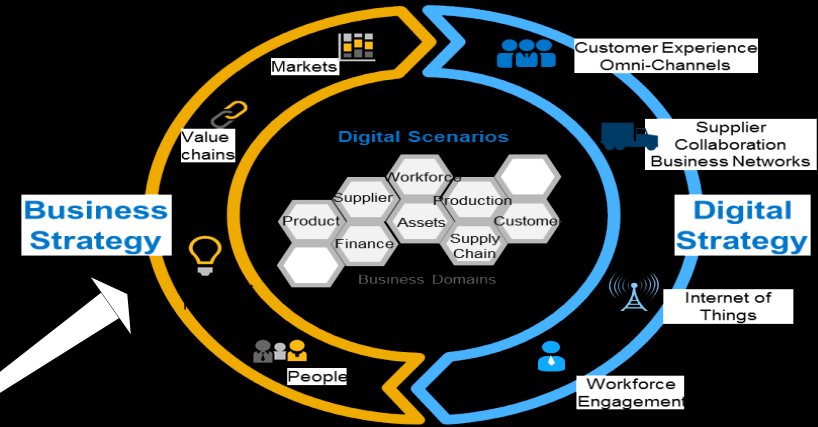
http://www.mckinsey.com/insights/business_technology/big_data_the_next_frontier_for_innovation



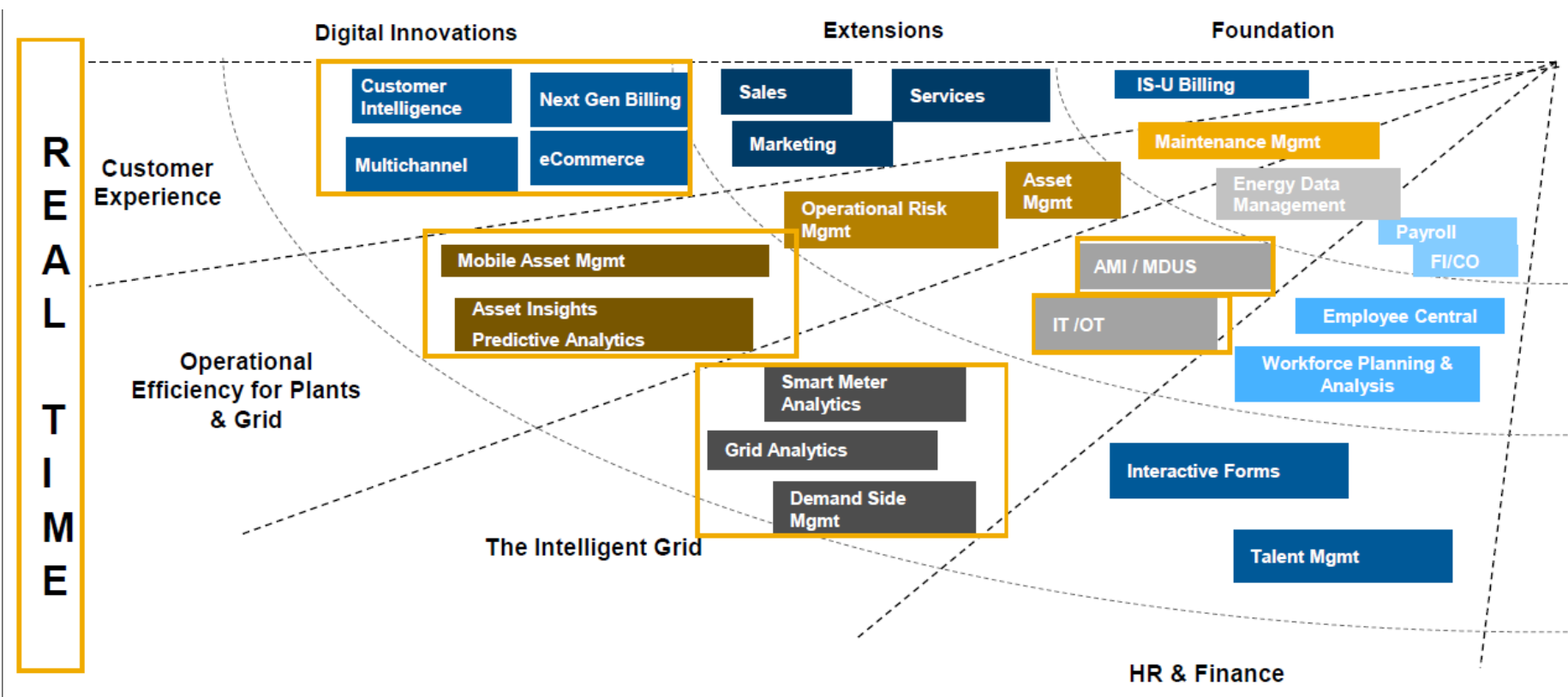
More than 60% of CEOs expect **15%–50% of their earnings growth** in the next **5 years** to come from technology-enabled business innovations.

McKinsey study, 2013

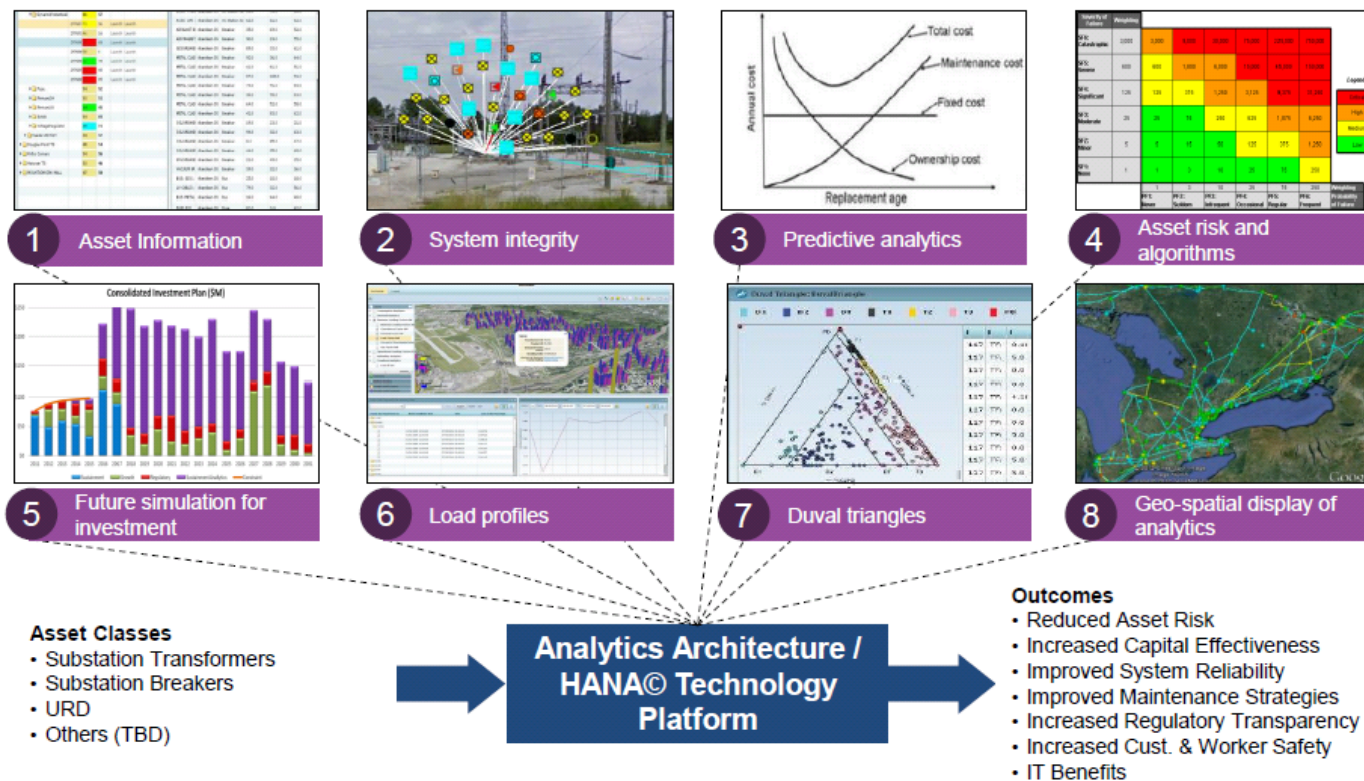
The Digital Strategy empowering the Business Strategy



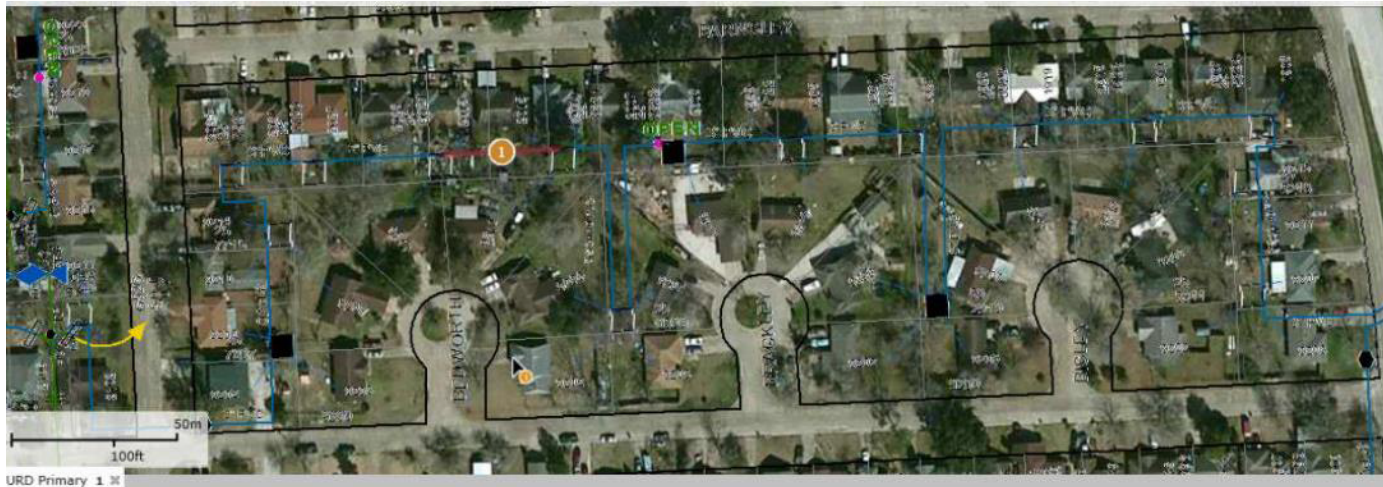
Technology innovations Maturity Model for Utilities & Grids



IT/OT Integration : Situation awareness, integrating financial and operational data with predictive analytics to drive decision making



Underground Residential Distribution (URD) : Role of IT/OT integration & Big Data in improving Outage Management



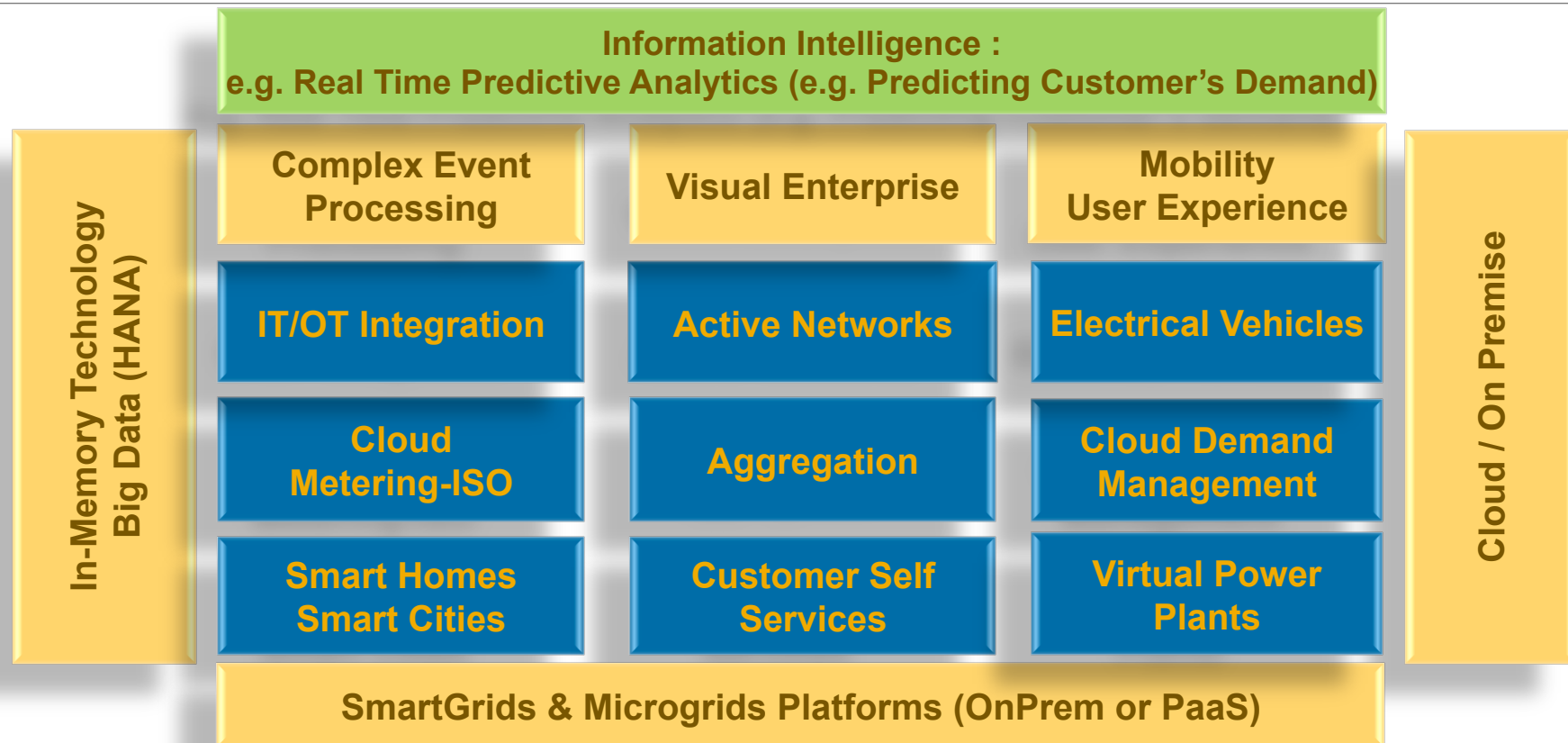
Analyze the test/inspection and historical outage data around Underground Residential Distribution assets (Primary cables, Pad Mount Transformers and Fuses)

View and Analyze a condition score for URD cables and transformers, Optimize inspection, Visualize the URD network on a geo-spatial user interface, Layer descriptive and predictive analytics



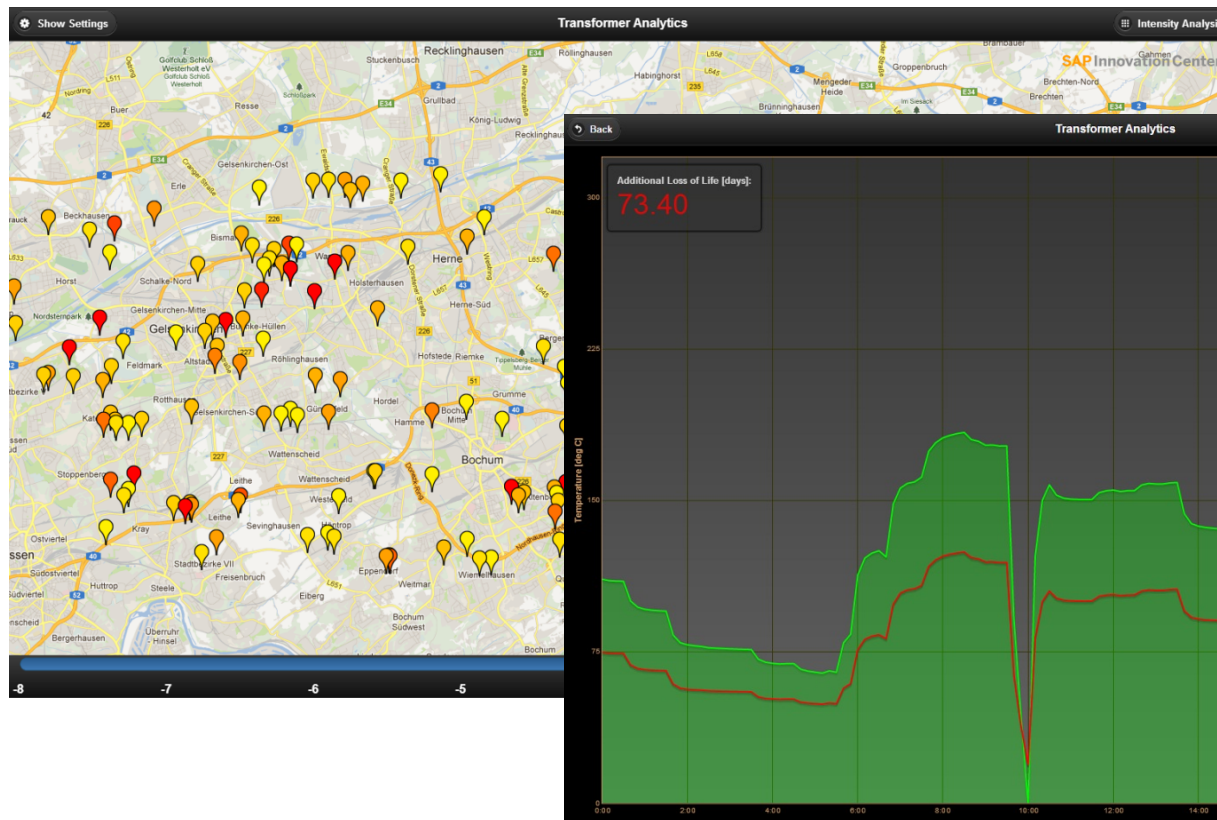
Digital Grid Applications & Analytics

combining **Business Processes** + **Information** + **Technology**



Critical Transformer Load & Loss of Life using in-Memory Big Data Predictive Analytics

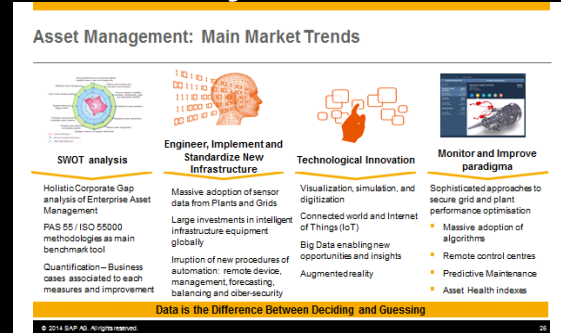
**In-Memory
Predictive**



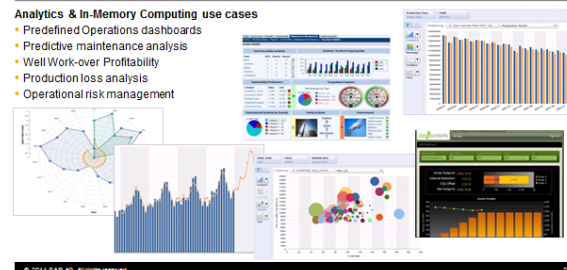
IEC 60076-7 VDE 0532-76-7
(Loading guide for oil-immersed transformers)

Example of Technology Innovations : Asset & Customers' Big Data and Analytics

Asset Lifecycle & Predictions In-Memory (HANA) & Analytics



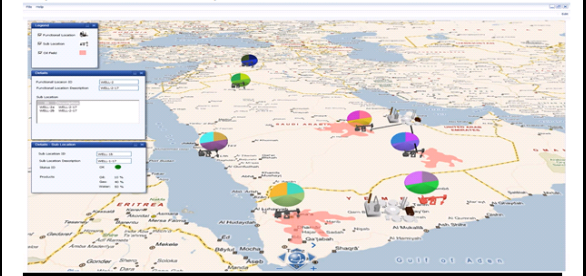
In-Memory Computing and Analytics



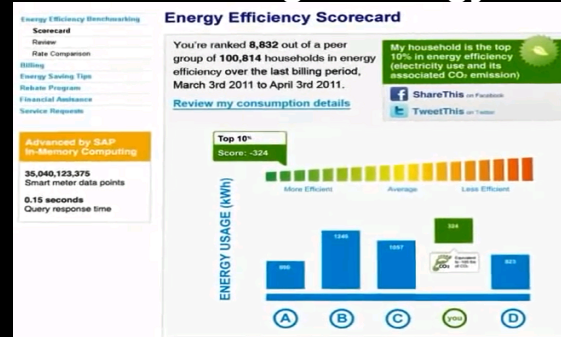
Geo Analytics

Geographical representation of Technical Objects

Empower users with visual experience

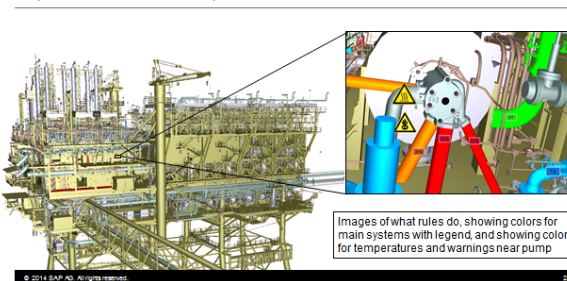


Smart Metering & Energy Efficiency 3D Visual Enterprise



3D Visual representation of Technical Objects

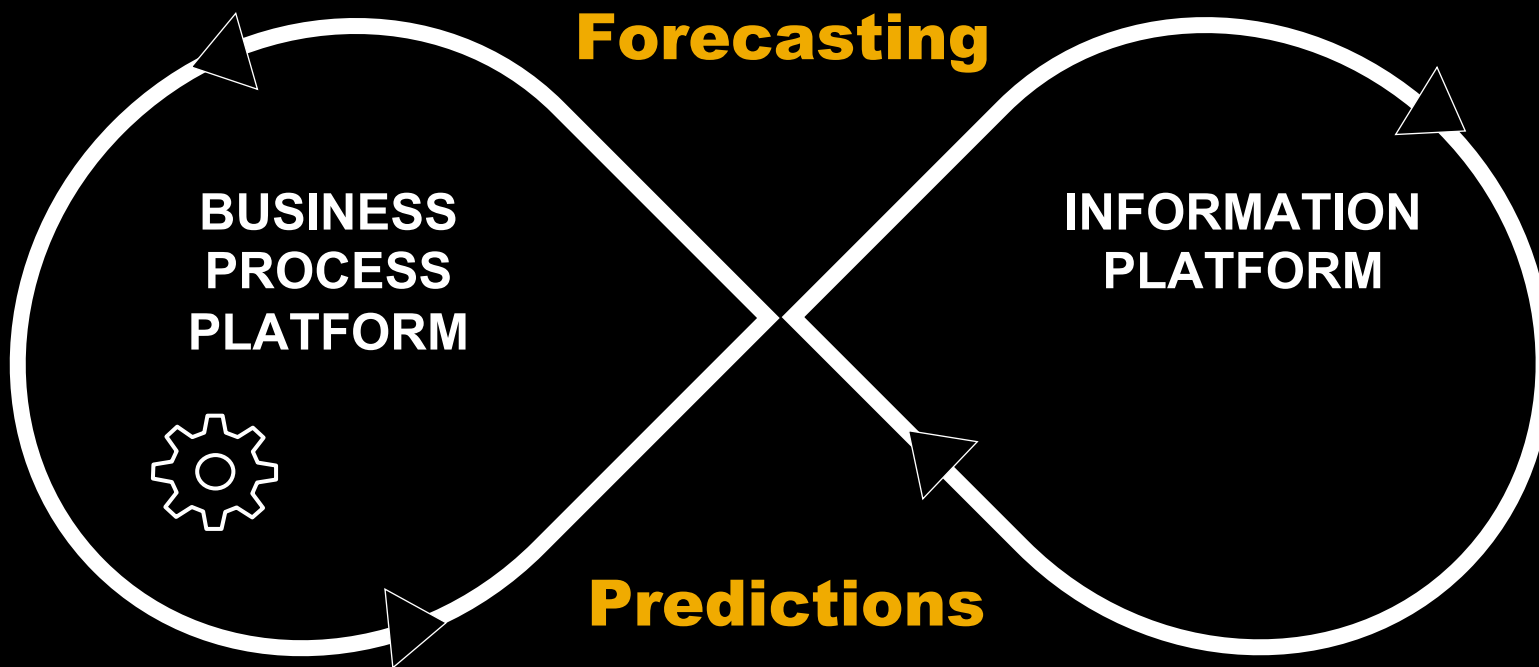
Empower users with visual experience



SmartGrids



The Unique Value Proposition Combining Business Processes, Information and



Powered by in-Memory Technology (SAP HANA)

Smarter Decisions + Smarter Processes = Smarter Services





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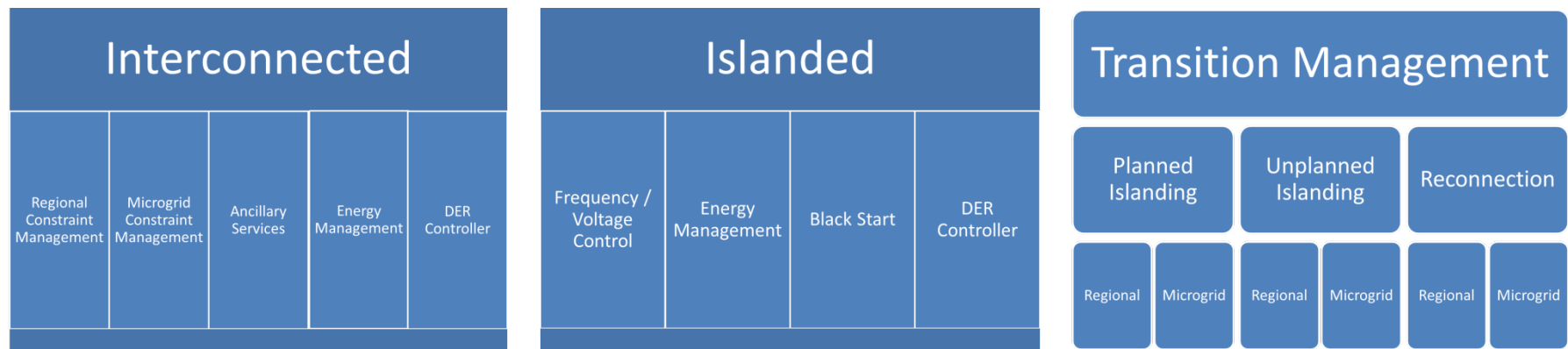
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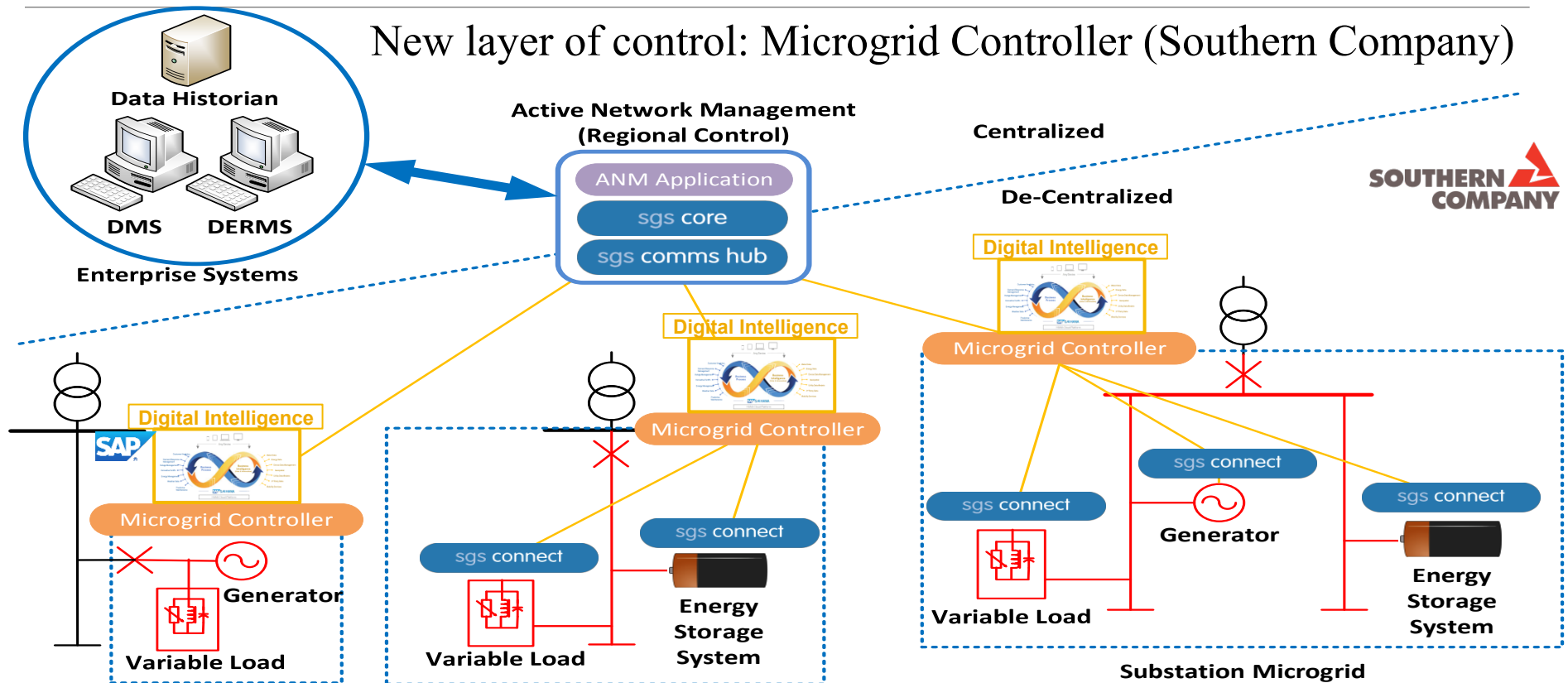
Microgrids different Modes of Operation and required integration in Active Network Management (e.g. Southern Company project)

In any of the three Operating modes of Microgrids, Active Network Management requires:

- Management of power flow constraints
- Management of voltage constraints
- Management of distributed generation contributing to transmission system constraints
- Smart electric vehicle charging
- Demand Response (domestic / commercial)
- Day ahead scheduling of controllable demand to coincide with renewable energy production to support frequency stability

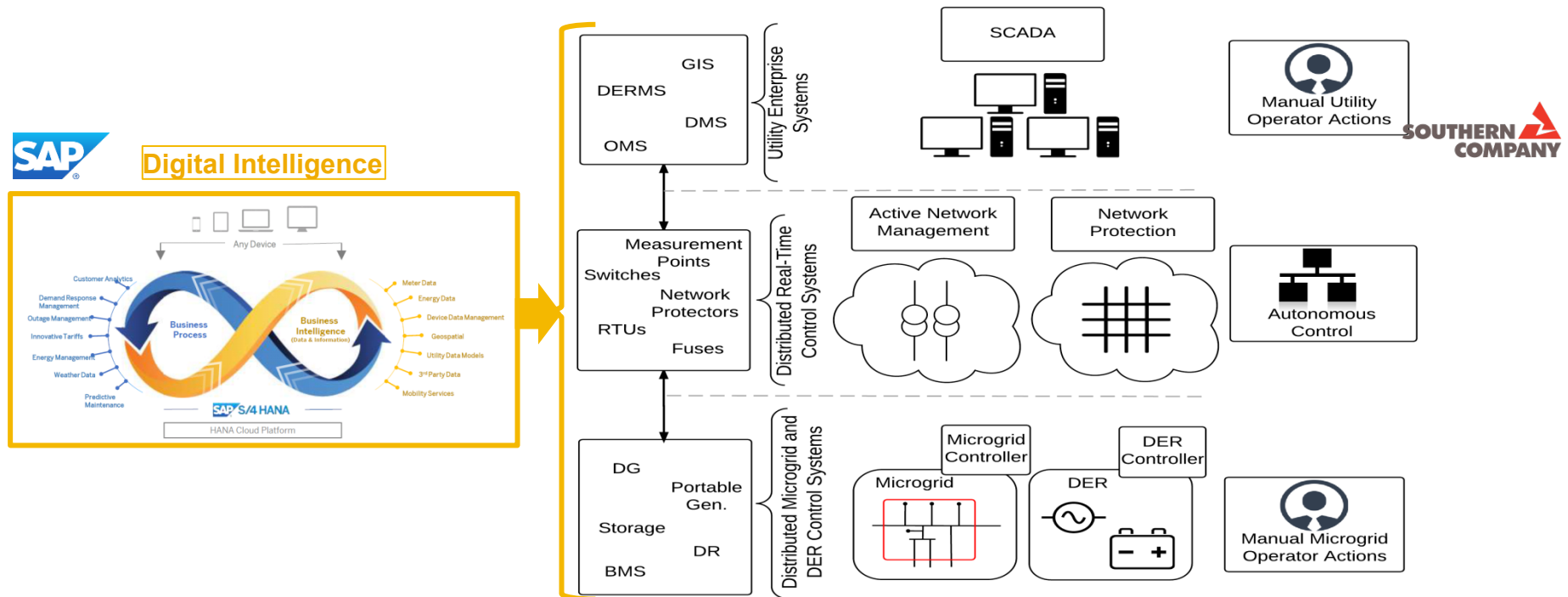


Incorporate Microgrids Controller enabled by Digital Intelligence for an improved Active Network Management

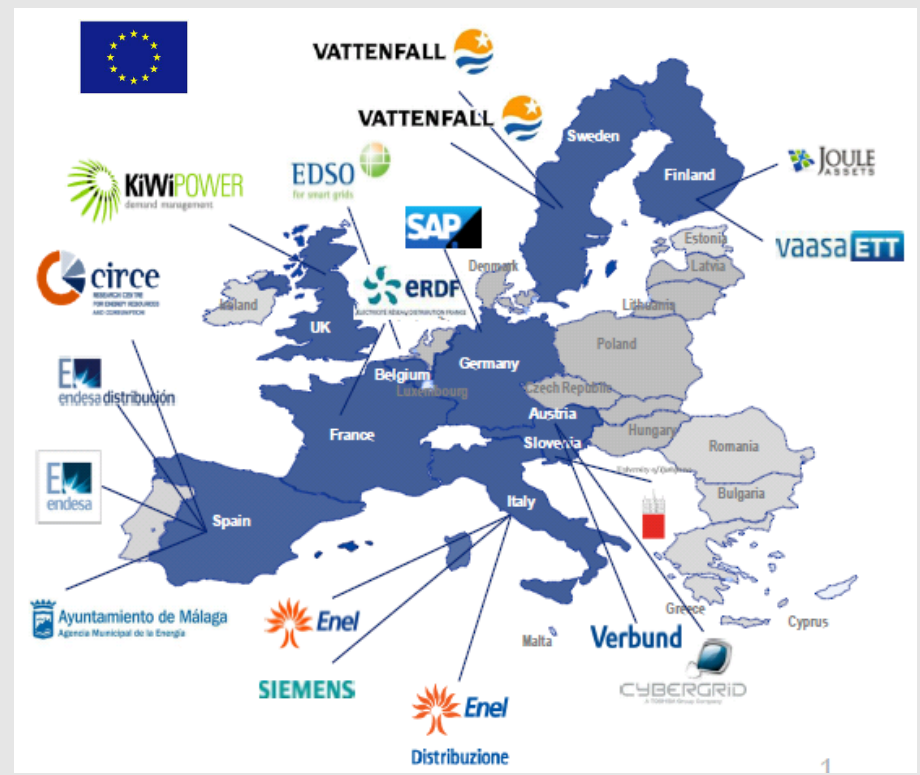


Layers of Microgrid Control (Southern Company Project) which could be empowered by Digital Intelligence (IT/OT, IoT, HANA, RT)

Layers of Microgrid Control



«Apple Store» like as a Public HANA Cloud Platform for Energy Services : H2020 project «**FLEXICIENCY**» could include Microgrid cases



ENR HCP “**FLEXICIENCY**”
Electricity pan-European
Marketplace for Distribution
& Retail :

Kind of “Apple Store” for
Energy Demand Services

target 10 000 Utilities on the
same Public Marketplace



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Microgrids : what will change ?

		WILL CHANGE TO...	BECOME	WITH ...
1	ENERGY	CONNECT ALL ASSETS AND CUSTOMERS DATA IN REAL TIME	PREDICTIBLE	SMARTGRIDS MICROGRIDS
2	NETWORKS	INTEGRATE MICROGRIDS WITH A SPECIFIC CONTROLLER LAYER	MORE ACTIVE	DIGITAL INTELLIGENCE
3	DATA	BIG DATA COLLECTED IN REAL TIME	INTELLIGENCE	IN-MEMORY HANA PREDICTIVE ANALYTICS
4	CUSTOMERS	FLEXIBLE DEMAND	EMPOWERED	DIGITAL ENERGY
5	MICROGRIDS	INTEGRATE WITH ACTIVE NETWORKS, DER AND ACTIVE DEMAND	DIGITAL	IT/OT, IoT, BIG DATA, HANA PREDICTIVE ANALYTICS



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