



HITACHI



ABB



Shaping the future of digital service partnerships today

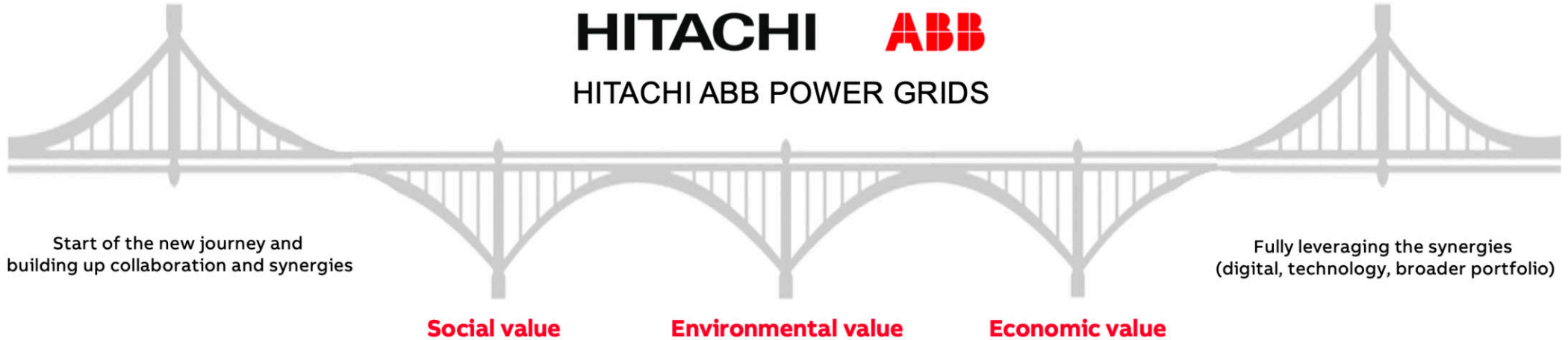
Mercedes Jul

Head of Product Management and Strategy for Grid Integration Service Solutions - Hitachi ABB Power Grids

ABB

HITACHI

HITACHI **ABB**
HITACHI ABB POWER GRIDS



Powering good for a sustainable energy future



Headquarters in
Zurich, Switzerland



12,000+ Service customers



World's largest installed base



200+ service centers



4 business units



1,500+ Field engineers



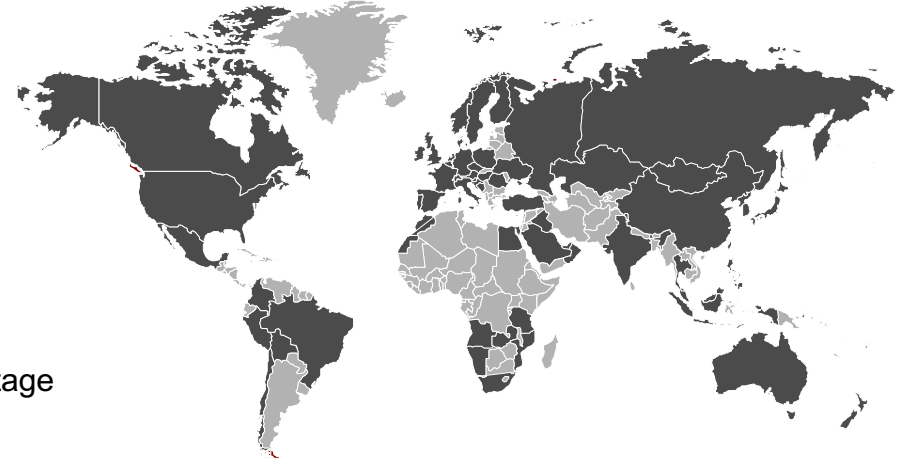
Present in ~90 countries
200 offices globally



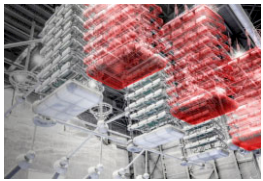
250+ years of combined heritage



36,000 employees



■ PG Installed Base
■ PG Service presence



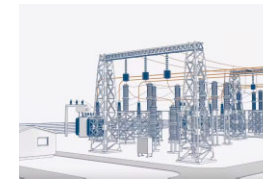
150+
HVDC-links



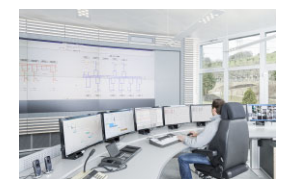
130,000+
Power Transformers



~150,000
HV Gas-insulated switchgears

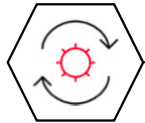


10,000+
Substation systems



10,000+
Substation Automation Systems

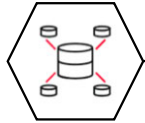
The power system is in the midst of fast-paced transformation



Entrance of new players, decentralization of generation and **empowerment of consumers**



Traditional services have a **growing number and profile of competitors** and, **price pressure**



The **value of knowledge and data is growing**



Whole **society is endeavoring to reduce emissions**



Covid-19 is creating **uncertainty and limitations** to on-field work



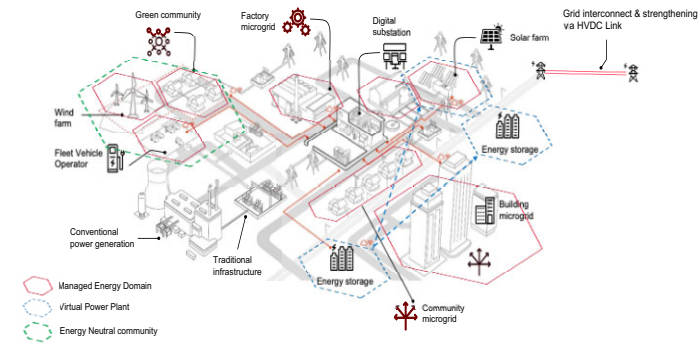
Traditional Service / Reactive

“Maintain or replace philosophy” & “one-off interactions”



Advanced Service / Continuous

“Trusted lifecycle partnership philosophy” & “Continuous interactions”

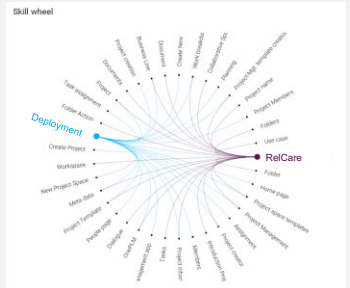
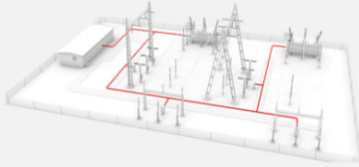
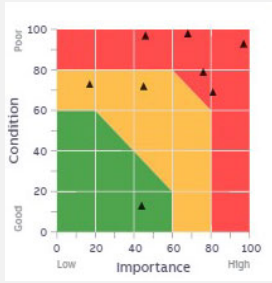
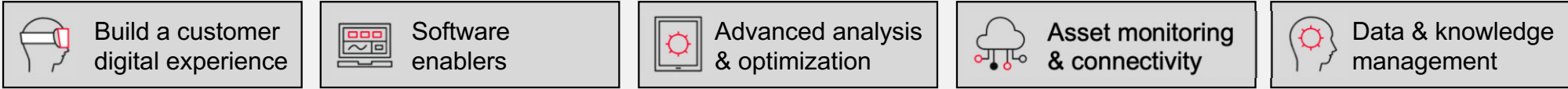


Future

... let's talk about the future ... TODAY

DIGITAL TRANSFORMATION

Digitalization is not just a trend; it is becoming an essential part of our world and Hitachi ABB Power Grids business, facilitating a differential customer experience and new business models



Key digitally enabled service capabilities and business models

AR remote support, 3D scanning, ...

Maintenance planning tools, workforce management...

Risk-based maintenance, condition assessments, ...

Lifecycle management, advanced models, ...

Spare parts management, tacit knowledge sharing, ...

Secure products, systems, services, and connections at all times (cyber & physical security)

What is RelCare?

With **a combined heritage of almost 250 years**, Hitachi ABB Power Grids has always focused on what brings value to our customers, **becoming their partner of choice** to make a stronger, smarter and greener grid possible.

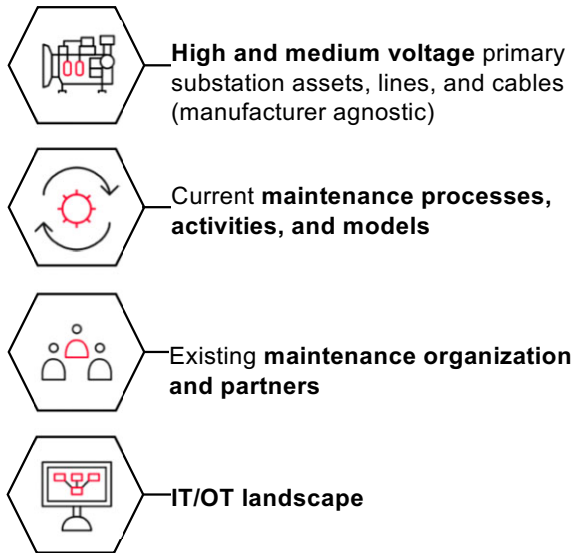
To translate this vast technical expertise and collaborative relationship with our customers into **a digital service partnership** we have created RelCare



RelCare - *the new way to master maintenance*

RelCare is a digital service partnership agreement to optimize operation and maintenance costs, sustainability, and reliability of power grid assets, by identifying and mastering asset risks

Customer power system environment



RelCare digital partnership agreement

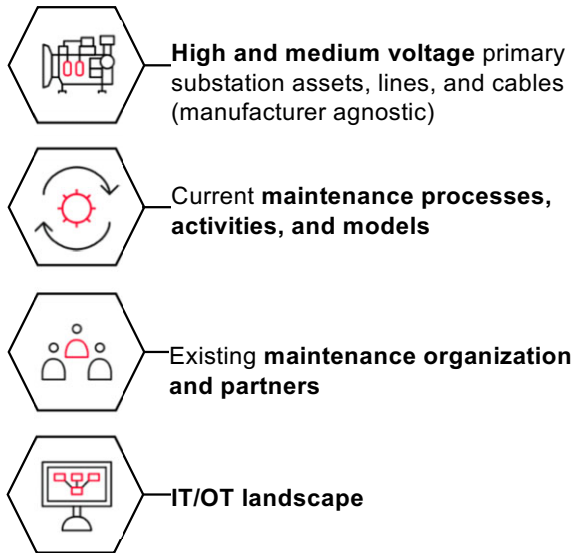


Comprehensive maintenance management service solution

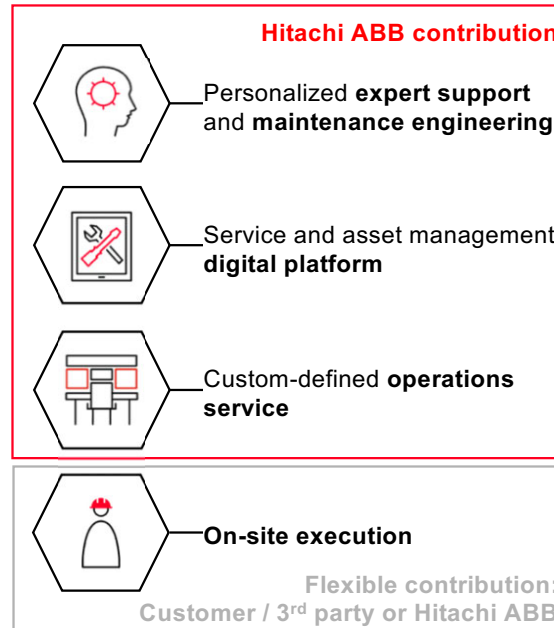


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Customer power system environment



RelCare digital partnership agreement

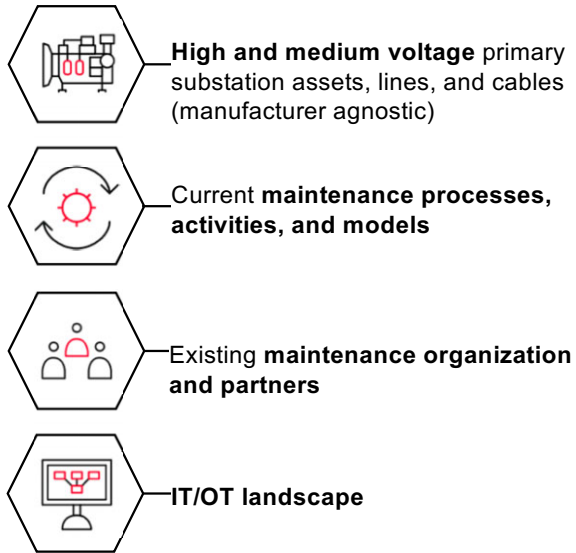


Comprehensive maintenance management service solution

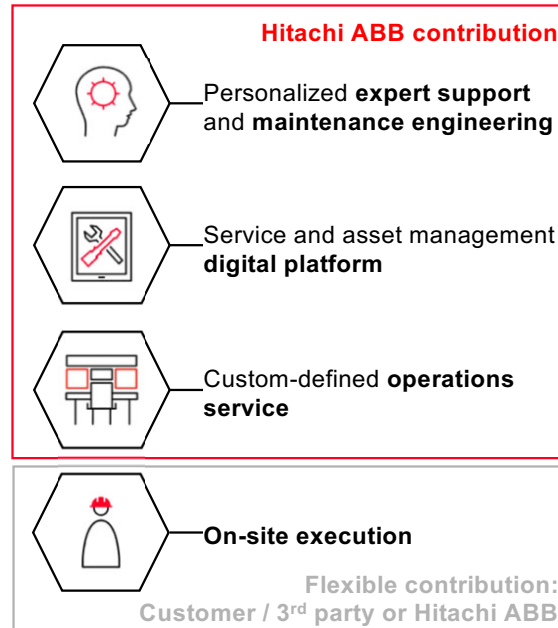


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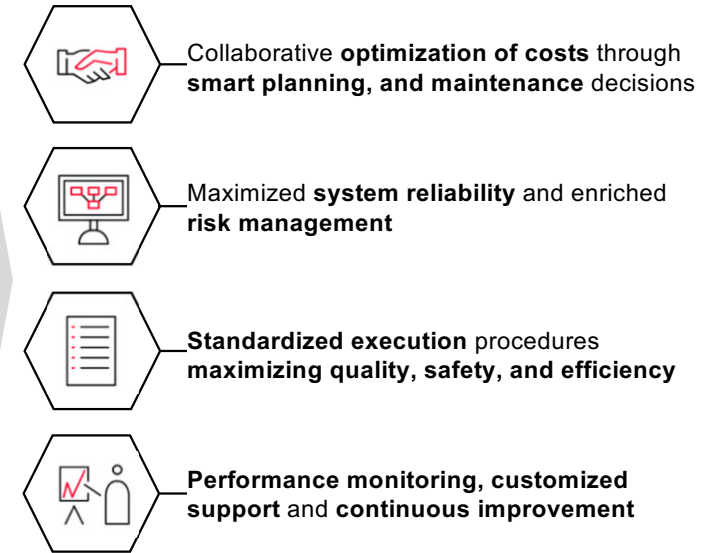
Customer power system environment



RelCare digital partnership agreement

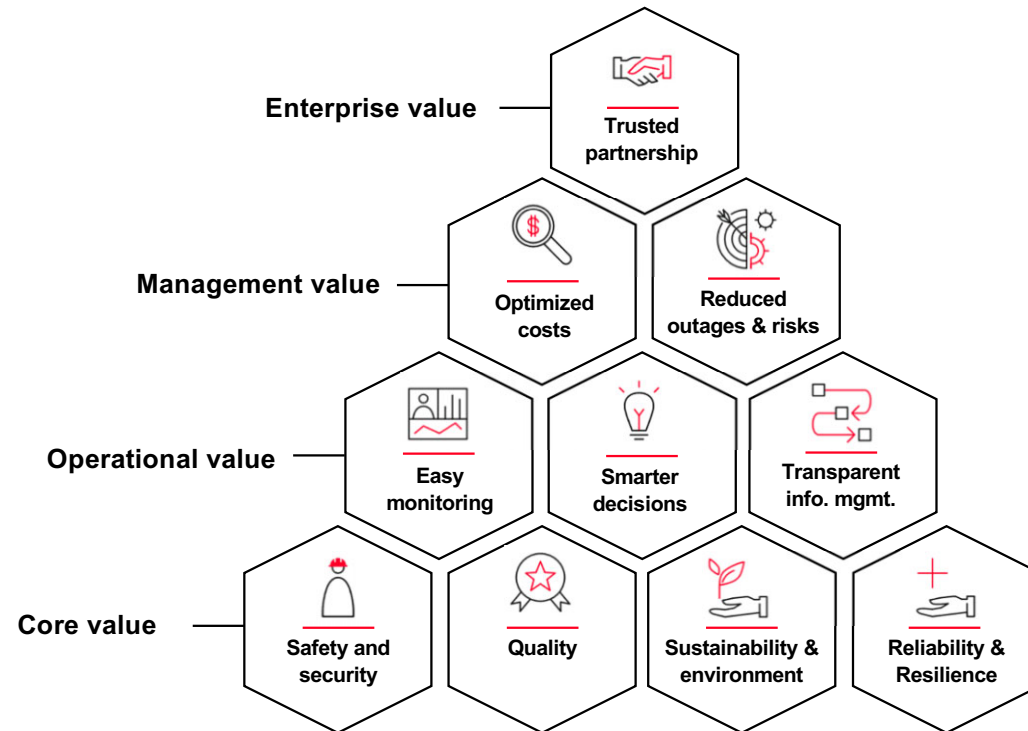


Comprehensive maintenance management service solution

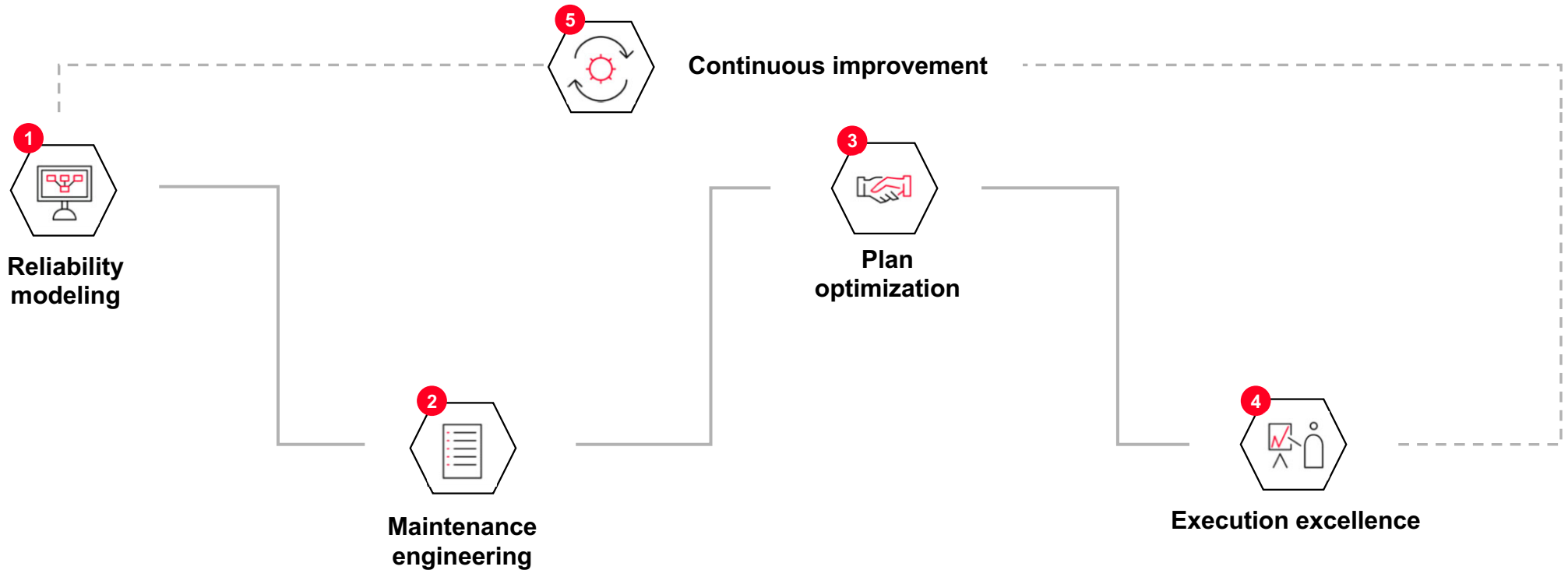




RelCare is a **digitally enabled service level agreement** designed to bring value to all levels of the organization:



RelCare is a **collaborative, and continuous improvement process:**



1

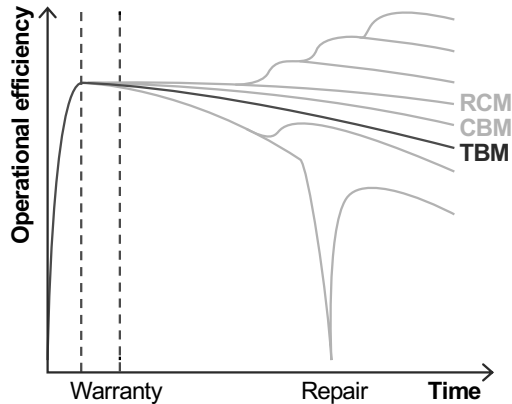


Reliability modeling

Based on operational and real-time assets information, the condition and importance of the assets is determined from a system perspective using Hitachi ABB's first-class asset models and reliability algorithms. This enable the transition from time-based to reliability-centered maintenance

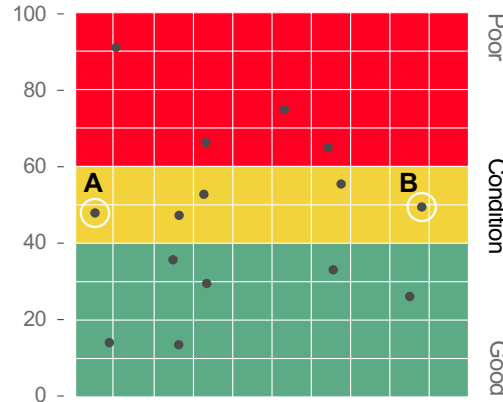
Time-based maintenance (TBM)

Planning according to time intervals recommended by the original equipment manufacturer (OEM)



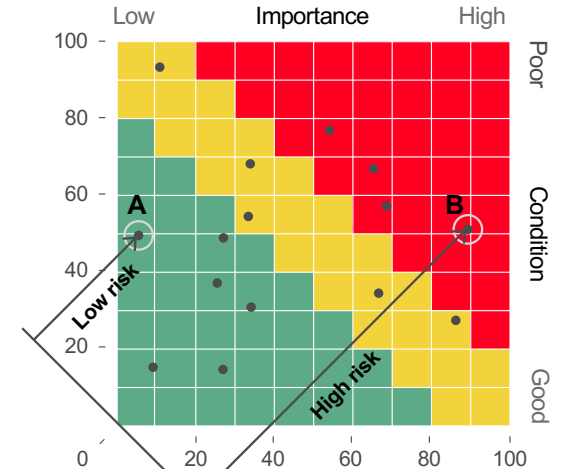
Condition-based maintenance (CBM)

Planning according to the condition/health of the assets



Reliability-centered maintenance (RCM)

Planning according to the asset risk



2



Maintenance engineering

Hitachi ABB's extended know-how and expertise in substation maintenance is applied to define/refine maintenance actions including SWMS¹ and advance maintenance policies to maximize quality, safety, and efficiency

4. Ensure the validity of the calibration of instruments

5. Make the connection as shown in the below diagram (typical connection diagram for 2 cores CT)

Current transformer
P1, P2- CT primary
1S1, 1S2, 2S1, 2S2- CT secondary

Insulation tester

Equipment earthing

6. Refer the operating instruction manual provided by the instrument manufacturer for testing kit operation

7. Apply 500V from the insulation tester to the secondary# with respect to ground

8. Measure the 60 sec insulation resistance value

9. Measure the ambient temperature and humidity values during the test

10. Once receive the stable measurement values from the testing kit, record the same (IR, ambient temperature and humidity) in the below table

Date:	Ambient temperature (°C):		Humidity (%):	
Test parameters	Applied voltage (V)	Measured IR value (MΩ)	Acceptance criteria (IR value (MΩ))	Tolerance
Secondary# to ground	500V			
Secondary# to ground	500V			

11. After complete the IR measurement reduce the voltage to zero in the insulation tester and switch "OFF" the same

12. Discharge the CT (using earth rod) before disconnect the test leads

2 Safety

2.1 General Instruction

All the safety measures shall be taken during the work. All the safety norms of customer / manufacturer / sub-contractor shall be followed. Necessary work permit and LOTO permit needs to be received from safety team, Hazards and risk assessment has to be made prior to start the work

2.2 Checklist

Sr.No	Description	Icon	Check	Remarks
1.	Check availability of PPEs in good condition with standard (basic requirement details given in point 2.3)			
2.	Identify the equipment in the work location			
3.	Check availability of testing equipment's and tools as per standard requirements			
4.	Check proper space and clearance for working			
5.	Availability of shutdown (if required)			
6.	Receive the work permit from the in-charge			
7.	Confirm isolation and earthing as per work permit			
8.	Check availability of first aid kit and portable fire extinguisher near work location			
9.	Check proper barricading is done in the work location			
10.	Do the safety analysis and risk assessment for the work			
11.	Do the lockout and tag out (if required)			

Approved by:

Name: _____ Signature: _____ Date / Place: _____

2.3 Basic requirement PPE's

Sr.No	Description	Remarks

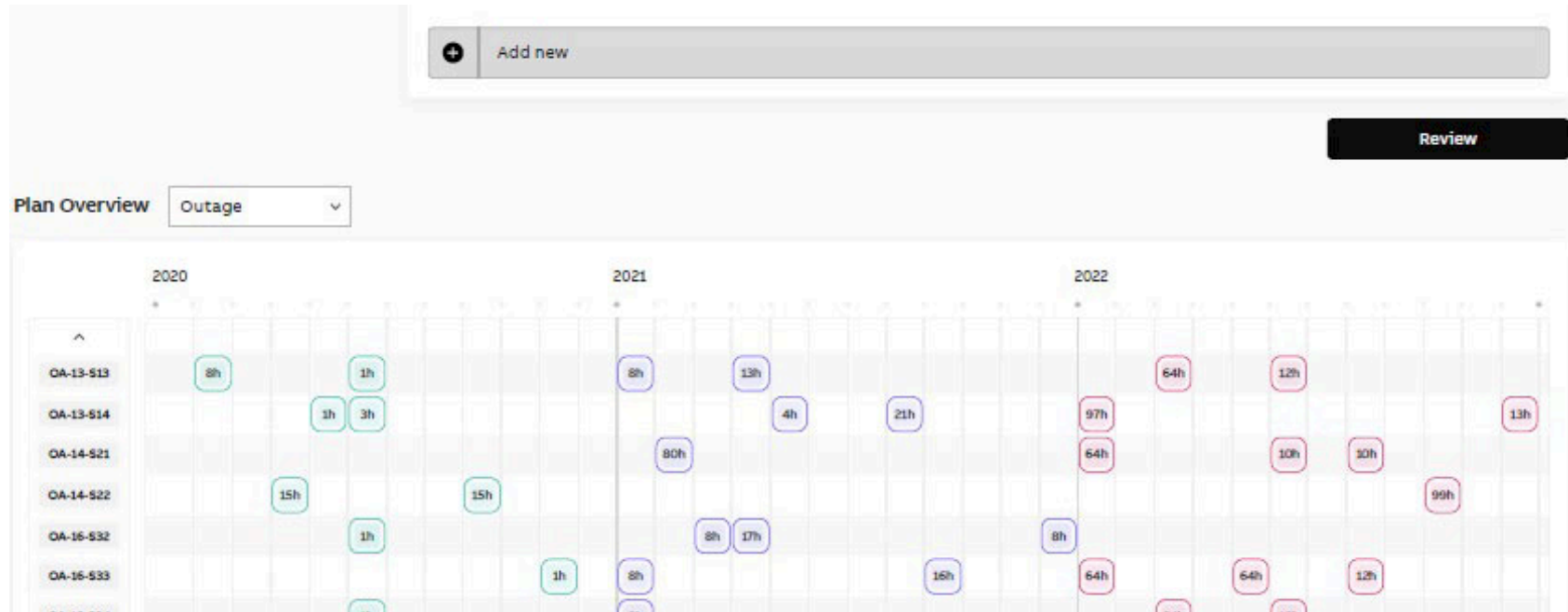
¹ Safe Work Method Statements

3



Plan optimization

In collaboration with our customers and potential 3rd parties, informed planning and maintenance decisions are made by selecting and prioritizing actions, which optimizes costs and system reliability



4



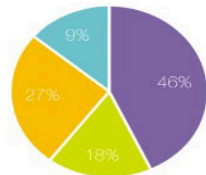
Execution excellence

The RelCare partnership includes task preparation, site execution and validation, and performance monitoring to guarantee O&M excellence

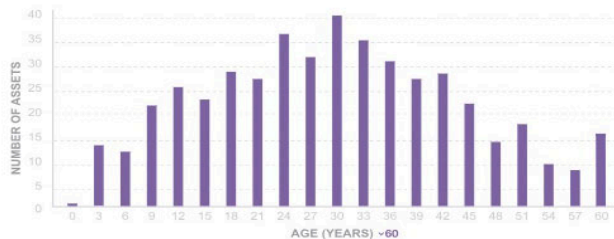
Performance monitoring

Assets by Manufacturer

MAKER	N° ASSETS	%
ABB	25	46%
GE	10	9%
SIEMENS	15	27%
OTHER	5	18%



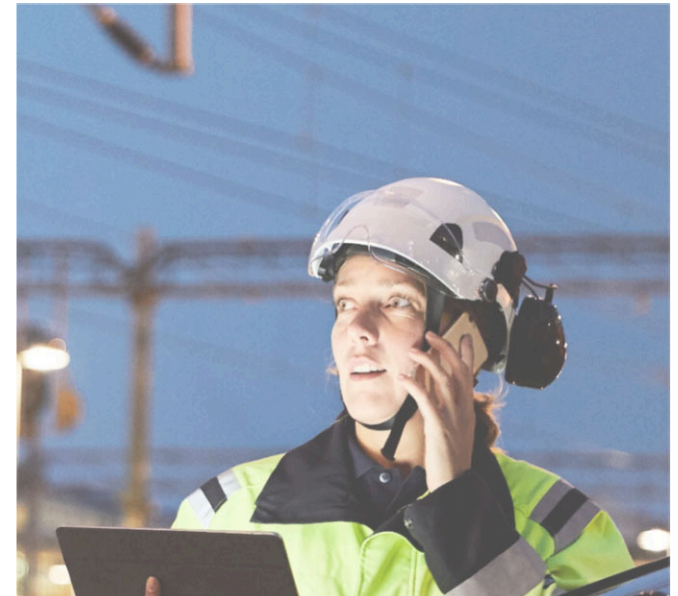
Asset age distribution



Maintenance action status

Year v 2015 to v 2017

● Not acknowledged
 ● Planned
 ● Under execution
● Under validation
 ● Validated



5



Continuous improvement

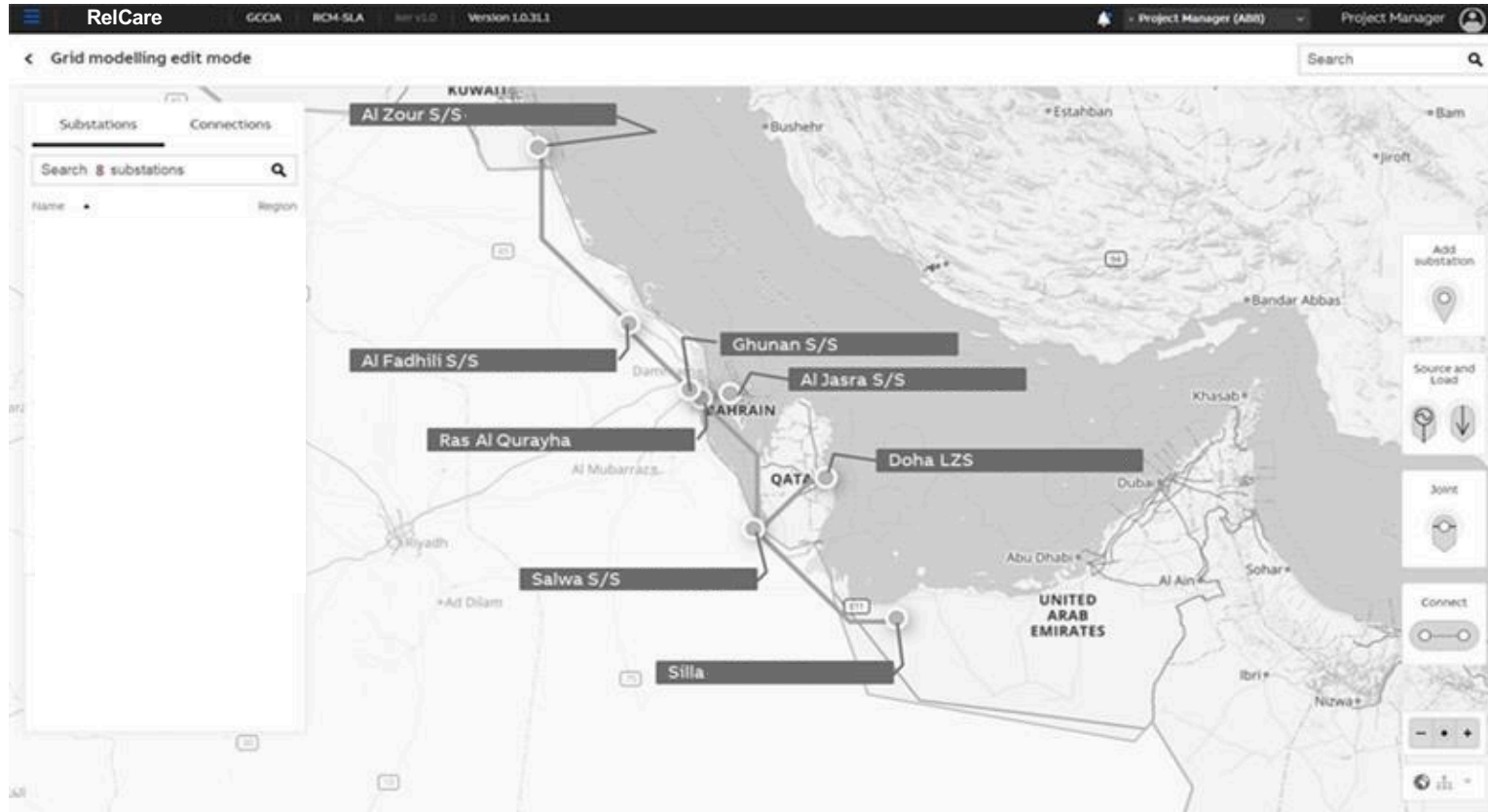
RelCare is **constantly learning** from every new maintenance executed, data gathered, advance policy defined, ... resulting in a **stronger performance** of our customer system **improving**





Consequently, this individual continuous improvement delivers a clear **social value** and underpins Hitachi ABB Power Grids vision to “**Powering good for Sustainable Energy**”.



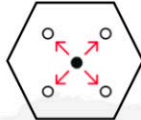
Gulf Cooperation Council Interconnection Authority (GCCIA) runs a 1.2BnUSD interlink power network for the 5 GCC countries



Highlights

-  **Service in 5 countries and 8 substations**
-  **Multivendor installed based**
-  **3rd party on-site execution**
-  **Value added from customer perspective:**
 - Reliability increase:** fundamental to performance and profitability
 - Confidence and expertise to digitalize** their critical Gulf network
 - Empowerment** of their O&M managers when **making decisions**

RelCare is a **digital partnership agreement** that focuses on the three pillars of an **optimal Service Strategy**:



Being in control of our system, understanding **the condition & life cycle** of its assets and how **the design** affects reliability



Making **strategic decisions** combining critical information about our business with relevant service parameters



Concentrating on **quality and safety**, both which improve drastically when work procedures are well-documented

These three pillars are founded on:

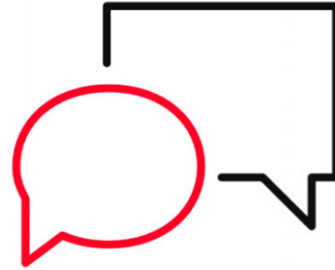


Digitalization and digital features that deliver superior value and a differential customer experience



Personalized expert support based on Hitachi ABB extended know-how and combined heritage of almost 250 years

RelCare - *the new way to master maintenance*



Q&A

Mercedes Jul Sánchez

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