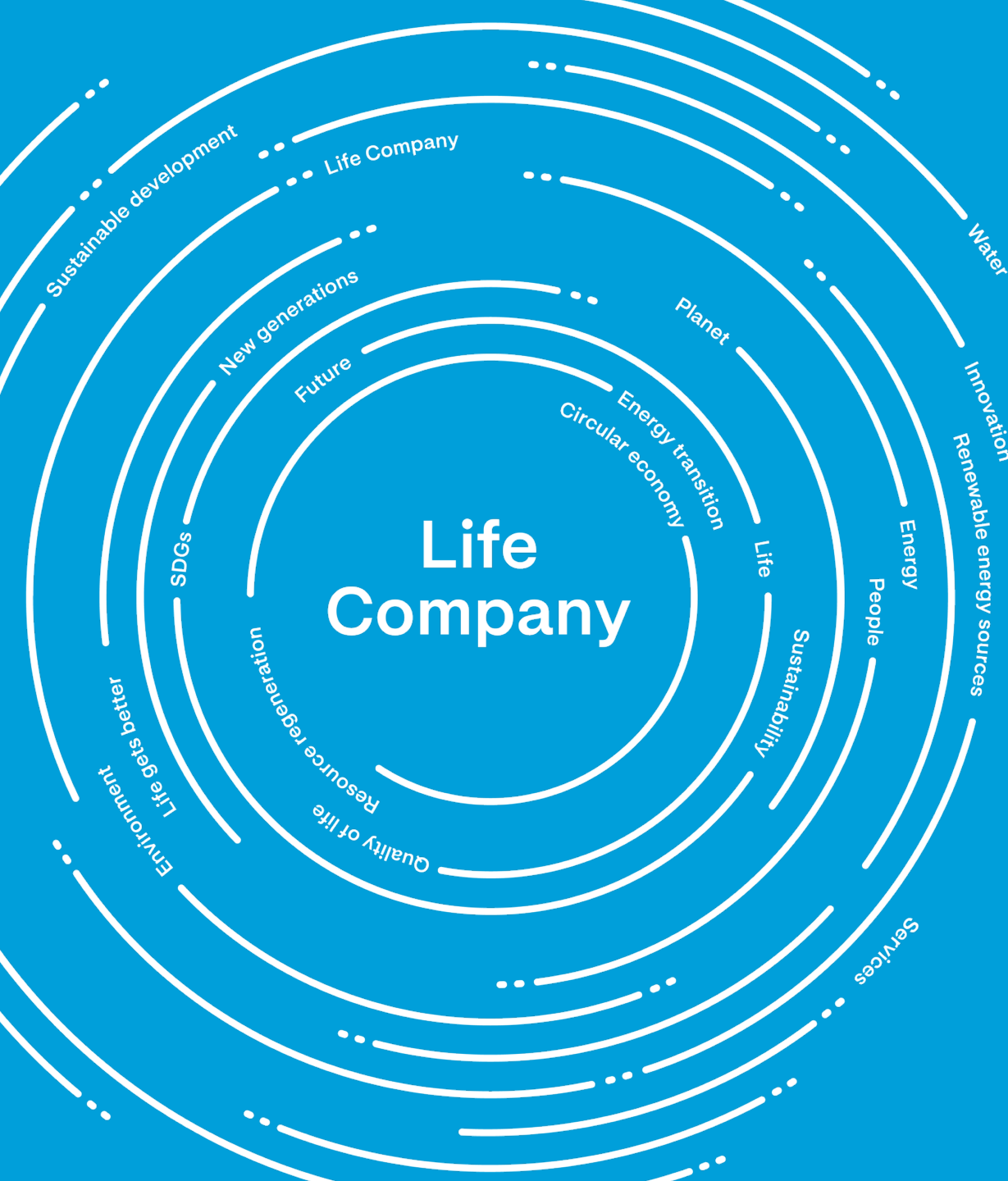




AVEVAWORLD
PARIS



Virtual control room

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A2A

15 October 2024



The Group

A2A. Life Company



We are a **Life Company**: we put life at the heart of everything that we do, for us and future generations.

Our technology and our infrastructures are at the service of **people** and of the protection of **nature**, so we work every day to **regenerate** the potential of every resource.

We promote energy from renewable sources, and we accelerate **decarbonisation**, promoting **electrification of consumption**.

We build a virtuous water cycle to save every drop.
We turn waste into resources so that all waste can become new **material, energy** and **heat**.

Our **vision** looks **forward**.

We build our **future today**, acting, **consciously**.

Our 2024-2035 Strategic Plan: a long-term Plan that focuses on future generations

Circular Economy

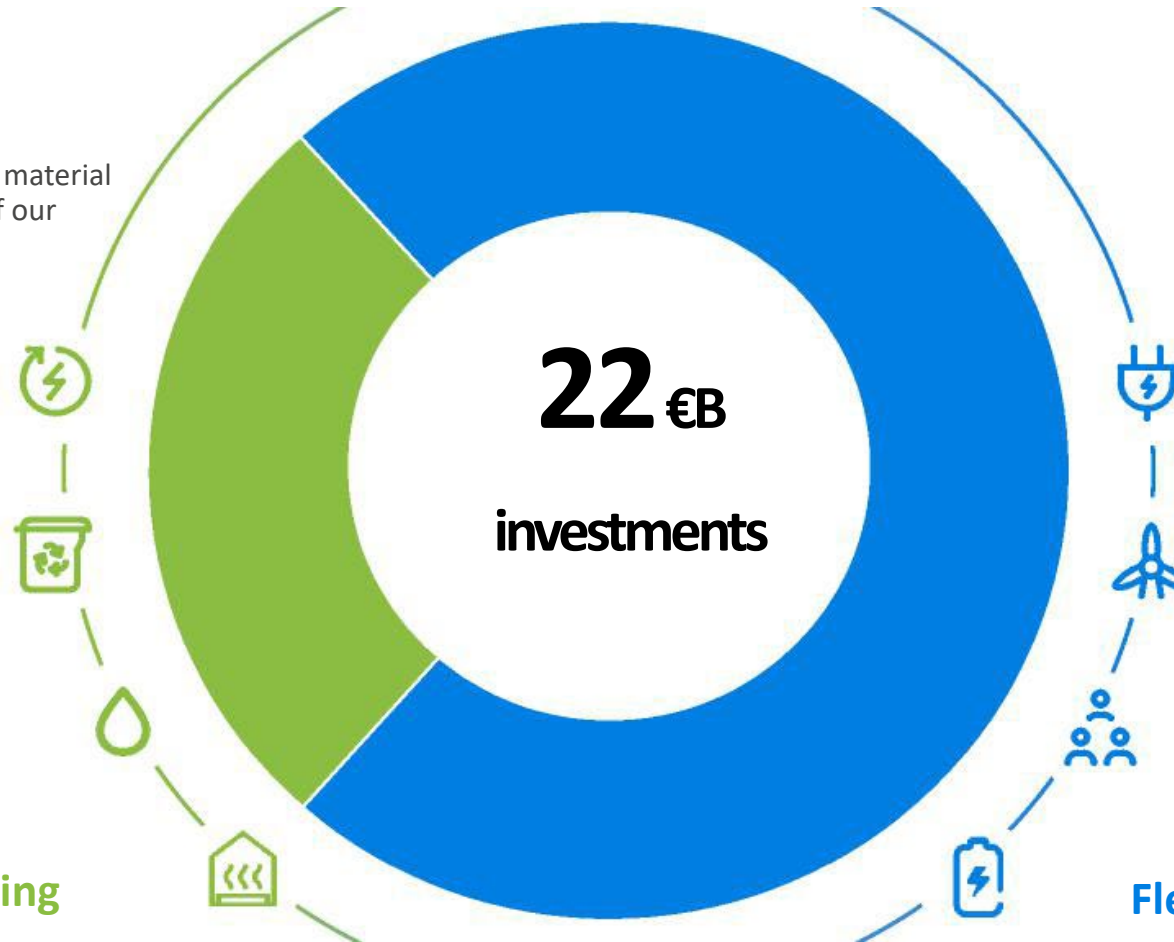
We enable **circular business models** for material and energy to **preserve the resources** of our Planet and protect the environment

Energy recovery

Material recovery

Water cycle

District Heating



Energy Transition

We contribute to **decarbonizing the system** by guiding the **electrification** of consumption and developing sources of **green energy**

Electric networks

Renewable energy

Customers

Flexible Energy

Where we are and what we do

Plants



Wind



Photovoltaic



Thermoelectric



Hydroelectric



Waste treatment



Material recovery



Waste-to-Energy



Landfill



Bioenergy

Services



Gas transport



Electricity distribution



Gas distribution



Waste collection



Public lighting



Integrated water service



Recharge stations E-mobility



District Heating



Virtual Control Room

Initial Situation

Problem

- **Metamorphosis** of the production paradigm
 - **Few** (<20) supervised power plants that produce a lot of energy
- ∨
- **Many** (100+) less-supervised power plants that produce less energy

Need

- **Simplification and Standardization**
- ∨
- **Centralized monitoring and control system**
 - **Standardize and automate management and field processes**

Virtual Control Room Project

Project born from the need of the **IES Manager** – Department of Management and Operation of Renewable Energy Plants (Wind and Solar Plants and Storage Development)

Strong collaboration between different functions

- **IES** – Asset Manager e Operations
- **OPE** – Operational Excellence
- **Digital & OT**
- Digital **Infrastructure, Architecture & Cyber Sec**
- RTI **Factory Software** – Alten
- **A2A Smart City**

Path Innovation

Project pathway

2021

Quick Win Data Centralization

- **Various** renewable energy plant **portfolios**
- **Different systems** based on plant type
- **Segregated data** across different systems – **reporting complexity**
- **Data centralization** from external systems to **a2a systems**

H1

2022

Assessment and Mobilization

- **Business function involvement** (Digital, OT, OPE, IES)
- **As-is assessment** (plants, schemas, hardware, software)
- **Standard definition** for field **data acquisition**
- **Asset inventory** of the plant fleet

Q2/Q3

2022

Scouting and Tender

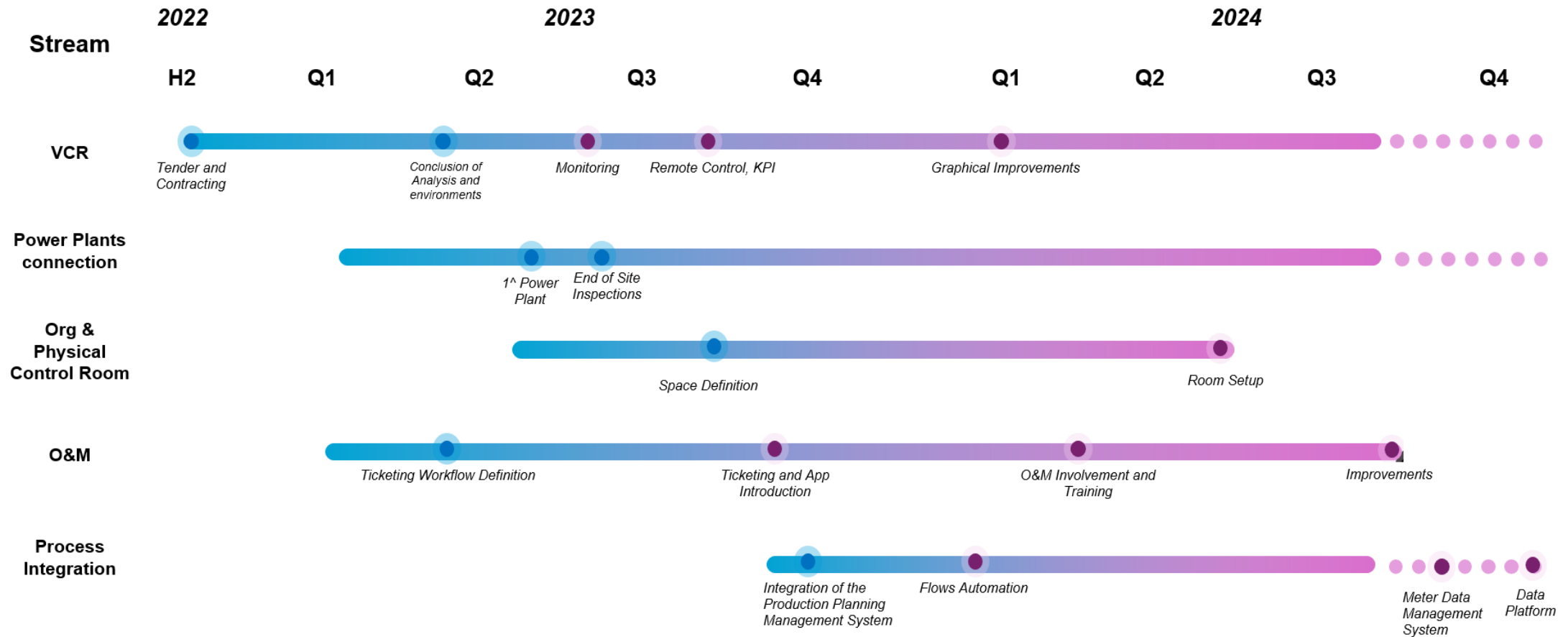
- Market **scouting** for suppliers and solutions
- **Selection and evaluation** based on **technical** parameters (data acquisition, plant remote control, OT, Security), **simplification**, 'Make' or '**Buy & Personalize**'
- Supplier **short list**

22/23

System Implementation and Go-Live

- **Information system**
- **Physical control room**
- **Field integration**
- **Site inspections** and plant connections
- **O&M app**
- **Integration into** the company's **application ecosystem**

Project Plan



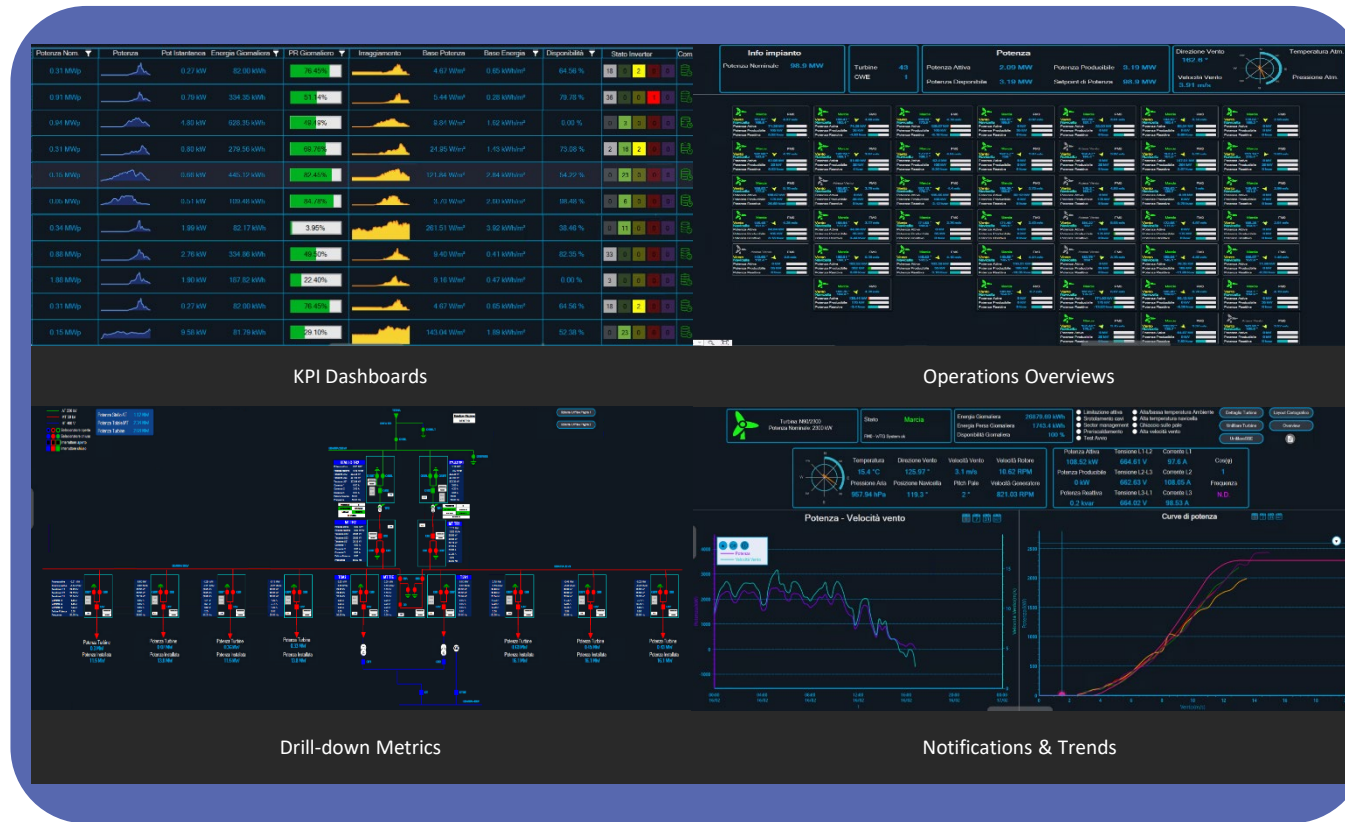
Unified operation center (1/2)



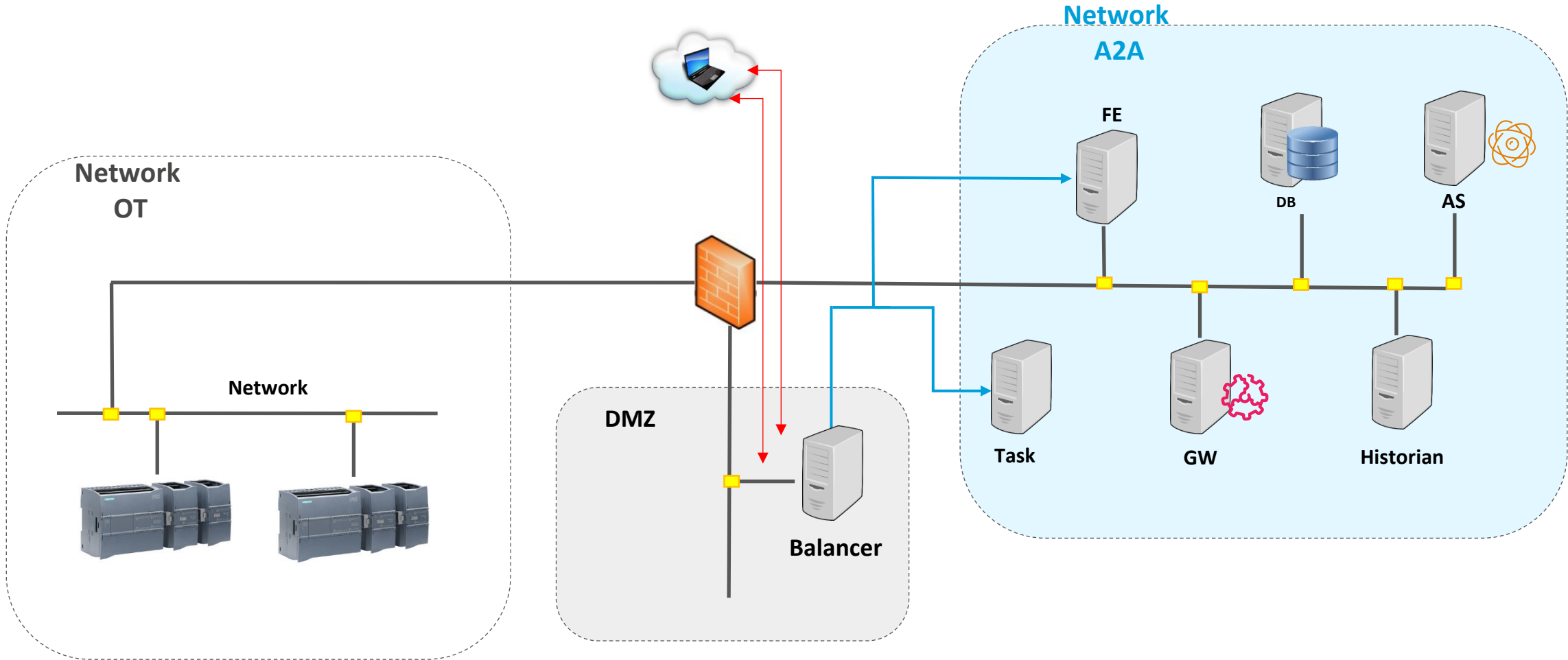
- Creation and management of KPIs
 - Plant/Asset
 - Type of energy produced
- Monitoring and Control
- Georeferencing of assets
- Collaboration between various teams
- Maintenance management
- Optimization in asset management
- Dashboarding
- Reporting
- Downtime Management
- PI Server integration
- Security improvement

Integration with A2A's security policies and technologies

Unified operation center (2/2)



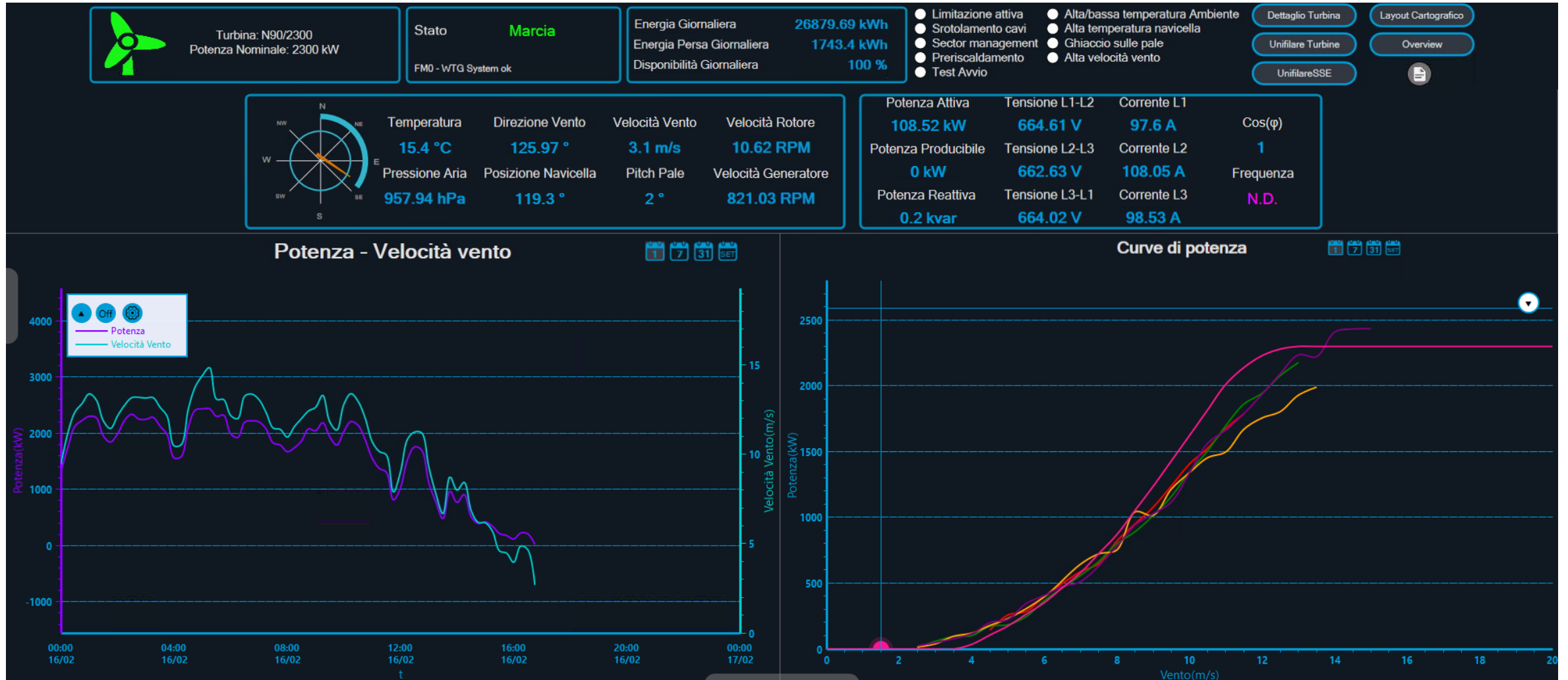
Architecture



Platform (1/7)



Platform (2/7)



Platform (3/7)

Info impianto Potenza Nominale 98.9 MW		Turbine 43 CWE 1		Potenza Potenza Attiva 2.09 MW Potenza Disponibile 3.19 MW		Potenza Producibile 3.19 MW Setpoint di Potenza 98.9 MW		Direzione Vento 162.6 ° Velocità Vento 3.91 m/s  Temperatura Atm. Pressione Atm.	
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Marcia Vento 161.62 Navicella 189.8 Potenza Attiva 71.36 MW Potenza Producibile 185 MW Potenza Reattiva 6.82 kVar	Marcia Vento 188.47 Navicella 103.4 Potenza Attiva 74.28 MW Potenza Producibile 35 MW Potenza Reattiva -4.83 kVar	Marcia Vento 168.83 Navicella 173.8 Potenza Attiva 129.57 MW Potenza Producibile 185 MW Potenza Reattiva -8.16 kVar	Marcia Vento 164.82 Navicella 168.6 Potenza Attiva 0 MW Potenza Producibile 35 MW Potenza Reattiva 0 kVar	Marcia Vento 151.88 Navicella 157.1 Potenza Attiva 32.03 MW Potenza Producibile 0 MW Potenza Reattiva 0 kVar	Marcia Vento 144.82 Navicella 185.4 Potenza Attiva 85.24 MW Potenza Producibile 0 MW Potenza Reattiva 6.89 kVar	Marcia Vento 178.82 Navicella 188.3 Potenza Attiva 0 MW Potenza Producibile 0 MW Potenza Reattiva 0 kVar
Marcia Vento 182.88 Navicella 183.8 Potenza Attiva 61.05 MW Potenza Producibile 35 MW Potenza Reattiva 6.53 kVar	Marcia Vento 182.24 Navicella 188.1 Potenza Attiva 81.60 MW Potenza Producibile 35 MW Potenza Reattiva 4 kVar	Marcia Vento 177.2 Navicella 188.1 Potenza Attiva 62.4 MW Potenza Producibile 185 MW Potenza Reattiva 9.36 kVar	Marcia Vento 162.67 Navicella 168 Potenza Attiva 0 MW Potenza Producibile 0 MW Potenza Reattiva 0 kVar	Attesa Vento Vento 158.47 Navicella 184.4 Potenza Attiva 0 MW Potenza Producibile 35 MW Potenza Reattiva 0 kVar	Marcia Vento 161.4 Navicella 161.5 Potenza Attiva 147.01 MW Potenza Producibile 264 MW Potenza Reattiva 2.67 kVar	Marcia Vento 211.18 Navicella 215.4 Potenza Attiva 0 MW Potenza Producibile 35 MW Potenza Reattiva 0 kVar
Marcia Vento 188.63 Navicella 177.3 Potenza Attiva 188.87 MW Potenza Producibile 176 MW Potenza Reattiva -26.69 kVar	Attesa Vento Vento 185.83 Navicella 183.8 Potenza Attiva 0 MW Potenza Producibile 0 MW Potenza Reattiva 0 kVar	Marcia Vento 167.12 Navicella 170.1 Potenza Attiva 135.85 MW Potenza Producibile 185 MW Potenza Reattiva -2.12 kVar	Marcia Vento 198.38 Navicella 188.9 Potenza Attiva 32.12 MW Potenza Producibile 0 MW Potenza Reattiva 0 kVar	Attesa Vento Vento 145.2 Navicella 164.4 Potenza Attiva 0 MW Potenza Producibile 0 MW Potenza Reattiva 0 kVar	Marcia Vento 138.63 Navicella 138.7 Potenza Attiva -8.29 MW Potenza Producibile 0 MW Potenza Reattiva 6.79 kVar	Marcia Vento 148.48 Navicella 161.3 Potenza Attiva 0 MW Potenza Producibile 0 MW Potenza Reattiva 0 kVar
Marcia Vento 146.45 Navicella 151.5 Potenza Attiva 84.84 MW Potenza Producibile 185 MW Potenza Reattiva 3.13 kVar	Marcia Vento 182.54 Navicella 177.3 Potenza Attiva 44.08 MW Potenza Producibile 35 MW Potenza Reattiva 3.44 kVar	Marcia Vento 171.53 Navicella 183.4 Potenza Attiva 0 MW Potenza Producibile 35 MW Potenza Reattiva 0 kVar	Marcia Vento 171.48 Navicella 182.5 Potenza Attiva 0 MW Potenza Producibile 0 MW Potenza Reattiva 0 kVar	Attesa Vento Vento 154.22 Navicella 187 Potenza Attiva 0 MW Potenza Producibile 176 MW Potenza Reattiva 0 kVar	Marcia Vento 172.65 Navicella 171.3 Potenza Attiva 0 MW Potenza Producibile 176 MW Potenza Reattiva 0 kVar	Marcia Vento 185.25 Navicella 153.8 Potenza Attiva 0 MW Potenza Producibile 0 MW Potenza Reattiva 0 kVar
Attesa Vento Vento 143.45 Navicella 132.4 Potenza Attiva 0 MW Potenza Producibile 35 MW Potenza Reattiva 0 kVar	Marcia Vento 185.91 Navicella 188.7 Potenza Attiva 102.52 MW Potenza Producibile 362 MW Potenza Reattiva 0.88 kVar	Marcia Vento 146.82 Navicella 142.5 Potenza Attiva 162.28 MW Potenza Producibile 185 MW Potenza Reattiva 3.18 kVar	Marcia Vento 148.95 Navicella 145.1 Potenza Attiva 116.21 MW Potenza Producibile 185 MW Potenza Reattiva -10.35 kVar	Attesa Vento Vento 182.79 Navicella 208 Potenza Attiva 0 MW Potenza Producibile 35 MW Potenza Reattiva 0 kVar	Marcia Vento 165.08 Navicella 145.1 Potenza Attiva 78.35 MW Potenza Producibile 185 MW Potenza Reattiva -11.80 kVar	Marcia Vento 166.67 Navicella 152.6 Potenza Attiva 11.90 MW Potenza Producibile 0 MW Potenza Reattiva -6.28 kVar
Marcia Vento 158.76 Navicella 164.8 Potenza Attiva 138.44 MW Potenza Producibile 176 MW Potenza Reattiva -3.4 kVar	Marcia Vento 138.84 Navicella 154.3 Potenza Attiva 0 MW Potenza Producibile 0 MW Potenza Reattiva 0 kVar	Marcia Vento 182.87 Navicella 175.9 Potenza Attiva 171.83 MW Potenza Producibile 176 MW Potenza Reattiva -13.63 kVar	Marcia Vento 135.48 Navicella 138.6 Potenza Attiva 88.12 MW Potenza Producibile 0 MW Potenza Reattiva -6.38 kVar	Marcia Vento 154.1 Navicella 154.8 Potenza Attiva 0 MW Potenza Producibile 35 MW Potenza Reattiva 0 kVar	Marcia Vento 133.22 Navicella 138.7 Potenza Attiva 64.87 MW Potenza Producibile 0 MW Potenza Reattiva 7.93 kVar	Attesa Vento Vento 141.81 Navicella 168.6 Potenza Attiva 0 MW Potenza Producibile 0 MW Potenza Reattiva 0 kVar

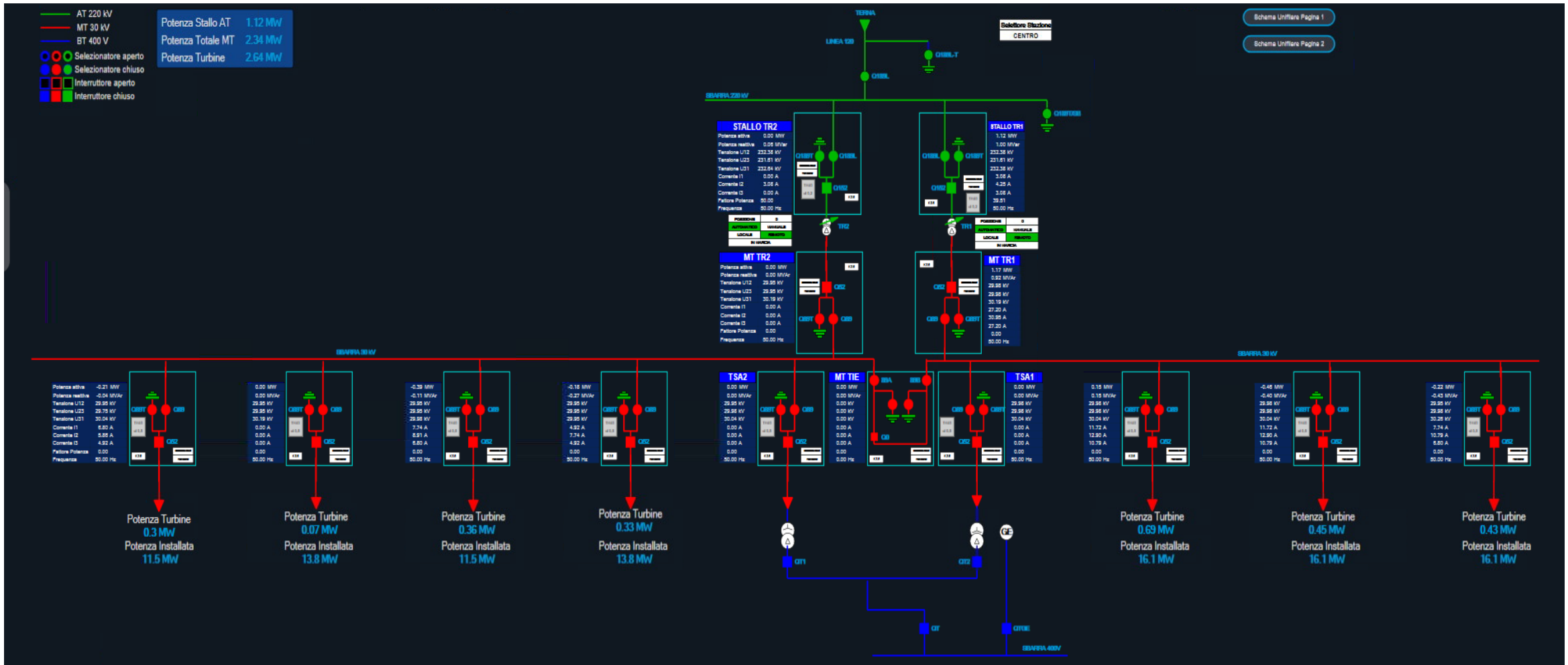
Platform (4/7)

Potenza Nom. ▼	Potenza	Pot Istantanea	Energia Giornaliera ▼	PR Giornaliero ▼	Irraggiamento	Base Potenza	Base Energia ▼	Disponibilità ▼	Stato Inverter	Com
0.31 MWp		0.27 kW	82.00 kWh	76.45%		4.67 W/m²	0.65 kWh/m²	64.56 %	18 0 2 0 0	
0.91 MWp		0.79 kW	334.35 kWh	51.14%		5.44 W/m²	0.28 kWh/m²	79.78 %	36 0 0 1 0	
0.94 MWp		4.80 kW	628.35 kWh	49.49%		9.84 W/m²	1.62 kWh/m²	0.00 %	0 3 0 0 0	
0.31 MWp		0.80 kW	279.56 kWh	69.76%		24.95 W/m²	1.43 kWh/m²	73.08 %	2 16 2 0 0	
0.15 MWp		0.66 kW	445.12 kWh	82.45%		121.84 W/m²	2.84 kWh/m²	54.22 %	0 23 0 0 0	
0.05 MWp		0.51 kW	109.48 kWh	84.78%		3.70 W/m²	2.60 kWh/m²	98.48 %	0 6 0 0 0	
0.34 MWp		1.99 kW	82.17 kWh	3.95%		261.51 W/m²	3.92 kWh/m²	38.46 %	0 11 0 0 0	
0.88 MWp		2.76 kW	334.86 kWh	49.50%		9.40 W/m²	0.41 kWh/m²	82.35 %	33 0 0 0 0	
1.88 MWp		1.90 kW	187.82 kWh	22.40%		9.16 W/m²	0.47 kWh/m²	0.00 %	3 0 0 0 0	
0.31 MWp		0.27 kW	82.00 kWh	76.45%		4.67 W/m²	0.65 kWh/m²	64.56 %	18 0 2 0 0	
0.15 MWp		9.58 kW	81.79 kWh	29.10%		143.04 W/m²	1.89 kWh/m²	52.38 %	0 23 0 0 0	

Platform (5/7)

Potenza Nominale	Potenza	Pot Istantanea	Energia Giornaliera	Efficienza	Disponibilità	Velocità Vento	Direzione Vento	Stato WTG	Com.																
41.40 MW		1.95 MW	32.48 MWh	90.11%	100.00%	4.51 m/s	-2°	<table border="1"> <tr> <td>0</td><td>18</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td>Disponibile</td><td>Indisponibile</td><td>Fuori Scansione</td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	0	18	0	0	0	0	0	0	Disponibile	Indisponibile	Fuori Scansione						
0	18	0	0	0	0	0	0																		
Disponibile	Indisponibile	Fuori Scansione																							
30.00 MW		24.24 MW	544.64 MWh	99.93%	100.00%	9.30 m/s	139° SE	<table border="1"> <tr> <td>0</td><td>8</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td>Disponibile</td><td>Indisponibile</td><td>Fuori Scansione</td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	0	8	0	0	0	0	0	0	Disponibile	Indisponibile	Fuori Scansione						
0	8	0	0	0	0	0	0																		
Disponibile	Indisponibile	Fuori Scansione																							
98.90 MW		2.24 MW	320.57 MWh	84.01%	99.39%	3.38 m/s	293° NO	<table border="1"> <tr> <td>7</td><td>36</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td>Disponibile</td><td>Indisponibile</td><td>Fuori Scansione</td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	7	36	0	0	0	0	0	0	Disponibile	Indisponibile	Fuori Scansione						
7	36	0	0	0	0	0	0																		
Disponibile	Indisponibile	Fuori Scansione																							
42.00 MW		32.99 MW	196.56 MWh	98.92%	99.02%	9.55 m/s	1° N	<table border="1"> <tr> <td>0</td><td>21</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td>Disponibile</td><td>Indisponibile</td><td>Fuori Scansione</td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	0	21	0	0	0	0	0	0	Disponibile	Indisponibile	Fuori Scansione						
0	21	0	0	0	0	0	0																		
Disponibile	Indisponibile	Fuori Scansione																							

Platform (6/7)



Platform (7/7)



Tipo Turbina: N90/2300
Potenza Nominale: 2300 kW

Stato **Marcia**

FM0 - WTG System ok

Energia Giornaliera **9398.03 kWh**
Energia Persa Giornaliera **1545.22 kWh**
Disponibilità Giornaliera **100 %**

- Limitazione attiva
- Srotolamento cavi
- Sector management
- Preriscaldamento
- Test Avvio
- Alta/bassa temperatura Ambiente
- Alta temperatura navicella
- Ghiaccio sulle pale
- Alta velocità vento

Dettaglio Turbina

Layout Cartografico

Unificare Turbine

Overview

UnificareSSE



Dati potenza

Potenza Attiva **146.35 kW**
Potenza Reattiva **6.49 kvar**
Potenza Apparente **146.5 kVA**
Cosphi **1**

Moltiplicatore

*T cuscinetto principale **26.8 °C**
*T cuscinetto gearbox lato generatore **58 °C**
*T olio nella coppa **55.7 °C**

Ambiente

Direzione Vento **299.63 °**
Velocità Vento **4.9 m/s**
Temperatura **8.5 °C**

Sistema di passo

Pitch Pala 1 **2.1 °**
Pitch Pala 2 **2.1 °**
Pitch Pala 3 **2.1 °**
Velocità Rotore **10.53 RPM**



Navicella

Posizione Navicella **297.8 °**

Generatore

*T Liq. raffred. Generatore **38.8 °C**
*T. Liq. raffred. ritorno Generatore **40.8 °C**
*T avv. L1 **55 °C**
*T avv. L2 **54.3 °C**
*T avv. L3 **55.3 °C**
*T Cuscinetto gener. lato gear **43.5 °C**
*T Cuscinetto gener. finale **41.9 °C**
Velocità Generatore **818.99 RPM**

Sistema idraulico

Press. olio accumulatore rotore **98.19 bar**
*T olio idraulico **16.2 °C**

Sistema imbardata

Attorcigliamento cavi navicella **342.8**
Stato imbardata **Auto**
Direzione imbardata **Stat**

A2A manage their renewable plant fleet with a unique tool designed to support future growth

Challenge

- Energy production paradigm metamorphosis
- From few bigger plants to many plants (>100) that produce less energy each - more complexity to manage
- Different systems and segregated data based on plant type

Solution

- Deployed AVEVA™ Unified Operation Center™ to streamline data collection, access, real time analysis, and control across plants

Results

- **Unique real time monitoring tool and remote control implemented**
- **Centralized information and simplified management**
- **Increased company scalability and responsiveness to the market changes**
- **Integrated reporting and ML initiatives proposed for data correlations**



When we take care of **energy, water** and
environment, life turns sky-bluer

This presentation may include predictions, estimates, intentions, beliefs and other statements that are or may be construed as being forward-looking. While these forward-looking statements represent our current judgment on what the future holds, they are subject to risks and uncertainties that could result in actual outcomes differing materially from those projected in these statements. No statement contained herein constitutes a commitment by AVEVA to perform any particular action or to deliver any particular product or product features. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect our opinions only as of the date of this presentation.

The Company shall not be obliged to disclose any revision to these forward-looking statements to reflect events or circumstances occurring after the date on which they are made or to reflect the occurrence of future events.

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ABOUT AVEVA

AVEVA is a world leader in industrial software, providing engineering and operational solutions across multiple industries, including oil and gas, chemical, pharmaceutical, power and utilities, marine, renewables, and food and beverage. Our agnostic and open architecture helps organizations design, build, operate, maintain and optimize the complete lifecycle of complex industrial assets, from production plants and offshore platforms to manufactured consumer goods.

Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life's essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world's most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. The company is headquartered in Cambridge, UK.

Learn more at www.aveva.com