



25th world gas conference
"Gas: Sustaining Future Global Growth"

The upgrade of Snam Rete Gas telecontrol systems

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- Company presentation
- The existing SCADA
- Scope of the project and the innovation program
- The infrastructure of the new SCADA
- The commissioning phase design
- The working plan
- Lessons learned

Overview of Italian gas infrastructure

SNAM

SNAM RETE GAS	STOGIT	GNL ITALIA	ITALGAS
<p>1 dispatching centre</p> <p>31,700 km of pipelines</p> <p>11 compression stations (850 MW)</p> <p>5 import points</p> <p>5 export points</p> <p>7,345 redelivery points</p> <p>~94% market share</p>	<p>1 dispatching centre</p> <p>8 operating fields</p> <p>15 bcm working gas</p> <p>8 compression stations (340 MW)</p> <p>8 treatment plants (300 mcm/d capacity)</p> <p>~400 wells</p> <p>~97% market share</p>	<p>1 onshore terminal</p> <p>3,5 bcm regas capacity</p> <p>100,000 m³ storage capacity</p> <p>20,000 to 70,000 m³ ship size</p> <p>~30% market share</p>	<p>~50,000 km of pipelines</p> <p>> 1,400 distribution concessions</p> <p>> 5,7 million redelivery points served</p> <p>~33% market share</p>

OTHER OPERATORS

<p>SGI</p> <p>Edison Stocaggio</p> <p>Other minors</p>	<p>Edison Stocaggio</p> <p>2 fields (~0,5 bcm)</p>	<p>Adriatic LNG</p> <p>1 offshore terminal</p> <p>8 bcm regas capacity</p>	<p>Enel Rete Gas – Gruppo F2i</p> <p>Reti Italia (10%)</p> <p>Other 240+ operators</p>
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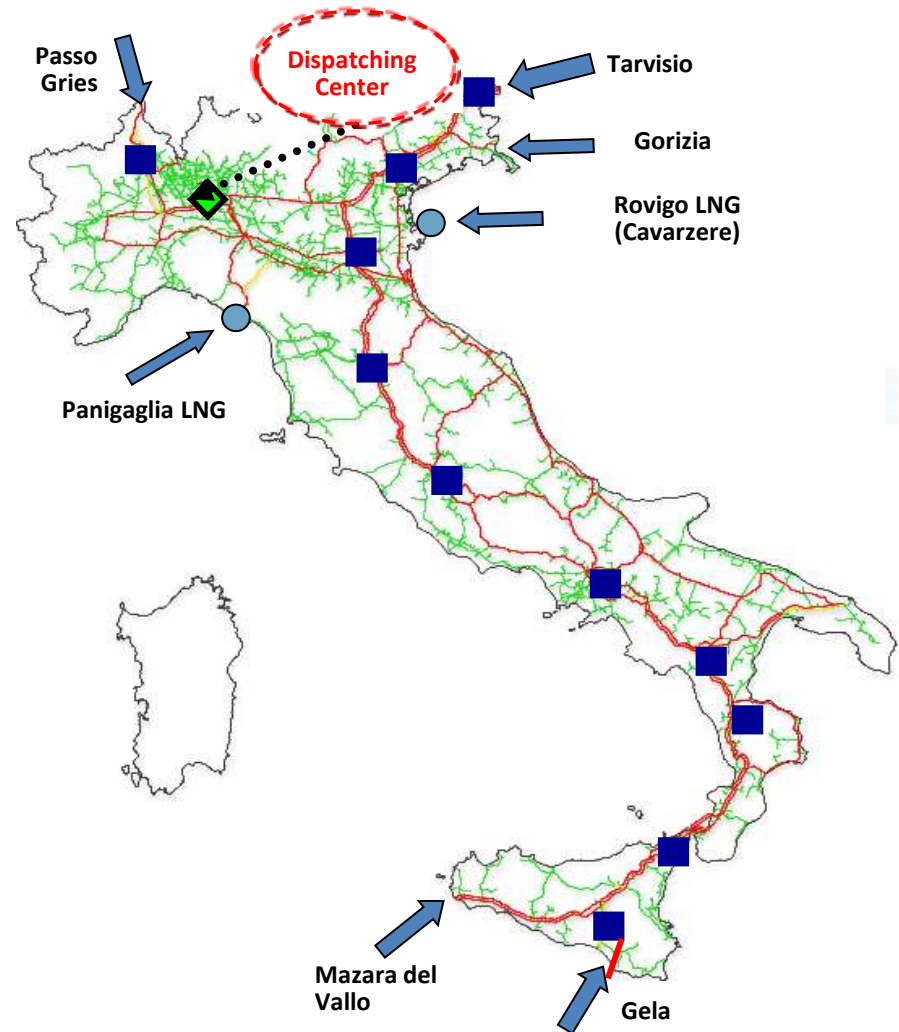
Snam Rete Gas transmission network

NATIONAL NETWORK (~8,900 km)

- Connects Entry Points and domestic production to storage fields and Regional Network
- 100% Remote controlled by Dispatching Center

REGIONAL NETWORK (~22,800 km)

- Connects National Network to about 7,000 Exit Points (local Distribution companies, Industries and Power generation plants)



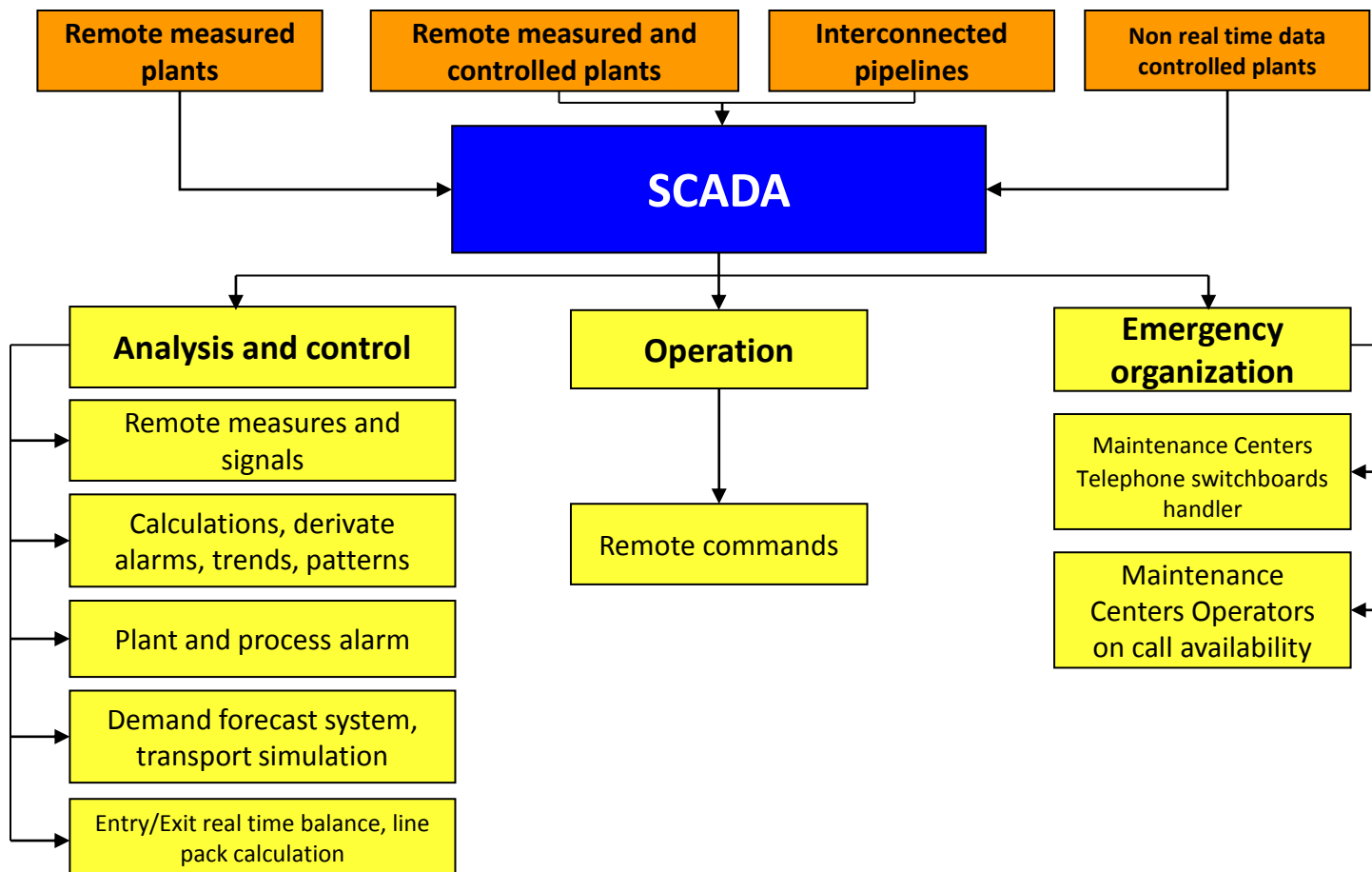
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SCADA's consistency

	Nr (*)	%
Compressor Stations	11	100
Connection and Distribution Junctions	22	100
Entry Points	28	100
National Network Valves	1,151	80
Reduction Stations	507	80
Pressure Monitoring Points	930	80
Main Off-takes	40	
TOTAL	2,689	

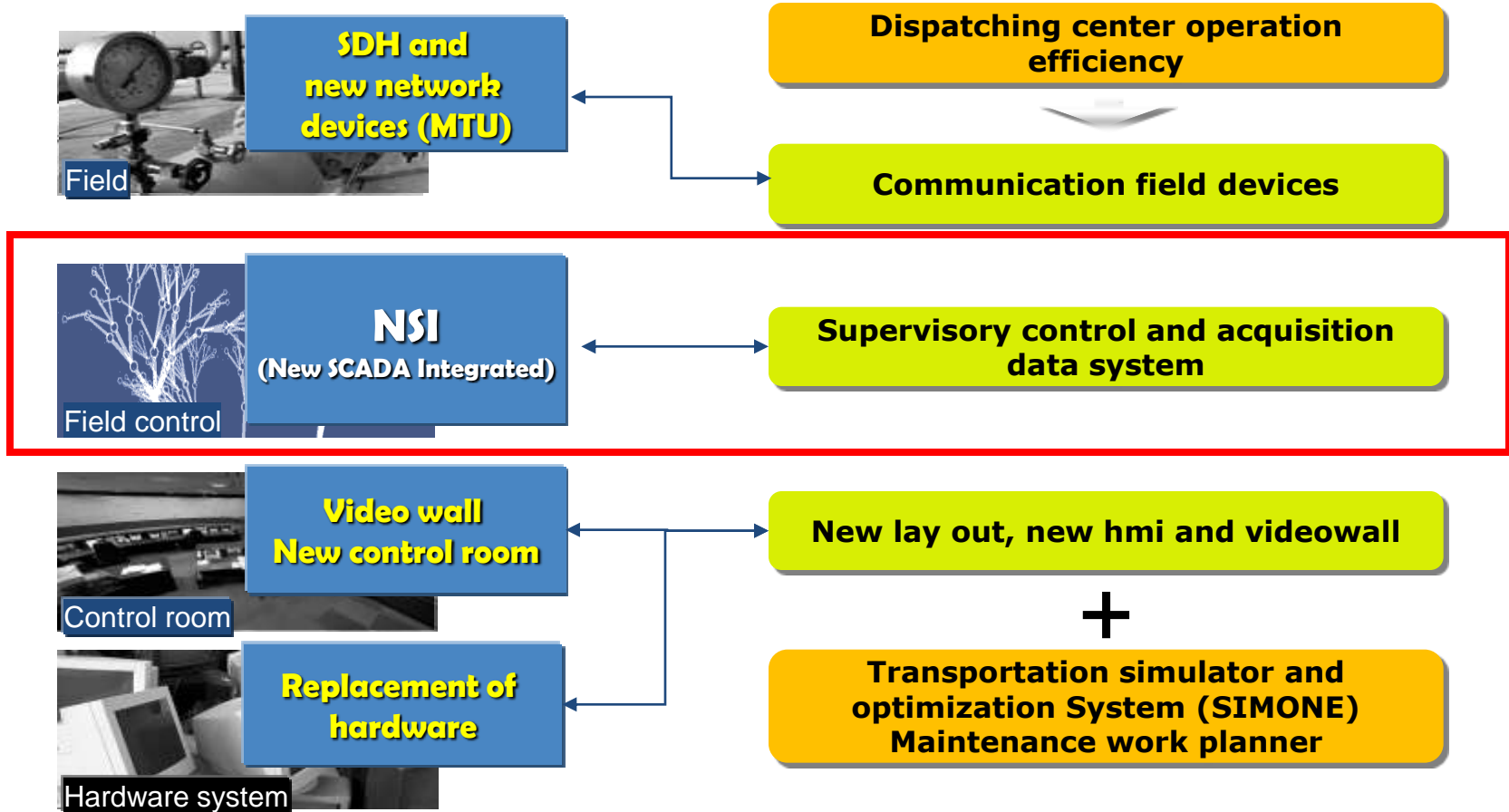
Today the SCADA system handles, every minute, more than 25.000 data, coming from both the 80,000 control points related to the gas plants and other 130,000 points, related to the telecommunication system

Old SCADA functionalities

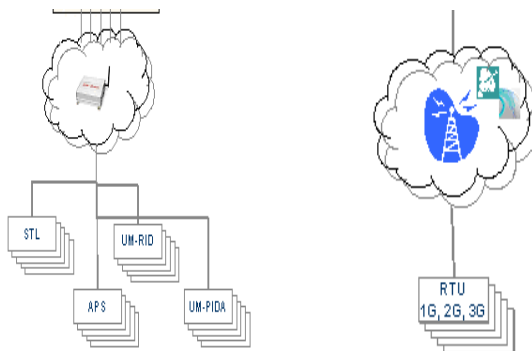
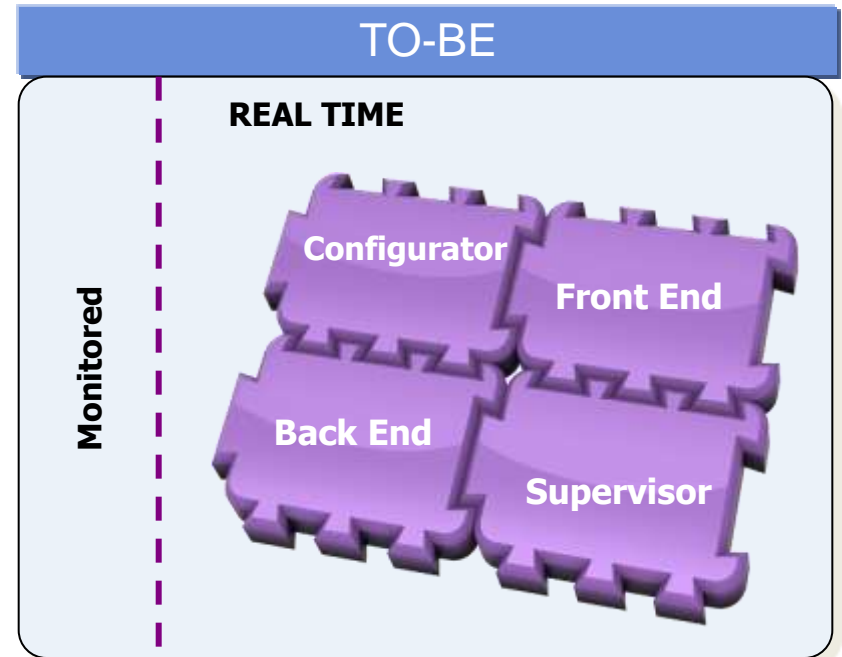
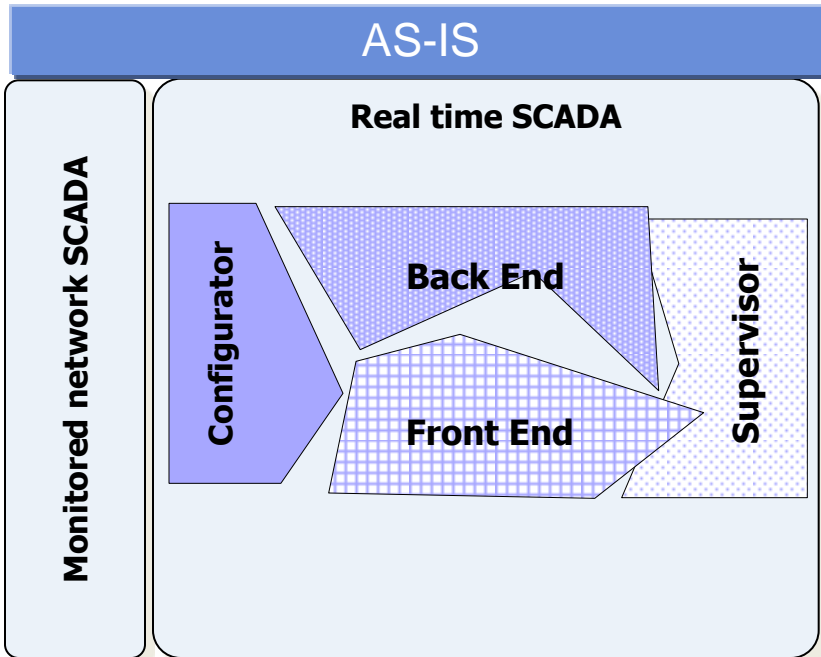


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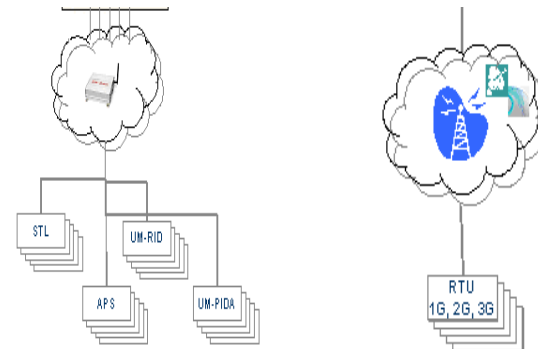
The innovation program



Scope of the NSI project



Commissioning



Preliminary specifications of the project

Preliminary specifications

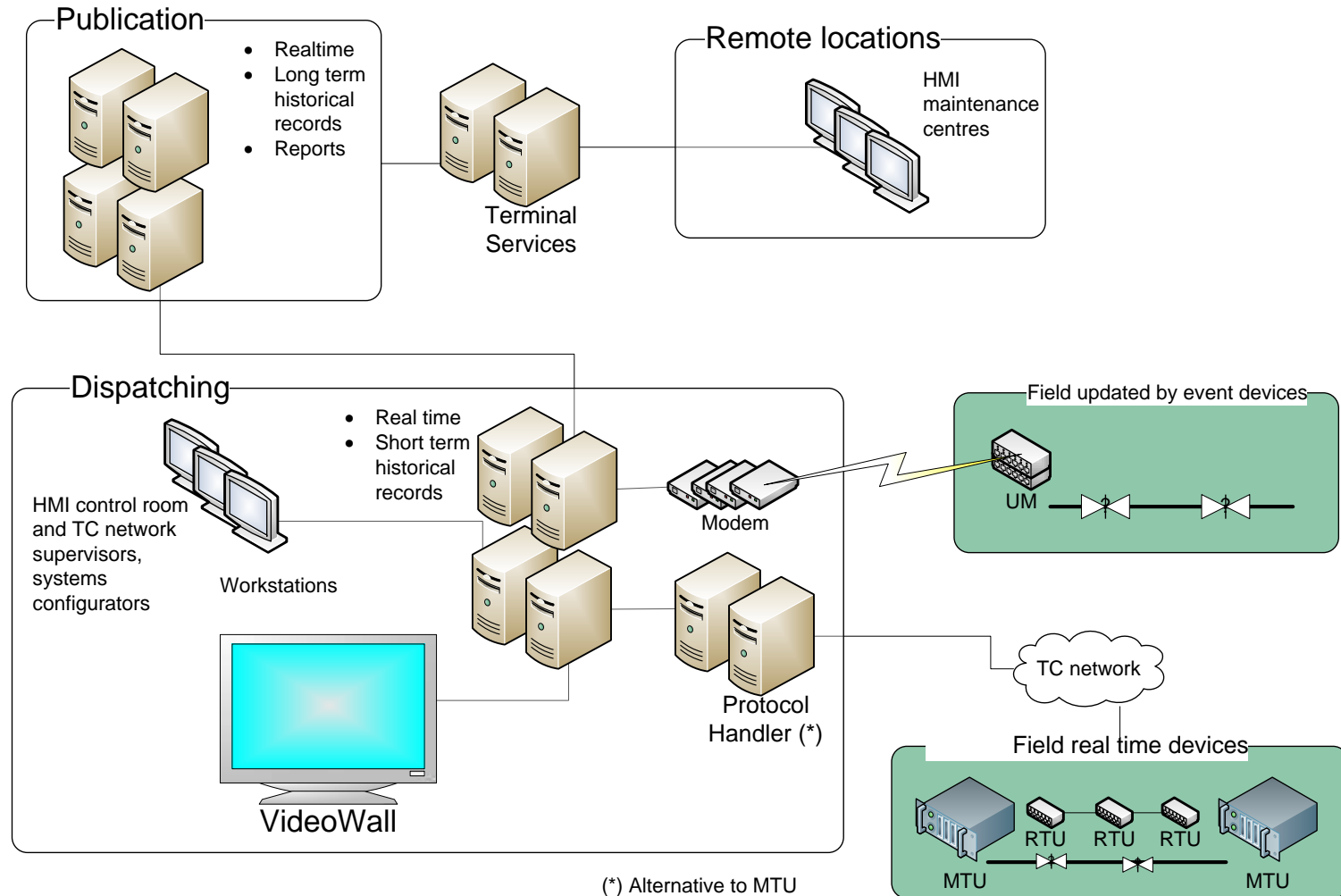
- Based on market product
- A single application for the Control Room, the pipeline network Maintenance Centres and the TC network Supervisors
- Ability to drive a new retro projection video wall, with more than 2022 real time objects

Constrains

- No changes to field apparatus, with the only exception for the MTU
- Continuity of service, during the transition from the old SCADA system to the new one
- Possibility to roll back, during the transition phase, from the new system to the old one, in case of severe problems affecting security of service
- No need to test all field apparatus after they have been transferred to the new system
- High reliability of data transfer, to other internal systems and to SCADA systems of the other interconnected gas network Operators

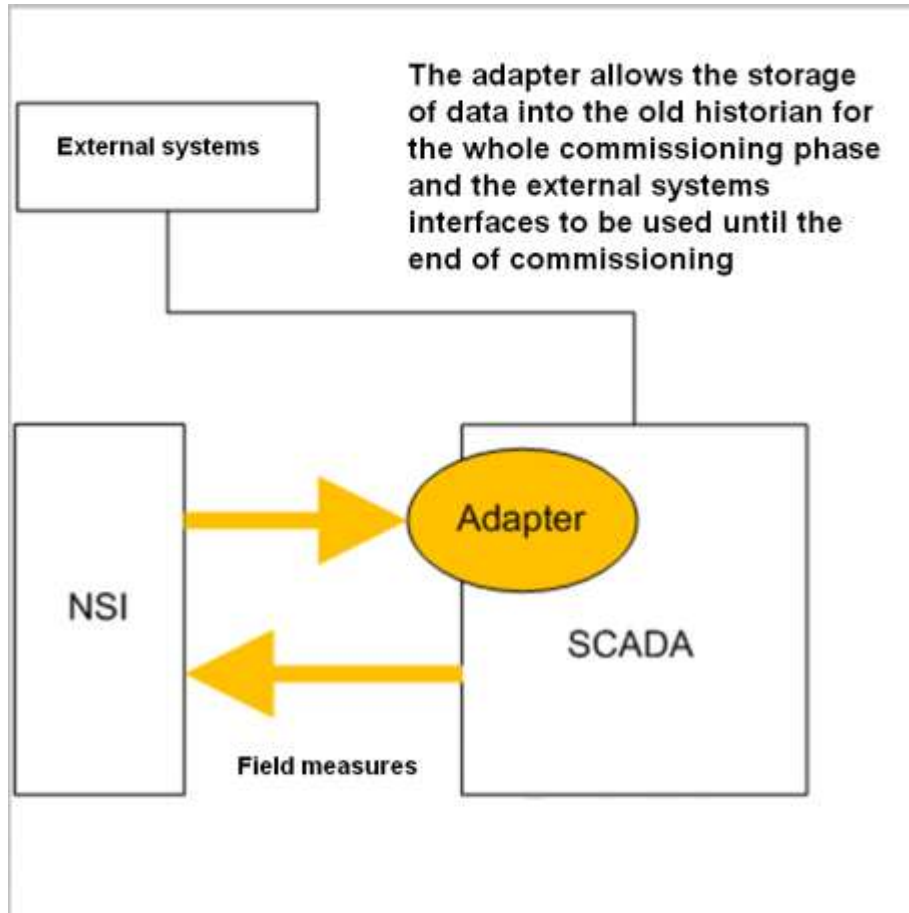
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The new SCADA infrastructure



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The design of the commissioning phase



Data exchange between NSI and SCADA BE during commissioning.

The scenario foresees the following choices to maintain double run and to postpone the updating of external systems interfaces:

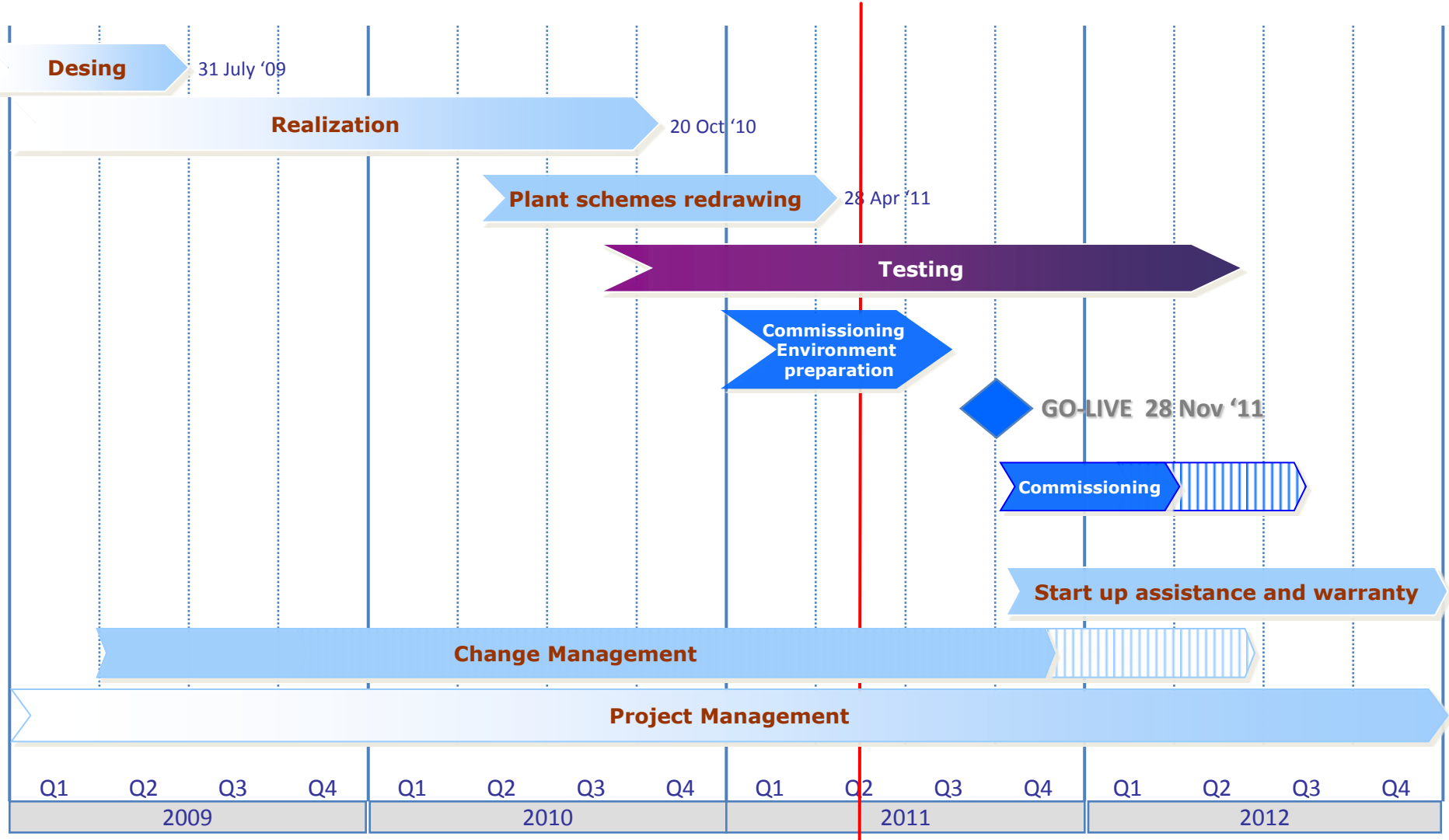
- **Data exchange from SCADA to NSI for stations not yet migrated to NSI**
- **Data exchange from NSI to Adapter for stations migrated to NSI**
- **External systems fed by SCADA during commissioning**
- **Roll back option in case of severe malfunctions**

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Rescheduling of the project

- During project execution, the working plan had to be reviewed:
- At the end of the engineering phase, to keep into account the changes occurred during the design phase
- At the beginning of the testing phase, to align the plan to the actual consistency of the commissioning team, in terms of full time resources and product competencies
- During the commissioning phase, to keep into account the higher complexity of pre-commissioning technical activities and the wider range of differences among field apparatus to be analyzed, and also because the very busy schedule of the Dispatching Center, due to the extremely cold weather in February

The current working plan



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Lessons learned

- The importance to have an independent production environment where all SCADA functionalities can be designed, tested, run, modified and retested, without any impact on the gas operation.
- The importance of change management after 20 years of usage of the existing SCADA, considering the transition to a Windows based market product and the adoption of a new video wall replacing the old one.
- Under estimation of the effort needed to migrate the RTUs into NSI, considering the high number of checks to be done before the transfer and the complexity of field.