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Webinar Farmindustria-ENEA

L'efficienza energetica nel settore Farmaceutico

Dalla ISO 50001..... agli interventi di efficientamento

3 maggio 2022

03 . 05 . 2022

Our industrial network

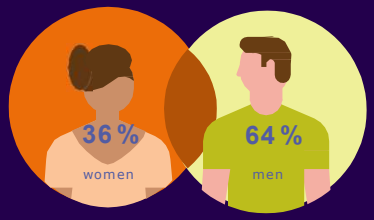
30 countries

69 MANUFACTURING SITES

18 DISTRIBUTION CENTRES

More than **33,000** employees

- **40%** Production
- **22%** Quality
- **12%** Distribution



Every day, close to 33,000 employees work daily all around the world in Pharmaceuticals and Vaccines to produce high-quality healthcare solutions and deliver them on time to support millions of people around the world

As of 2020

Sanofi in Italy

ORIGGIO (VA)
Opella Site

MILANO
Legal Headquarters: Sanofi Italia
Clinical Research Unit

SCOPPITO (AQ)
Sanofi Site

BRINDISI
EuroApi Site
Biotech. Centre

ANAGNI (FR)
Sanofi Site

Headquarters

Production

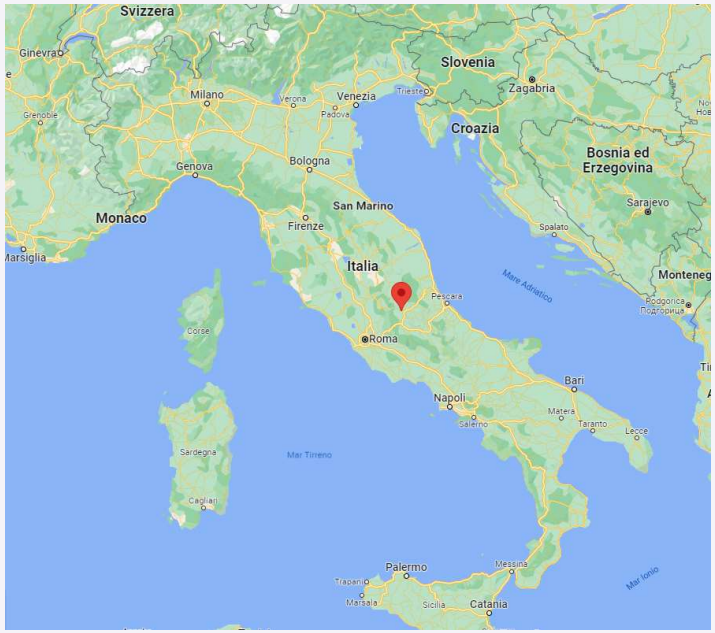
Research

1 Clinical Research unit

1 Biotech Centre

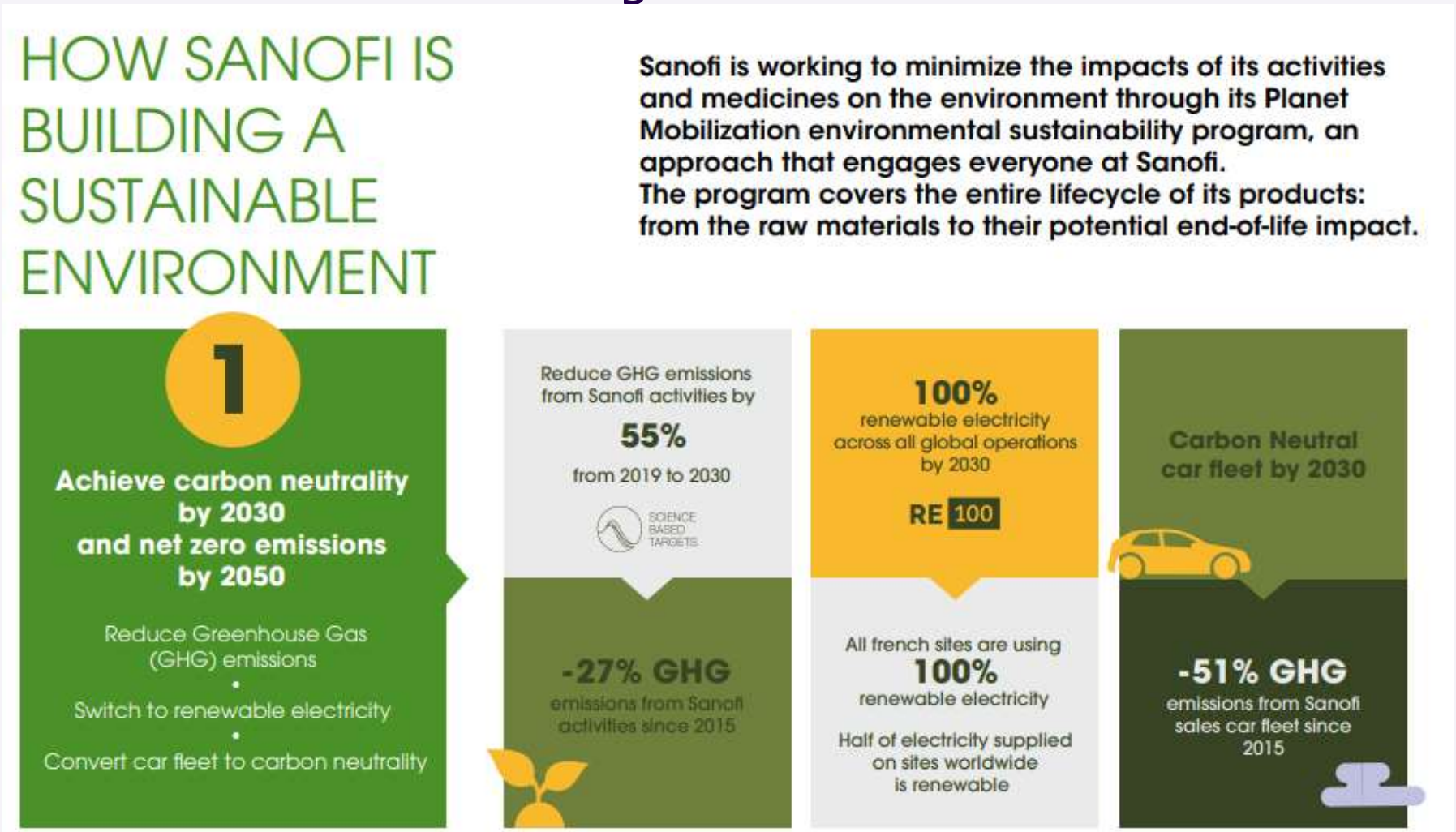
2700
Employees
of which1400 in industrial sites

Description Site Scoppito: Key Figures

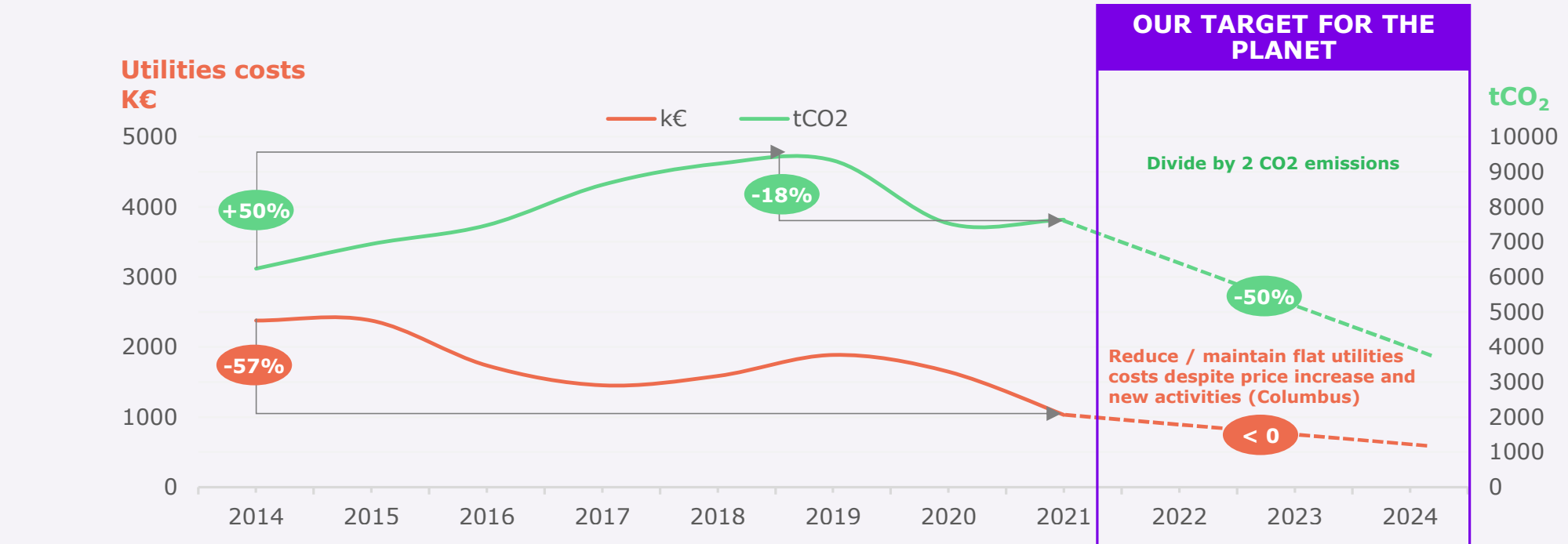


- **Employees 2021:** **310**
- **Surfaces according KPI standard 2020:** **29637 m²**
- **Energy Consumption 2019 / 2020 / 2025:** **47513 MWh / 44573 MWh / 37564MWh**
- **CO_2 Emission 2019 / 2020 / 2025:** **9181 TCO_2 / 7522 TCO_2 / 6607 TCO_2**
- **Activity Indicator 2021:** **120 MU boxes / 3,3 Bio Tablets**

Sanofi Planet Mobilization Program



Scoppito: Environmental performance is our priority



Trigenerator
Reduced costs but increased Co2

Utilities Team

Photovoltaic

4 Main actions to evaluate

1. Photovoltaic Step 2 (Local Project)
2. Metering & Monitoring (Central Team)
3. Heat Pump (Evaluate ROI)
4. Future of Trigeneration (New Technology)

Photovoltaic 2

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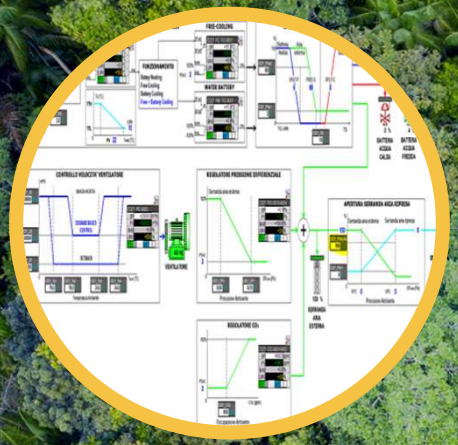
PLANET MOBILIZATION

IN SCOPPITO, ITALY
Our VISION is to be TOP site in terms of energy efficiency and environmental impact



HVAC energy saving

Bluprint monitoring

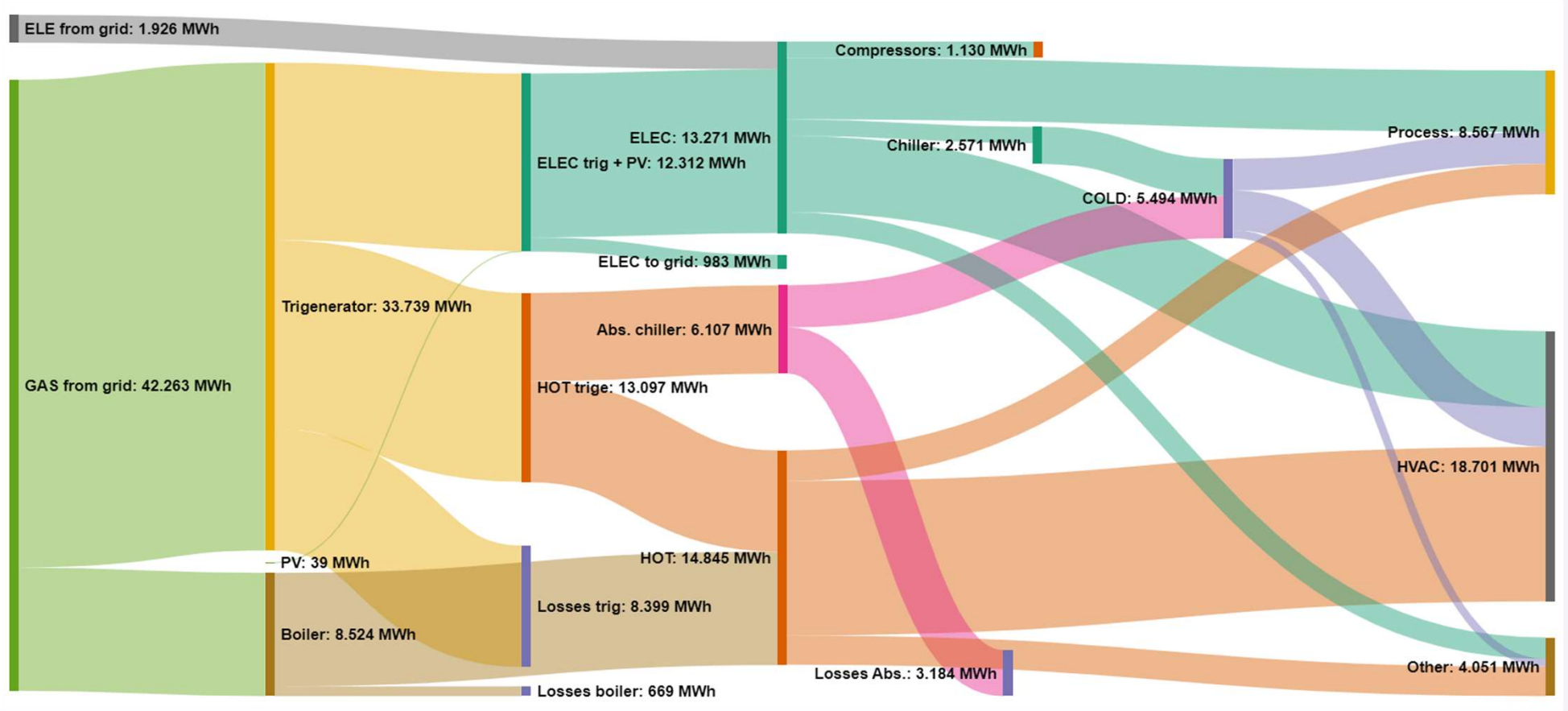
PV solar plant

10% Electrical Power supply from renewable source since 2021

-20% CO2 emission by Energy Saving Projects in 2023 (vs 2019)

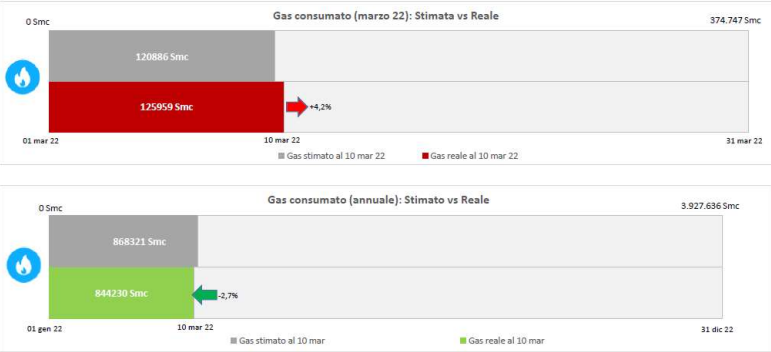
-15% Energy consumption, in order to mantain flat the site energy consumption despite new manufacturing workshop and products

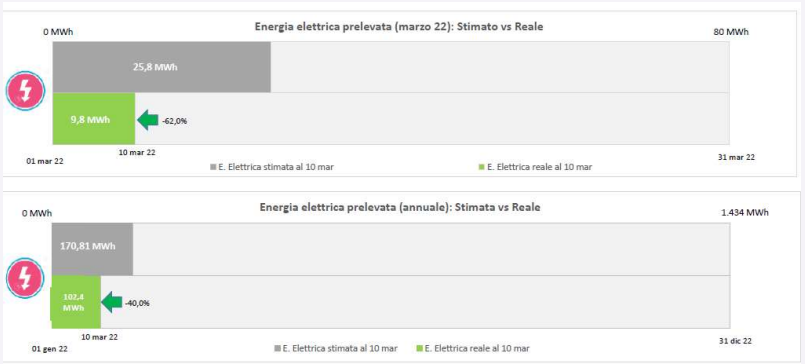
From Energy Balance (ISO 50001).....



……to Baseline definition & Energy Performance indicator

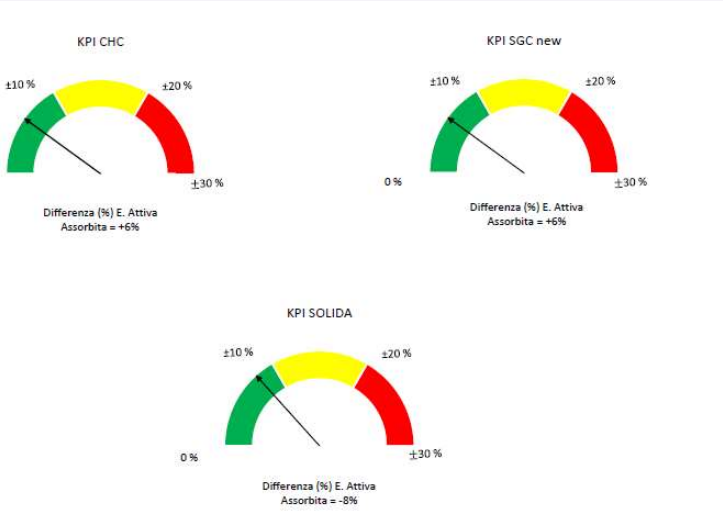
- Baselines





- Energy Performance indicator's and monitoring

Equipment	Formula in STD-000034 Energy Operational Standard KPI & Monitoring
Hot Water Boiler	$Efficiency_{\text{hot water boiler}} = \dot{m}_{Water} \times C_p \times (T_{out}-T_{in}) / \dot{E}_{Gas\ HHV}$
Steam Boiler	$Efficiency_{\text{Steam production}} = \dot{E}_{\text{Steam M4}} / \dot{E}_{\text{Gas M1}}$ with $\dot{E}_{\text{Steam M4}}$ = Specific enthalpy of steam multiplied by the flow of useful steam $\dot{E}_{\text{Gas M1}}$ = Energy flow of Gas in kW in High Heating Value (HHV)
Chiller	$COP_{Chiller} = Fl_1 \times \rho \times C_p \times (T_1 - T_2) / \dot{W}_1$
Compressor	$Efficiency_{Compressor} = E_{compressor} / V_{Compressed\ air}$
HVAC	$Efficiency_{AHU} = (\dot{E}_{Fans} + \dot{E}_{Cooling} + \dot{E}_{Heating}) / \dot{V}$



…..to Energy saving Projects planning and implementation

Name of Project	Description	Status	Form of Energy	Impact MWh (+ = increase)	Impact TCO2 (+ = increase)
HVAC Packaging	air change rate reduction, fresh air reduction, variable set point, free cooling/heating, high efficiency fans, setback	completed	Electricity	-582,45	*
			Gas	-186,30	-34
HVAC CHC-SGC	air change rate reduction, fresh air reduction, variable set point, free cooling/heating, high efficiency fans, setback	completed	Electricity	-477,85	
			Gas	-125,86	-23
HVAC Solid step 1	variable set point, free cooling/heating, high efficiency fans, setback	completed	Electricity	-304,38	
			Gas	-277,78	-51
HVAC Solid step 2	air change rate reduction, fresh air reduction	completed	Electricity	-710,23	
			Gas	-69,44	-13
HVAC Lab-Gown	air change rate reduction, fresh air reduction, variable set point, free cooling/heating, high efficiency fans, setback	In progress	Electricity	-239,44	
			Gas	-90,31	-16
New High Efficiency Chiller Scoppito	high efficiency magnetic bearing with free cooling	In progress	Electricity	-581,00	
			Gas	-2.177,00	-396
Solar energy Scoppito STEP1	920 kWp ground + 70kWp carport	completed	Electricity	-1.216,00	
			Gas		
Solar energy Scoppito STEP2	maximize installation (around 2 MWp)	Proposed	Electricity		
			Gas	**	
Geothermal & Heat pump	evaluate heat/cold generation with heat pump + geothremal	Proposed	Electricity		
			Gas	**	
Metering and monitoring	Digital project for online energy KPI + new meters installation proposal	In progress	Electricity		
			Gas	**	
New project OSD expansion	oral solid department extension	completed	Electricity	1.326,00	
			Gas	1.582,00	288
New project Columbus	New product launches building	completed	Electricity	532	
			Gas	879	160
New compressor	old chiller substitution with high efficiency one + control system	completed	Electricity	-300,00	
			Gas		

* No CO2 saving due to Green energy with G.O. from the grid

** electricity saving to be calculated as gas saving from trigeneration

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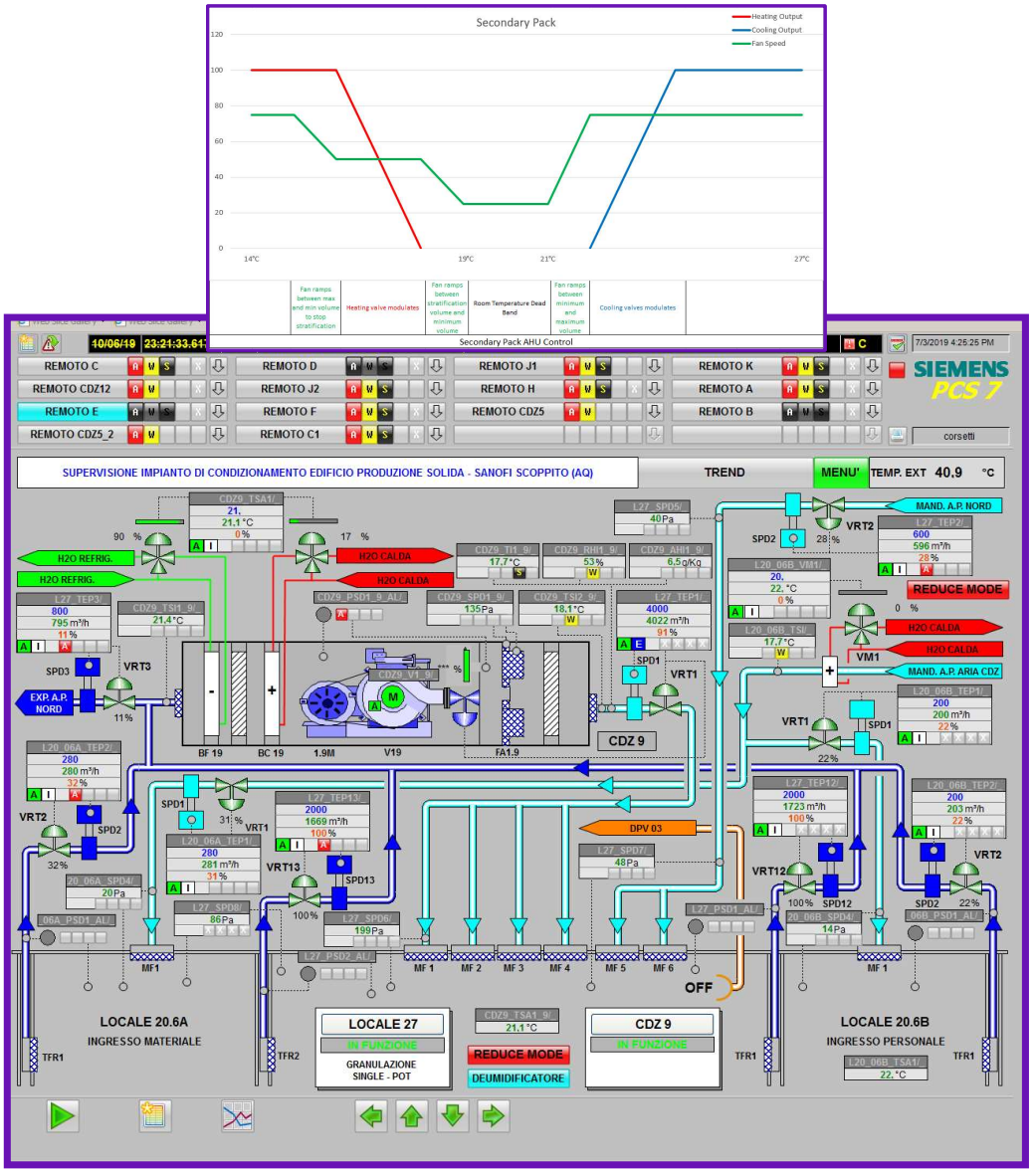
HVAC Global Project

- **ACH & FRESH AIR REDUCTION**
  - Air change rate reduction in accordance to new Global Sanofi SOP
  - Fresh air reduction for minimum people requirements

- **SETBACK & BMS OPTIMISATION**
  - Setback (reduce ACH during non-production or demand control in secondary packaging)
  - Temperature variable set point
  - Automatic fresh air and differential pressure control
  - Free cooling

- **SETBACK & BMS OPTIMISATION**
  - Cooling/heating leakages reduction
  - Heat recovery



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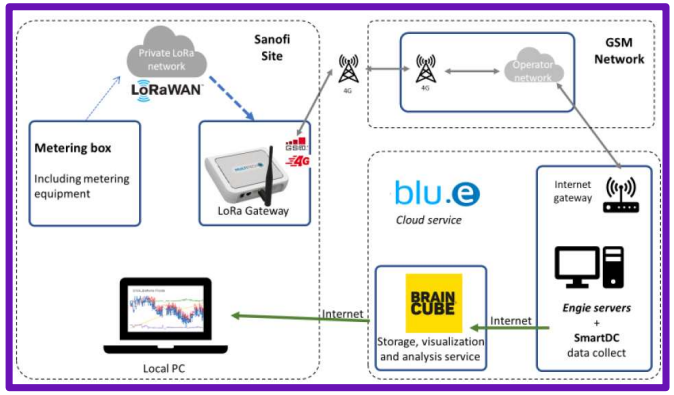
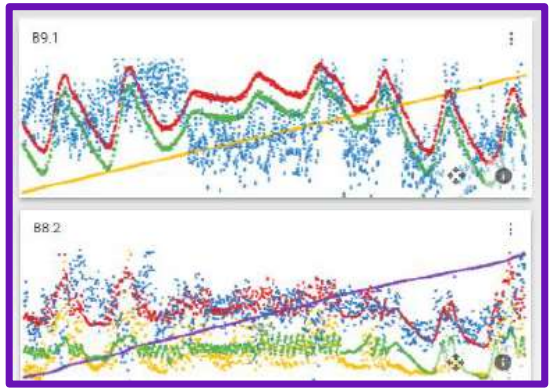
BLUprint Global Project

- **Metering STEP**
  - Installation of 42 box with external flow, velocity, temperature, pressure, humidity sensors

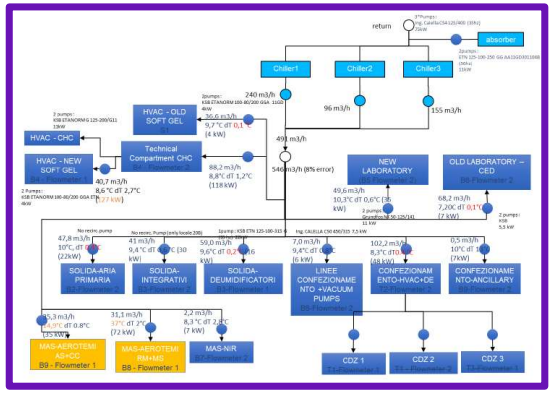
- **Data monitoring**
  - Gateway configuration for data communication to blu.e server





- **Data analisys**
  - Big data analysis and comparison

- **Best practices**
  - Best practice optimization proposal for main utilities system



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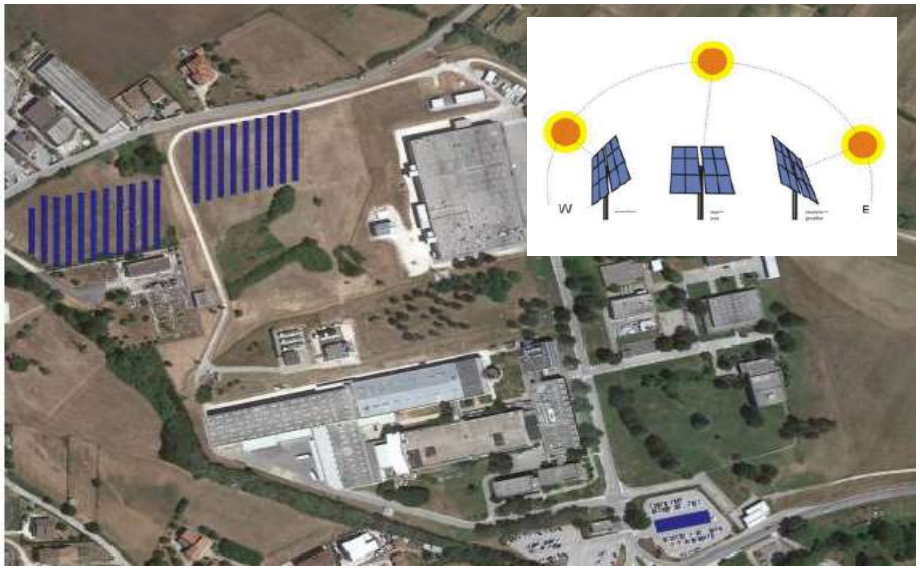
PV solar Global Project

Ground panels installation

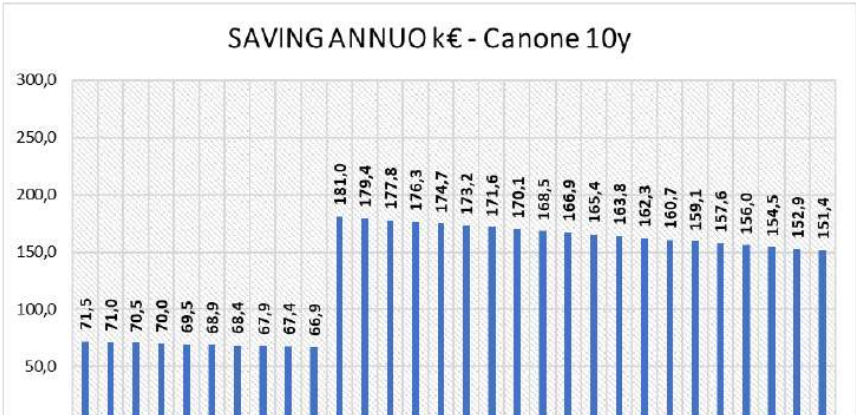
- Power 999 KWp
- Production 1.600 MWh/year
- Self consumption 1.216 MWh/year (76%)
- NO CAPEX by Sanofi (leasing formula)
- After 10 years only 500€ for PV solar plant acquisition
- Carport with charging station



EE savings

- 65/70 k€/ year savings for first 10 years
- About 170k€/year savings after 10 years
- Hypothesys calculation fixed EE price 165€/Mwh)

	Anno	Anno di contratto	Produzione PV [MWh]	Ricavi autoconsumo [€]	Ricavi immissioni [€]	Canone ENGIE [€]	Manutenzione O&M [€]	SAVING ANNUO CLIENTE [€]	SAVING CUMULATO CLIENTE [€]	WAYOUT (a fine anno) [€]
CANONE (10 anni)	2020	1	1.599	177.305	23.933	-145.527		55.711	55.711	
	2021	2	1.588	176.032	23.761	-144.483		55.311	111.021	
	2022	3	1.576	174.759	23.589	-143.438		54.911	165.932	-648.130
	2023	4	1.565	173.486	23.417	-142.393		54.511	220.442	-562.911
	2024	5	1.553	172.213	23.245	-141.348		54.111	274.553	-475.079
	2025	6	1.542	170.940	23.074	-140.303		53.711	328.264	-384.725
	2026	7	1.530	169.667	22.902	-139.259		53.311	381.574	-291.941
	2027	8	1.519	168.395	22.730	-138.214		52.911	434.485	-196.824
	2028	9	1.507	167.122	22.558	-137.169		52.511	486.996	-99.476
	2029	10	1.496	165.849	22.386	-136.124		52.111	539.107	-500



Savings are calculated considering:

- grid energy price of 165 € / MWh (excise duties included)
- self-consumption of 76% and revenues of 43 € / MWh for the energy fed into the grid.
- maintenance and management costs of € 21.000 / year from the end of the contract with Engie (from the 11th to the 30th year)
- module degradation rate: 2.5% the first year; and inferior 0.6% / year from the second to the thirtieth year

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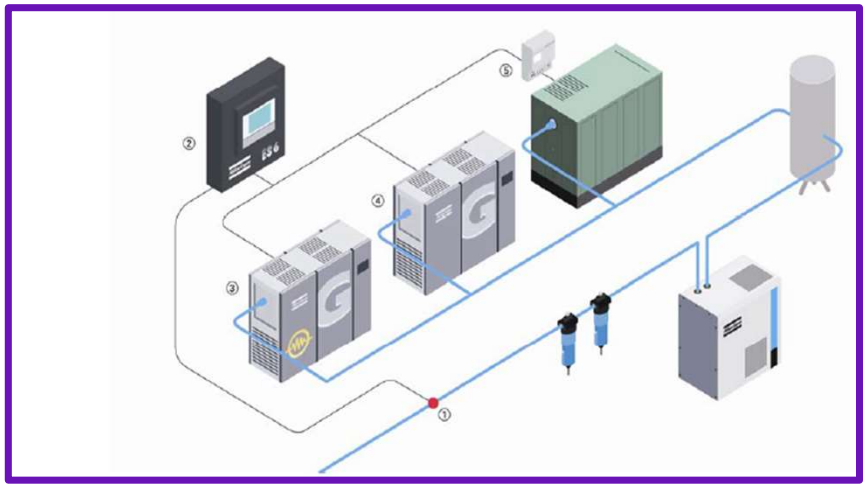
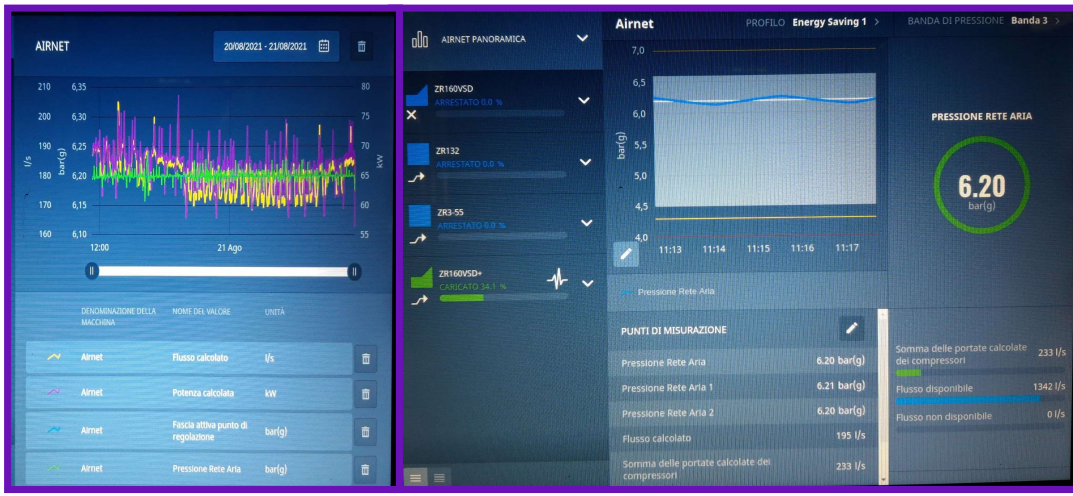
Compressed air Local Project

- **Consumption analysis**
  - Meters installation for compressed air production and electrical consumption

- **Compressed air station revamping**
  - Installation of a new low consumption compressor
  - Piping bottle neck elimination
  - Supply pressure reduction



- **Digitalization**
  - New software installation for best compressor configuration sequency start selection
  - Web connection for real time information availability



- **Operational improvement**
  - Cooling water system set optimization

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Chillers substitution - Proposed situation

Trane RTAC 400
Year 2002
$P_{nominal}$ 1451 kWf
ESEER 4,02
COP actual 3,26

Existing

Substitute one old chiller with a new one with HIGH EFFICIENCY (magnetic technology) also at low load, low energy consumption and low GWP

Trane GVAF 350
XPG XLN
Anno 2020
$P_{nominal}$ 1250 kWf
ESEER 6,26

New

Energy saving
581.328 kWh/year

Energy saving
75.572 k€/year

CO2 reduction
164 tons CO2/year

	RTAC 400 SE	GVAF 350 XPG XLN
EER	2,87	3,48
SEER	4,02	6,26
Total Power Consumption [kWh/year]	1262035	680707
Energy saving (compared to RTAC) [kWh/year]	0	581328
ES Energy saving [€/year]	0	75.572,64 €
Investment cost [€]	-	212.800,00 €
Payback Time (No maintenance considered)	-	2,8
Ordinary maintenance cost [€/y]	-	3.250,00 €
Electrical Maintenance costs [€/y]	-	9.600,00 €
(ES - Total Maintenance cost) [€/y]	-	62.722,64 €
Payback Time [years]	-	3,4
energy saving (10 years)		755.726,40 €
maintenance cost (10 years)	DATE	128.500,00 €
investment		212.800,00 €
Saving 10 years		**414.426,40 €**

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Energy bill

		delta				delta		
	MWh	MWh	MWh	MWh	€	€	€	€
2019	47.878				1.880.297			
2020	44.670	- 3.209			1.654.880	- 225.417		
B21	44.363	- 307			1.407.497	- 247.383		
F21	43.197	- 1.166	- 1.473	- 4.681	1.029.363	- 378.134	- 625.517	- 850.934
			-3%	-10%			-38%	-45%

- **Final result sum of:**
  - Energy saving project planned in B21 executed on time with good results in line or higher than expectative
  - Energy variable prices reduction in line with tender
  - Implementation of additional operational energy saving activities vs B21
  - Delay on OEB4 & PYO start vs B21 (hp in September 2021 vs real Dec 22)

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KEY SUCCESS FACTORS

SITE DIRECTION SPONSORSHIP

TEAM TECHNICAL COMPETENCIES

CENTRAL SUPPORT AND PROMOTION

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Energy Saving Project TEAM Organization

Central Support
- Central Engineering
- Central Purchasing
- Central SMS
- Central HSE

Site Project Manager
Fabrizio Raparelli

External support for project Management and Design (TEP + Agapè)

Site functions: Quality, Production, HSE, Validation, Planning, Finance

Site Utilities & Electrical maintenance

SANOFI

External support for white certificates, ISO 50001 and new project evaluation (TEP)

Partnership for Trigeneration efficiency, PV solar installation, energy contracts (Engie)

Partnership for energy monitoring and utilities best practices (Blu.e)

ENERGY SOLUTION TEP a Snam company

ENGIE

blu.e by ENGIE

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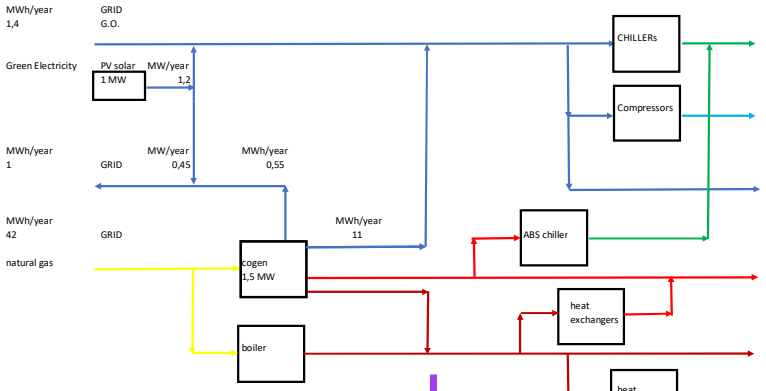
SCENARIO ROADMAP VISION 2030

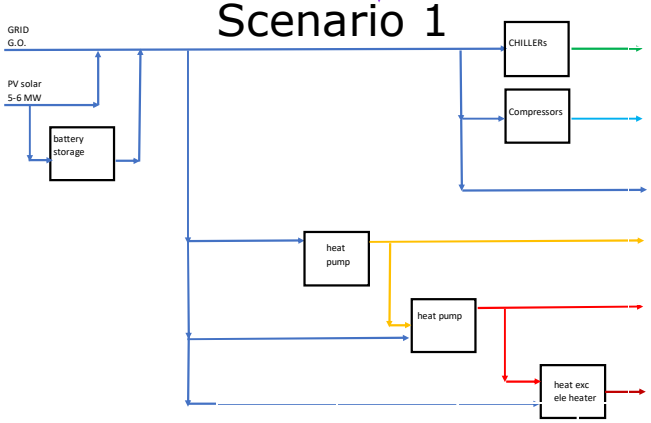
2021

Energy cost
Technology
Law req.

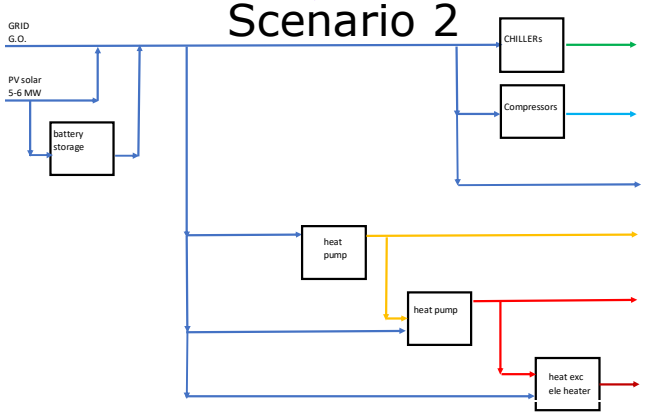
2030



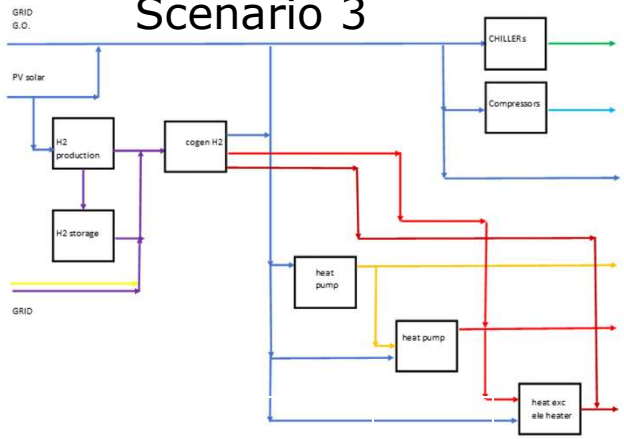
Scenario 1



Scenario 2



Scenario 3



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electricity gas CW SHW HW WW CA

THANK YOU

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