



SUSTAINABLE HEATING AND COOLING IN CASTING INDUSTRY SUSPIRE PROJECT CASE STUDY



SusPIRE Project. H2020-EE-18-2015



Sustainable Production of Industrial Recovered Energy using Energy Dissipative and Storage Technologies.

PARTNERS (9):

- PCB. PreciCast Bilbao (SPAIN)
- DOW-CORNING (BELGIUM)
- IK-4 AZTERLAN (SPAIN)
- IK-4 TEKNIKER (SPAIN)
- MET (LITHUANIA)
- QPUNKT (AUSTRIA)
- TECNODELTA (ITALY)
- TELUR (SPAIN)
- ZAE-BAYERN (GERMANY)



1st of October 2015 to 30th of September 2019

Keys & Goals

CASTING FACTORY IN BARAKALDO, SPAIN

- Excess Heat Recovery in Casting Plant
- High and Low Temperature Subsystems
- Energy Storage at Medium Temperature (PCM) & Low Temperature (UTES)
- Space Conditioning of Process Rooms and Offices
- Heat Exportation to Council Sport Centre (Swimming Pool)

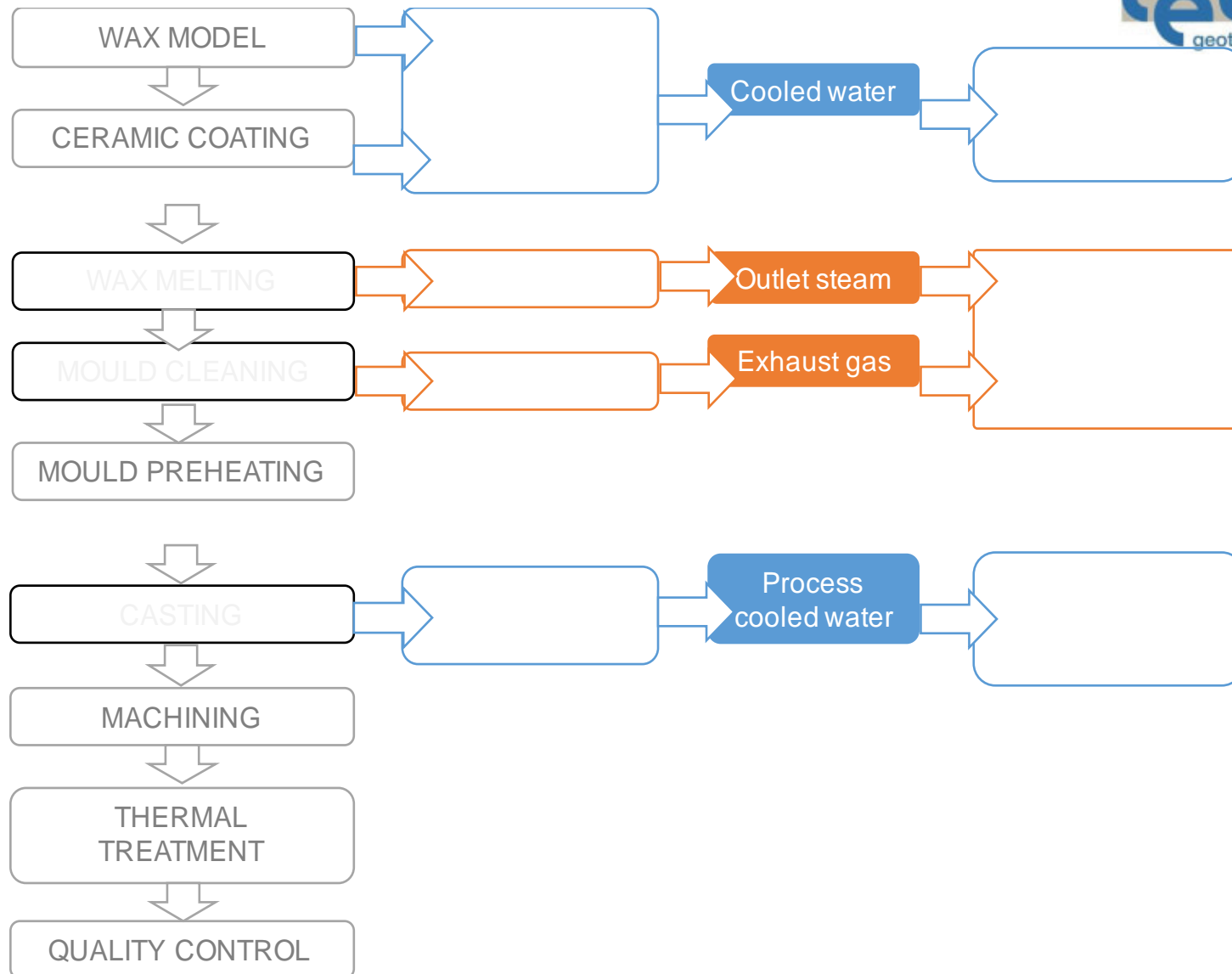
EXCESS HEAT RECOVER

70%

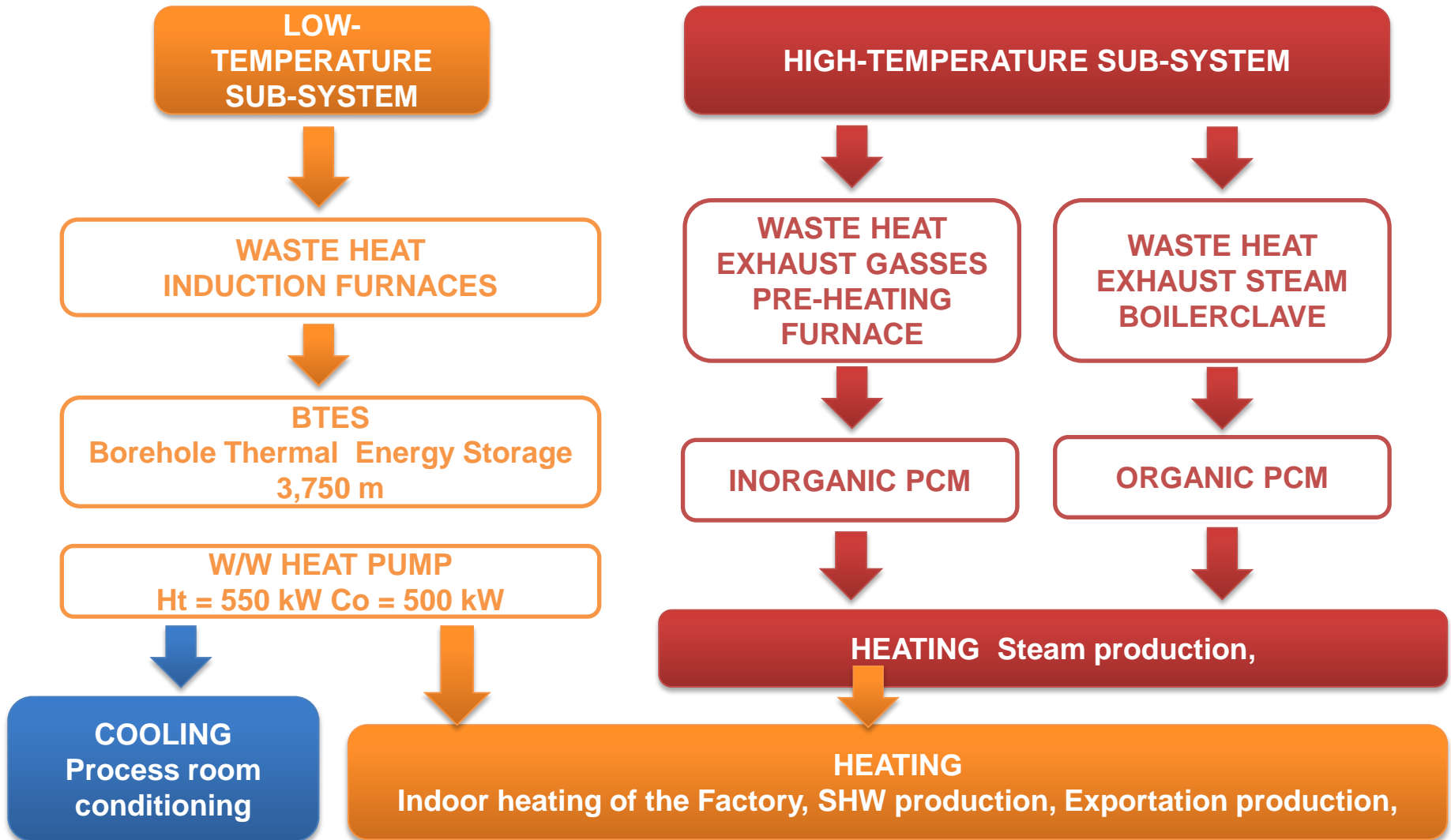
PRIMARY ENERGY SAVINGS

20%

Waste Heat Sources



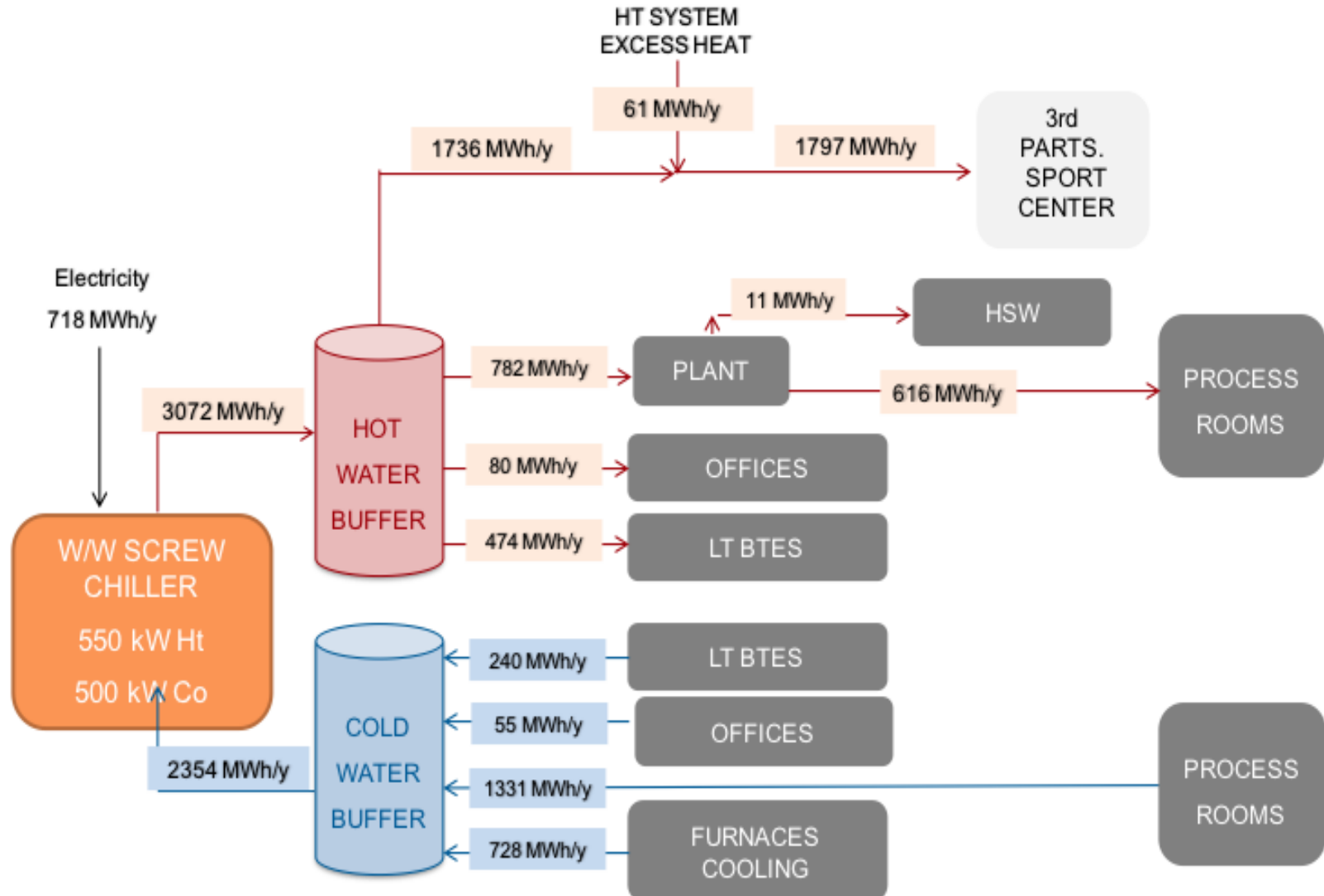
Excess Heat Recovering System



Excess Heat Sources

FROM:	WASTE HEAT CONSIDERED MWh/year	RECOVERED HEAT MWh/year
preheating furnaces (exhaust gasses from 1 furnaces)	820	512
office cooling	55	55
ceramyc/wax rooms cooling	1338	1331
melting furnaces cooling	968	968
boilerclave	150	17
total	3331	2883
Recovered heat ratio		87%

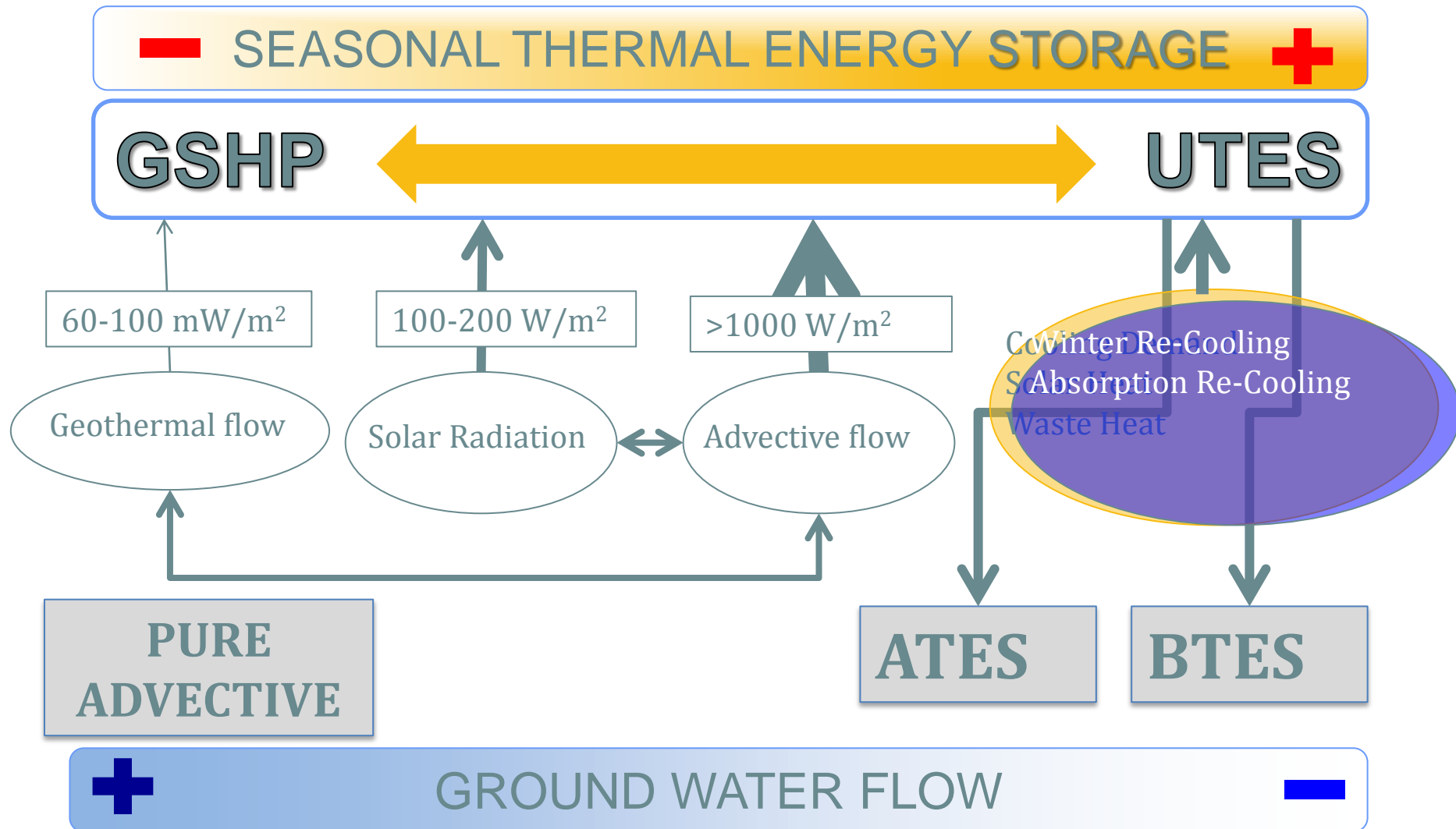
Energy Balance Low Temperature Subsystem



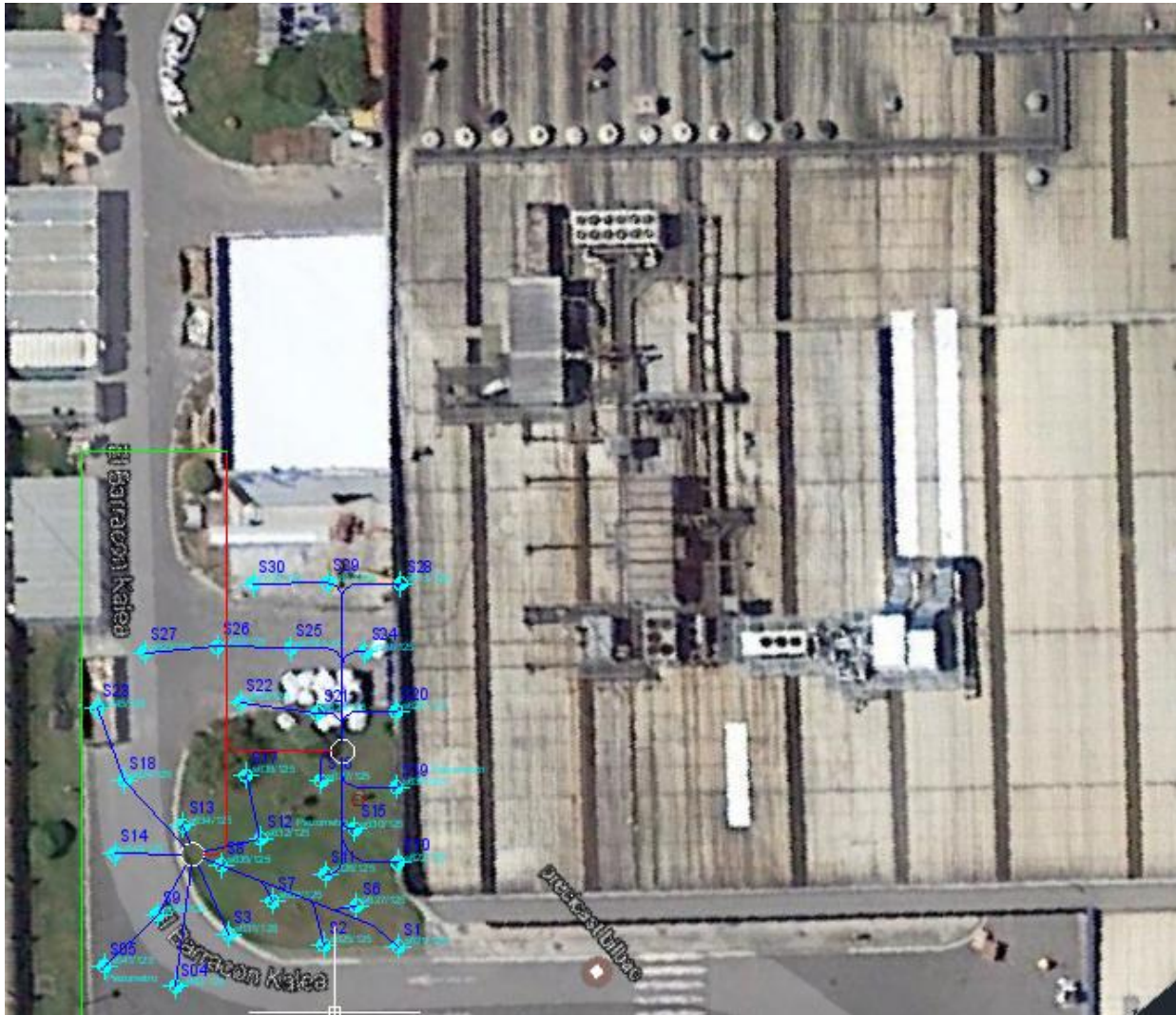
Covered Demand and Environmental Savings

	HEATING AND COOLING		HEATING					COOLING				TOTAL H&C
			OFFICES CONDITIONING	PLANT SPACE CONDITIONING	SHW	SPORT CENTRE	TOTAL	OFFICES CONDITIONING	PLANT SPACE CONDITIONING	PROCESS COOLING	TOTAL	
PRE-SUSPIRE	CONVENTIONAL	MWh _t	80	774	23	2,446	3,322	56	1,672	2,972	4,699	8,022
	PRIMARY ENERGY CONSUMPTION	MWh	94	1,209	35	3,821	5,160	65.7	1,980	235	2,280	7,440
	EMISSIONS	tCO ₂	13.2	255	7.5	806	1,081	9.2	277	32.8	319	1,400
SUSPIRE LT PROTOTYPE + SPORT CENTRE SUPPLY	CONVENTIONAL	MWh _t	0	3.0	11.4	710	724	0	26.4	2,139	2,166	2,890
	500 KW GEOEXCHANGE BTES	MWh _t	80	771	11.4	1,736	2,598	56	1,646	832	2,534	5,132
	PRIMARY ENERGY CONSUMPTION	MWh	47	479	6.7	2,136	2,669	8	280	199	487	3,156
	EMISSIONS	tCO ₂	6.6	64	0.9	377	449	1.2	39.1	23.6	64	513
ENVIRONMENTAL SAVINGS	PRIMARY ENERGY	MWh	47	731	29	1,685	2,491	57	1,700	36	1,793	4,284
		%	50%	60%	81%	44%	48%	87%	86%	15%	79%	58%
	EMISSIONS	tCO ₂	6.6	191	6.5	428	633	8.0	238	9.2	255	888
		%	50%	75%	87%	53%	59%	87%	86%	28%	80%	63%

Geoexchange Technologies



Borehole Field Layout



30 Boreholes
125 M
3.750

Coaxial Heat
Exchanger
PE-RT
Ø 63 PN16 EXT
Ø 40 PN16 INT

4 MANIFOLDS



Drilling Works



Loop Construction



Symbiosis. Lasesarre Sport Center

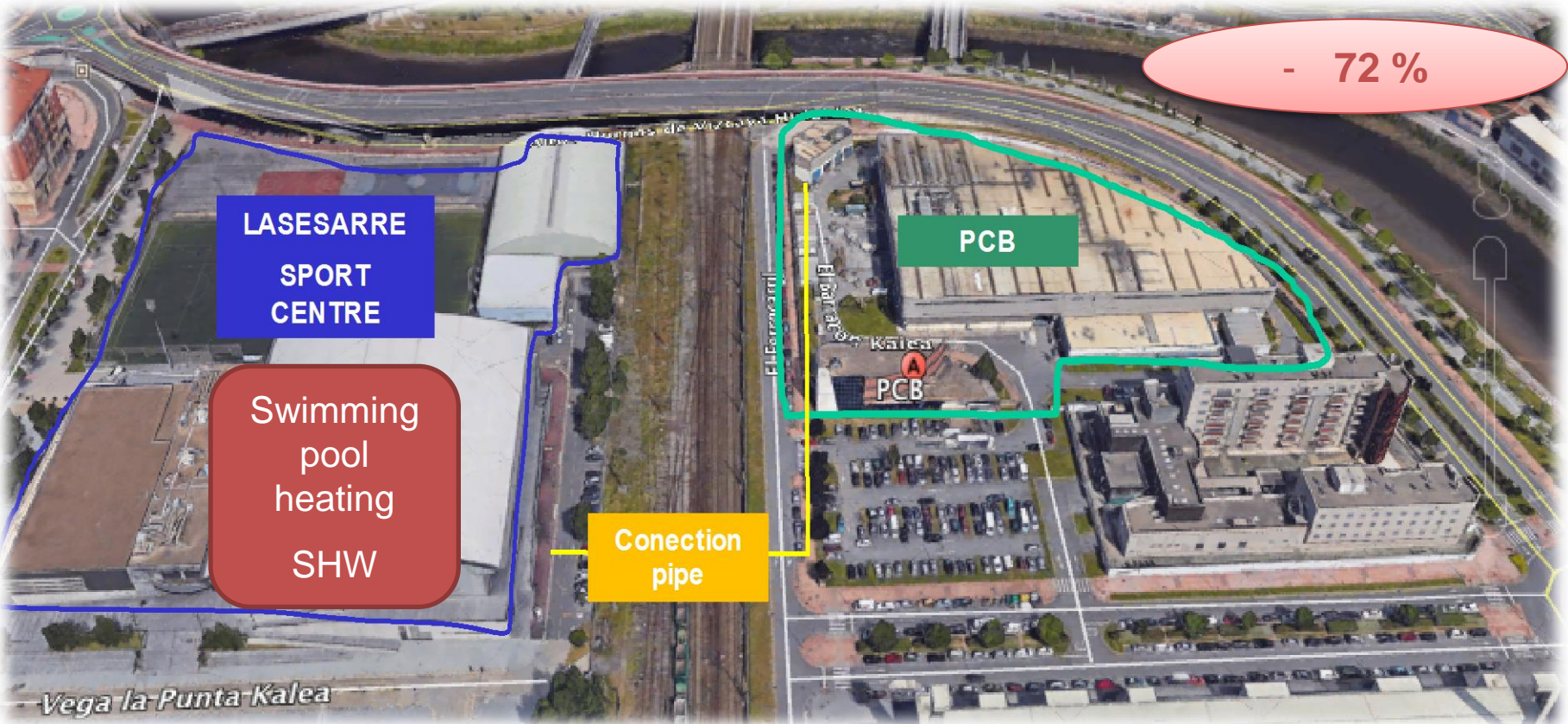
CURRENT CONSUMPTION
Natural gas
3,2 GWh hcv/y



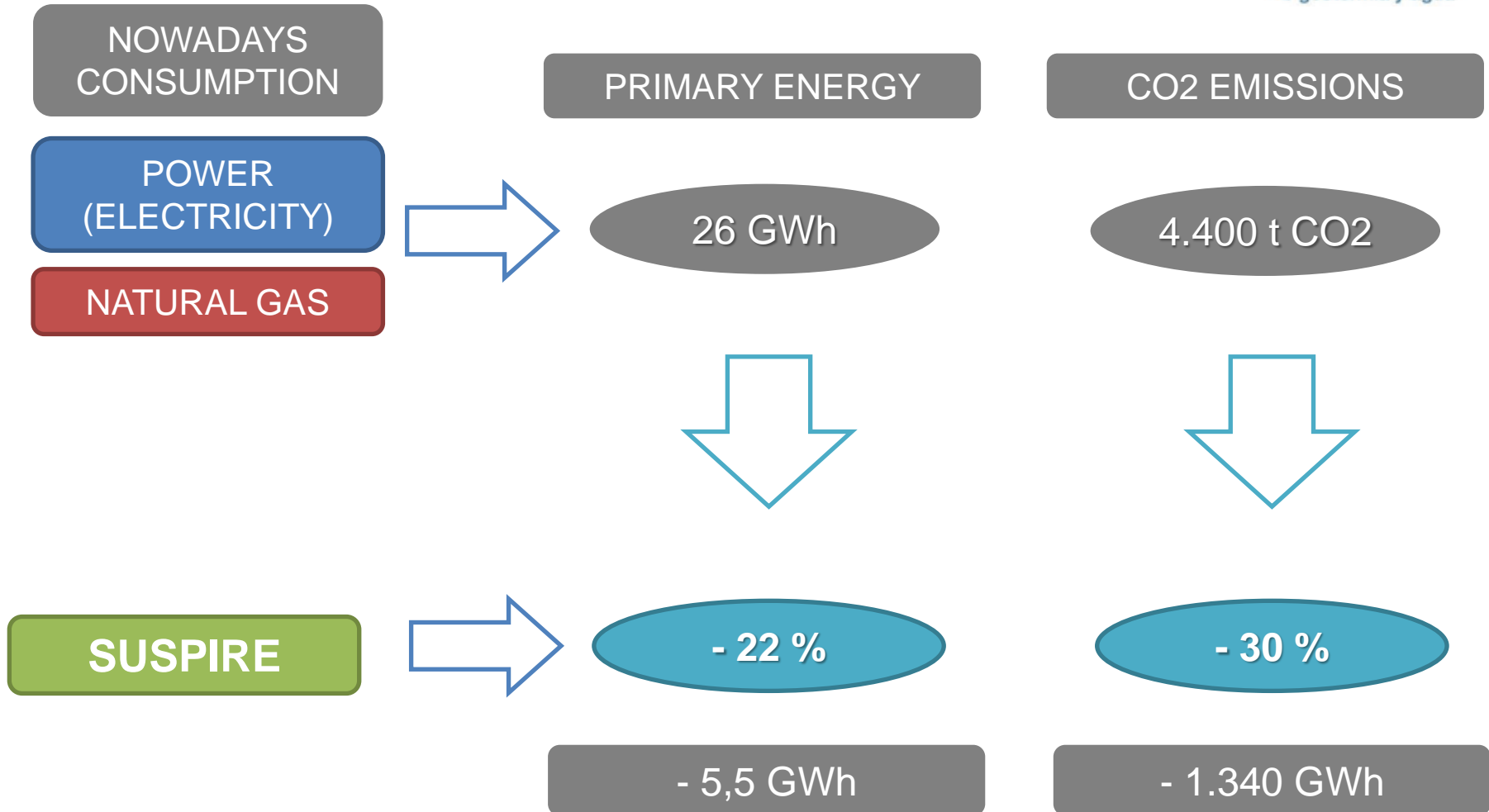
ENERGY PROVIDED FROM PCB

1,7 GWh HEATING
2,3 GWh hcv

- 72 %



Expected Results



Thank you for your attention