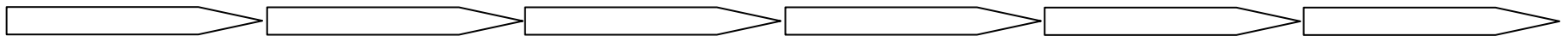
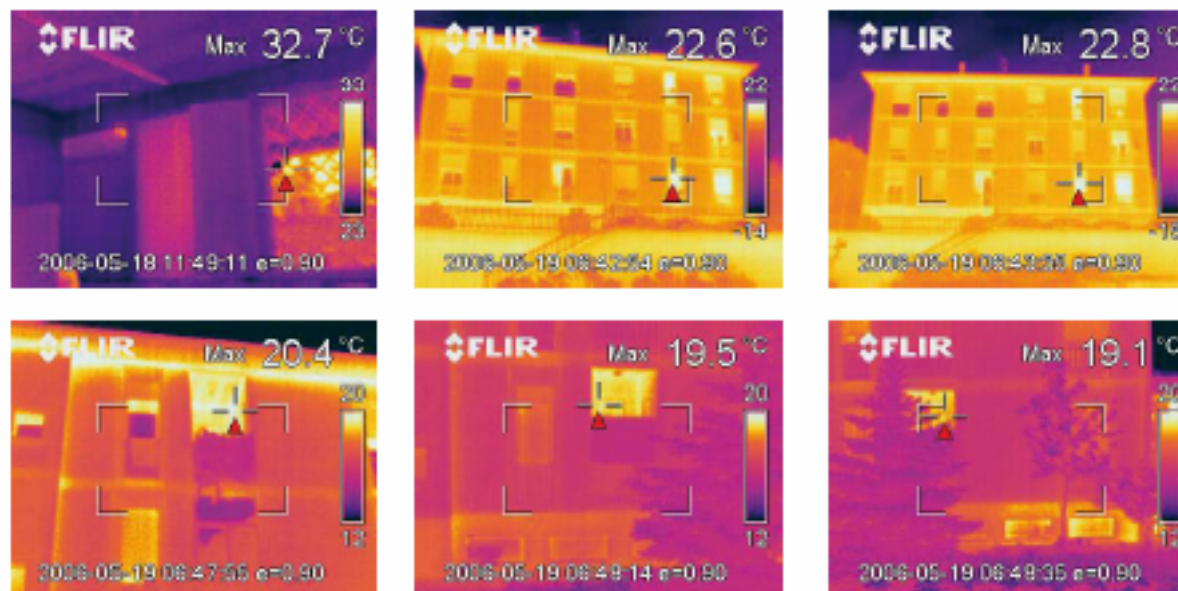




PHASES

1. Survey of the building and of the heating system
2. Analysis Natural gas consumption
3. Determination of current efficiency and E.D. (energy demand)
4. Simulation of works in order to save energy, determination of future efficiency and E.D.
5. Determination of payback of the investments





THERMOGRAFIC EXAM

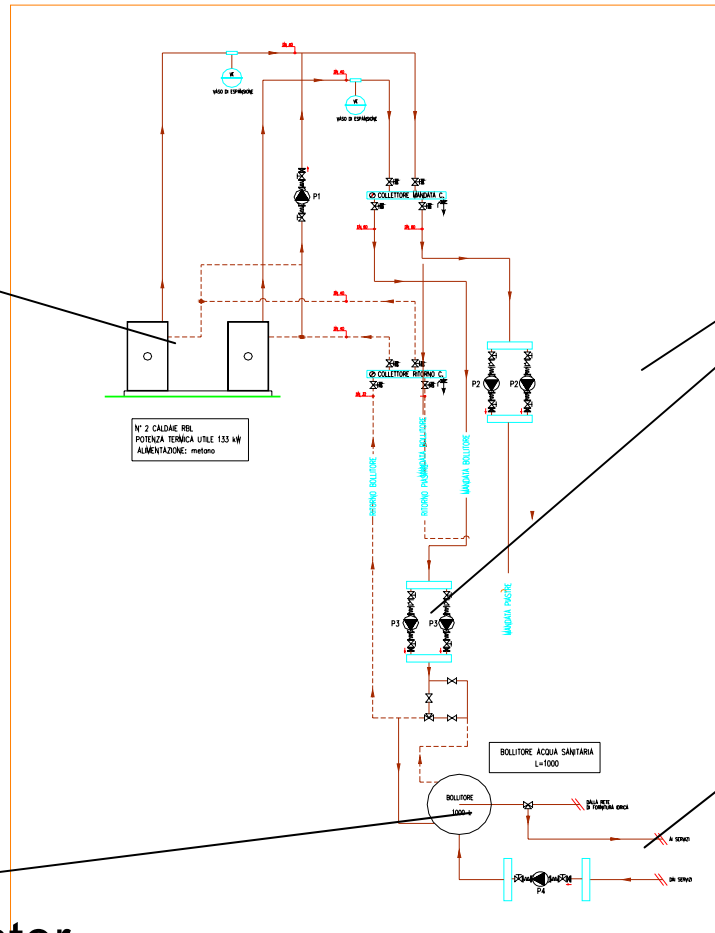
1. SURVEY OF EXISTING HEATING SYSTEM-P&I



Boilers



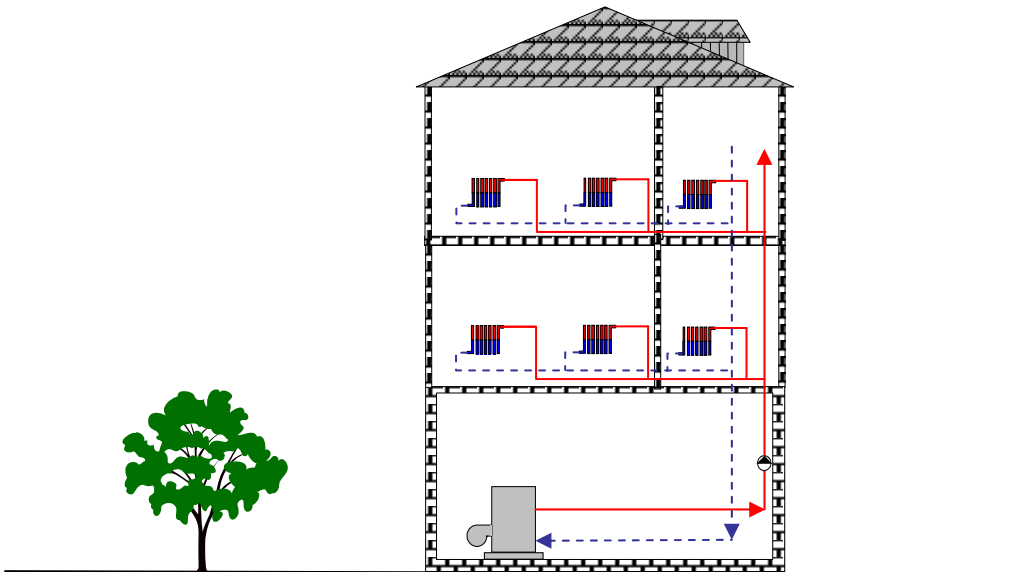
Pumps



Tank san. Hot Water

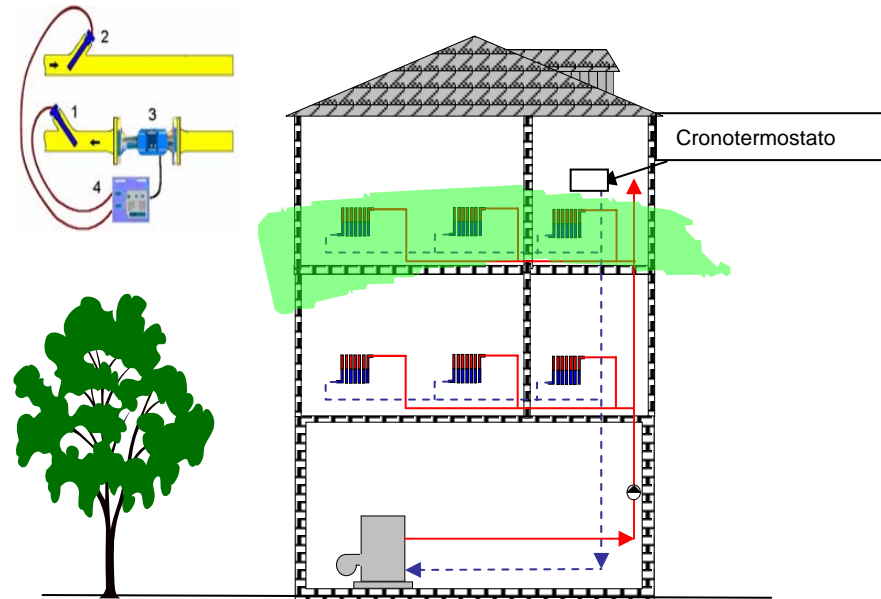
1. SURVEY OF EXISTING HEATING – RADIATOR and DISTRIBUTION

- The material of existing radiator is Cast iron
- There is a manifold for each apartment



5. Simulation of energy saving work determination of future Efficiency and D.E.

- 1) High efficiency Boilers (condensing)
- 2) Pumps with Frequency Converter
- 3) Individual record system of energy consumption



4. Comparison current and future efficiency

Current Efficiency (UNI 10348)

	Tipologia	Efficiency(%)
Production	2 Boilers 133 kW	$\eta_p = 85.3$
Distribution	Carbon steel piping with insulation	$\eta_d = 95$
Emission	Radiators	$\eta_e = 90,7$
Regulation	Thermostatic-Valves	$\eta_r = 94$
		$\eta_{gs} = 67.6$

Future Efficiency (UNI 10348)

	Tipologia	Efficiency(%)
Production	1 Boilers 100 kW	$\eta_p = 97.3$
Distribution	Carbon steel piping with insulation	$\eta_d = 95$
Emission	Radiators	$\eta_e = 92,2$
Regulation	Thermostatic-Valves- and two ways valves for each manifold and clim. Regu.	$\eta_r = 96$
		$\eta_{gs} = 81.8$

Comparison current and future

Current Energy and Consumption (UNI 832)

		Surface area	Vol
Heating (MJ/m ³ anno)	168.8	955m ²	354 0m ³
Hot Water (MJ/m ³ anno)	33.1		
Tot. (MJ/m ³ anno)	201.9		
Gas Consum. (m ³)	20.790		
D.E.	173 kW/m² anno		

Future Energy and Consumption (UNI 832)

		Surface area	Vol
Heating (MJ/m ³ anno)	125	955m ²	354 0m ³
Hot Water (MJ/m ³ anno)	28,5		
Tot. (MJ/m ³ anno)	154		
Gas Consum. (m ³)	15.437		
D.E.	129 kW/m² anno		

6. Determinatio of Payback period

Energy Cost +maintanance Before €	Energy Cost +maintanace after €	Savings €	Costs installation €	Payback (years)
19.500	11.500	8.000	70.000+tax	< 10