



after refurbishment

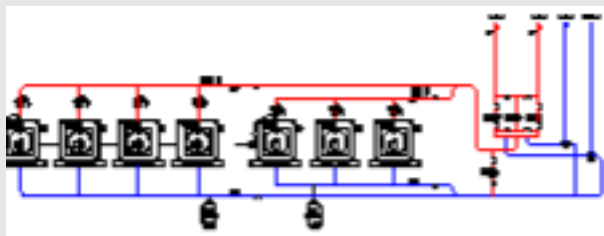


before refurbishment



GENERAL INFORMATION	
Building owner	Agenzia Territoriale per la Casa della Provincia di Asti
Address	Different buildings in the town area
Number of dwellings	644 before and after refurbishment
Number of floors	different for each buildings (from 3 to 6 floors)
Average size of the dwellings	73.53 m ² before and after refurbishment
Total heated floor area	47,350.91 m ² before and after refurbishment
Year of construction	from 1970 to 1985
Year of refurbishment	2004
Has the refurbishment been carried out while the dwelling was occupied?	Yes
Has an independent quality assurance been carried out?	Yes, by a testing surveyor
Total building costs	cost of natural gas for heating before refurbishment 489,980.40 €/year cost of natural gas for heating after refurbishment 444,104.40 €/year
Building costs concerning energy recovery	1,325,727.21 €



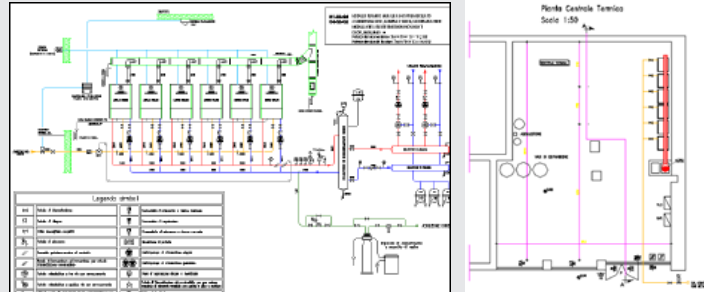
INITIAL SITUATION/LOCAL CONDITION	 <p>graph: old layout of central heating</p>
TYPE OF REFURBISHMENT (MEASURES WHICH HAVE BEEN CARRIED OUT)	replacement of central heating boilers with central waste-heat boilers
WHY HAVE THE MENTIONED MEASURES BEEN CARRIED OUT?	because the central heating boilers were old and had an high pollution-level

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PLANS



ENERGY RELATED ACTIVITIES			
Exterior components			
Systems engineering	central waste-heat boilers		
ENERGY RELATED INDICATORS			
	Initial situation	After refurbishment	Reduction
Energy performance	202.34 kWh/m ² a	147.51 kWh/m ² a	27.1 %
Energy consumption	9,580,776.39 kWh/a	6,984,906.94 kWh/a	27.1 %
CO ₂ -emission	40.88 kg/m ² a	29.80 kg/m ² a	
Heating system	boilers fed to natural gas	waste-heat boilers fed to natural gas	
DHW-system	individual boiler	individual boiler	
Monitoring system	not present	remote controlling system	
Regional energy costs	natural gas 0.6 €/m ³		

SUBSIDIES	40 % from Regione Piemonte (530,290.88 €) 60 % from ATC di Asti (795,436.33 €)
STATEMENT	The improvement of the central heating was concerning not only the replacement of the boilers, but also the refurbishment of all installations in the central heating (lighting set, hydro plant, pipes, valves, chimneys, etc.), addition of a water softener and finally improvement of the walling.
CONTACT	ATC di Asti via Carducci 86 14100 Asti Phone: +39-0141-380901 E-mail: direzione@atc.asti.it