



## An ESCo experience on Small Scale CHP

CESI Ricerca, Milano

22th October 2008

# Who is Heat & Power



Heat & Power is an ESCo specialising on Small Scale Cogeneration

- Installs and runs its own plants
- Supplies cogenerated energy (Heat, Power, Cool) to the clients at lower tariffs
- Brings, where requested,
  - Emergency power in case of black-out
  - Environmental image

Heat & Power uses natural gas, biogas, biomasses

Heat & Power presently runs the **widest Small Scale CHP network** in Italy, with more than 35 cogenerators and important Italian and Multinational clients

# Mainly Small Scale CHP...



130 kW mGT trigeneration Plant

...with good experience  
on Medium Scale

Efficiency Index (IRE)  
goes from 10 to 30%

4.800 kW GT Cogeneration Plant



# Remoting



- Heat & Power's plants are run locally by a dedicated PLC (SOEC®) and managed by the Tortona Remote Control Room





## Italia : le decentrali HEAT and POWER



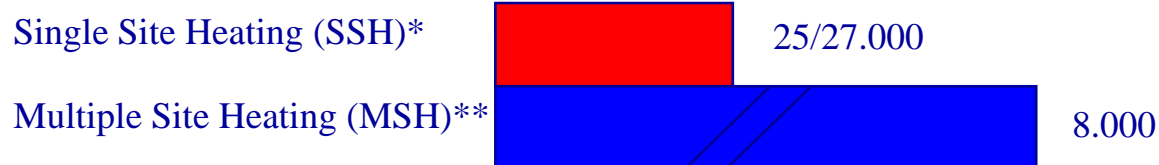
**Heat & Power**

GENERAZIONE CONTINUA DI ENERGIA ELETTRICA E CALORE

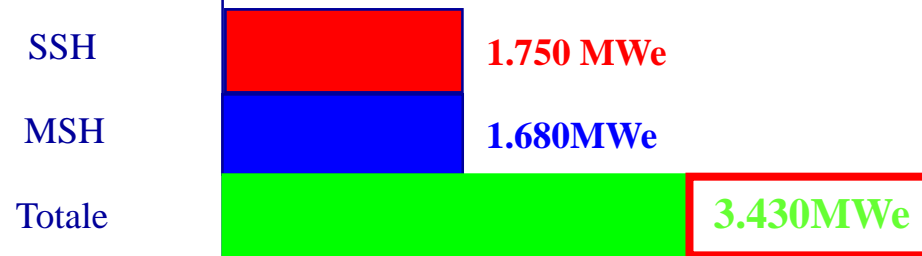
# The potential of Small Scale CHP in Italy is huge



## Potenzial Sites N°



## Potential Power



2006 ASSOESCO Research

\* Includes 15.000 office buildings, 1.500 commercial centers, 5.000 sport facilities, 1.000 hotels, 2.000 hospitals and 2.500 communities (religious, civil, army). The research reckons 70% of the sites technically fit the project.

\*\* Blocks of around 500 apartments, connected by a Proximity District Heating (PDH) with 300 kW CHP

# But economics don't agree yet....



<b>SMALL COGENERATION PLANT</b>			
<i>100 kWe; only heat; microturbine</i>			
<i>Sport Center with pool (industrial tax on N-gas)</i>			
<i>Power kWe</i>	100		
<i>Saturation</i>	72%		
<i>h/year</i>	6.307		
<i>Average electric efficiency</i>	27,3%	240.910	(mc)

# Small Scale CHP Economics



## SMALL COGENERATION PLANT

	Power	Heat	
Gross production kWh	630.720		
Auxiliary kWh	9.460		
Net production kWh	621.260	973.249	
Tariff €/kWh	0,11299	0,04721	<b>10% rebate on Power. Around 7k€</b>
White Certificates	0	(Today no White Certif. TEE)	
<b>ESCo Turnover €</b>	<b>70.196</b>	<b>45.947</b>	<b>116.143</b>
<b>Natural Gas €</b>			<b>82.261</b>
<b>O &amp; M €</b>			<b>11.200</b> <small>0,018</small>
<b>Gross Operational Margin</b>			<b>22.682</b>

## Actual Data 2007

### Financial profitability evaluation

Investment € 160.000

#### Cash Flow

0	-160.000	
1	22.682	-137.318
2	22.682	-114.635
3	22.682	-91.953
4	22.682	-69.270
5	22.682	-46.588
6	22.682	-23.906
7	22.682	-1.223
8	22.682	21.459
9	22.682	
10	22.682	

**Simple Return time: 7,5 years**

**→ Result: last year less than 100 units installed in Italy**



# Small Scale CHP Economics



## SMALL COGENERATION PLANT

	Power	Heat
Gross production kWh	630.720	
Auxiliary kWh	9.460	
Net production kWh	621.260	973.249
Tariff €/kWh	0,11299	0,04721

White Certificates **3.154** (ex Sceda 21 AEEG)

ESCo Turnover € **73.350** **45.947** **119.297**

Natural Gas € **82.261**

O & M € **11.200** 0,018

Gross Operational Margin **25.836**

## Actual Data 2007

### Financial profitability evaluation

Investment € 160.000

#### Cash Flow

0	-160.000	
1	25.836	-134.164
2	25.836	-108.328
3	25.836	-82.492
4	25.836	-56.656
5	25.836	-30.820
6	25.836	-4.984
7	25.836	20.852
8	25.836	46.688
9	25.836	
10	25.836	

**Simple Return time: 6,2 years**

# Small Scale CHP Economics



## SMALL COGENERATION PLANT

	Power	Heat	
Gross production kWh	630.720		
Auxiliary kWh	9.460		
Net production kWh	621.260	973.249	
Tariff €/kWh	0,11299	0,04721	
White Certificates	18.922	(necessary 3c€/kWh)	
<b>ESCo Turnover €</b>	<b>89.118</b>	<b>45.947</b>	<b>135.065</b>
<b>Natural Gas €</b>			<b>82.261</b>
<b>O &amp; M €</b>			<b>11.200</b> <small>0,018</small>
<b>Gross Operational Margin</b>			<b>41.604</b>

## Actual Data 2007

### Financial profitability evaluation

Investment € 160.000

#### Cash Flow

0	-160.000	
1	41.604	-118.396
2	41.604	-76.792
3	41.604	-35.188
4	41.604	6.416
5	41.604	48.020
6	41.604	89.624
7	41.604	131.228
8	41.604	172.832
9	41.604	
10	41.604	

**Simple Return time: 4 years**

# Incentives summary



Absolute lack of incentives (White Certificates from AEEG Sceda 21 are blocked)

If present, they would not be sufficient (around 0,5 c€/kWh)

Necessary at least 3 c€/kWh to exploit the huge potential of the Small Scale CHP market

The market has been waiting years for the 2004/8/CE Cogeneration Directive to be accepted in Italy.

Law came in Jan 07.

Now application Decrees still missing

# About White Certificate in the ESCo experience



- ↪ Uncertainty in the certification times (*emission comes months later the request*) → difficult use for cash-flow and financing
- ↪ Low frequency White Certificates emissions: selling waves
- ↪ Asymmetric market: few “obliged” giants vs many small ESCos
- ↪ No real time information system about W.Cert requested quantities → difficult estimate future value
- ↪ ESCo cannot afford to keep the Certificates for better times → a new organization among ESCos –perhaps with the support of a financial subject- could get more stable and higher prices

# So what: today



- ↪ Huge market potential for Small Scale CHP
  - ↪ Interesting for business, environment and politics as well
  - ↪ Presently no incentives and strong red tape for permitting process
- No market

# So what: tomorrow



- ↗ We understand a mechanism aimed to put on the same level (*CO2 avoided*) different technologies, but
- ↗ **In this way, some technologies don't manage to start**
- ↗ In our case: no installed volumes, no standardization, no investments reductions
- ↗ A solution could be to **temporary boost White Certificates for potential technologies like Small Scale CHP**
- ↗ A higher White Cert value for some years would bring important installed volumes and consequent cost reductions, letting the market to start.

**Today it may seem an opinion in the dark.....  
....but we believe we'll do it!**



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