

# **ECO-City project:**Seasonal waste storage, Trondheim





### **Project information**

Project type: Address:

End construction year:

Capacity:

Additional cost for ecoapplication:

Total project cost:

Industrial waste crusher

Heggstadmoen,

Trondheim

2010 15 ton/hour

627 780 €

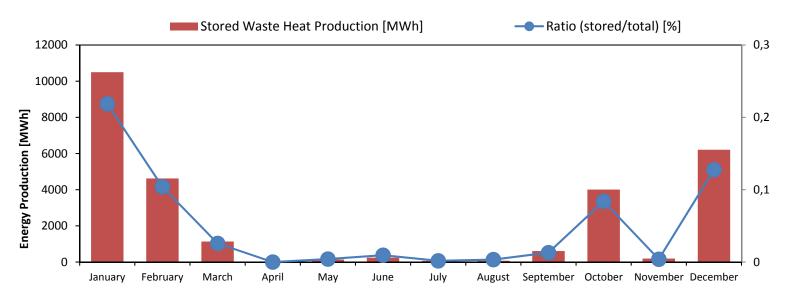
675 000 €

## Special ECO-technologies used:

- Dry waste is stored during spring and summer for combustion in cold season
- Waste wrapped in plastic for storage and transport
- The wrapped waste balls must be broken up into smaller pieces before the incinerator feed for the combustion plant
- Special engineered equipment ("ball crusher") has been designed to break up waste balls
- Heat Supplying to the district heating
- The project has developed and tested custom equipment in cooperation with the supplier



## **Energy production**



## **ECO-City project partners**















# ECO-City project: Seasonal waste storage, Trondheim



### What has been done:

Waste is wrapped in plastic foil like balls for better storage conditions. It is developed a cutting machine for waste balls so that the waste balls is cut up / solved up (removal of the straps and plastic) to combustible fractions. The machine ensures that manual handling of balls is avoided.

#### Why it has been done:

The reason for the project was to develop a cutting machine for waste balls that contribute to increased energy utilization of waste.

The reason for the project can be summarized in the following main points:

- Storage of waste from the summer for use during the winter period through the packaging sorted food waste
- Reduce the need to "fire the crows" in the summer
- Increased amount of waste burned in the winter results in lower energy costs because the waste replaces the use of oil / gas in the winter period

#### How it was done:

#### Goal 1:

Develop a cutting machine for waste balls so that the waste balls is being cut up / dissolved (removal of the straps and plastic) to combustible fractions. Target partially achieved. Sometimes it happens that the ball goes through the mill without being dissolved. This happens if a ball is laying on its side, or with the narrow side through the machine. This is prevented by visual monitoring of the waste reception facility.

#### Goal 2:

Develop a solution that allows one to avoid manual handling of the balls. Goal achieved. The balls are tipped directly into the Walking Floor and Cutting Machine is located in the end so that the Walking Floor automatically transports the balls through the cutting machine

#### Goal 3:

Treat 40 tons of waste balls in 20 minutes. Target not achieved. It takes about 1 hour and 15 minutes to process 30 tons of waste (full car with trailer). The goal was not realistic to achieve. The use of time is still acceptable, as it is added to a solution, where the waste reception facility is able to monitor the treatment of the balls from the weighing bridge by use of camera.



## **Energy production**

| Production<br>Total<br>[MWH] | Production<br>Stored<br>[MWh]   | Heat Content [kWh/ton]  | <b>Total</b><br><b>Waste</b><br>[tons]  | Stored<br>Waste<br>[tons]   | OAT<br>actual<br>[°C]   | <b>OAT</b><br>normal<br>[°C]   | year<br><b>2012</b>   |
|------------------------------|---|---|---|---|---|--|---|
| 47 985                       | 10 500  | 2 500   | 19 194  | 4 200   | -1.9  | -3.0   | January   |
| 44 441                       | 4 623   | 2 500   | 17 777  | 1 849   | -0.6  | -2.5   | February  |
| 44 015                       | 1 135   | 2 500   | 17 606  | 454   | 3.6   | 0.0  | March   |
| 42 207                       | 0   | 2 500   | 16 883  | 0   | 2.8   | 3.0  | April   |
| 33 227                       | 138   | 2 500   | 13 291  | 55  | 7.9   | 9.0  | May   |
| 25 359                       | 240   | 2 500   | 10 144  | 96  | 11.0  | 12.0   | June  |
| 37 193                       | 63  | 2 500   | 14 877  | 25  | 13.3  | 13.0   | July  |
| 22 345                       | 75  | 2 500   | 8 938   | 30  | 13.3  | 12.5   | August  |
| 47 024                       | 610   | 2 500   | 18 810  | 244   | 8.7   | 9.0  | September   |
| 47 712                       | 4 008   | 2 500   | 19 085  | 1 603   | 4.0   | 5.5  | October   |
| 49 504                       | 193   | 2 500   | 19 802  | 77  | 3.0   | 0.5  | November  |
| 48 665                       | 6 210   | 2 500   | 19 466  | 2 484   | -5.4  | -2.0   | December  |
| 489 678                      | 27 793  | 2 500   | 195 871   | 11 117  | 5.0   | 4.8  | Total 2012  |
|                              | Total [MWH] 47 985 44 441 44 015 42 207 33 227 25 359 37 193 22 345 47 024 47 712 49 504 48 665 | Stored         Total           [MWh]         [MWH]           10 500         47 985           4 623         44 441           1 135         44 015           0         42 207           138         33 227           240         25 359           63         37 193           75         22 345           610         47 024           4 008         47 712           193         49 504           6 210         48 665 | Content [kWh/ton]         Stored [MWh]         Total [MWH]           2 500         10 500         47 985           2 500         4 623         44 441           2 500         1 135         44 015           2 500         0         42 207           2 500         138         33 227           2 500         240         25 359           2 500         63         37 193           2 500         75         22 345           2 500         610         47 024           2 500         4 008         47 712           2 500         193         49 504           2 500         6 210         48 665 | Waste [tons]         Content [kWh/ton]         Stored [MWh]         Total [MWH]           19 194         2 500         10 500         47 985           17 777         2 500         4 623         44 441           17 606         2 500         1 135         44 015           16 883         2 500         0         42 207           13 291         2 500         138         33 227           10 144         2 500         240         25 359           14 877         2 500         63         37 193           8 938         2 500         75         22 345           18 810         2 500         610         47 024           19 085         2 500         4 008         47 712           19 802         2 500         193         49 504           19 466         2 500         6 210         48 665 | Waste [tons]         Waste [tons]         Content [kWh/ton]         Stored [MWh]         Total [MWH]           4 200         19 194         2 500         10 500         47 985           1 849         17 777         2 500         4 623         44 441           454         17 606         2 500         1 135         44 015           0         16 883         2 500         0         42 207           55         13 291         2 500         138         33 227           96         10 144         2 500         240         25 359           25         14 877         2 500         63         37 193           30         8 938         2 500         75         22 345           244         18 810         2 500         610         47 024           1 603         19 085         2 500         4 008         47 712           77         19 802         2 500         193         49 504           2 484         19 466         2 500         6 210         48 665 | actual [°C]         Waste [tons]         Content [kWh/ton]         Stored [MWh]         Total [MWH]           -1.9         4 200         19 194         2 500         10 500         47 985           -0.6         1 849         17 777         2 500         4 623         44 441           3.6         454         17 606         2 500         1 135         44 015           2.8         0         16 883         2 500         0         42 207           7.9         55         13 291         2 500         138         33 227           11.0         96         10 144         2 500         240         25 359           13.3         25         14 877         2 500         63         37 193           13.3         30         8 938         2 500         75         22 345           8.7         244         18 810         2 500         610         47 024           4.0         1 603         19 085         2 500         4 008         47 712           3.0         77         19 802         2 500         193         49 504           -5.4         2 484         19 466         2 500         6 210         48 665 | normal [°C]         actual [°C]         Waste [tons]         Content [kWh/ton]         Stored [MWh]         Total [MWH]           -3.0         -1.9         4 200         19 194         2 500         10 500         47 985           -2.5         -0.6         1 849         17 777         2 500         4 623         44 441           0.0         3.6         454         17 606         2 500         1 135         44 015           3.0         2.8         0         16 883         2 500         0         42 207           9.0         7.9         55         13 291         2 500         138         33 227           12.0         11.0         96         10 144         2 500         240         25 359           13.0         13.3         25         14 877         2 500         63         37 193           12.5         13.3         30         8 938         2 500         75         22 345           9.0         8.7         244         18 810         2 500         610         47 024           5.5         4.0         1 603         19 085         2 500         4 008         47 712           0.5         3.0         77         19 802 |

# **ECO-City project partners**











