Enel Green Power
Geothermal for Agriculture and Food

Geneve, 30th October 2015
Enel Green Power
Geothermal for Agriculture and Food

• Enel Green Power – Geothermal leader in Italy
• The business of Heat supply
• Some examples for the use of geothermal heat for food and agriculture
• Opportunities and how to support them
Enel Green Power
Geothermal Leader in Italy

In operation since 1904

761 MW of net installed capacity (1)

5.5 TWh Production per year (1)

360 GWht of sold heat (1)

87.3% load factor (1)

700 employees

1,2 MTEP saved
3,9 Mt of CO₂ avoided

37 Power units
496 wells
570 Km pipelines (1)

1,2 MTEP saved
3,9 Mt of CO₂ avoided

700 EGP employees, more than 1000 contractor workers.

Source: Company information.
(1) As of 2014

- The biggest fully integrated geothermal operator
- Pioneer in the exploitation of the resource – international player
- Culture of field “cultivation” – reinjection as main strategy to compensate the field decline
- Performance leadership: efficiency and availability of power plants.
- Proprietary Technologies
- Innovation.
Enel Green Power
Heat Business

Supplied heat (GWh) 360 split (4% of Italian district heating business and 17% from renewable resource in the same business)
- 52.1% building heating
- 40.4% greenhouses
- 7.2% industrial uses
- 0.3% food industry

Contracts 282
- 7 supplies to district heating systems including Ferrara (HERA)
- 6 supplies for greenhouses – 282,000sm
- 4 supplies for food industry
- 3 other industrial consumers
- 275 minor contracts

FY 2014
Heat Business

Production wells

steam 200 - 220 °C

Water 40 °C

water 30 °C

80%

20%
Heat Business

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>€ cent/Mcal</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPL</td>
<td>25</td>
</tr>
<tr>
<td>Methane</td>
<td>5</td>
</tr>
<tr>
<td>Diesel</td>
<td>15</td>
</tr>
<tr>
<td>Agricultural Diesel</td>
<td>10</td>
</tr>
<tr>
<td>Steam for Electricity</td>
<td>1</td>
</tr>
<tr>
<td>Steam-byproduct</td>
<td>0</td>
</tr>
</tbody>
</table>

Legend:
- State Support
- Cost
Up today there are more than 280,000 sm of greenhouses with 250 workers involved. Production characterized by the necessity to have constant high temperature during the entire year.
- Many types of flower
- Basil
- etc.
40% of the heat is delivered to Greenhouses.
Heat business: food

Most of our customers are part of associations like “SlowFood” and “Comunità del Cibo”

Geothermal as the driver for adding value to traditional and high quality food productions
1% of the total heat is used in cheese and salami production activities.
1% of the heat is used in cheese and salami production activities.
Heat business: food
Future Development

The potential development of new activities in the food and agriculture fields, using geothermal, is still high in Italy, especially in **Tuscany**

**Opportunities**
- Good resource availability
- Incentives
- EGP – Regione Toscana agreement on supply of heat to support new start-ups and local economy
- Availability of financing for start-ups located on geothermal territory

**Barriers**
- Locations quite far from main roads
- Lack of knowledge about the real opportunities
Future Development

General Market for

Food

Flower

Costs for Greenhouse near main communication roads

Thermal Energy = 22%
Transportation = 12%

Costs for Greenhouse at Radicondoli

Thermal Energy = 7%
Transportation = 20%

Geothermal savings 34% - 27% = 7%
How to Incentivate Development

**Enel Green Power efforts**

- Enel green Power, together with local communities that host geothermal power plants, is strongly committed to support start-ups supplying heat for their production process
- **Geothermal district heating** is an important element to mitigate logistical difficulties
- The opportunity to operate directly next to geothermal power plants makes access to the heat easier and cheaper than in other locations
- Lower cost of electricity inside “geothermal area”

**What’s missing?**

- More information about opportunities offered by the geothermal
- A systematic research focus on discovering activities/productions could maximize the benefits that geothermal can bring
Thanks for your kind attention