Welcome to ARC

- Technical Director
  Dan Fredskov
ARC is owned by five municipalities in the capital area

600,000 citizens
68,000 businesses
ARC operates by a balancing principle where revenue and expenses have to balance on a 5 year basis.
Business Areas

- Recycling
- Waste to energy
- Sanitary landfill
- Transfer station for hazardous waste
Amager Bakke
Old and expensive. Compliance with environmental requirements

Modern and flexible. High environmental and energy profile

Since 1970

From 2017
Vision for Amager Bakke:

- SIGNIFICANT HIGH ENVIRONMENT AND ENERGY PROFILE
- MODERN AND FLEXIBLE
- INTEGRATED IN THE CITY
- SHOWCASE FOR WASTE TREATMENT
2013
- Turn of the first sod
- Piling

2014
- Visible
- Design of chimney and turbine

2015
- Installation of machines
- Steelconstruction
- Closing of building

2016
- District Heating Connection
- Testing and inciniration

2017
- Commercial operation
Technology

INCINERATOR / BOILER
2 UNITS 35t/h
GRATE FIRED

FLUE GAS CLEANING
ELECTROSTATIC PRECIPITATOR
FRONT-END SCR
WET FLUE GAS CLEANING

ENERGY PRODUCTION
STEAM TURBINE 60 MW
FLUE GAS CONDENSATION AND HEAT PUMPS
How it all works
99,9 % reduction of hydrochloric acid

Reduction in CO₂ emissions by more than 100,000 tonnes

Dioxin is removed

25% more energy from the waste

NOx emissions will be removed by 96 %

99,5 % reduction of sulphuric acid
Output ratios

- **No heatpumps**
  - Power: 63 MW
  - Heating: 57 MW

- **With heatpumps**
  - Power: 57 MW
  - Heating: 190 MW

- **Heatpumps and turbine by-pass**
  - Power: 247 MW
  - Heating: 0 MW

- High electricity production – normal heating needs
- High wind power production or high heating needs
Heating Networks in the Capital Area
## Investment in Mechanical and Electrical Equipment

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Cost</th>
<th>Equivalent in USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furnace/boiler</td>
<td>1.000 million DKR</td>
<td>(150 million USD)</td>
</tr>
<tr>
<td>Flue gas treatment</td>
<td>400 million DKR</td>
<td>(60 million USD)</td>
</tr>
<tr>
<td>Turbine/generator</td>
<td>150 million DKR</td>
<td>(22 million USD)</td>
</tr>
<tr>
<td>Control and monitoring system</td>
<td>100 million DKR</td>
<td>(15 million USD)</td>
</tr>
<tr>
<td>District heating and electrical connections</td>
<td>70 million DKR</td>
<td>(10 million USD)</td>
</tr>
</tbody>
</table>
## Cost and Revenue

<table>
<thead>
<tr>
<th>Maintenance cost</th>
<th>Years in operation</th>
<th>Maintenance cost in percentage of investment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-2</td>
<td>1,5 %</td>
</tr>
<tr>
<td></td>
<td>2-5</td>
<td>1,8 %</td>
</tr>
<tr>
<td></td>
<td>5-10</td>
<td>2,2 %</td>
</tr>
<tr>
<td></td>
<td>10-</td>
<td>3,0 %</td>
</tr>
</tbody>
</table>

### Operational cost

<table>
<thead>
<tr>
<th>Operational cost</th>
<th>210 DKR/ton waste (30 USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manpower</td>
<td>50 FTE (engineers and craftsmen)</td>
</tr>
</tbody>
</table>

### Revenue from sale of energy as well as gate fee

<table>
<thead>
<tr>
<th>Energy</th>
<th>140 DKR/ton waste (20 USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td>500 DKR/ton waste (75 USD)</td>
</tr>
<tr>
<td>Gate fee</td>
<td>200 DKR/ton waste (30 USD)</td>
</tr>
</tbody>
</table>
250 meters to nearest Residential area. Need for Openness and Communication
Facilities on Amager Bakke
What happens with that ski slope?
Det danske kæbeværk er Ga-Jol-vejr
530,000 Danish people went skiing in 2013.
Our dream ...
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