We are one of Europe’s largest heat suppliers ...

We record less than 1% p.a. customer churn in our >2 m end customer base ...

We deliver 9% ROCE in the Heat portfolio ...

... and we serve Europe’s growth powerhouses (Berlin, Amsterdam, Hamburg, Uppsala, ...)

... and we enjoy substantial political support from our partners to grow and expand our presence

... and base this on a detailed roadmap towards CO₂ neutrality in Heat

Vattenfall Heat fits well with the new energy landscape and offers further growth potential
VATTENFALL HEAT IN NUMBERS

Highlights

- Solid, semi-regulated, revenue streams
- A growing customer base with low churn
- An accelerating contribution to climate smartness
- An established platform to tap into new decentral heat businesses

Financial development (SEK bn)\(^1\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Sales</th>
<th>EBITDA</th>
<th>Underlying EBIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>27.8</td>
<td>5.6</td>
<td>2.4</td>
</tr>
<tr>
<td>2015</td>
<td>27.3</td>
<td>5.7</td>
<td>1.8</td>
</tr>
<tr>
<td>2016</td>
<td>28.4</td>
<td>7.1</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Key data

>2m end customers measured in dwelling equivalents\(^2\)

Growth by 50k new customers in 2016

20.3 TWh Heat sold in 2016

3,790 employees in 2016

Vattenfall is a European leader in district heating

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\(^1\) Including condensing

\(^2\) Based on average household heat consumption
THREE CORE MARKETS WITH DIFFERENT CHARACTERISTICS

<table>
<thead>
<tr>
<th>Market characteristics (all market players)</th>
<th>Germany</th>
<th>Netherlands</th>
<th>Sweden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (space) heating market size (TWh)¹</td>
<td>712</td>
<td>203</td>
<td>83</td>
</tr>
<tr>
<td>Dominating fuel</td>
<td>gas/coal/waste</td>
<td>gas/waste</td>
<td>wood/waste/el. no gas grid</td>
</tr>
<tr>
<td>Share of renewables in District Heating (DH)¹</td>
<td>10%</td>
<td>1%</td>
<td>68%</td>
</tr>
<tr>
<td>Average customer heat price €ct/kWh</td>
<td>8</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Number of customer equivalents</td>
<td>1,7m</td>
<td>210k</td>
<td>230k</td>
</tr>
<tr>
<td>Vattenfall’s market position</td>
<td>#1</td>
<td>#1</td>
<td>#3</td>
</tr>
</tbody>
</table>

| Growing German market                       | Young Dutch Market | Mature Swedish market |

A well balanced market mix allows Vattenfall to capitalize on growth opportunities

¹ Source: Vattenfall analysis
POTENTIAL FOR PROFITABLE GROWTH

Residential heat market structure

<table>
<thead>
<tr>
<th>Country</th>
<th>DH Market Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netherlands</td>
<td>&lt;15% DH in cities</td>
</tr>
<tr>
<td>Germany</td>
<td>20-30% DH in Berlin and Hamburg</td>
</tr>
<tr>
<td>Sweden</td>
<td>~80% DH in Uppsala and Stockholm</td>
</tr>
</tbody>
</table>

Our (current) footprint

- **Sweden – mature DH market**
  - Strong growth in metropolitan areas expected (esp. Stockholm, Uppsala)
  - District heating providing CO₂-free base supply, heat pumps taking larger market share

- **Netherlands – young DH market**
  - Strong growth in Amsterdam and surroundings (+6% p.a.)
  - Ambition to replace gas by 2050; an opportunity for district heating growth
  - District heating with high usage of third party heat sources (waste, etc.), growth of heat pumps

- **Germany – developing DH market**
  - Hamburg and Berlin “boom” towns of the future
  - District heating based on climate neutral solutions in densely populated areas; modern decentralised solutions (gas based, heat pumps) replacing old oil and gas boilers elsewhere

A well balanced market mix allows Vattenfall to capitalize on growth opportunities

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1 Source: Vattenfall analysis
Drivers for district heating revenues

- “Additional” revenue from electricity sales
- Revenues from district heating based on price—indexed long-term contracts in most cases

Revenue breakdown

~82% Revenues from heat sales

~18% Revenues from electricity

Contract lengths for district heating customers

- 3 months: 15-30 years
- 10 years: Churn: <1% p.a.

Customers stay with us long-term, providing Heat with a highly stable revenue stream
WE CONTRIBUTE ACTIVELY TO “POWER CLIMATE SMARTER LIVING”

**Customer growth**
- Broaden product offering
- Realise strong customer growth in district heating and decentralised energy solutions
- Position Heat as partner of choice for cities
- Regulatory management

**Shape a sustainable portfolio**
- Develop and deliver on climate neutrality/CO₂ roadmaps
- Increase the share of third party heat sources (TPI)
- Integration of renewable energy sources with Power-to-Heat solutions

**Drive innovation**
- Foster and implement digital solutions on supply and customer side
- Smart meter roll-out
- Test new CO₂-free fuels (ammonia, hydrogen)

**Improve performance**
- High performing operations (top quartile ranking in external benchmarks)
- Reduce maintenance Capex and Opex
- Excellence in project execution

**Develop our team and culture**
- Deliver on industrial safety targets
- Secure new competences
- Encourage entrepreneurship and collaboration
25% MORE CUSTOMERS BY 2025

A strong customer value proposition...

transparent  

fair  

decentral

first time  

right  

simple  

with a personal touch

...will create continued growth

Heat has strong growth ambitions – within district heating and decentralised solutions across all markets

1 Heat customers in dwelling equivalents x 1000
Decentralised solutions are already today substantial contributors to Vattenfall Heat’s performance and have a strong potential for future growth.

Decentral growth

- Focus on B2B-segment
- Organic growth in Berlin and Hamburg and adjacent cities and potential for inorganic growth
- Bundling of our distributed business into one entity
- Current product = heat solutions with gas boilers and mCHPs
- Future: add renewable sources to offering

Decentral heat contracting demand in Germany (TWh)\(^1\)

Customer growth
VATTENFALL HEAT WILL GO GREEN BY 2050

Ambition for zero CO₂ emissions by 2050

- Switch from coal to gas and from peat to biomass
- Add heat storages and Power-to-Heat (results in -2.8 Mt savings in 2035 vs. today, i.e. -30%)
- Take advantage of existing sources of industrial “waste heat” (Third Party Integration)
- Work with technology partners on new CO₂-free technologies (hydrogen, ammonia)
- Align closely and integrate city partners

Shape a sustainable portfolio

Vattenfall Heat CO₂ reduction path

More than 50% of CO₂ reduction achieved by 2030 due to coal phase out in Germany
Remaining CO₂ part will by reduced by stepwise implementation of CO₂ technologies

A clear path towards substantial CO₂ reductions
INCREASE IN THIRD PARTY HEAT SOURCES

Fuel mix ¹

Third Party Integration (TPI) vol.

<table>
<thead>
<tr>
<th>Year</th>
<th>800 MW</th>
<th>1,500 MW</th>
<th>1,800 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Waste heat</td>
<td>Biogas, hydrogen, -oil</td>
<td>Solar-/geothermal</td>
</tr>
<tr>
<td>Today</td>
<td>44%</td>
<td>10%</td>
<td>11%</td>
</tr>
<tr>
<td>2030</td>
<td>38%</td>
<td>13%</td>
<td>5%</td>
</tr>
<tr>
<td>2050</td>
<td>43%</td>
<td>10%</td>
<td>6%</td>
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TPI examples

- Waste incineration (Berlin, Hamburg + NL)
- Green heat from digesters and biomass boilers (NL)
- Industrial waste heat (SWE)
- Moorburg (300 MW)
- Waste water (130 MW)
- Industrial process (60 MW)
- Others
- Power to Gas small scale CHP
- Geothermal (NL)
- Biomass (SWE)
- Waste incineration (NL)
- Low temp. Heat (all)

We are already today integrating external supply and will foster this going forward

¹ Vattenfall analysis
WE DRIVE INNOVATION

Currently 60 Network information points
New: 19,100 Network information points

Load mgt.
Consumption opt.
Production data
Consumption data

Distribution:
1. Electronic accounting
2. Heat revenue planning
3. Densification potential

Operation:
1. Support fault mgt.
2. Elimination of manual meter reading

Going “digital” is top ranked on Vattenfall’s agenda
What we have achieved

What we will continue to do until 2020 on top

- **Portfolio optimisation** → decommissioning of aging assets and strategic portfolio adjustments
- **We permanently benchmark ourselves to learn from the past**: the yearly Solomon benchmark provides an outside-in perspective on the performance of our assets, costs, reliability and efficiency
- **With Structured Maintenance Review (SMR) we plan the future asset related activities**: enables risk/benefit based maintenance decisions
- **International procurement optimisation** (economy of scale effects) results in lower costs and higher quality of provided services

... and will continue this route consistently
## STRATEGY – DELIVERED

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