POLISH DISTRICT HEATING SECTOR

SECTOR ANALYSIS WITH BUSINESS OPPORTUNITIES FOR SWEDISH COMPANIES

18 December 2014
Warsaw
AGENDA

- Key questions
  - Key findings
  - Opportunities
  - Potential
  - Structure
KEY QUESTIONS

- Opportunities
  - What are the main business opportunities in the segment?
  - How large are the business opportunities?
  - Who can make use of the business opportunities?
  - How to make use of the business opportunities?
- Potential
  - How large is the segment and how has the segment size developed in the past?
  - How is the segment expected to develop in near future?
  - What drives segment growth?
- Structure
  - How is the segment structured?
  - How many actors are active?
  - Who are the key players, how do they target the market and where are they located?
  - What regulations should be considered?
AGENDA

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**KEY FINDINGS**

- **Opportunities**
  - Main business opportunities include construction of new CHP sources, modernization of heating plants as well as expansion and upgrade of DH pipeline
  - Business opportunities identified are worth nearly 3 BEUR
  - The opportunities are for suppliers of gas and steam turbines, boilers, piston gas engines, flue gas cleaning installations, low emission gas or biomass boilers, heat exchangers, networks upgrading solutions, hydraulic control solutions and intelligent network management
  - To make use of the business opportunities, Swedish SMEs should participate in tender procedures, build networking contacts with general contractors and investors, form partnership with local players

- **Potential**
  - Poland has the biggest DH market in Europe worth nearly 3 BEUR and 16 million inhabitants connected
  - Both district heat production and sales are stable. Heat demand to grow by 1% yearly until 2030
  - Only 60% of heat produced in CHP sources
  - DH market is very fragmented though it undergoes consolidation
  - District heating pipeline has grown by 1,000 km during last 5 years
  - Fixed assets of the Polish district heating sector on track of improvement
  - Drivers for growth are government support, regulations and expanding agglomerations

- **Structure**
  - Almost 50% of DH companies belong to public sector though majority of heating systems in biggest agglomerations is controlled by private companies
  - Only 8 producers with installed capacity over 1GW. They control nearly 30% of the market
  - Top 10 DH distributors control about 40% of transmission networks
  - Key actors are Termika, Dalkia, EDF, PGE, Tauron, Fortum, MPEC Kraków, GPEC
  - Several regulations should be considered but no significant legal entry barriers
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MAIN BUSINESS OPPORTUNITIES

- Construction of new CHP sources
- Expansion of DH pipeline
- Modernization of heating plants
- Opportunities
CONSTRUCTION OF NEW CHP SOURCES

What – examples:
- Termika: planned construction of a new block in Żerań CHP, Warsaw to be ready by 2018
- Tauron: planned new block in Łagisza CHP, Silesia to be ready by 2018 and in Stalowa Wola CHP built together with PGNiG
- Fortum: planned tenders in Wrocław and Zabrze
- Energa: planned tenders in Elbląg, Kalisz and Grudziądz

How large
- Estimated investments:
  - Termika: ca 360 MEUR
  - Tauron: ca 720 MEUR
  - Fortum: 600 – 730 MEUR

Identified investments totally: 1.7 – 1.8 BEUR

For whom
- Suppliers of gas and steam turbines, boilers, piston gas engines, heat exchangers and other related equipment

How
- Tenders
- General contractors networking contacts
- Investors networking contacts

SOURCE: WNP.PL, PRESS ARTICLES, COMPANIES WEBSITES, BUSINESS SWEDEN ANALYSIS
MODERNIZATION OF EXISTING HEATING PLANTS

- **What**
  - Modernization or replacement of existing heating plants installations triggered by Industrial Emissions Directive (IED)
  - Examples of investments
    - EDF: investments in several CHPs
    - Termika: sulfur removing installation in Siekierki CHP, Warsaw

- **How large**
  - EDF: over 480 MEUR
  - Termika: ca 120 MEUR
  - Identified investments totally: 600 MEUR

- **For whom**
  - Suppliers of flue gas cleaning installations (for removal of sulfur, nitrogen and dust), low emission gas or biomass boilers

- **How**
  - Tenders
  - Network building among investors and general contractors
  - Forming partnerships with local players

SOURCE: PRESS ARTICLES, COMPANIES WEBSITES, BUSINESS SWEDEN ANALYSIS
UPGRADE AND EXPANSION OF DH PIPELINE

What
- Connection to DH pipeline within low emission reduction programme administered by National Environment Protection Fund
  - In towns with population > 10 000
- Enea: upgrading and expanding of MPEC Białystok pipeline
- MPEC Kraków development

How large
- Ca 220 MEUR in until 2019
- Ca 140 MEUR within Integrated Regional Investments project
- Identified investments totally: 360 MEUR

For whom
- Suppliers of pipeline upgrading solutions, hydraulic control solutions and intelligent network management

How
- Tenders
- Network building among investors and general contractors

SOURCE: PRESS ARTICLES, COMPANIES WEBSITES, BUSINESS SWEDEN ANALYSIS
AGENDA

- Key questions
- Key findings
- Opportunities

Potential
- Structure
DISTRICT HEATING PLAYS AN IMPORTANT ROLE IN POLAND

SHARE OF CITIZENS SERVED BY DH IN SELECTED EUROPEAN COUNTRIES, %, IN 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Share of Citizens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iceland</td>
<td>92</td>
</tr>
<tr>
<td>Latvia</td>
<td>68</td>
</tr>
<tr>
<td>Lithuania</td>
<td>67</td>
</tr>
<tr>
<td>Denmark</td>
<td>63</td>
</tr>
<tr>
<td>Estonia</td>
<td>62</td>
</tr>
<tr>
<td>Finland</td>
<td>50</td>
</tr>
<tr>
<td>Sweden</td>
<td>48</td>
</tr>
<tr>
<td>Poland</td>
<td>41</td>
</tr>
<tr>
<td>Czech R.</td>
<td>39</td>
</tr>
<tr>
<td>Slovakia</td>
<td>36</td>
</tr>
<tr>
<td>Austria</td>
<td>22</td>
</tr>
<tr>
<td>Romania</td>
<td>19</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>18</td>
</tr>
<tr>
<td>Germany</td>
<td>12</td>
</tr>
<tr>
<td>France</td>
<td>8</td>
</tr>
<tr>
<td>Italy</td>
<td>5</td>
</tr>
<tr>
<td>Norway</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: EUROHEAT & POWER
BIGGEST DISTRICT HEATING MARKET IN EUROPE

NUMBER OF CITIZENS SERVED BY DH IN SELECTED EUROPEAN COUNTRIES IN MILLION, IN 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Citizens Served in Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>16,0</td>
</tr>
<tr>
<td>Germany</td>
<td>9,6</td>
</tr>
<tr>
<td>France</td>
<td>5,2</td>
</tr>
<tr>
<td>Sweden</td>
<td>4,8</td>
</tr>
<tr>
<td>Czech R.</td>
<td>4,3</td>
</tr>
<tr>
<td>Romania</td>
<td>3,8</td>
</tr>
<tr>
<td>Denmark</td>
<td>3,8</td>
</tr>
<tr>
<td>Italy</td>
<td>3,0</td>
</tr>
<tr>
<td>Finland</td>
<td>2,5</td>
</tr>
<tr>
<td>Lithuania</td>
<td>2,0</td>
</tr>
<tr>
<td>Slovakia</td>
<td>1,8</td>
</tr>
<tr>
<td>Austria</td>
<td>1,8</td>
</tr>
<tr>
<td>Latvia</td>
<td>1,4</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>1,3</td>
</tr>
<tr>
<td>Estonia</td>
<td>0,6</td>
</tr>
<tr>
<td>Iceland</td>
<td>0,3</td>
</tr>
<tr>
<td>Norway</td>
<td>0,1</td>
</tr>
</tbody>
</table>

MORE THAN 3 TIMES LARGER POPULATION CONNECTED TO DH THAN IN SWEDEN

SOURCE: EUROHEAT & POWER, EUROSTAT
TURNOVER OF DH COMPANIES NEARLY 3 BEUR

COMPANIES TURNOVER FROM DH SALES, BEUR

INVESTMENT OF HEATING COMPANIES, BEUR

INVESTMENTS ARE GROWING AT A SIMILAR PACE AS THE TURNOVER OF THE SEGMENT

SOURCE: URE, BUSINESS SWEDEN ANALYSIS
PRODUCTION OF HEAT REMAINS STABLE

PRODUCTION OF HEAT FOR DH BY SEGMENT, PJ

![Chart showing production of heat for DH by segment from 2008 to 2013.](chart)

- **Utilities**
- **Industry**
- **Other**

**2008**
- Utilities: 272
- Industry: 12
- Other: 12

**2009**
- Utilities: 267
- Industry: 15
- Other: 6

**2010**
- Utilities: 295
- Industry: 14
- Other: 6

**2011**
- Utilities: 257
- Industry: 12
- Other: 5

**2012**
- Utilities: 267
- Industry: 12
- Other: 5

**2013**
- Utilities: 262
- Industry: 12
- Other: 5

CAGR -0.6%

**SOURCE:** URE
60% OF HEAT IS PRODUCED IN CHP SOURCES

PRODUCTION OF HEAT FOR DH BY TYPE OF PRODUCTION, PJ

<table>
<thead>
<tr>
<th>Year</th>
<th>CHP</th>
<th>Heat</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>181</td>
<td>107</td>
</tr>
<tr>
<td>2009</td>
<td>184</td>
<td>104</td>
</tr>
<tr>
<td>2010</td>
<td>195</td>
<td>120</td>
</tr>
<tr>
<td>2011</td>
<td>175</td>
<td>99</td>
</tr>
<tr>
<td>2012</td>
<td>179</td>
<td>105</td>
</tr>
<tr>
<td>2013</td>
<td>175</td>
<td>103</td>
</tr>
</tbody>
</table>

ABOUT 40% OF HEAT PRODUCTION IN POLAND IS THE POTENTIAL FOR FUTURE UPGRADE/MODERNISATION

SOURCE: URE
SALES OF HEAT REMAIN STABLE

SALES OF HEAT, PJ

SLIGHT DECREASE CAUSED BY ENERGY EFFICIENCY INVESTMENTS IN THERMOMODERNISATION OF OLDER BUILDINGS

SOURCE: URE
DEMAND FOR DISTRICT HEAT IS EXPECTED TO GROW BY 0.7% YEARLY UNTIL 2030

FORECASTED DEMAND FOR DISTRICT HEAT BY SEGMENT, PJ

- Agriculture
- Trade and Services
- Industry & Construction
- Households

FASTEST GROWTH 3.1% YEARLY EXPECTED FOR TRADE AND SERVICES SECTOR

SOURCE: ARE 2011
DUE TO CONSOLIDATION PROCESS NUMBER OF HEATING COMPANIES WENT DOWN BY 13% SINCE 2008

NUMBER OF HEATING COMPANIES PER SEGMENT

-13%

COMMENT

- Examples of consolidation processes:
  - Fortum acquired CHP Zabrze and CHP Bytom in 2011
  - EdF has acquired CHP Gdańsk, CHP Gdynia, 3 CHP plants in Wrocław, CHP in Zielona Góra, CHP in Toruń, CHP in Kraków
  - Enea acquired CHP Białystok in 2011 followed by acquisition of MPEC Białystok in 2014
  - Termika acquired 2 CHP and 3 heat plants in Warsaw, 1 CHP in Pruszków
  - Is looking for more CHP and heat plants to buy already in 2015
    - in need of modernization
    - located in towns > 100 000 population

SOURCE: URE, PRESS ARTICLES
410 COMPANIES ACTIVE

NO OF HEAT PRODUCERS BY INSTALLED CAPACITY, TOTAL 410 COMPANIES, 2013

COMMENT
- 6% of companies have almost 50% of installed capacity
- 22% of companies stand for almost 80% of installed capacity
- 6% of companies with installed capacity of 500MW and more
- Almost 60% of companies with installed capacity below 50MW

POLISH DISTRICT HEATING MARKET IS VERY FRAGMENTED

SOURCE: URE
COAL 80% OF SHARE IN HEAT PRODUCTION

TOTAL HEAT PRODUCTION BY FUELS, PJ

- Coal
- Oil
- Other
- Natural gas
- Biomass

Growth/decrease rate
- 37%
- 45%
- - 48%

NATURAL GAS AND BIOMASS ON THE RISE, OIL DECREASING TENDENCY

SOURCE: URE

BUSINESS SWEDEN
DISTRICT HEATING PIPELINE HAS GROWN BY 1 000 KM DURING LAST 5 YEARS

TRENCH LENGTH OF DISTRICT HEATING PIPELINE, THOUSAND KM

COMMENT
- Examples of investments:
  - Enea: upgrading and expanding of MPEC Białystok networks
    - Ca 25 MEUR in the coming 5 years
  - MPEC Kraków
    - Connecting 400 new buildings to the networks in 2011-2014
    - Ca 140 MEUR for further development within Integrated Regional Investments project

SOURCE; URE, PRESS ARTICLES
FIXED ASSETS OF THE DISTRICT HEATING COMPANIES ON TRACK OF IMPROVEMENT

DEPRECIATION RATE* OF FIXED ASSETS IN %

SOURCE: URE, EUROEHAT, BUSINESS SWEDEN ANALYSIS

COMMENT

- Heat sources upgrades include:
  - Construction of CHP sources units to increase production efficiency
  - Installation of flue gas cleaning systems to reduce emissions
- Networks upgrades designed to reduce heat losses comprise:
  - Replacement of old pipelines with pre-insulated ones
  - Reduction of unnecessary pipe diameters
  - Introduction of intelligent network management

*Depraciation shows the share of amortization of fixed assets
## Drivers for Growth Are Political, Financial and Economic

<table>
<thead>
<tr>
<th><strong>CHP Government Support</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- The present Government support for CHP sources in Poland is binding till 2018</td>
</tr>
<tr>
<td>- Leading heating companies believe it will be prolonged and invest in new CHP sources</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>KAWKA Programme</strong></th>
</tr>
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<tbody>
<tr>
<td>- Programme to reduce low emission for 2013 - 2018 administered by National Environment Protection Fund with total budget of over 190 MEUR</td>
</tr>
<tr>
<td>- Through replacement of old stoves and small coal-fired boilers used for heating houses and connecting to DH pipeline</td>
</tr>
<tr>
<td>- in towns with population over 10,000 in 11 regions of Poland</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Industrial Emissions Directive</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Necessity to invest in modernisation of existing heating plants by installing flue gas cleaning or building new CHP sources in order to adapt to IED binding from 2016</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Economic Growth and Expanding Agglomerations</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Economic growth expected to enhance heat consumption in trade and services, industry and construction and households</td>
</tr>
<tr>
<td>- Growing agglomerations e.g. Warsaw, Kraków, Wrocław will create demand for new DH pipeline</td>
</tr>
</tbody>
</table>

*Source: Business Sweden Analysis*
AGENDA

- Key questions
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HEATING GENERATION CONCENTRATED IN THREE REGIONS

SOURCE: URE

50 - Number of companies, 2013

Installed capacity GW, 2013
- > 10
- 5 - 10
- 2 - 5
- < 2
BIGGEST NUMBER OF DISTRIBUTION COMPANIES AND LONGEST DH PIPELINE IN TWO REGIONS

53 - Number of companies, 2013

Pipeline length
Thousand km, 2013
- > 2
- 1 – 2
- < 1

SOURCE: URE
ALMOST 50% OF DISTRICT HEATING COMPANIES BELONG TO PUBLIC SECTOR

OWNERSHIP STRUCTURE OF DH COMPANIES, %, 2012

- Public sector: 48%
- Private sector: 24%
- Mix with private majority: 16%
- Mix with public majority: 12%

COMMENT

- Nearly 50% of district heating companies in Poland are controlled by local self-government units.
- However, public ownership concerns mainly heating systems in smaller towns.
- In result of privatization processes the majority of heating systems in biggest Polish agglomerations is controlled by private sector, e.g.
  - Warsaw: Dalkia (transmission) and Termika (generation)
  - Łódź: Dalkia
  - Silesian agglomeration: Tauron (transmission & generation), Fortum and CEZ (generation)
  - Wrocław: Fortum (transmission) and EDF (generation)
  - Poznań: Dalkia

SOURCE: URE, PWC
TOP 8 HEAT PRODUCERS CONTROL 30% OF THE MARKET

MARKET SHARES OF HEAT PRODUCERS
%, 2013, by installed capacity, 100%=56 GW

MARKET SHARES OF TOP 8 HEAT PRODUCERS
%, 2013, by installed capacity, 100%=16 GW

- Termika 25%
- Dalkia 22%
- EDF 18%
- PGE 14%
- Tauron 7%
- CEZ 5%
- Fortum 5%
- ECO 4%

Other 70%

TOP 8 30%

Local companies
International companies

* Only 8 companies with installed capacity > 1 GW

SOURCE: URE, COMPANIES WEBSITES, BUSINESS SWEDEN ANALYSIS
TOP 10 DH DISTRIBUTORS CONTROL 40% OF TRANSMISSION NETWORKS

MARKET SHARES OF HEAT DISTRIBUTORS %, 2013, by networks length, 100%=20 000 km

MARKET SHARES OF TOP 10 HEAT DISTRIBUTORS %, 2013, by networks length, 100%=7 600 km

SOURCE: URE, COMPANIES WEBSITES, BUSINESS SWEDEN ANALYSIS
LOCATION OF KEY HEAT PRODUCERS AND DISTRIBUTORS

SOURCE: BUSINESS SWEDEN ANALYSIS
SEVERAL REGULATIONS SHOULD BE CONSIDERED

EU AND POLISH REGULATIONS

<table>
<thead>
<tr>
<th>Subsegment/Regulation</th>
<th>DH Generation</th>
<th>DH Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Law</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Energy Policy until 2030</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Energy Efficiency Act</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>URE concession regulations</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Directive 2004/8/EC</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Industrial Emissions Directive</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

NO SIGNIFICANT ENTRY BARRIERS

SOURCE: BUSINESS SWEDEN RESEARCH AND ANALYSIS
BUSINESS SWEDEN MAKES IT EASIER FOR SWEDISH COMPANIES TO GROW INTERNATIONALLY

BUSINESS SWEDEN INTERNATIONALISATION SERVICES

Examine opportunities and choose market
- Export Information
- Steps to Export
- Trade Facilitation
- Market Selection Analysis

Understand market and define entry strategy
- Market Analysis
- Visiting Program
- Market Entry Strategy
- Partner Search
- Business Opportunity Pr.
- Connect

Establish presence in foreign markets
- Incorporation
- Business Support Office
- Acquisition Support
- Recruitment Services
- Sourcing Services

Develop and grow your international business
- Sales and Marketing Support
- Operational Support
- Business Development
- BSO Connect
CONTACT BUSINESS SWEDEN IN WARSAW

Daniel Larsson
Trade Commissioner
Business Sweden in Warsaw

daniel.larsson@business-sweden.se
+48 602 55 20 22