China air source heat pump market development

Cooper Hengyi Zhao 赵恒谊 Rotterdam, May 17th,
Vice general secretary – China heat pump alliance, CHPA
Program manager-International Copper Association, ICA
China heat pump alliance is initiated by China Energy Conservation Association and International Copper Association in 2009.

Organizations:
- Policy makers
- Policy lobby
- Supply Chain
- Market education
- Market intelligence
- International cooperation
- OEMs
- Parts
- Local associations
- Distributors
- Institution
- Consulting

Strategies:
- Promote heat pump, especially, air source heat pump heating application.

Targets:
- Policy lobby
- Supply Chain
- Market education
- Market intelligence
- International cooperation
China heat pump alliance
Organization, Strategy, Targets

Promote ASHP to replace gas/coal-fried, and electrical resistance boiler, to gain more market share in heating sector.

>200 manufacturer members, represent >80% air source heat pump production in China

Gained grant from EU Switchasia funding
Signed MOU with EHPA

200 manufacturer members, represent >80% air source heat pump production in China
China heat pump alliance development
### Air Source Heat pumps in China

#### 热泵在中国的总体情况

<table>
<thead>
<tr>
<th>Product</th>
<th>HP</th>
<th>Market Size-2016</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air to air HP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air to air reversible</td>
<td>Room AC</td>
<td>50 million units, &gt;200 billion RMB</td>
<td>Primary - Cooling</td>
</tr>
<tr>
<td></td>
<td>VRF</td>
<td>30 billion RMB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Package AC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Duct AC</td>
<td>10 billion RMB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Air to air</td>
<td></td>
<td>Heating</td>
</tr>
<tr>
<td></td>
<td>Industrial drying</td>
<td>100 million RMB</td>
<td></td>
</tr>
<tr>
<td>Air to water HP</td>
<td>Domestic-Sanitary hot water</td>
<td>1.3 million units, 7 billion RMB</td>
<td>Only/Primary for heating</td>
</tr>
<tr>
<td></td>
<td>Commercial-Sanitary hot water</td>
<td>120K units</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Space heating</td>
<td>200K units</td>
<td></td>
</tr>
<tr>
<td>Air to water reversible</td>
<td>Scroll compressor</td>
<td>5 billion RMB</td>
<td>Primary - Cooling</td>
</tr>
<tr>
<td></td>
<td>Screw compressor</td>
<td>1.2 billion RMB</td>
<td></td>
</tr>
</tbody>
</table>
Air Source Heat Pump Growth in China

Heating Application, not including reversible cooling product

- DHW-Sanitary hot water
- Air to water heat pump-space heating
- Industry and agriculture application

In 2016, 12.8 billion RMB turnover (Factory price)
Air source heat pump - Sanitary hot water

Air to water heat pump - Sanitary hot water application
Domestic sales, 1.3 million units in 2015.

Source: China heat pump alliance
Renewable policy-Air source heat pump heating product (Aerothermal)

- Renewable energy policy for air source heat pump heating equipment:
  - Since 2012, CHPA works with Congress, National bureau of Energy, and Ministry of building (MOHURD), to facilitate the RE policy for air source heat pumps.

<table>
<thead>
<tr>
<th>Province or City</th>
<th>Policy</th>
<th>Issued By</th>
<th>Issued On</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>Guidebook for Including Aerothermal Energy in Renewable Energy Sources</td>
<td>Center of Science and Technology of Construction, MOHURD</td>
<td>November 25, 2015</td>
</tr>
<tr>
<td></td>
<td>13th five-years national energy conservation action plan</td>
<td>State council</td>
<td>Dec. 2016</td>
</tr>
</tbody>
</table>
Air source heat pump water heater
Household project
Total residential water heater, 40 million units sold in 2014 DHW-HP, 3% by units, 9% by value. Still big potential.

2015 China residential water heater market share

Source: China heat pump alliance & Chinaiol
Air source heat pump-Space heating

2016, low temp air to water, ASHP, 215K units
Around **700%** growth, comparing with 2015.

2014 to 2016 low temp air to water heat pump installation in China

2014: 0.21
2015: 0.74
2016: 2.23

Around 406% growth, comparing with 2014.
Air pollution, “Haze”, a big problem in north of China during winter

• Air pollution, “HAZE”, big threats for people health.

• Central government set targets and timeline to control air pollution. Especially for the area, around Beijing, the capital.
“Coal to electricity” program in China
Coal fired boiler replacement by electrical heating devices

Since 2013, Beijing government, agriculture committee, started the “coal to clear energy” subsidy program. **90% equipment investment subsidized** by government

Investigation and field trials for several kinds of electrical heating products, including,

- Direct electrical heater
- Thermal storage electrical heater
- Electrical heating film
- Electric carbon rail
- Geo source heat pump
- Air source heat pump

In 2015, **50,000 households** participated in “coal to electricity” program. 5844 units air to water heat pump were installed with air to water heat pump, **around 12%**.
CHPA supports Beijing government to choose heat pump as key technical solution, in “Coal to electricity” program

From 2015 to 2016, CHPA worked close with Beijing agriculture committee to do technical comparing and “coal to electrical” program guidelines,

- Policy proposal preparation.
- Organize OEM for field trials.
- Industry investigation.
- Technical workshops
- Draft guideline and work plan.

Key benefits-Air source heat pump,
- Energy saving
- Low grid update investment
- Comfort

Thanks helps from Thomas-EHPA, Roger Normand-IEA HPC, Marek-ISE.
“Coal to electricity” in China
Coal fired boiler replacement
by electrical heating devices

As a result, in 2016, Beijing decided to set the 80% market share requirement in the “Coal to electricity” program guidelines for heat pump and hybrid system.

For each household who choose air source heat pump,

Government subsidy, 24,000 RMB
Self-paid, 4,000 RMB

Total around 28,000 RMB for one typical air to water heat pump system, not including heat emitter
Air to water heat pump
Replaced coal-fired boilers
Village by village in 2016 winter
In 2016, air to water heat pump achieve 28 times growth in Beijing

Heat pump market share in “Coal to electricity” program of Beijing, increase from **12% in 2015 to 76.8% in 2016.**

**161,000** units installed ASHP for space heating in Beijing in 2016. Comparing with 2015, **28 times** increase

Beijing government gave **5 billion RMB** subsidy for air source heat pump in 2016 to replace coal fired boilers.
Beijing, air to water heat pump
Technical details in 2016

Source: China heat pump alliance
2017 bigger market
Continue fast growth

Prime minister, Li Keqiang, announced in this March, in 2017, China will complete 3 million household “coal to clear energy”, including gas and electricity.

2017, Beijing plans to install around 300,000 units air to water heat pumps.

Shandong, Shanxi, Hebei, Henan, provinces will take actions for “coal to electricity” program.
ASHP industry application also grows fast in China. In 2016, the whole market is already 350 million RMB, 45% growth rate comparing with 2015.

**2010-2015 China ASHP industrial dryer market development**

- **Agriculture**
  - Tea, tobacco, etc.
- **Industry**
  - Publication, paper making, etc.
- **Food process**
  - Mushroom, seafood
- **Chinese medicine**
  - Wolfberry, etc.
- **Cloth dryer**
  - Cloths
- **Specials**
  - Mud, fireworks

Source: China heat pump alliance
China heat pump industry projection
(Air source heat pump heating application)

On Feb 17, we had our core member meeting. 116 manufacturer representatives voted for the industry projection. 48% chose >50 billion RMB till 2020.
• Heat pump application need policy support globally to competing with traditional/ fossil fuel heating equipment.

• Create a synergy in the world heat pump community to speak for heat pump technologies at policy making process.

- RE policy for China, Japan and other countries.
- Unified EE standard for all water heater and boilers.
- Existing Coal boiler replacement.

- Policy handbook, policy best practices/experience sharing workshop, etc.
Thank you 谢谢！

For more information please contact cooper.zhao@copperalliance.org zhaohy@cecaweb.org.cn

赵恒谊 Cooper Hengyi Zhao

电话：021 6391 5816
手机：189 1618 1988