INDUSTRIAL PUMPS, FANS & ASDs
BPA Market Research Team, AUGUST 18, 2022
Standalone pumps and fans are huge energy consumers in the Industrial sector.

- **MOTORS 73%**
- **PUMPS & FANS 31%**
- **COMPRESSED AIR 9%**
- **MATERIAL HANDLING 18%**
- **MATERIAL PROCESSING 20%**
- **REFRIGERATION 20%**
- **PROCESS HEAT 4%**
- **HVAC 9%**
- **LIGHTING 7%**
- **OTHER 6%**
- **OTHER 2%**

2021 Plan Industrial Electricity Consumption
ENERGY EFFICIENCY
The Adjustable Speed Drive is the **biggest energy saving opportunity** for these equipment
Built **quantitative model** with best available data

- National Pump and Fan Stock
- Regional Macroeconomic Trends
- Regional ASD Market Intelligence
- Regional Pump and Fan Operations

Stock Turnover Model + Expert Review

Regional energy consumption estimates
What did we learn about the market?
Industrial pump and fan stock **grew consistently** from 2016 to 2021

<table>
<thead>
<tr>
<th>Year</th>
<th>In-service motor HP, pumps &amp; fans</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>2,295,849 motor HP</td>
</tr>
<tr>
<td>2016</td>
<td>2,342,648 motor HP</td>
</tr>
<tr>
<td>2017</td>
<td>2,337,759 motor HP</td>
</tr>
<tr>
<td>2018</td>
<td>2,447,032 motor HP</td>
</tr>
<tr>
<td>2019</td>
<td>2,454,338 motor HP</td>
</tr>
<tr>
<td>2020</td>
<td>2,419,957 motor HP</td>
</tr>
<tr>
<td>2021</td>
<td>2,387,350 motor HP</td>
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Average pump size increased over the past 6 years.

This is because industries with larger average motor sizes are increasing in the region.
While stock grew, the overall energy consumption stayed flat.

<table>
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<tr>
<th>Year</th>
<th>Motor HP (motor HP)</th>
<th>Energy Consumption (aMW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>2,295,849</td>
<td>908.5</td>
</tr>
<tr>
<td>2016</td>
<td>2,342,648</td>
<td>915.3</td>
</tr>
<tr>
<td>2017</td>
<td>2,337,759</td>
<td>903.6</td>
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<td>2018</td>
<td>2,447,032</td>
<td>936.4</td>
</tr>
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<td>2019</td>
<td>2,454,338</td>
<td>928.5</td>
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<td>2,419,957</td>
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<td>2021</td>
<td>2,387,350</td>
<td>888.7</td>
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Energy consumption per motor HP decreased over time

Average UEC, Pumps & Fans (kWh/HP)

- Pumps: \(-148\) kWh/HP
- Fans: \(+274\) kWh/HP


Energy consumption values:
- 2015: 3,466 kWh/HP
- 2016: 3,423 kWh/HP
- 2017: 3,386 kWh/HP
- 2018: 3,352 kWh/HP
- 2019: 3,314 kWh/HP
- 2020: 3,288 kWh/HP
- 2021: 3,261 kWh/HP
ASD Saturation has **increased a lot** in the past 6 years

...Especially in the Pacific Northwest
That increase helped keep industrial pump and fan energy consumption down.
What kinds of **equipment** are getting ASDs?

- **Variable Load Systems**
  - Operating Hours
  - Percent of Max Load

- **Large motors**
ASDs are starting to appear on more constant load pumps

ASD-equipped Pump Motor HP

<table>
<thead>
<tr>
<th>Year</th>
<th>Variable Load</th>
<th>Constant Load</th>
</tr>
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<tbody>
<tr>
<td>2015</td>
<td>0%</td>
<td>100%</td>
</tr>
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<td>0%</td>
<td>100%</td>
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</table>

2015: 24% Variable Load, 76% Constant Load
2021: 35% Variable Load, 65% Constant Load
What about different facility types?
What about different facility types?
Regional custom programs go deep to understand ASD savings
Custom programs also concentrate in certain facility types.
Custom programs also concentrate in certain facility types.
Custom programs target highest savings opportunities.

Total market savings, as kWh:
- Program Savings: 20%
- Momentum Savings: 32%

Total market savings, as Motor HP:
- 68%
- 80%
Where do we go from here?
There are still a lot of pumps and fans without ASDs
Those without ASDs are mostly **constant load systems**

- **Remaining Fan Motor HP**
  - Variable load: 37%
  - Constant load: 63%

- **Remaining Pump Motor HP**
  - Variable load: 29%
  - Constant load: 71%
80% of remaining potential reside in 5 facility types.
The world is recognizing the benefits of ASDs, including and beyond utility programs.
Where does the research go from here?
CONTACT

For more information, visit

Questions? Contact
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