Coal Micro-District Heating
Outline

1. oil and coal
2. costs
3. values
4. Conclude
Question:

is coal oil?
They are energy
used
for heating
Made of hydrogen and oxygen
Therefore they are the same!
Compare
Comparison

Chemical Composition

**Oil**

Carbon and Hydrogen

**Coal**

Carbon and Hydrogen
Comparison

Physical state

Oil | Liquid
Coal | Solid
Comparison

<table>
<thead>
<tr>
<th></th>
<th>Oil</th>
<th>Coal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler cost</td>
<td>$2,000</td>
<td>$20,000</td>
</tr>
</tbody>
</table>
Comparison

<table>
<thead>
<tr>
<th></th>
<th>Oil</th>
<th>Coal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>$1,000</td>
<td>$10,000</td>
</tr>
</tbody>
</table>
Comparison

Oil
none, inside
house

Coal

$5,000
## Comparison

<table>
<thead>
<tr>
<th>Container</th>
<th>Oil</th>
<th>Coal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>80 cubic feet tank</td>
<td>500 cubic feet bunker</td>
</tr>
</tbody>
</table>

Comparison

- **Oil**
  - Underground tank: $2,000

- **Coal**
  - Bunker: $3,000
Comparison

Oil

Automatic
free

Coal

by
appointment

$150 fee
Comparison

Oil

Automatically Pumps

collection

Coal

Coal hopper must be filled by hand
2 hours per week
or with
$2,000
Automated auger system
1 hour per week
<table>
<thead>
<tr>
<th></th>
<th>Oil</th>
<th>Coal</th>
</tr>
</thead>
<tbody>
<tr>
<td>tailings</td>
<td>Only tailings</td>
<td>Ash</td>
</tr>
<tr>
<td>smoke</td>
<td>Only smoke</td>
<td>must be removed by hand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 hours per week</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or with</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$3,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automated auger system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>And ash bunker</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ash removed once a month</td>
</tr>
<tr>
<td>smoke stack</td>
<td>Oil</td>
<td>Coal</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>built-in</td>
<td>$500</td>
<td>Tall stack</td>
</tr>
<tr>
<td></td>
<td>$5000</td>
<td>$5000</td>
</tr>
</tbody>
</table>
Comparison

- Oil
  - clean smoke
  - no PM 2.5

- Coal
  - some smoke
  - some pollutants
## Comparison

<table>
<thead>
<tr>
<th>Boiler Explosion Precision</th>
<th>Oil</th>
<th>Coal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>180 °F ± 3 °F, Under 70psi pressure</td>
<td>180 °F ± 7 °F, Under 0 psi pressure</td>
</tr>
<tr>
<td>Fuel</td>
<td>Oil</td>
<td>Coal</td>
</tr>
<tr>
<td>------</td>
<td>-----</td>
<td>------</td>
</tr>
<tr>
<td>Cost</td>
<td>$30/MMBtu</td>
<td>$10/MMBtu</td>
</tr>
</tbody>
</table>
Question: is coal oil?
Answer:

both are energy
both used
For heat
BUT
NOT
the same!
Question: is Tar-Sand oil?
NO