Plugwise Data Analysis
About Plugwise

• Dutch company started in 2006

• Developed wireless energy management system

• Plugwise’s objective: substantial energy savings
How Plugwise Works

• Wireless network of smart plugs (the Circle)

• Data is transmitted via Zigbee 2.4 GHz Mesh Network

• Data is processed into graphs and overviews

• Switch appliances on and off from PC
Plugwise Data Overview

- 3 data traces of appliance use in commercial settings
- Each trace from an office building in the Netherlands (Ministry, Company, and Municipality)
- kWh given for each individual hour over several weeks
Plugwise Data Breakdown

Monthly Total power usage:

- Ministry: 4007 kWh
- Company: 1326 kWh
- Municipality: 426 kWh
Plugwise Data Breakdown

Monthly Total power usage:

- Ministry: 4007 kWh
- Company: 1326 kWh
- Municipality: 426 kWh

- Red: printer
- Pink: vending machine
- Green: coffee maker
- Yellow: desktops
- Blue: water heater
- Purple: charger
- White: other
## Plugwise Data Breakdown

<table>
<thead>
<tr>
<th>Appliance Type</th>
<th># of Appliances</th>
<th>Monthly kWh</th>
<th>Monthly Cost*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printer</td>
<td>64</td>
<td>1183 kWh</td>
<td>247€ / $313</td>
</tr>
<tr>
<td>Vending Machine</td>
<td>11</td>
<td>1096 kWh</td>
<td>229€ / $290</td>
</tr>
<tr>
<td>Coffee Maker</td>
<td>22</td>
<td>788 kWh</td>
<td>164€ / $208</td>
</tr>
<tr>
<td>Desktops</td>
<td>58</td>
<td>332 kWh</td>
<td>69€ / $87</td>
</tr>
</tbody>
</table>

4007 kWh in 11 weeks

* Dutch electricity price: 20.87 € per 100 kWh
Company Appliances

Company's August Power Usage

- Vending Machine 5
- Water Cooler 52

watt-hours

Day

3 10 17 24 31
Municipality Appliances

Municipality's January Power Usage

- Refrigerator 10
- Coffee maker 22
Municipality Coffee Breaks

Coffee Makers

- Blue: coffee maker 22
- Green: coffee maker 23
- Red: coffee maker 18
- Cyan: coffee maker 19
- Pink: coffee maker 16

Watt-hours vs. Time (Hour)
Ministry Printers & Desktops

Ministry Desktops & Printers

- Computer Desktop
- Laser Printer
- Inkjet Printer

Time (Hour)

watt-hours

12am 2am 4am 6am 8am 10am 12pm 2pm 4pm 6pm 8pm 10pm
Ministry Inkjet Printers

Ministry Inkjet Printers: Average watt-hours by hour

- Printer 50
- Printer 51
- Printer 53
- Printer 150
- Printer 153
- Printer 154

Time (Hour):
- 12am
- 2am
- 4am
- 6am
- 8am
- 10am
- 12pm
- 2pm
- 4pm
- 6pm
- 8pm
- 10pm

Watt-hours:
- 0
- 20
- 40
- 60
- 80
- 100
- 120
- 140
- 160
- 180

Graph showing the average watt-hours used by various printers over different hours of the day.
Ministry Desktops

Ministry Desktops - Average watt-hours by hour

- Desktop 19
- Desktop 111
- Desktop 144
- Desktop 145
- Desktop 208

Time (Hour)

watt-hours
Municipality Desktops

Municipality Desktops - Average watt-hours by hour

Watt-hours

Time (Hour)

12am 2am 4am 6am 8am 10am 12pm 2pm 4pm 6pm 8pm 10pm

Desktop 0
Desktop 1
Desktop 2
Desktop 5
Desktop 8
## Energy Reduced

<table>
<thead>
<tr>
<th>Ministry Appliance</th>
<th>November Power Usage</th>
<th>January Power Usage</th>
<th>Percent Reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printers</td>
<td>947 kWh</td>
<td>764 kWh</td>
<td>19%</td>
</tr>
<tr>
<td>Vending Machines</td>
<td>867 kWh</td>
<td>775 kWh</td>
<td>11%</td>
</tr>
<tr>
<td>Coffee Makers</td>
<td>788 kWh</td>
<td>730 kWh</td>
<td>6.5%</td>
</tr>
<tr>
<td>Desktops</td>
<td>260 kWh</td>
<td>205 kWh</td>
<td>21%</td>
</tr>
<tr>
<td>TV / LCD</td>
<td>152 kWh</td>
<td>123 kWh</td>
<td>19%</td>
</tr>
</tbody>
</table>