Enterprise Level Recycling: PNM’s “Other” Sustainability Programs

The New Mexico Recycling Coalition

September 2014
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PNM’s Corporate Sustainability Goal

PNM Resources’ commitment to communities we serve includes being a good steward of our environment and achieving superior levels of environmental performance.

Among PNM Resources’ efforts:
- reducing air emissions at power plants
- reducing water use at power plants
- managing all gas- and coal-fired power plants under ISO 14001-certified Environmental Management Systems
- operating all electric services under an EMS that is consistent with the ISO 14001 standard
- wildlife protection
- development of an environmental sustainability policy
PNM Sustainability Programs

- Renewable and energy efficiency programs at PNM get a lot of attention and with good reason.
- 2013 was a really big year at PNM:
  - The state's first geothermal energy plant came online.
  - We nearly doubled the amount of solar on our system.
  - Customers saved energy equivalent to serving 10,500 homes using PNM energy efficiency programs.
  - Fresh water usage on a gallon per megawatt hour has dropped by 24 percent.
  - Since 2006, the San Juan Generating Station has reduced:
    - Nitrogen oxide (NOx) emissions by 41 percent.
    - Sulfur dioxide (SO2) by 60 percent.
    - Particulate matter by 69 percent, and
    - Mercury by 99 percent.
- Contemplating huge changes in our energy portfolio at San Juan.

PNM’s “Other” Sustainability Programs

- But................
  PNM also seeks to protect the environmental in ways most people do not know about through programs such as:
  - Environmental Management System for T&D.
  - Avian Protection.
Changing Culture

- EMS adopted to reduce environmental liability during small construction and maintenance projects
- Waste Reduction and diversion
- Avian protection—doing the right thing while making our system more reliable
- Notable shift in employee attitude from reticence to pride results in improved environmental stewardship
- “Other” sustainability programs have helped PNM move from compliance to “doing the right thing”

PNM’s Predecessor Companies

1880 - 1960
To the frontier communities, smoke stacks were not eyesores but monuments to progress*

Albuquerque Panorama 1883

*Paraphrased Electrifying America at p-5.

T&D EMS Background

- All T&D work is screened through PNMR’s EMS
- Easy to say but much harder in practice considering
  - Thousands of projects across two states and
  - The small size of PNM’s environmental staff
PNM’s EMS for T&D--How Does It Work?

- Process is elegantly simple—imagine a 3-step graduated sieve
- Screen for
  - Jurisdictional triggers
    - Federal, State, Tribal lands
  - Specific, known issues
    - Biological and threatened and endangered species and habitat
    - Waters of the US
    - Cultural resources
    - Hazards including LUST and CERCLA
  - Work order writers self screen by answering a series of questions on a screening form
  - Any "yes" answers on the screening form trigger ESD review

HotZones

- HotZones for Workorders
  - Environmental Services developed HotZones with attributed GIS data for
    - Parks and Open Space;
    - Suitable or occupied habitat for T&E species
    - Designated Critical Habitat;
    - Bosque, streams, arroyos, wetlands, open water, or riparian habitat,
    - Archaeological sites, cemeteries, national and state register properties or districts,
    - Landfills or LUST;
    - Land jurisdictions including federal state and Indian lands
  - HotZone subsequently conflated and display on ArcFM systems as an unattributed feature class
HotZones - An Operational Tool

A mixture of environmental GIS datasets into one layer identifying areas of concern

EMS Work Flow Process

- All work activities are planned, scheduled and controlled

- No work scheduled without environmental clearance

- All clearances contain environmental stipulations which outlines the conditions under which work can be performed
  - Includes general stipulations such as staying on existing access, staying within the ROW, protecting water bodies, nests, report archaeological discoveries, and spills
  - Special stipulations can include protocol surveys, cultural and or biological monitors
  - Certain projects require regulatory interaction/permitting
Making EMS Work

- Training and outreach are key
- 4 hour training on a wide range of environmental topics customized to job function
- Encompasses all key issues
- Over 1000 employees trained
- Biennial refresher
- Our employees know where we are coming from—they understand our issues!

Waste Reduction and PNM’s Team Green

- 30 PNMR facilities participate in PNMR’s Team Green
- Facilities include
  - Offices
  - Generation facilities
  - Construction Centers
- Includes over 100 people
- All volunteer—nobody’s full time job
Program Challenges

• Dispersed geography
• Setting up recycling in diverse communities, some of which lack recycling programs
• How to move larger, more specialized materials to market
• Measuring solid waste and recyclables
• Creating a reduce/re-use/recycle culture!

Program Solutions

• Company uses a major supplier to provide equipment in both states
  – Worked out an agreement to backhaul recyclables (at no additional expense)
  – Allows common recyclables and large items such as transformers, wood poles, and wood reels to move through the system
• Developed a customized database to track waste and recycling
• Created individual facility recycling plans
• Waste audits at key facilities
• Consistent top down bottom up communication
• Corporate goals sponsored by executive management and incorporated into performance management
### 2013 What Our Programs Recycled

<table>
<thead>
<tr>
<th>Materials</th>
<th>TNMP</th>
<th>PNM</th>
<th>San Juan</th>
<th>Total</th>
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<tbody>
<tr>
<td>Asphalt</td>
<td>325.00</td>
<td>325.00</td>
<td>1.03</td>
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<td>Boiler Tubing</td>
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<td>Cement Block</td>
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<td>Concrete</td>
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<td>e-Waste</td>
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<td>Food Composting</td>
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<tr>
<td>Green Waste</td>
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<td>10.96</td>
<td>10.96</td>
<td>10.96</td>
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<tr>
<td>Grey Water</td>
<td>29.22</td>
<td>29.22</td>
<td>29.22</td>
<td>29.22</td>
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<tr>
<td>Kitchen supplies</td>
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<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
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<tr>
<td>Lighting</td>
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<td>0.09</td>
<td>0.19</td>
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<td>Metal</td>
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<td>Paper</td>
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<td>33.55</td>
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<td>Plastic</td>
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<td>1.03</td>
<td>1.11</td>
<td>3.78</td>
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<td>Transformers</td>
<td>0.84</td>
<td>1.46</td>
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<td>Used Coolant</td>
<td>0.19</td>
<td>0.19</td>
<td>0.19</td>
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<td>Used Oil</td>
<td>196.76</td>
<td>125.17</td>
<td>44.69</td>
<td>366.62</td>
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<tr>
<td>Used solvent</td>
<td>0.26</td>
<td>0.26</td>
<td>0.26</td>
<td>0.26</td>
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<tr>
<td>used tires</td>
<td>5.87</td>
<td>0.23</td>
<td>6.11</td>
<td>6.11</td>
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<tr>
<td>Wood</td>
<td>2234.65</td>
<td>804.20</td>
<td>22.62</td>
<td>3061.47</td>
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<tr>
<td>Total Diversion</td>
<td>3553.99</td>
<td>7388.08</td>
<td>2204.29</td>
<td>13146.36</td>
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<tr>
<td>Total Waste</td>
<td>412.83</td>
<td>505.21</td>
<td>713.62</td>
<td>1631.65</td>
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<tr>
<td>Diversion Rate</td>
<td>89.6%</td>
<td>93.6%</td>
<td>75.5%</td>
<td>89.0%</td>
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### PNM’s Team Green—How Does It Work?

- Set Goals – yearly waste diversion goals are set at the corporate level
  - work with local staff to identify challenges and opportunities to increase waste diversion

- Measure program success
  - database was developed on company intranet
  - metrics include waste generated and diverted

- Keep staff energized!
  - Market accomplishments
2013 Waste Goal

- The 2013 waste goal was for 75% of our facilities to increase diversion by 5%

- Through the End of the Year we achieved “Optimum”
  - 25 of 30 increased diversion rate by 5%
    - 5 of 6 offices
    - 3 of 3 generation facilities
    - 17 of 21 service/construction centers
  - 83.3% of facilities increased diversion by an average of 33%!

2014 Waste Goal

- The 2014 goal is geared toward building on last year’s goal and lays out the following targets
  - Threshold – 65 percent of facilities will exceed a 60 percent diversion rate
  - Target – 70 percent of facilities will exceed a 60 percent diversion rate
  - Maximum -- 80 percent of facilities will exceed a 60 percent diversion rate
Waste audits

• Work with struggling facilities to identify opportunities to increase waste diversion

• Successful audit must have participation from key stakeholders
  – Team Green leads work with management, project engineers, facilities managers, and staff

• Develop a strategy that works for each local facility

• Reach out to external organizations, such as the NMRC, for assistance on how to recycle or donate materials

How much does it weigh?

• Many materials are weighed at time of collection (scrap metals, roll-off’s, ewaste, green waste, and wood)

• Algorithms were developed to estimate waste weights
  – Based on volume, cubic yards, and type of waste (office vs. construction)

• Team Green members track volume of waste collected

• Keep it simple!
Measuring diversion

- Local Team Green volunteers enter waste, diversion, and donations
- Monthly corporate reports are generated
Keep staff energized!

- Monthly email newsletter is used for each facility
- Details diversion status, upcoming projects, challenges, etc.
- Recognizes individuals critical to Team Green success

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2013 Seven-Year Results

<table>
<thead>
<tr>
<th>Year</th>
<th>Generated</th>
<th>Disposed</th>
<th>Diverted</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>74% Diverted 3,688 tons</td>
<td>74% Diverted 3,556 tons</td>
<td>5,044 tons</td>
</tr>
<tr>
<td>2008</td>
<td>80% Diverted 5,546 tons</td>
<td>80% Diverted 5,378 tons</td>
<td>6,924 tons</td>
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<tr>
<td>2009</td>
<td>78% Diverted 5,302 tons</td>
<td>78% Diverted 5,121 tons</td>
<td>6,823 tons</td>
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<tr>
<td>2010</td>
<td>69% Diverted 6,387 tons</td>
<td>69% Diverted 6,178 tons</td>
<td>9,265 tons</td>
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<tr>
<td>2011</td>
<td>55% Diverted 4,308 tons</td>
<td>55% Diverted 4,078 tons</td>
<td>7,843 tons</td>
</tr>
<tr>
<td>2012</td>
<td>52% Diverted 3,063 tons</td>
<td>52% Diverted 3,035 tons</td>
<td>5,878 tons</td>
</tr>
<tr>
<td>2013</td>
<td>82% Diverted 7,339 tons</td>
<td>82% Diverted 7,815 tons</td>
<td>8,964 tons</td>
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</table>

- Disposal weight is measured but front-load weights are estimated.
- 2008 numbers include Gas Company but not TNMP.
- 2009 numbers include TNMP but not Gas Company.
- 2010-2011 waste numbers increased due to the closure of the San Juan Generating Station landfill in March 2010.
- 2012 numbers do not include construction and demolition at HQ.
- 2013 numbers do not include Person Station demolition.
2013 The WARM Model

- Recycling saves energy, resources, and the production of GHG because it takes much less energy to recycle resources into new ones than to extract, transport, and process virgin materials
- The WARM Model was created by EPA to estimate GHG emission and BTU usage reduction from recycling, source reduction, and composting
- PNMR's recycled resources including fly ash are equivalent to:
  - Conserving 5,321 households' energy consumption
  - Conserving 102,961 barrels of oil
  - Conserving 4,785,612 gallons of gasoline

<table>
<thead>
<tr>
<th>Material</th>
<th>Tons Recycled</th>
<th>Total MTCO2E</th>
<th>Million BTU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Cans</td>
<td>2.16</td>
<td>-18</td>
<td>-107</td>
</tr>
<tr>
<td>Aluminum</td>
<td>193.31</td>
<td>-1353</td>
<td>-22,074</td>
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<tr>
<td>Copper</td>
<td>276.68</td>
<td>-1866</td>
<td>-23023</td>
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<tr>
<td>Branches</td>
<td>1844.80</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Corrugated Cardboard</td>
<td>88.70</td>
<td>-273</td>
<td>-1353</td>
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<tr>
<td>Dimensional Lumber</td>
<td>1414.67</td>
<td>-2448</td>
<td>373</td>
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<tr>
<td>Mixed Paper</td>
<td>329.33</td>
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<td>-6019</td>
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<td>Mixed Metals</td>
<td>5678.12</td>
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<td>Mixed Plastics</td>
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<td>-125</td>
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<tr>
<td>Personal Computers</td>
<td>130.79</td>
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<tr>
<td>Fly Ash</td>
<td>36,548.18</td>
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<tr>
<td>Totals</td>
<td></td>
<td>-62957</td>
<td>-598230</td>
</tr>
</tbody>
</table>

2013 Program Accomplishments

- Team Green celebrated its 10th anniversary in 2013—what a long way the program has come!
- PNMR’s diversion rate in 2013 was the highest ever at 82%--not including Person Station demolition
- 3rd party waste audits were conducted at San Juan and the Albuquerque Electric Service Center to increase diversion in complex facilities
- PNMR bested optimal in achieving the 2013 waste goal
- PNM was named the “Large Business Recycler of the Year” by New Mexico Green Chamber of Commerce!
- Diversion climbed steeply and waste decreased dramatically in 2013, due to
  - Waste goal response from all facilities
  - Substantial metal recycling at San Juan
Thank you for your time

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