PENNSYLVANIA’S ENERGY RESOURCES
Powering Communities into the Future

American Planning Association – PA Chapter
October 22, 2013
Session Overview

Powering Communities into the Future

- Keys to Successful Planning
- Examples of State Planning
  - State planning case studies
- Keystone State’s Energy Portfolio
- Marcellus Shale – A Game Changer
- A Changing Energy Landscape
- Benefits to Consumers
- Non-Traditional Energy Resources
- PA State Energy Plan
- What’s Coming Up Next?
- Questions?
Keys to Successful Planning

- Assessment & Baseline
  - Know where you are to know where you are going
- Objective data & information
- Realistic goals & objectives
  - Are they attainable?
- Periodic review & update
- Keep your target audience(s) in mind
  - Who is going to use it?
Examples of State Planning

- Statewide Water Resources Plan
- Alternative Energy Portfolio Standards
- Solid Waste & Recycling Plan
- Pennsylvania State Energy Plan
Statewide Water Resources Plan
A Case Study

**What?**
- Act 220 of 2002
- Regional & State Water Plan – update each 5 yrs.
- Critical shortages & future demands
- Prioritize infrastructure improvements
- Balance competing interests
- Educate & inform policymakers

**Why?**
- 2nd most stream miles (86,000) in U.S. (Alaska)
- 162,000 acres of lakes
- 404,000 acres of wetlands
- 2nd most private water wells (1m) in U.S. (Michigan), serving 3.5 m residents
Alternative Energy Portfolio Standards
A Case Study

What?
- Act 213 of 2004
- Statutorily prescribed plan
- Annually increases mandatory use of alternative & renewable resources through 2020 (18%)
- Regular reports to General Assembly evaluating competitiveness of alternative & renewable energy

Why?
- Diversify PA’s electric generation portfolio
- Lower emissions
- Attract capital investment to PA
Solid Waste & Recycling Planning
A Case Study

What?
- Act 101 of 1988
- Requires county & municipal planning
- Updated at least 3 years prior to exhausting permitted disposal capacity
- Must submit to all municipalities & advisory committee

Why?
- Ensure availability of sufficient processing & disposal capacity for generated waste
- Provide for transportation, collection & storage of municipal waste
- Reduce waste disposal through recycling
Keystone State’s Energy Portfolio

OVERVIEW

Pennsylvania’s Energy Portfolio

Worth Planning For?
Keystone State’s Energy Portfolio

ABUNDANT...AFFORDABLE...DOMESTIC

- Coal
- Oil & Gas
  - Unconventional Shale gas
  - Conventional oil & gas
- Nuclear
- Renewables & Alternatives
- Energy Efficiency & Storage
- Competitive Electric & Gas Markets
Keystone State’s Energy Portfolio
~ continued ~

ABUNDANT…AFFORDABLE…DOMESTIC

- 2nd largest energy field in the world
- 4th largest energy producer in U.S.
- 2nd largest electric generator in U.S.
- 2nd largest nuclear generator in U.S.
- 4th largest coal producer in U.S.
- 3rd in natural gas production in U.S.
  - 2 TCF in 2012, double from 2011
  - Net exporter for first time in 100 years
- 15th in total wind capacity installed
- 2+ million electric choice customers
PA Energy Consumption by Source & Sector – 2010 (BTUs)

Source: U.S. Energy Information Administration
Marcellus Shale – A Game Changer

Marcellus What??
Marcellus Shale – A Game Changer

- 489 tcf of *technically recoverable* gas (2009 – T. Engelder)
- Largest Unconventional Shale Gas Play in Nation
- 9 bcf/day – 25% of all U.S. shale gas production
- Production doubled in 2010, 2011 & 2012
By the Numbers...Drilling

- How many unconventional wells drilled?
  - 7,125 (since 2005)
  - 1,365 (2012)
  - 905 (2013 – thru 9/26)

- Gas Production
  - 4,227 producing wells (June 30, 2013)
  - Amount of production reported every 6 months
    - 631 bcf (July- Dec ’11)
    - 894 bcf (Jan- June ’12)
    - 1,146 bcf (July-Dec ’12)
    - 1,406 bcf (Jan-June ’13)
Energy = Jobs
Oil & Gas Industry

- 30,752 Employed in Core Industries
  - 164% increase since 2009

- 214,302 Employed in Ancillary Industries
  - 7.9% increase since 2009 (total employment increased 2.7% across all industries)

- Average Salaries
  - $82,643 (core industries)
  - $64,559 (ancillary industries)
  - $47,922 (all industry sectors)

- $2.0 billion corporate & personal taxes paid (since '07)
- $406 million impact fees ('12-'13)
Energy = Jobs
Oil & Gas Industry

- Between 2010 and 2015, the shale gas industry in Pennsylvania’s economy will grow by nearly 19% annually.

- By 2035, will contribute $42.4 billion annually to Pennsylvania’s economy – up from $7.1 billion in 2010.

- Shale industry job growth is averaging 14% a year.

- “Jobs Contribution” will grow from 56,884 in 2010 to 111,024 in 2015 and 270,058 in 2035.

Source: IHS Global Insight
PA – Shale Gas
Doing It Right

REGULATORY

- Well Permit Fee Increase
  - DEP oversight/permit staff doubled (202 staff)
- Chapter 78 Revisions
  - Well Construction Standards
- Chapter 95 Revisions
  - Wastewater Treatment Standards (TDS)
- DEP’s Call to Operators
  - April 19, 2011 - Stop Transporting Waste Water to Grandfathered Facilities
PA – Shale Gas
Doing It Right

LEGISLATIVE

- **Act 15 of 2010**
  - 6 Month Production Reporting
  - Posted on DEP’s Website

- **Act 127 of 2011 – Gas & Hazardous Liquids Pipelines Act**
  - Authorizes PUC to enforce federal pipeline safety laws; creates registry

- **Act 9 of 2012 – Unconventional Well 911 Emergency Response Information**
  - Requires operators to adopt, register and display unique GPS coordinate address at well site
  - Operators must also develop and file an emergency response plan

- **Act 13 of 2012**
  - First comprehensive update of Oil & Gas Act since 1984
  - Impact Fee & Enhancement of Environmental Standards
PUBLIC NOTICE & SETBACK DISTANCES

- Extends permit notification:
  - 1,000 feet increased to 3,000 feet
  - Municipality and adjacent municipality
  - E-FACTS – online notification (free email subscription)

- Extends well setback distances:
  - Streams, rivers & waterways: 100 feet increased to 300 feet
  - Buildings: 200 feet increased to 500 feet
  - Water wells: 200 feet increased to 500 feet
  - Public water supplies: 1,000 feet (new standard)
  - Maintain 100 foot setback from edge of disturbance and waterways
  - Limits on drilling activity and storage of material in floodplains

- Outlines standards for well pad containment systems
A Changing Energy Landscape

- Recent trends in energy development & use
  - Where were we?
  - Where are we?
  - Where are we going?
## A Changing Energy Landscape

### PA Electricity Generation by Fuel Type

<table>
<thead>
<tr>
<th>Year</th>
<th>Coal</th>
<th>Natural Gas</th>
<th>Other (Non-Woody) Biomass</th>
<th>Renewable Sources</th>
<th>Hydroelectric</th>
<th>Nuclear Power</th>
<th>Petroleum</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>36%</td>
<td>57%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>2010</td>
<td>34%</td>
<td>48%</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>2017</td>
<td>35%</td>
<td>35%</td>
<td>23%</td>
<td>1%</td>
<td>0%</td>
<td>5%</td>
<td>1%</td>
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</table>
A Changing Energy Landscape
Pending Coal Fired Power Plant Retirements

Over 16,000 MW of Pending Deactivations
(~13,500 MW since 11/2011)
## Proposed Gas Fired Power Plants

<table>
<thead>
<tr>
<th>Applicant</th>
<th>County</th>
<th>Approximate Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moxie Liberty, LLC</td>
<td>Bradford</td>
<td>900</td>
</tr>
<tr>
<td>Berks Hollow Energy Associates, LLC</td>
<td>Berks</td>
<td>855</td>
</tr>
<tr>
<td>Moxie Patriot, LLC</td>
<td>Lycoming</td>
<td>900</td>
</tr>
<tr>
<td>Bakers Farm Energy, LLC</td>
<td>York</td>
<td>650</td>
</tr>
<tr>
<td>Hickory Run Energy, LLC</td>
<td>Lawrence</td>
<td>750</td>
</tr>
<tr>
<td>Tenaska Pennsylvania Partners, LLC</td>
<td>Westmoreland</td>
<td>900</td>
</tr>
<tr>
<td>Tenaska Pennsylvania II Partners, LLC</td>
<td>Lebanon</td>
<td>900</td>
</tr>
<tr>
<td>Sunbury Generation LP</td>
<td>Snyder</td>
<td>1,064</td>
</tr>
<tr>
<td>Future Power PA, Inc.</td>
<td>Schuylkill</td>
<td>300</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>7,219</strong></td>
</tr>
</tbody>
</table>

Source: PA Department of Environmental Protection
A Changing Energy Landscape


Evolution of Fuel Mix for Annual Electricity Production
Benefits to Consumers

PJM Wholesale Cost
Full-Year 2008 ($/MWh)

- Energy, 71.00
- Reliability (Capacity), 6.12
- Transmission, 3.55
- Regulation, 0.68
- Operating Reserve, 0.00
- PJM Cost, 0.21
- Reactive, 0.30
- Trans. Owners Control, 0.09
- Synchronized Reserve, 0.08
- Black Start, 0.02

TOTAL: $84.66/MWh

PJM Wholesale Cost
Full-Year 2012 ($/MWh)

- Energy, 35.23
- Reliability (Capacity), 6.02
- Transmission, 4.71
- Regulation, 0.25
- Operating Reserve, 0.75
- PJM Cost, 0.32
- Reactive, 0.35
- Trans. Owners Control, 0.08
- Synchronized Reserve, 0.04
- Black Start, 0.03

TOTAL: $47.77/MWh

*Values are PJM averages and do not reflect potential locational cost differences.
Benefits to Consumers
Reduced Energy Costs – Wholesale Electricity Prices

Historical & Future Prices for PJM Electricity 2008-2013

PJM $/MWh Price
## Benefits to Consumers

### Reduced Energy Costs – Lower Purchased Gas Costs

<table>
<thead>
<tr>
<th>Utility</th>
<th>PGC Rate / mcf</th>
<th>% Change</th>
<th>Customer Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2008*</td>
<td>2012*</td>
<td>2008-2012</td>
</tr>
<tr>
<td>PECO</td>
<td>$11.10</td>
<td>$5.49</td>
<td>51%</td>
</tr>
<tr>
<td>NFG</td>
<td>$10.34</td>
<td>$4.82</td>
<td>53%</td>
</tr>
<tr>
<td>PGW</td>
<td>$10.58</td>
<td>$4.71</td>
<td>56%</td>
</tr>
<tr>
<td>Columbia</td>
<td>$10.25</td>
<td>$4.15</td>
<td>60%</td>
</tr>
<tr>
<td>Equitable</td>
<td>$11.81</td>
<td>$5.56</td>
<td>53%</td>
</tr>
<tr>
<td>UGI</td>
<td>$11.79</td>
<td>$6.38</td>
<td>46%</td>
</tr>
<tr>
<td>UGI Penn</td>
<td>$10.66</td>
<td>$5.22</td>
<td>51%</td>
</tr>
<tr>
<td>Peoples</td>
<td>$9.53</td>
<td>$3.39</td>
<td>64%</td>
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</table>

*1st Quarter 2008 & PUC-approved rate for 2012  
* Residential heating customer using 15 mcf/month
Benefits to Consumers

Improved Air Quality

PJM Market – Average Power Generation Emissions
Pounds Per MWh of Electricity produced
Non-Traditional Energy Resources

- Alternative & Renewable Energy
- Energy Efficiency & Demand Response
- Competitive Markets
Alternative & Renewable Energy

- Alternative Energy Portfolio Standards Act
  - Tier 1, Tier 2 & solar carve out
  - 18% by 2021
    - 8% Tier 1 (including 0.5% solar)
    - 10% Tier 2

- Alternative Energy Investment Act
  - $650 million
    - $180 m residential & commercial solar projects

- Competitive Electricity Markets
  - At least 20 suppliers offering 24 “green” products
    - [www.choosepawind.com](http://www.choosepawind.com)
    - [www.oca.state.pa.us](http://www.oca.state.pa.us)
Energy Efficiency & Demand Response

Energy Efficiency

- Act 129 of 2008
  - Phase 1: 3.5% consumption reductions by May 2013
  - $1.5 : $1 benefit to cost ratio
  - Phase 2: Staggered targets May 2013-May 2016:

<table>
<thead>
<tr>
<th>Utility Territory</th>
<th>Three-Year % of Energy Efficiency Reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duquesne</td>
<td>2.0</td>
</tr>
<tr>
<td>Met-Ed</td>
<td>2.3</td>
</tr>
<tr>
<td>Penelec</td>
<td>2.2</td>
</tr>
<tr>
<td>Penn Power</td>
<td>2.0</td>
</tr>
<tr>
<td>PPL</td>
<td>2.1</td>
</tr>
<tr>
<td>PECO</td>
<td>2.9</td>
</tr>
<tr>
<td>West Penn</td>
<td>1.6</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>2.2</td>
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</table>
Energy Efficiency & Demand Response

Demand Response

- Act 129 of 2008
  - 4.5% reduction during summer 2012 peak 100 hours
  - Robust economic DR participation in PJM Auction:
    - 14,832 MW in 3-yr forward auction (May 2012)
    - 12,408 MW in 3-yr forward auction (May 2013)
- FERC Order 745 – full wholesale price paid for economic DR instead of difference with retail pricing
Competitive Markets

Electric Competition in PA

- 2,119,115 customers shopping
  - 37% of all customers
    - 36% residential
    - 46% commercial
    - 87% industrial
- 1st in nation with 47 licensed residential suppliers*
- 109 total suppliers & 200 brokers/marketers
- 2nd in nation in competitive residential markets*

Drivers:
- Lower costs, locked-in rates & associated products
- Preferred generation sources

* Annual Baseline Assessment of Choice in Canada & the United States (ABACCUS)
## Competitive Markets

### Electric Competition in PA

**Weekly PA PowerSwitch Update**

Pennsylvania Public Utility Commission

www.PAPOWERSWITCH.com

### Customers Switching to an Electric Generation Supplier

**Wednesday, October 16, 2013**

<table>
<thead>
<tr>
<th>Electric Utility</th>
<th>Date Updated</th>
<th>Total Switching Customers</th>
<th>Residential Switching Customers</th>
<th>Commercial Switching Customers</th>
<th>Industrial Switching Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>#</td>
<td>% of Load</td>
<td>#</td>
<td>% of Load</td>
</tr>
<tr>
<td>Duquesne</td>
<td>10/12/13</td>
<td>261052</td>
<td>44.3</td>
<td>86.1</td>
<td>232048</td>
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<tr>
<td>Met-Ed</td>
<td>10/16/13</td>
<td>194920</td>
<td>35.1</td>
<td>63.6</td>
<td>165043</td>
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<tr>
<td>PECO</td>
<td>10/15/13</td>
<td>524052</td>
<td>33.0</td>
<td>62.0</td>
<td>441709</td>
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<tr>
<td>Penelec</td>
<td>10/16/13</td>
<td>212673</td>
<td>36.1</td>
<td>68.4</td>
<td>174366</td>
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<tr>
<td>Penn Power</td>
<td>10/16/13</td>
<td>57746</td>
<td>35.8</td>
<td>64.2</td>
<td>49166</td>
</tr>
<tr>
<td>Pike County</td>
<td>10/16/13</td>
<td>2655</td>
<td>59.0</td>
<td>59.0</td>
<td>2151</td>
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<tr>
<td>PPL</td>
<td>10/12/13</td>
<td>644273</td>
<td>45.7</td>
<td>74.7</td>
<td>541551</td>
</tr>
<tr>
<td>UGI</td>
<td>10/12/13</td>
<td>794</td>
<td>1.2</td>
<td>21.3</td>
<td>4</td>
</tr>
<tr>
<td>West Penn Power</td>
<td>10/16/13</td>
<td>221010</td>
<td>30.0</td>
<td>61.2</td>
<td>184178</td>
</tr>
<tr>
<td>Statewide Total</td>
<td>10/16/13</td>
<td>211915</td>
<td>37.4**</td>
<td>67.0**</td>
<td>1797206</td>
</tr>
</tbody>
</table>

* Percentage based on the total number of customers of regulated electric utilities in Pennsylvania as of 2/1/13. (4,980,186 Residential + 687,602 Commercial/Industrial = 5,667,788 Total Customers).

** Percentage represents megawatt hours currently delivered by alternative suppliers.
PA State Energy Plan

WHAT IS AN ENERGY POLICY?

- Day-to-day decision making – started Jan. 18, 2011
- Philosophy of Government
  - “All of the Above”
  - Avoid picking winners and losers
  - Encourage innovation and creativity
- Priority the Administration Places on Energy Issues

WHAT IS AN ENERGY PLAN?

- A Document
- Inventory of Assets & Resources
- Outlines Vision on How PA’s Assets Will Grow Economy & Secure Energy Independence
- Focused on Target Audiences
  - Who will read & use the plan?
PA State Energy Plan

CORE PRINCIPLES

- ‘All of the Above’ – and Below
  - We need all our resources
- Embracing free markets
  - Consumers win when they can choose
- Energy independence leads to energy security
  - Energy imported = dollars exported
- Abundant, affordable & domestic
  - American energy for American jobs
- Enhancing our environment
  - Yesterday’s legacies are today’s opportunities
    - Brownfield redevelopment
    - Acid mine drainage
    - Waste coal electric generation
PA State Energy Plan

- Pennsylvania’s history as an Energy Capital
- The energy resources positioning PA as the new Energy Capital
- Energy Portfolio
  - What we have
  - Making use of our resources
- Benefits & opportunities for job-creators
  - Abundant, affordable, domestic
- Enhancing Pennsylvanians’ quality of life
  - Today’s opportunities helping clean up yesterday’s environmental legacies
- Highlighting success stories
- Resources
  - Economic development network
  - Workforce training
PA State Energy Plan
Who is the Audience?

- Job-Creators:
  - Business & Industry
  - Capital Investors
  - Regional Chambers of Commerce

- Governor’s Administration
  - Cabinet Members
  - Agency Personnel Involved in Energy Policy & Economic Development

- General Assembly & Other Elected Officials

- All Pennsylvanians
  - Clear Understanding of Pennsylvanians Assets
  - Clear Understanding of Gov. Corbett’s Vision for these Assets
What’s Coming Up Next?

- **Default Electric Procurement**
  - Act 129 of 2008 – prudent mix
  - PUC Retail Markets Investigation (90 day procurement)
  - Competitive suppliers proposal (SB 1121)

- **Natural Gas Extension – SB 738 & SB 739**
  - PUC-approved utility plans evaluating extension opportunities
  - 10-year financing
  - Funding for gas line extensions

- **Energy Efficiency Targets – Phase 2**
  - May 2013 – May 2016
  - Evaluation of demand response cost effectiveness
QUESTIONS?

THANK YOU

~

AMERICAN PLANNING ASSOCIATION
PA CHAPTER