May 28, 2015

Key Findings from the Pilgrim Nuclear Power Station Study

Jonathan G. Cooper, University of Massachusetts - Amherst

Available at: https://works.bepress.com/jonathan_cooper/5/
The Pilgrim Nuclear Power Station Study

Presented to the Old Colony Planning Council

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Professor and Project Director
University of Massachusetts

Jonathan G. Cooper
Graduate Research Assistant
University of Massachusetts

Jennifer Stromsten
Project Consultant
Institute for Nuclear Host Communities

May 28, 2015
Project Team

- Department of Planning and Development
  - Lee Hartmann, AICP, Director

- Office of the Town Manager
  - Melissa Arrighi, Town Manager

- Old Colony Planning Council
  - Pat Ciaramella, Executive Director

- Economic Development Practicum
  - John Mullin, Professor
  - Graduate Student Team

- Center for Economic Development
  - Henry Renski, Director
  - Jonathan Cooper, Research Assistant

Project Consultant

- Institute for Nuclear Host Communities
  - Jennifer Stromsten, Program Director
Purpose

- **Project:** to help local and regional officials better understand Pilgrim Station’s current and future socio-economic impacts

- **Tonight:** to provide a summary of report contents
  - Major Findings
  - Impacts of Pilgrim Station
  - Issues with Nuclear Plant Closure
  - Recommendations
MAJOR FINDINGS
Major Findings: Plymouth & Barnstable Counties

- Annual plant operation provides region with income + revenue of approximately $150,000,000
  - Sustains approximately 600 jobs with high wages
  - Workforce clustered near plant
  - Positive and stabilizing effect on town and region with lower income totals and higher levels of seasonal jobs
Major Findings: Plymouth & Barnstable Counties

- Plant employees and vendors create substantial “second wave” economic impacts of $105,000,000
  - Supporting an additional 600 jobs in the region
  - Significant spending in non-nuclear industries
  - High levels of home ownership and tax revenue
Major Findings: Plymouth & Barnstable Counties

- If plant operation produces...
  - Approximately 1,200 jobs
  - Approximately $14 million in municipal taxes
  - Approximately $107 million in wages and benefits
  - Approximately $148 million in non-payroll spending
Major Findings: Plymouth & Barnstable Counties

- If plant operation produces...
  - Approximately 1,200 jobs
  - Approximately $14 million in municipal taxes
  - Approximately $107 million in wages and benefits
  - Approximately $148 million in non-payroll spending

- Then plant closure means...
  - Workforce losses beyond the power plant
  - Reductions to municipal finances
  - Household spending impacts in non-nuclear homes
  - Revenue impacts in several industries in the economy
OPERATIONAL IMPACTS OF PILGRIM STATION
Hundreds of High-Paying Jobs

<table>
<thead>
<tr>
<th>Jobs</th>
<th>Share</th>
<th>Pilgrim Station</th>
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Source: Old Colony Planning Council (2014)
Hundreds of High-Paying Jobs

- Approximately 600 full-time employees

Table 4.2: 2015 Job and Wage Shares of Pilgrim Station, by Region

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- Approximately 600 full-time employees
- Annual payroll of $55 million

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Hundreds of High-Paying Jobs

- Approximately 600 full-time employees
- Annual payroll of $55 million
- Average wage doubles local and regional totals

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Source: Old Colony Planning Council (2014)
A Close-to-Home Workforce
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- OCPC is home to 267 employees
  - Over 45 percent
A Close-to-Home Workforce

- OCPC is home to 267 employees
  - Over 45 percent
- Wages in OCPC total $25 million
  - Spread unevenly

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<th>Cape Cod</th>
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<tr>
<td>Plymouth</td>
<td>Carver</td>
<td>Sandwich</td>
</tr>
<tr>
<td>17.8 million</td>
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<td>3.8 million</td>
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<tr>
<td>Kingston</td>
<td>Wareham</td>
<td>Bourne</td>
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<td>3 million</td>
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<td>2.3 million</td>
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<td>Barnstable</td>
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A Close-to-Home Workforce

- OCPC is home to 267 employees
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- Wages in OCPC total $25 million
  - Spread unevenly
- Clustering keeps local spending high
  - Banks, groceries
- Impacts housing markets
  - Provides tax revenues

<table>
<thead>
<tr>
<th>Town</th>
<th>Workers</th>
<th>Median</th>
<th>Real Estate</th>
<th>Rate</th>
<th>Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth</td>
<td>190</td>
<td>$307,733</td>
<td>$58.47 million</td>
<td>15.54</td>
<td>$908,580</td>
</tr>
<tr>
<td>Sandwich</td>
<td>40</td>
<td>$349,500</td>
<td>$13.98 million</td>
<td>14.82</td>
<td>$207,200</td>
</tr>
<tr>
<td>Kingston</td>
<td>32</td>
<td>$329,512</td>
<td>$10.54 million</td>
<td>16.94</td>
<td>$178,624</td>
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<tr>
<td>Carver</td>
<td>33</td>
<td>$259,100</td>
<td>$8.55 million</td>
<td>17.01</td>
<td>$145,431</td>
</tr>
<tr>
<td>Duxbury</td>
<td>13</td>
<td>$609,200</td>
<td>$7.92 million</td>
<td>15.60</td>
<td>$123,552</td>
</tr>
<tr>
<td>Marshfield</td>
<td>24</td>
<td>$386,700</td>
<td>$9.28 million</td>
<td>13.29</td>
<td>$123,336</td>
</tr>
<tr>
<td>Bourne</td>
<td>25</td>
<td>$388,779</td>
<td>$9.72 million</td>
<td>10.07</td>
<td>$97,875</td>
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<tr>
<td>Barnstable</td>
<td>19</td>
<td>$457,349</td>
<td>$8.69 million</td>
<td>9.30</td>
<td>$80,807</td>
</tr>
<tr>
<td>Middleboro</td>
<td>15</td>
<td>$261,500</td>
<td>$3.92 million</td>
<td>15.78</td>
<td>$61,890</td>
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Many Industries Supported

Pilgrim Station

- Technical Services
  - Engineering/Consulting
- Manufacturing
  - Electronics/Equipment
- Specialty Construction
  - Utility Systems/Electric
- Industrial Equipment
  - Machinery/Metals
- Support Services
  - Landscaping/Security
Many Industries Supported

**Pilgrim Station**
- Technical Services
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- Manufacturing
  - Electronics/Equipment
- Specialty Construction
  - Utility Systems/Electric
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- Support Services
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**Plant Workforce**
- Health Care
  - Physicians/Hospitals
- Financial Services
  - Banks/Lenders
- Real Estate
  - Brokers/Developers
- Food Services
  - Grocers/Restaurants
Regional Industry Mix Matters
Regional Industry Mix Matters

- Supply chain is large and varied
Regional Industry Mix Matters

- Supply chain is large and varied
- Many plants prefer regional spending

<table>
<thead>
<tr>
<th>Plant</th>
<th>State</th>
<th>Region</th>
<th>Non-Region</th>
<th>Region PCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diablo Canyon</td>
<td>CA</td>
<td>$21.8</td>
<td>$277.0</td>
<td>7.3%</td>
</tr>
<tr>
<td>Duane Arnold</td>
<td>IA</td>
<td>$2.2</td>
<td>$76.7</td>
<td>2.8%</td>
</tr>
<tr>
<td>Seabrook</td>
<td>NH</td>
<td>$54.4</td>
<td>$147.5</td>
<td>26.9%</td>
</tr>
</tbody>
</table>

Source: Nuclear Energy Institute
Regional Industry Mix Matters

- Supply chain is large and varied
- Many plants prefer regional spending
  - Good matches pay dividends

Table 4.4: Regional Accrual of Non-Payroll Expenditures

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<th>State</th>
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Source: Nuclear Energy Institute
Regional Industry Mix Matters

- Supply chain is large and varied
- Many plants prefer regional spending
  - Good matches pay dividends
- County mix likely contributes to high regional spending

Table 4.5: Nuclear Power Plant Vendor Sectors in Plymouth County, 2012

<table>
<thead>
<tr>
<th>Subsector Name</th>
<th>Employment</th>
<th>Earnings</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Jobs</td>
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</tr>
<tr>
<td>Specialty Sectors</td>
<td></td>
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<tr>
<td>Professional and Technical Services</td>
<td>6,913</td>
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<td>Advanced Manufacturing</td>
<td>4,927</td>
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<td>Specialty Construction</td>
<td>8,311</td>
<td>$62,660</td>
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<tr>
<td>Durable Goods Wholesale and Leasing</td>
<td>2,900</td>
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<tr>
<td>Administrative and Support Services</td>
<td>6,273</td>
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<td>Food Services</td>
<td>16,979</td>
<td>$16,172</td>
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<td>Specialty Sectors</td>
<td>23,051</td>
<td>$65,575</td>
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<td>23,252</td>
<td>$11,999</td>
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<tr>
<td>Non-Vendor Industries</td>
<td>129,654</td>
<td>$45,993</td>
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<tr>
<td>Total</td>
<td>175,957</td>
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Source: Massachusetts Department of Labor ES-202; Author’s calculations
Regional Industry Mix Matters

- Supply chain is large and varied
- Many plants prefer regional spending
  - Good matches pay dividends
- County mix likely contributes to high regional spending
  - Approximately $60m in 2014

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ISSUES WITH NUCLEAR POWER PLANT CLOSURE
Nuclear Plant Closure Context

- Mandatory Retirement
  - Less time for older plants to recoup costs
  - No plant has ever reached 60 years

- Challenges from other energy sectors
  - Reduced profits
  - Industry excluded from emissions reductions
Nuclear Plant Closure Characteristics

- How is nuclear plant closure different from
  - Other power plants?
  - Manufacturing plants?
  - Other industry plants?
Nuclear Plant Closure Characteristics

- Location
- Workforce
- Cleanup
- Assistance
- Spent Fuel

- How is nuclear plant closure different from
  - Other power plants?
  - Manufacturing plants?
  - Other industry plants?

- Five Factors affecting
  - Redevelopment
  - Public support
  - Outside interest
Nuclear Plant Closure Characteristics

- **Location**
  - Out of the way
Nuclear Plant Closure Characteristics

- **Location**
  - Out of the way
  - Pilgrim 3 miles from nearest on-ramp
  - Limited access by road or rail
Nuclear Plant Closure Characteristics

- Location
  - Out of the way
- **Workforce**
  - Highly specialized

![Bar chart showing jobs created for operating energy plants per 1,000-megawatts of capacity, with nuclear plants having the highest jobs created at 500, followed by coal at 220, wind at 90, and natural gas at 60. Sources: Ventyx and U.S. Department of Energy.](chart.png)
Nuclear Plant Closure Characteristics

- **Location**
  - Out of the way

- **Workforce**
  - Highly specialized
  - Large number
  - Many likely to relocate

---

**Jobs Created for Operating Energy Plants**

*Jobs per 1,000-megawatts of capacity*

- **Nuclear**: 500
- **Coal**: 220
- **Wind**: 90
- **Natural Gas**: 60

*Sources: Ventyx and U.S. Department of Energy*
Nuclear Plant Closure Characteristics

- Location
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- **Cleanup**
  - Many variables
Nuclear Plant Closure Characteristics

- **Location**
  - Out of the way
- **Workforce**
  - Highly specialized
- **Cleanup**
  - Many variables
  - Major staffing reductions within 3 years
  - State and federal standards differ
Nuclear Plant Closure Characteristics

- Location
  - Out of the way
- Workforce
  - Highly specialized
- Cleanup
  - Many variables
- **Assistance**
  - No direct allies

Source: Various state economic development information sources, 2012
Nuclear Plant Closure Characteristics

- Location
  - Out of the way
- Workforce
  - Highly specialized
- Cleanup
  - Many variables
- **Assistance**
  - No direct allies
  - No established methods or amounts

State Economic Development Programs Targeting Specific Industries (2012)

Source: Various state economic development information sources, 2012
Nuclear Plant Closure Characteristics

- Location
  - Out of the way
- Workforce
  - Highly specialized
- Cleanup
  - Many variables
- Assistance
  - No direct allies
- Spent Fuel
  - Policy failure
Nuclear Plant Closure Characteristics

- Location
  - Out of the way
- Workforce
  - Highly specialized
- Cleanup
  - Many variables
- Assistance
  - No direct allies
- **Spent Fuel**
  - Policy failure
  - Was never part of the deal
  - Now a matter for the courts
Three Categories to “Build”

- KNOWLEDGE
- SUPPORT
- MOMENTUM
Three Categories to “Build”

- **KNOWLEDGE**
  - Public focus at closure is on safety and site reuse
  - Time to learn about impacts is NOW

- **SUPPORT**

- **MOMENTUM**
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- **SUPPORT**
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  - New allies emerging as other plant closures continue

- **MOMENTUM**
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- **KNOWLEDGE**
  - Public focus at closure is on safety and site reuse
  - Time to learn about impacts is NOW

- **SUPPORT**
  - Current policy focus is not on local impacts
  - New allies emerging as other plant closures continue

- **MOMENTUM**
  - Closure process still unclear to many people
  - Starting now creates the opportunity to shape the conversation
Building Knowledge

- Develop detailed assessments of socio-economic benefits
  - High Priority, Near Term

- Stay informed of regulatory and legal developments
  - Medium Priority, Medium Term

- Match existing best practices for plant closure to Pilgrim Station specifics
  - Lower Priority, Medium Term
Building Support

- Create and maintain a non-adversarial process
  - HIGHEST Priority, Near Term

- Identify key stakeholders to determine roles
  - High Priority, Near Term

- Develop relationships with relevant state and federal agencies
  - Medium Priority, Long Term
Building Momentum

- Work with legislators to expand energy transition planning
  - Higher Priority, Near Term

- Focus development planning off-site
  - Medium Priority, Near Term

- Promote stability in plant-based revenue
  - Medium Priority, Long Term
Thank You

Any questions?