Brownfields to Brightfields

Revitalizing Brockton by Converting a Former Manufactured Gas Plant to a Solar Energy Generating Station

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Background – City of Brockton

- Located 20 miles south of Boston, 30 miles northeast of Providence
- Diverse population of 94,304
  - 62% self-report as “white”
  - Significant Cape Verdean and Haitian populations
- Industrial history
  - Shoe manufacturing
  - Thomas Edison constructs first centrally-powered electric station in Brockton in 1883
- “City of Champions”
Brightfield Site History

- Former Brockton Gas Works manufactured gas plant, 1898-1963
- Bay State Gas Company is property owner and responsible party
- Two lots spanning 27 acres on opposite sides of Grove Street
- Contaminants capped below the ground – limited reuse options
- Remediation completed August 2004
What is a Brightfield?

• A brightfield is a brownfield that is redeveloped using solar energy technologies
  - Concept created by US Department of Energy

• Brockton’s Brightfield consists of 1,512 SCHOTT Solar modules

• At 460 kW, the Brockton Brightfield is the largest solar array in New England and the largest brightfield nationwide
Why a Solar Brightfield?

- Brockton 97% developed
- Residential impact of brownfields
  - Industrial areas abut residential areas
- Environmental justice issues
  - Not a dumping ground!
- Brightfield is a unique opportunity
  - No pollution
  - No noise
  - No traffic
Brockton’s Brightfields Partners
Brightfield Development Activities and Timeline

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2000 2001 2002 2003 2004 2005 2006

- Procurement
- Vendor Selection
- Finalize Grant Agreements
- MTC
- DOE
- Finalize Contracts
- Turnkey Vendor
- Electricity
- REC
- MGPP
- Design
- Permitting
- Construction
- Commissioning
Feasibility Study Summary

• Conclusions
  - 10 acres developable
  - 1 MW PV array technically feasible
  - Mounting structure must not penetrate the cap
  - City ownership more economically feasible than private
  - Site aesthetics are key to community support

• Recommendations
  - Phase I – a .5 MW PV installation, 600 MWh/year
  - Initial capital costs: $3.6 million; 60% city financing, 40% grant funding ($3/watt)
  - Key next steps – financing and marketing
Feasibility Study – Illustrative Site Plan
Installing the System: Features

- The system consists of 1,512 SCHOTT Solar ASE 300 modules
  - Utility scale
- South facing, 42 degree angle to maximize total electricity generation
- SatCon Inverters
- Fat Spaniel Data Acquisition System
- Landerholm Electric Co. – local installation (IBEW Local 223)
Installing the System – Site Preparation
Installing the System – Modules
Installing the System – Modules
Interconnection and Commissioning
Thomas A. Edison Educational Plaza
“Before” and “After”
System Performance

• The system is projected to produce about 580 MWh per year of electricity
  – Enough to power about 77 homes, or Brockton City Hall plus a portion of the police station load

• Module warranty 20 years, expected system life of 30-50 years
Project Benefits

• Environmental
  – No pollution, noise, or traffic
  – Avoids annual emissions of ~ 677,000 pounds of CO$_2$, 1,200 pounds of SO$_2$ and 315 pounds of NO$_x$

• Aesthetic
  – Converts blighted industrial brownfield into clean energy showcase
  – Enhances local property values and encourages reinvestment
  – Improves Brockton’s image – innovative, cleaner and greener
Project Benefits (cont’d)

• Economic
  – Converts idle brownfield into revenue generating asset
  – Jobs for local installers
  – Revenues to MA-based renewable energy businesses
  – Eliminate city’s liability for City-owned parcel

• Educational
  – Programming for children and general public
Lessons Learned – What Works

• Community-based project
• Do your homework!
• Political support
  – Local, state and federal
• Community investment
• Multiple funding sources
• Partnership approach
• Cost-effectiveness
  – $3.00 per watt incentive
Lessons Learned – What Doesn’t Work

• Policy barriers requiring special legislation
• Transactional costs
  – 101 decision points
• Complexity of joint action
  – Multiple participants with varying levels of commitment and urgency
• Time is an enemy
• Insurance – difficult to obtain and expensive!
Policy Changes to Facilitate Renewable Energy on Brownfields

- Pending MA Energy Bill (Senate 2468):
  - “Green communities” assistance
  - Net metering provisions
    - Increase cap from 60 kW to 2 MW
    - Neighborhood net metering
  - Municipal renewable energy provisions
    - Creates “small municipal renewable energy generating facility” <10 MW
    - Legal authority
    - Borrowing term
    - Procurement
    - Siting reform