BROCKTON BRIGHTFIELDS

Generating Clean Energy for Brockton

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”

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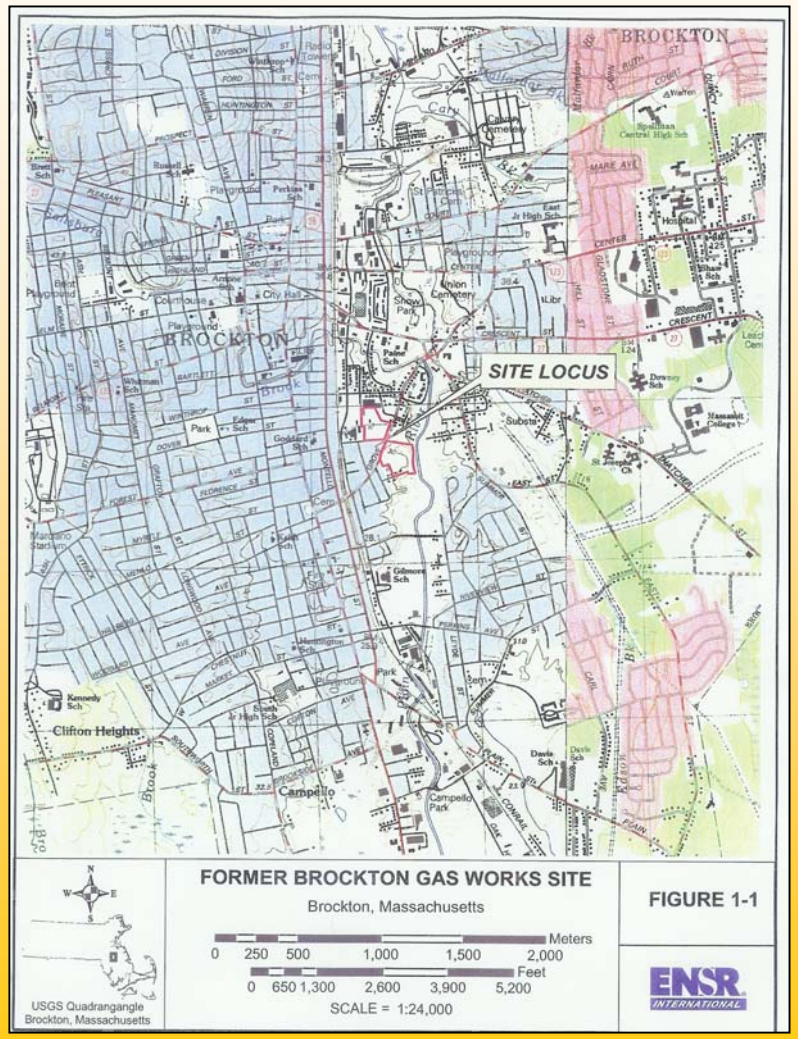
Brightfield Site History



- 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

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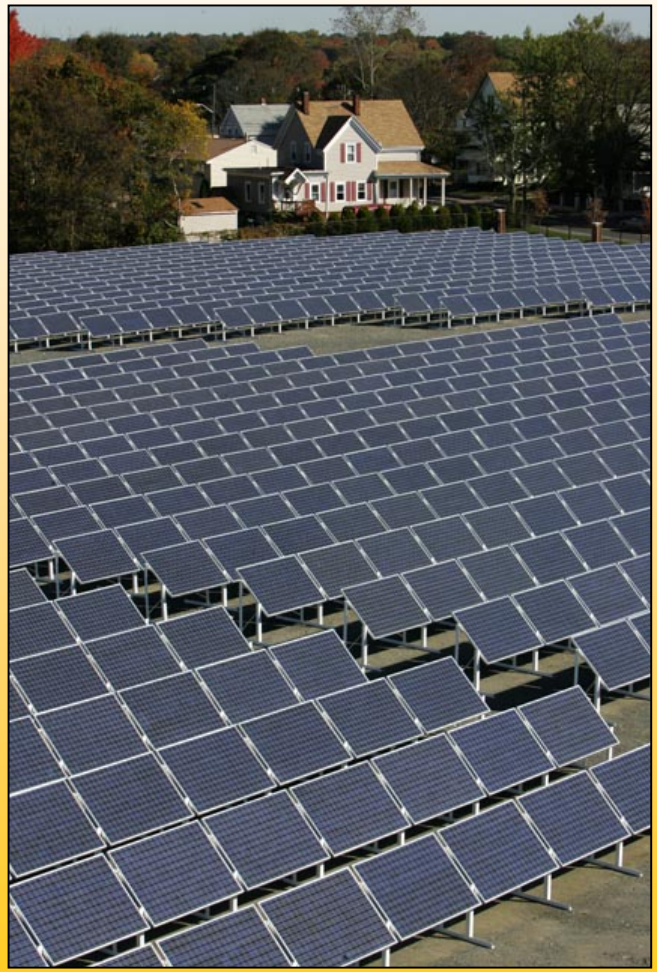
What is a Brightfield?

- 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



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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

Massachusetts Technology Collaborative
Renewable Energy Trust

EPA United States Environmental Protection Agency New England

Massachusetts Department of Environmental Protection

Bay State Gas
A NiSource Company

KEMA

Constellation NewEnergy
The way energy works. for your business

GLOBAL SOLAR
Systems That Deliver

SCHOTT solar

nationalgrid

LANDERHOLM ELECTRIC CO., INC.

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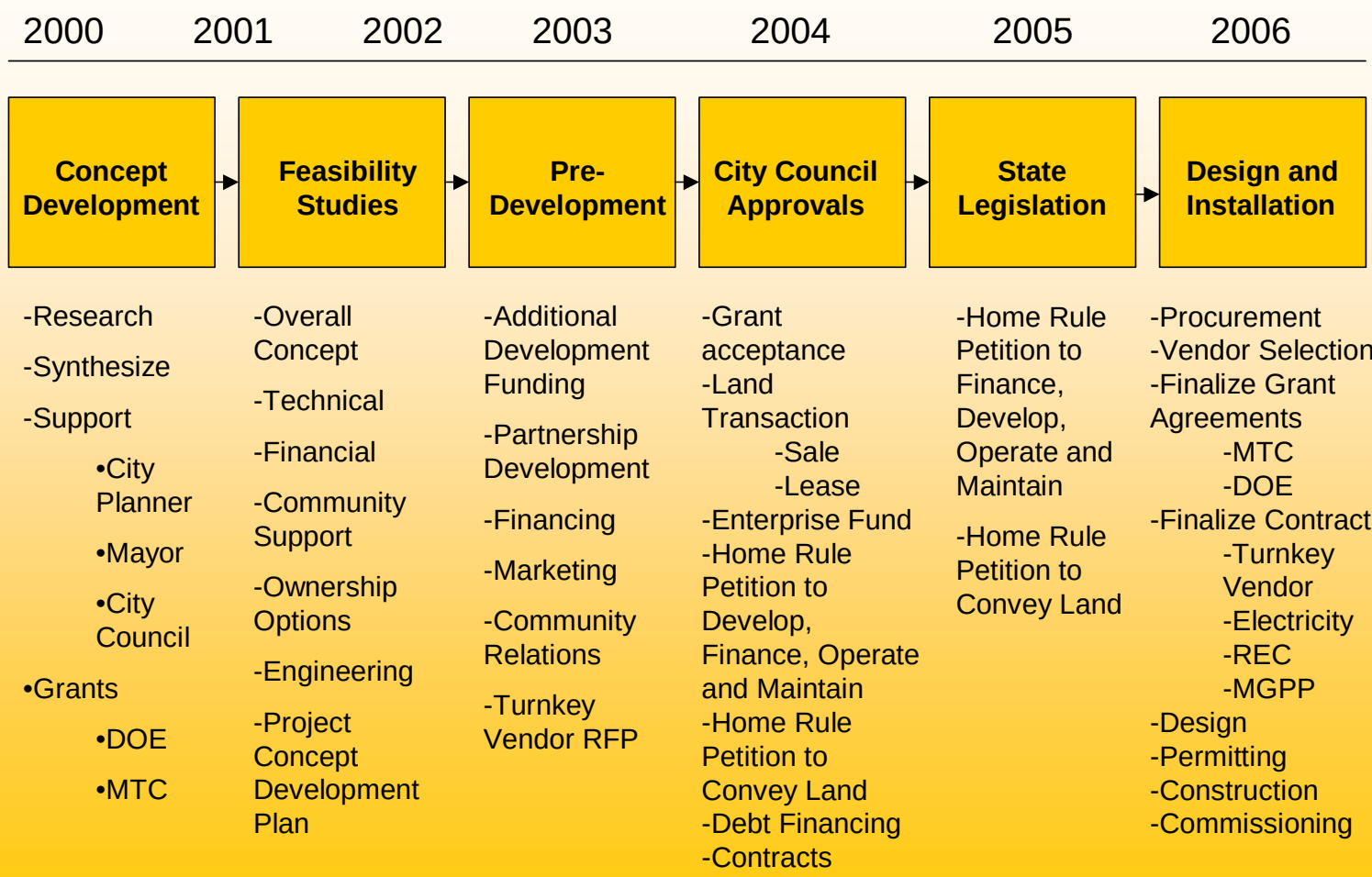
Brightfield Development Activities and Timeline



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

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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)

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Installing the System – Site Preparation

Installing the System – Modules

Installing the System – Modules

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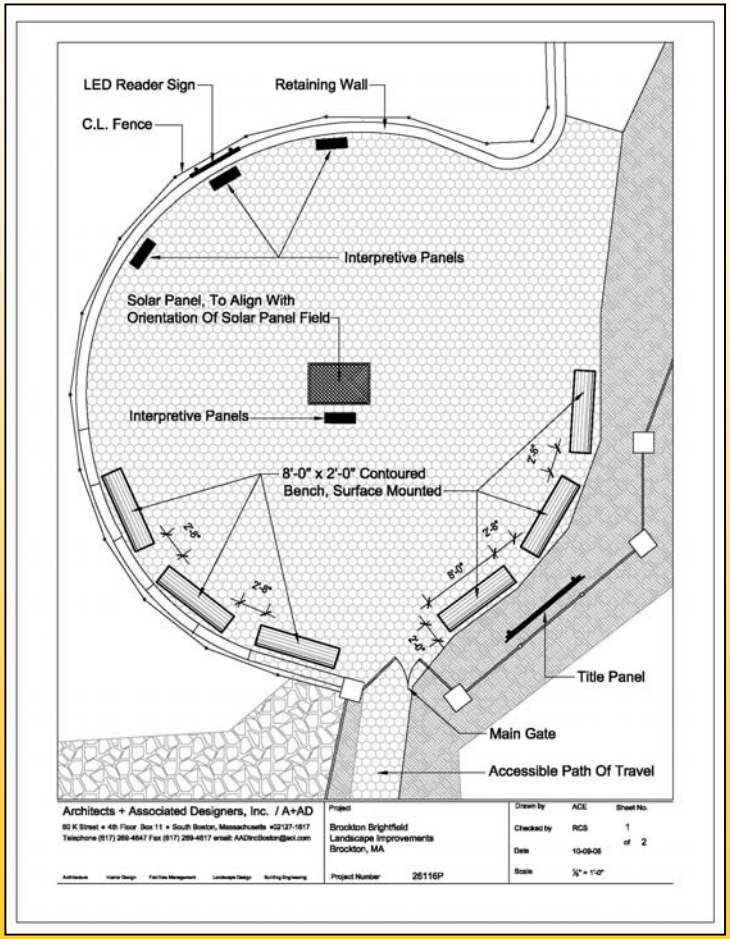
Interconnection and Commissioning

Thomas A. Edison Educational Plaza



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“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

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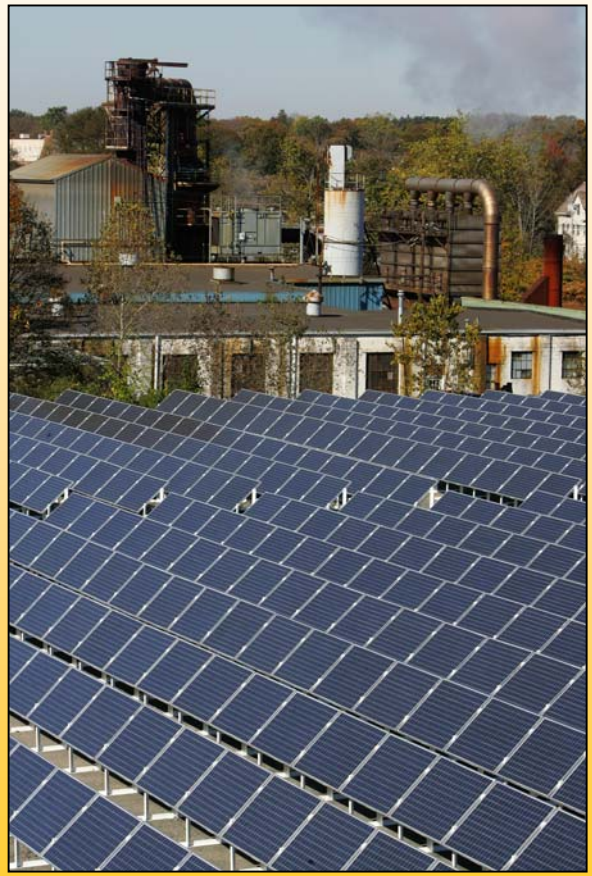
Project Benefits

- **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 NOx
- **Aesthetic**
  - Converts blighted industrial brownfield into clean energy showcase
  - Enhances local property values and encourages reinvestment
  - Improves Brockton's image – innovative, cleaner and greener



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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

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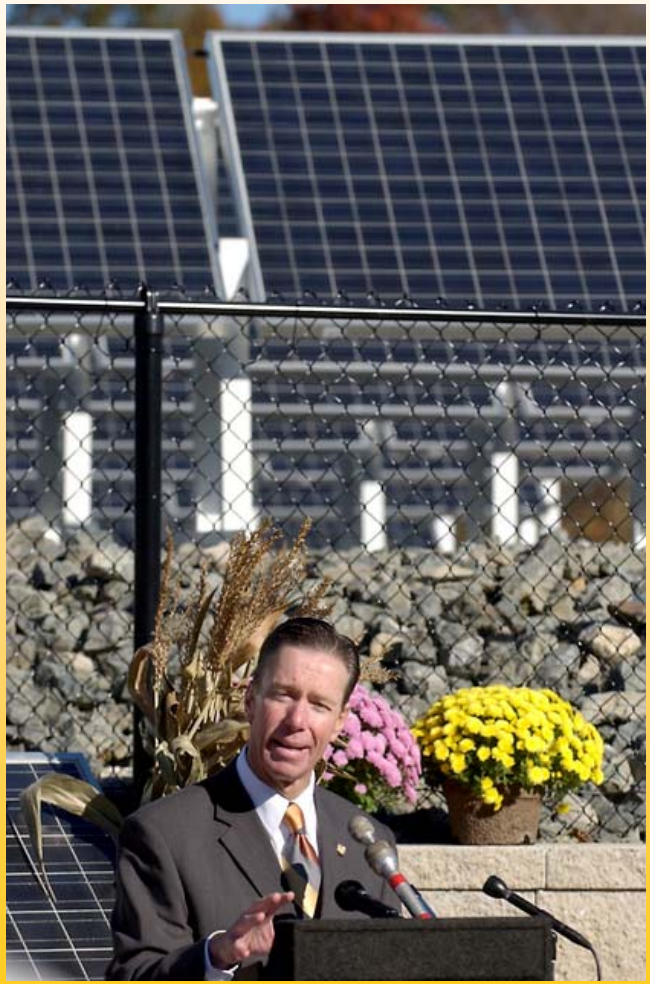
Lessons Learned – What Works

- 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



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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