Brownfields and Sustainability

Energy-efficient Locations, Green Jobs, and Energy Production

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Brownfields Federal Policy supported by the Brownfields Inner Circle

Redevelopment Economics

- Green Job Strategies
- Climate Benefits of Smart Growth
- Brownfields Strategies
- Site Redevelopment Analysis and Financing
- Incentives to Support Smart Growth
- Economic Impact Analysis

Brownfields, Green Buildings, and Energy-efficient Locations

- Brewer's Hill, Baltimore
  - $125 million mixed use
- Building and site characteristics:
  - Green – MD Green Bldgs. Tax credit ☑
  - Rehab vs. demo/new construction ☑
- VMT characteristics
  - Density ☑
  - Mixing of uses/internal design ☑
  - Close to Job Center ☑
  - Degree of connectedness to the existing grid ☑
  - Access to transit ☑

Energy-efficient Locations, Green Jobs, and Energy Production

1. Green job growth
2. Strategies that place green jobs and renewable energy on brownfields
3. Model projects - green jobs and renewable energy on brownfields
4. Brownfields and energy-efficient locations
5. Model projects that combine energy-efficient locations with energy production

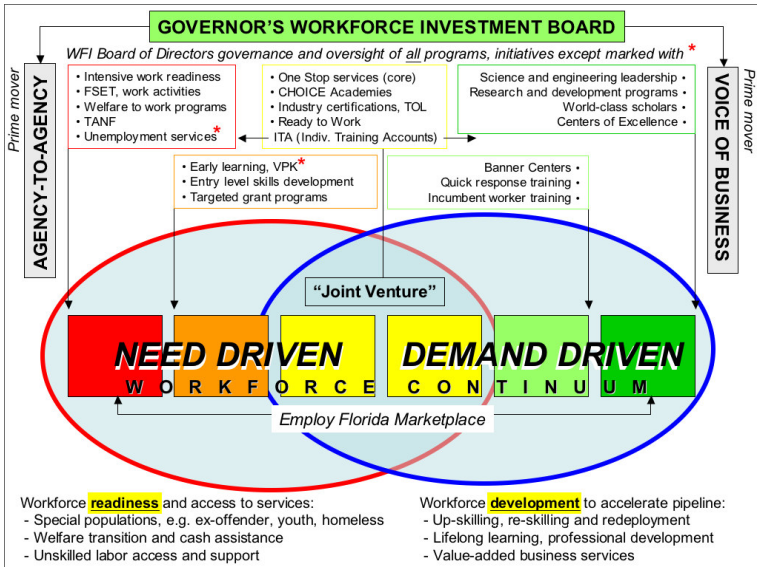
Brownfields and Green Jobs

- Green job growth should go to sustainable locations:
  - Infrastructure in place
  - Near transit and close to urban activity centers
  - Close to lower income populations

Green Jobs on Brownfields

Defining Green Jobs - Florida

- Workforce Florida:
  - **"A green job increases the conservation and sustainability of natural resources for the benefit of Floridians. This includes jobs that reduce energy usage or lower carbon emissions, and protect Florida's natural resources. Green jobs should provide worker-friendly conditions, pay sustainable wages and offer opportunities for continued skill training and career growth."**



US Green Job Growth

- USCM projection:
  - 750,000 currently to more than 4.2 million by 2038.
- Apollo Alliance:
  - 380,000 in component parts manufacturing for renewable energy
- Pew Climate:
  - Jobs in renewable energy grew 9.1% annually, 2003-2007
- American Solar Energy Society (ASES)
  - Jobs in energy efficiency and renewables grew by 8.4 mil in 2007
  - Will grow to 38 mil by 2030 (35% of the economy).

EPA Repower America

- Renewable energy – land needs. States with Renewable Energy Portfolio requirements – 6,700 MW by 2025
- EPA tracks:
  - 480,000 sites/15 million acres contaminated properties
  - 10,000 abandoned coal mines
- Screening – 5,000 sites and 1.1 million acres potentially suitable for PV

Locating Renewable Energy on Brownfields– State Model

- Arizona Bureau of Land Management examining 42 brownfield sites totaling 26,000 acres, including:
  - Landfills
  - abandoned mine lands
  - gravel pits
  - hazardous material sites
  - former airfields
  - trash dumps

Climate Strategies that Target Brownfields – Local Models

- Cincinnati counts redeveloped brownfields as part of carbon reduction:
  - For every 0.23 acres of existing forest that is maintained, approximately 1 metric ton of CO2 emissions is saved.
  - For every 0.01 acres of deforestation of greenfield properties avoided, approximately 1 metric ton of CO2 emissions is saved.
  - For every 25.6 tree seedlings planted on a redeveloped brownfield site, approximately 1 metric ton of CO2 emissions is saved.
  - For every 680 pounds of waste not placed in a landfill by incorporating recycling of construction and demolition materials into brownfield redevelopment, approximately 1 metric ton of CO2 emissions is saved.
  - For every 0.18 cars eliminated from the roadways as a result of building businesses closer to the urban population through brownfield redevelopment, approximately 1 metric ton of CO2 emissions is saved.
  - For every person that resides in a clustered mixed-use development instead of a suburban-style residential subdivision, approximately 2.7 metric tons of CO2 emissions is saved

Green Job Strategies that Target Brownfields – Local Models

- Los Angeles
  - Developed a "clean tech" campaign
  - Targeted a 20-acre brownfield site for a green tech cluster
  - Established two green job incentive funds:
    - a $15 million port-related Technology Advancement Program (TAP);

- Los Angeles City Employees' Retirement System - $46 million set aside.

Green Job Strategies that Target Brownfields – Local Models

- Kansas City "Green Zone" – Concentrates resources to 150 under-served area:
  - Job training
  - human resource services
  - business incentives

Green Job Strategy for Allegheny River Towns (draft)

- Assess area green assets
  - Research and tech transfer
  - Public policies
- Inventory incentives and compare…
- Business growth and opportunities
  - Current green businesses
  - Start-ups
  - Other businesses that could branch out
  - Green tech cluster???
- Analyze competitive advantage
  - Shift share and location quotient analysis
  - Evaluate competitive areas
- Examine potential matches between business expansion opportunities and the land/space available.
- Explore green tech incubator

Fort Pitt Brewery and Eco-clean Burners

Green Job Strategy for Allegheny River Towns (draft)

- Converteam – electrical systems for solar and wind

- Eco-clean Burners – converting plastic waste to energy

- Exterior Technologies – solar skylights

- Flabeg Corp – concave mirrors for solar

Green Jobs Energy on Brownfields

PA Steel Mill Anchored by Renewable Energy Component Manufacturers

Keystone Industrial Port Complex in 2,400-acre US Steel, Fairless Hills, PA

- Start-up solar material manufacturer AE Polysilicon Corporation,
- Spanish wind energy manufacturer Gamesa Wind US LLC, and
- Bard Bio-fuels, a 60 Mgy soybean-based biodiesel plant

Incentives - $11.92 million in loans, grants, tax incentives

Dollars Leveraged: $104 million

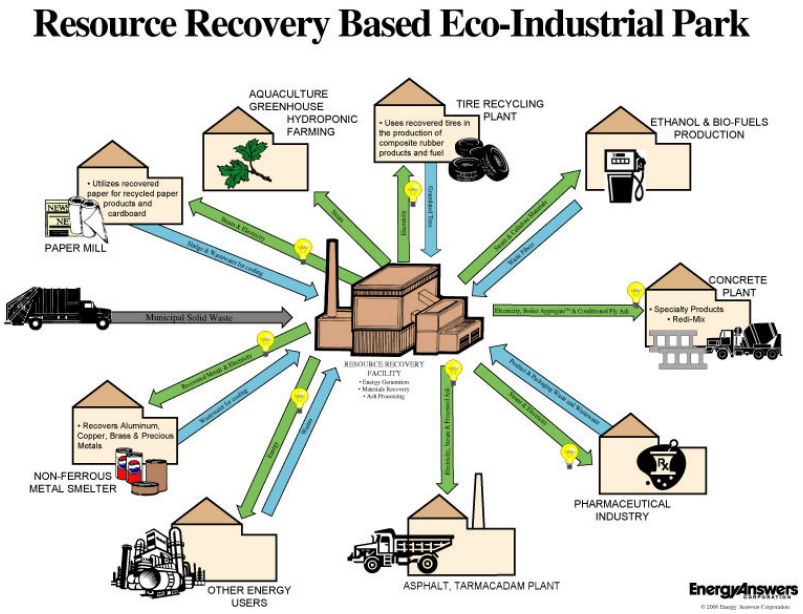
Jobs Leveraged: 450

Detroit (Wixom) Bets on Energy Park Reuse of Ford Plant

- Renewable energy park
- 2,800 jobs
- Xtreme Power (advanced battery manufacturer)
- Clairvoyant Energy (PV manufacturers)
- $100 million in tax breaks

Baltimore – CHP Plant could Anchor Industrial Redevelopment

- Energy Answers – Combined Heat and Power reuse of FMC fertilizer plant
- 120 MW plant
- 150-160 jobs
- Using 20 acres of 120 FMC plant, remainder complimentary industrial



Renewable Energy on Brownfields

Baltimore – Landfill Gas Fuels CHP plant which Provides Energy to Coast Guard

Landfill gas-supplied CHP plant provides 100% of the Yard's electricity requirement independent of the regional electric grid

- Removes 4 MW (approximately equivalent to 2,500 homes) of electricity from the regional electric grid the project

Buffalo – Wind farm on Contaminated Bethlehem Steel Property

- EPA Fact Sheet – "construction could occur without excavating the contaminated soil. Instead, the windmill foundations, service roads and green space cover the contamination."
- Wind turbines will generate over 50 million kilowatt-hours of electricity each year, enough electricity to power 9,000 homes.

Philadelphia Naval Shipyard – Solar on Contaminated Waste Site

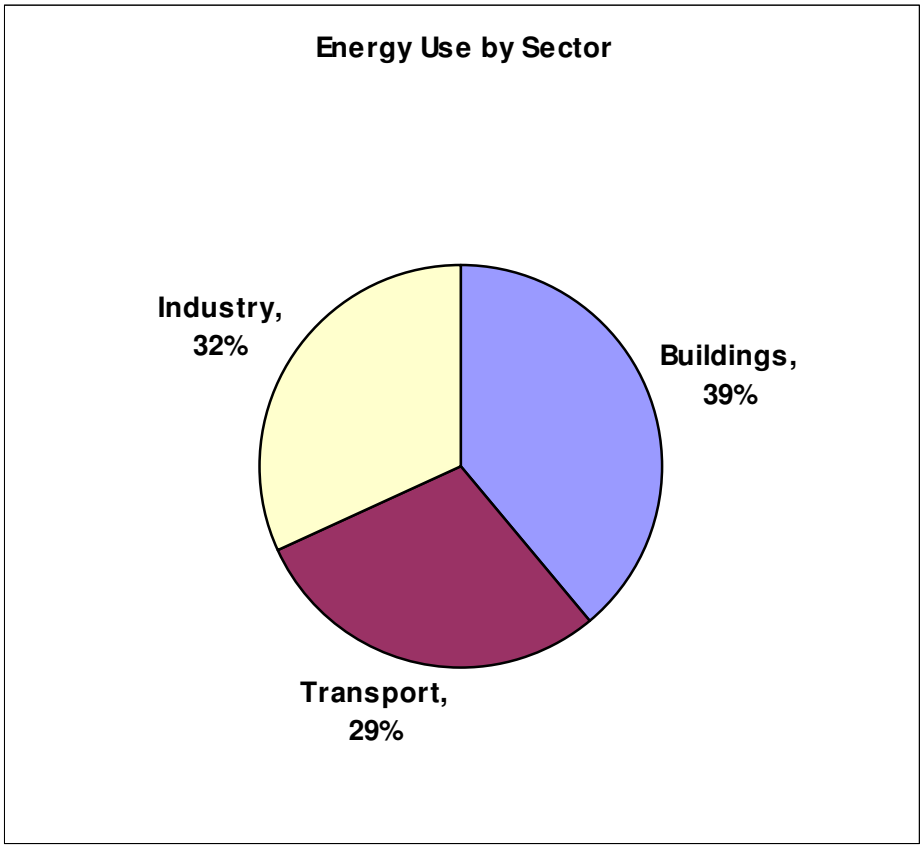
- Part of 1,000-acre shipyard redevelopment
- 1.5 megawatt solar on 7-acre brownfield, former landfill and incinerator
- On-going remediation and deed-restricted land use limits.

Wind and Solar as an Interim Use

- Milwaukee – Solar unit designed as an interim use
- Chicago – wind unit designed as interim use

Brownfields and Energy-Efficient Locations

Energy Demands by Sector

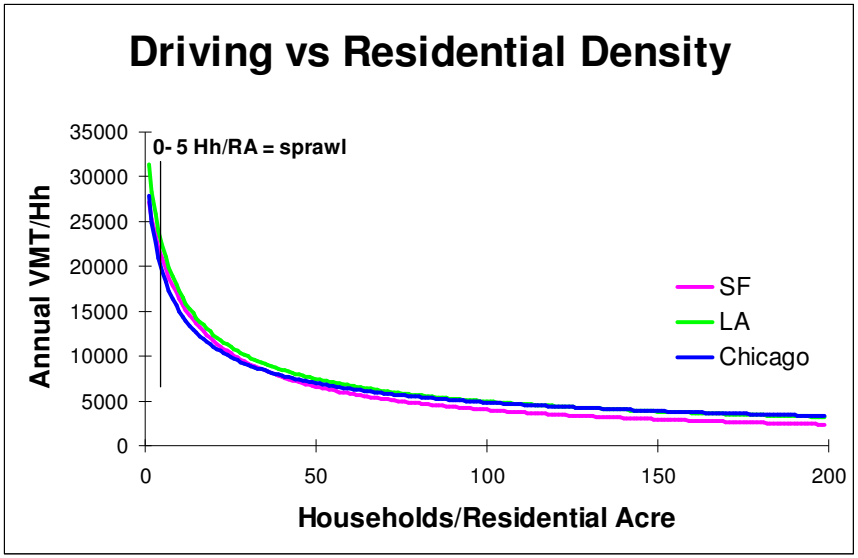


Brownfields – Contribution to Energy Efficiencies and Sustainability

- Transportation and VMT's
  - Brownfields and energy-efficient locations
- Building-Related Energy Efficiencies:
  - Green Buildings
  - Density
- Site related Energy Efficiencies:
  - Infrastructure
  - Carbon sink value
  - Distributing energy
  - Distributed energy
- Sites that Involve Energy Production

Transportation/VMT's
ULI Report – "Growing Cooler"

- 20% – 40% VMT reduction due to "compact in-fill" development.
- Factors affecting the range, in rank order:
  - Residential density
  - Mixing of uses/internal design
  - Proximity to city center or job center
  - Degree of connectedness to the existing grid
  - Access to transit



- Can brownfields projects claim the VMT reductions attributed to dense/compact development?

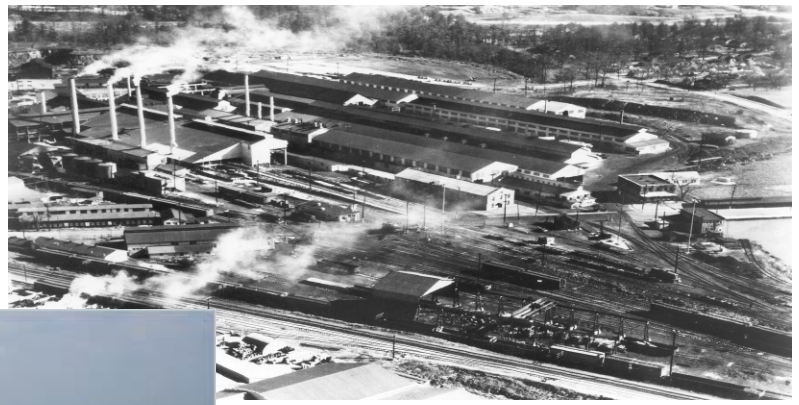
Transportation, Brownfields and VMT's

- Redevelopment of American Can, Baltimore
  - Density ☑
  - Close to job center ☑
  - Mixing of uses/internal design ☑
  - Degree of connectedness to the existing grid ☑
  - Access to transit ☑

Transportation/VMT's –
Brownfields and VMT's

- New (unreleased) EPA Case Studies of 5 sites:
  - 21% - 58% lower VMT's
- Clean Air-Brownfields Project:
  - Dallas and Baltimore case studies: Brownfields vs greenfields, saves:
    - 22% - 55% VMT's
    - 40% - 87% - NOX
    - 36% - 73% - VOC's
- Atlantic Station EPA Analysis
  - Atlantic Steel (vs. 3 alternate suburban sites) saves:
    - 14% - 52% VMT's
    - 37% - 81% - NOX
    - 37% - 81% - VOC's

Transportation/VMT's
Atlantic Steel to Atlantic Station



- 6 mil sq ft office
- 5,000 DU's
- 2 mil sq ft retail
- 1,000 hotel rms
- 11 acres open space

Transportation/VMT's –
Brownfields and VMT's

	Region	Atlantic Station Residents	Atlantic Station vs. Region - % Reduction
Individuals - ave VMT per day	**32.4**	**8.6**	**73.5%**
	Region	**Atlantic Station Workers**	**Atlantic Station vs. Region - % Reduction**
Commuting miles per day	**18.9**	**12.0**	**36.3%**

Going beyond VMT's – Building Factors

- Buildings account for 39% of energy demand
- Ways to reduce GHG's attributable to Buildings:
  - Green/energy efficient buildings
  - Efficiencies in heating and air conditioning higher density structures (fewer exposed surfaces)

Building Factors – Green Buildings

- Green Buildings and Brownfields
  - Market forces favor large-scale mixed use urban/brownfields projects going green;
  - USGBC – 50% of LEED ND Pilots got points for brownfields

Brownfields – Combining VMT Reduction and Green Buildings

- Model for measuring VMT reduction
- H.F. Miller redevelopment - reduce CO_2 by 296 metric tons
  - Reduce VMT by 40%
  - LEED Gold – reduce internal energy use by 33%
  - VMT reduction accounts for 55% of differential

HF Miller Tin Can and Box Company/2601 N. Howard Street, Baltimore – the dual benefit of energy-efficient buildings in energy-efficient locations

Building Factors – Green Buildings
Mega-Brownfields Projects – Going Green

Atlantic Station, Atlanta

Gates Rubber, Denver

Gateway South, Baltimore

Cleveland Flats East Bank, Cleveland

Building Factors - Density

- Efficiencies in heating and air conditioning more dense structures (fewer exposed surfaces)
  - Multi-family housing averages ½ the electricity use of single-family housing;
  - ULI report – 20% differential when control for socioeconomic factors and DU size

Going beyond VMT's – Site Factors

- Infrastructure-related energy demands
  - Cost differential –
    - $55,000/DU/Suburban vs.
    - $7,500/DU/brownfields
  - Infill 25% lower than greenfields (EESI)
- Greater efficiency (lower "line-loss") in transmitting energy
- Carbon sink value of retained forest
  - 0.23 acres forest retained equals 1 metric ton of CO2 emissions is saved
- Distributed Energy
  - District waste-to-energy and chilled water plants serve many urban core areas

Going beyond VMT's – Site Factors – Distributed Energy

- Waste-to-Energy plants
  - 89 waste-to-energy plants operating in 27 states;
  - Generate 2,500 megawatts electricity to 2.3 million homes;
  - 1500-ton/day facility saves **270,000 tons** CO_2 annually

Baltimore's waste to energy plant – BRESCO – serves Baltimore's core/Downtown

Brownfields/Mixed Use with Energy Production

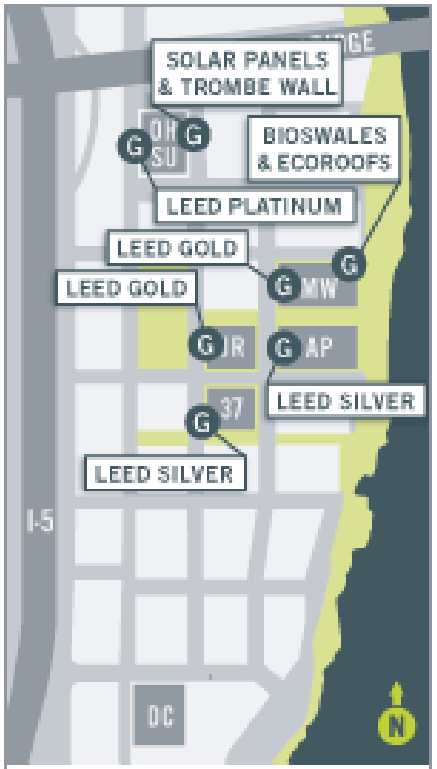
Belmar Mixed Use Development, Lakewood, Co.

- 22-city block mixed use redevelopment of failed downtown mall
- Garage roof solar installation 1.7 MW array
- EPA Brownfields Funding
- Rebate from Xcel Energy, driven by Colorado's renewable portfolio standard

Brownfields/Mixed Use with Energy Production

Portland – South Waterfront

- Energy Production:
  - *Solar energy – sunshades*
  - *Combined Heat and Power (CHP)*
- Green Buildings
- VMT characteristics



MW - MERIWETHER
AT - ATWATER PLACE
JR - THE JOHN ROSS
37 - 3720
DC - DISCOVERY CENTER

Brownfields/Mixed Use with Energy Production

Georgetown Land Development, Redding, CN

- Energy Production
  - *Hydro-electric power generation*
  - *Photovoltaics*
  - *Fuel Cell energy production*
- Green Buildings
- TOD
- VMT characteristics

Brownfields and Energy Policy Implications

- Reward "Double Benefit" sustainable urban redevelopment:
  - Development Incentives
  - Energy Policy
    - "Cap and trade"
    - Other energy incentives

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