Natural Infrastructure: The Importance of Public-Private Partnerships

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Natural infrastructure solutions can be the more cost-effective option...WHY?

**Regulatory drivers:** Increasing compliance costs of environmental regulations make natural infrastructure solutions more economical

**Reduced costs relative to grey infrastructure:**
Reduced equipment & installation costs, operation & maintenance costs

**Social benefits:** Natural infrastructure can produce additional ecosystem services (co-benefits) that generate social value

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**Example:** Forest carbon offsets in California

(California EPA Air Resources Board)

**Example:** Street trees add an average of $8,870 to the sales price of a single-family residential home in Portland, OR

(Donovan and Butry, 2010)

**Example:** 90% of NYC’s drinking water is drawn from 1,600 square miles of the Catskills watershed

(Chichilnisky and Heal 1998)
Public-private partnerships: the importance of incentives

Example: The economics of green roofs

Private costs and benefits
- Conventional roof
  - Construction + O&M costs
- Green roof
  - Construction + O&M costs
  - Energy savings
  - Private cost difference

Public costs and benefits
- Stormwater runoff
- Urban heat island
- Reduced stormwater runoff
- Improved air quality, reduced CO$_2$
- Improved habitat
- Amenities

Source: Irwin 2013
Public-private partnerships: the importance of incentives

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  - Construction + O&M costs
  - Stormwater runoff
  - Urban heat island

- Public costs and benefits
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  - Improved habitat
  - Amenities

- Private cost difference

- Incentives (public cost)
  - Source: Irwin 2013
Public-private partnerships: the importance of incentives

Example: The economics of green roofs

Private cost and benefits

Conventional roof

Green roof

Construction + O&M costs

Private cost difference

Energy savings

Private value of incentives

Construction + O&M costs

Win-win solution: net private costs of green roof are lower than conventional roof and net public benefits are positive

Improved habitat

Amenities

Reduced stormwater runoff

Improved air quality, reduced CO₂

Stormwater runoff

Incentives (public cost)

Source: Irwin 2013
Municipal stormwater management programs: a mix of regulations and incentives

Example: City of Philadelphia implemented impervious-based stormwater billing in 2010

City of Philadelphia Stormwater Fees
- Gross Area charge: $0.526/mo per 500 sq ft
- Impervious Area charge: $4.145/mo per 500 sq ft
- Credits offered for management of first inch of stormwater runoff using natural infrastructure (porous pavement, green roof, downspout disconnect, trees) → avoided public costs of $170 million

What is a stormwater utility?
A stormwater utility, operating much like an electric or water utility, may collect fees related to the control and treatment of stormwater that can be used to fund a municipal stormwater management program.

Types of incentives and examples

- **Reduced fees**: By offering fee discounts to landowners who reduce runoff, the City of Philadelphia saves up to $250,000 per acre of managed land in avoided infrastructure costs.

- **Avoided regulatory costs**: In San Jose, California, 87 percent of all development projects have less than 10,000 sq. ft. of impervious surface to stay under the new water quality requirement threshold.

- **Development incentives**: Chicago’s Green Permit Program expedites permit reviews for projects that meet certain LEED criteria.

- **Portland’s Floor Area Ratio (FAR) Bonus**: Increases a building’s allowable area in exchange for adding a green roof.

- **Rebates and financing**: Santa Monica, CA gives Landscape Grants to property owners that use native landscaping to reduce water consumption.

- **Awards & recognition**: BEST (Businesses for an Environmentally Sustainable Tomorrow) Awards by City of Portland

Example: Owens Corning facility parking lot retrofit (Portland, OR)

- Runoff from 31,000 square feet of impervious area is filtered and partially infiltrated, reducing pollutants entering the public stormwater system.

- 3,010 square feet of impervious area was removed and replaced with vegetated infiltration swales.

- Total cost: $125k; $96k grant from Portland’s Bureau of Environmental Services’ Innovative Wet Weather Program (IWWP) Grant Funds.

- A stormwater management charge discount was granted under Portland’s Clean River Rewards program.

Source: “Green Infrastructure Case Studies,” EPA-841-F-10-004, Aug. 2010

Source: City of Portland
References

- City of Portland. Ownings Corning Profile.. http://www.portlandoregon.gov/bes/article/323151