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# Decarbonizing Government Operations with Energy Service Performance Contracting

Examples from U.S. States and Abroad

June 1, 2023

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U.S. DEPARTMENT OF ENERGY BATTELLE

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# Introduction

- Decarbonizing government operations
- ESPCs and high decarbonization costs
  - Filling the gap
  - M&V implications
- ESPCs and a social cost of carbon
  - Social costs and alternatives
  - Stranded assets
- Other retrofit options

# Decarbonizing government operations

## Examples from Domestic and International Jurisdictions

Motivation:

- Limited literature on decarbonization of governments' own operations
- U.S. Federal Government is the U.S.'s largest energy consumer
  - Critical to understand best practices for efficient, large-scale, deep decarbonization



http://hdl.loc.gov/loc.pnp/highsm.25155

# Jurisdictions

- Canada
- Germany (Baden-Württemberg)
- Washington State
- Boston, MA
- Washington, DC
- Cornell University (Ithaca, NY)

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# ESPCs and high decarbonization costs

**When decarbonization costs more than the energy saved, how do jurisdictions handle this with ESPCs?**



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# Filling the gap

- Two-part contract managed by ESCO
  - Traditional ESPC component
  - Non-ESPC component: alternative financing mechanisms for deep decarbonization measures




https://www.energy.gov/eere/femp/about-federal-energy-savings-performance-contracts

# Filling the gap

- Boston: grants, green bonds
  - City finances projects directly, uses grants to repay itself
- Canada: capital injections from government agencies
  - Each agency budgets its own funds, ideally Federal government will eventually have a centralized pool
- Germany: government subsidies
  - 15-20% total project costs, essentially required with equal access for all ESCOs
- Washington State: grants, utility incentives and rebates
  - Grants awarded directly to agencies, further costs managed with incentives and rebates

# M&V implications

| Jurisdiction | ESPC contract length | M&V for non-ESPC component |
|---|---|---|
| Boston | 20 years | Is considering implementing carbon savings guarantee as an operations and maintenance expense |
| Canada | 15 years | Has no guarantee, but uses GHG inventories to monitor building performance |
| Germany | 15 years | Has short-term guarantees, around 5 years |

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# ESPCs and a social cost of carbon

**At a practical level, how do jurisdictions pay for the social cost of carbon in places with specific policies on the social cost of carbon that they must factor in?**



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# Social costs of carbon and alternatives

| Jurisdiction | Carbon valuation method | Deemed carbon value |
|---|---|---|
| Boston | Alternative cost of compliance to building emission standards | $234/tCO$_2$e in 2021, subject to review every 5 years |
| Canada | Engineering study to determine cost of decarbonizing government operations divided by total anticipated emissions | C$300/tCO$_2$e in 2020<br>USD 224/tCO$_2$e in 2020 |
| Cornell University | Began with one value from Interagency Working Group, applied its own estimated discount rate | $58/tCO$_2$e in 2016 |
| Germany | Carbon price applied to all transportation and heating, including public buildings | €25/tCO$_2$e in 2021, will increase to €55/tCO$_2$e by 2025 |
| Washington State | Established a working group to determine a social cost of carbon in the near-term | N/A |

# Social costs of carbon and alternatives

## Highlight: Canada

- Each government agency assessed real property portfolio through a third party engineering study
- Looking at
  - How much will it cost to achieve carbon neutrality?
  - How much emissions will be avoided?
- Divide the two to get a carbon price per unit of $CO_2$

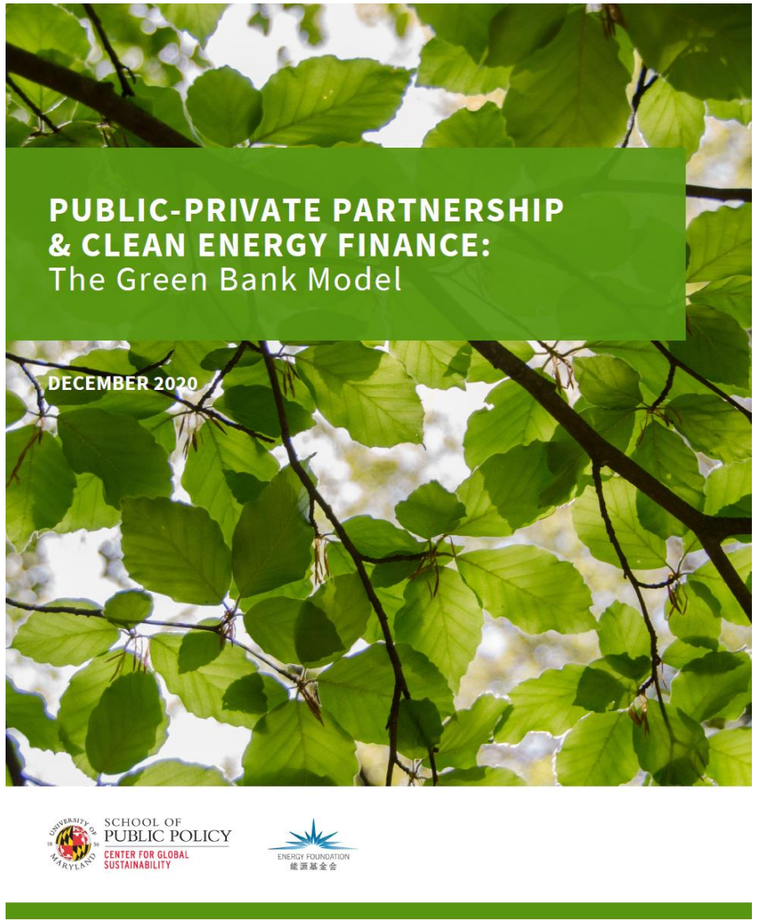
# Stranded assets

- Long-term planning is critical in facilitating deep decarbonization of buildings and other assets
  - Building retrofits typically once every 30-40 years
  - New vehicle fleets can last 10+ years
- Partial decarbonization efforts can lock in fossil fuels and make financing future measures more difficult
  - Stranded asset if jurisdiction reaches its target year for eliminating fossil fuels



# Overview of other US programs

- Building performance standards
- Green banks
- Weatherization Assistance Program
- State utility retrofit programs




Frech, J., Lou, J., Yu, S., Song, J., Hultman, N. (2020). Public-Private Partnership & Clean Energy Finance: The Green Bank Model. Center for Global Sustainability, University of Maryland, College Park, MD. 49pp.

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# Thank you

