

Regional Hub Policy Series

Embodied Carbon and Zoning and City Incentive Programs

Overview

This Presentation

- 1. Zoning and City Incentive Programs
- 2. Integrating Embodied Carbon
- 3. Case Studies

Policy Introductory Series

- 1. Introduction to the Embodied Carbon Policy Landscape
- 2. Climate Action Plans
- 3. Procurement Policy
- 4. Building Codes
- 5. Zoning and City Incentive Programs
- 6. Reuse and Deconstruction



Thanks to the CLF Regional Hub Policy Leads for feedback and review of this series.



Matching Policy Opportunities with Embodied Carbon Reduction Strategies

| | Optimize Project | Optimize System | Optimize Procurement |
|--------------|--|---|--|
| STRATEGIES | Build less, reuse more Design to reduce embodied carbon and increase material/structural efficiency | Choose low-carbon systems and assemblies Use alternate, low-carbon materials | Select the lowest carbon version of the selected product Clean manufacturing (efficiency, fuel switching) |
| TOOLS | Early Design Calculators, Rules of Thumb | Whole Building Life Cycle Assessment (WBLCA) | Environmental Product Declaration (EPDs) / EC3 Tool |
| ICY MEASURES | Reuse & De | econstruction | |
| | Zoning and City I | ncentive Programs | Procurement (Buy Clean) |
| | | Building Codes | s and Regulations |
| Pol | | Climate Action Plans | |





Zoning and City Incentive Programs

City Control and Influence

| Land | Infrastructure | Buildings |
|--|---|---|
| City owned: Cities commonly own significant amounts of land In Canada, much of the publicly owned land is owned by provincial or federal government | City owned: Ability to establish basic infrastructure Cities own most underground infrastructure, as well as most of the groundlevel infrastructure | City owned: Cities own most of the buildings required for their own operations Particularly in Europe, own social housing companies, most schools and sports and recreation buildings |
| City regulated: Establish zoning and develop the land as well as rezone any partly built areas Zoning also differs by country and states | City regulated: Exception of national/state roads and rails | City regulated: Cities have control over private development of land and buildings via zoning and permitting Care and medical facilities depending on country |



Zoning and Land Use

Regulations governing how land can be used

- Rules for where/how of residential, commercial, mixed-use, green space, and industrial areas
- Nature, function, density
- How land use is managed and optimized can create a significant impact on embodied carbon reductions



Example zoning: City of Seattle, 2012



City Planning and Permitting Incentive Programs

Complement (or precursor) to phasing-in regulatory requirements

Broader group of voluntary policies that provide incentives such as:

- Expedited permitting or plan check time
- Fee reduction
- Density bonuses
- Design challenges with awards and media attention to spark awareness/innovation

Benefits

- Test requirements
- Establish case studies
- Increase external and internal capacity and awareness before regulation





Integrating Embodied Carbon

Embodied Carbon

Zoning, land use, and city incentive programs can narrow the range of emissions **early on** with **long-term impact**

- Decisions made in these phases have very high potential impact
 - Ex. Choosing the land to zone and to build on to moving to determining constraints for density, massing and height.
- **Cities** are in a great position to implement regulations regarding these sectors compared to on a national scale.

ZONING AND LAND USE POLICIES

| POLICY CODE | POLICY NAME |
|----------------|---|
| Z1 | EMBODIED CARBON TARGETS FOR ZONING PROCESS |
| Z2 | SET ZONING REQUIREMENTS FOR BIO- BASED MATERIALS |
| Z3 | CARBON-SCORED LAND SALES COMPETITIONS |
| Z4 | PARKING REQUIREMENT OPTIMIZATION |
| Z5 | APARTMENT SIZE AND SPACE EFFICIENCY GUIDELINES |
| Z6 | PREFABRICATED OR MODULAR CONSTRUCTION PRIORITY |
| Z7 | INCREASING DENSITY USING EXISTING INFRASTRUCTURE |
| Z8 | USE LOW CARBON BUILDING TYPOLOGIES IN ZONING |

Source: CNCA Framework



Building Policies: Prescriptive and Performance Requirements





Performance-based Building Policies for Embodied Carbon

Building Approach

• Uses <u>Whole Building LCA tools</u> or calculators to measure performance

- Incentivizes <u>Designers</u> to collaborate to design a lower carbon building
- Captures strategies like:
 - Building/material reuse
 - Use of carbon-storing materials
 - Efficient structural/building design

- Well-suited city policies because <u>early</u> in design
- Broadest set of strategies available for reductions
- Led by design team

What does this policy look like in action?

- City sets building carbon budget (kgCO₂e/m²) for different building types
 OR percentage % reduction requirements from a baseline
- 2. City requires disclosure of WBLCA results during permitting/similar to verify compliance



Prescriptive Approaches

Require/incentivize predetermined list of strategies that reduce embodied carbon

Examples:

- Zoning requirements for carbon-storing materials
- Parking requirement optimization
- Apartment size and space efficiency guidelines/requirements
- Zone lower carbon building typologies

Read more: CNCA Framework

Pros:

- Requires less capacity-building to implement
- Easier to scale

Cons:

- Need additional research to determine most effective strategies
 - Ex. defining lower carbon building typologies
- Does not allow for/reward project-specific approaches and innovation





Case Studies

Overview

Zoning and Land Use Case Studies

- 1. City of Vancouver (B.C.) Green Building Rezoning Policy
- 2. Helsinki (Finland) Zoning Requirements for Bio-based Materials
- 3. London, UK Citywide Parking Reform

City Incentive Programs Case Studies

- 1. City of Seattle Green Building / Expedited Green Program
 - a. Related example: San Diego County Green Building Incentive Program
 - b. Related example: <u>Austin Energy Green Building Program</u>
- 2. City of Somerville Zoning Ordinance



Case Study City of Vancouver Green Buildings Policy for Rezoning

Phase 1: Disclosure (2017 -)

"All projects shall **report the life-cycle equivalent carbon dioxide emissions** (ie: global warming potential impact, or 'embodied carbon') **of each building, in kgCO2e/m²**, as calculated by a whole-building life-cycle assessment (LCA)."



Summary of the 'How We Build and Renovate' Section of the City of Vancouver Climate Emergency Action Plan



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Phase 2: Set Reduction Targets (2022 -)

Projects must **demonstrate % reduction** from baseline guided by the city (*publishing soon, updates ~5 years*)



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Phase 2: Set Reduction Targets (2022 -)

Project must **demonstrate** % **reduction** from baseline guided by the city (*publishing soon, updates* ~5 years)



Inform new policies (2023 -)

- **2022:** The first reduction target(s) is introduced in the <u>rezoning</u> plan.
- **2023:** Possible first embodied carbon requirements are added to the Building By-law.
- **2026:** The_rezoning policy targets are updated & 2022 rezoning targets are possibly adopted into the code.
- **2030**: 2026 rezoning targets are adopted into the code & higher targets are set for the rezoning policy to move towards net-zero emissions.



Case Study Helsinki, Finland

Designating zoning requirements for bio-based materials.

Benefits:

- Increasing carbon storage
- Reduced embodied carbon emissions when ensuring sustainable sources of wood (FSC or PEFC certified)





Case Study Helsinki, Finland



<u>Puuinfo Ov</u>, 2020

Example language:

- The building frame and facade must be predominantly wood.
- The wood elements must be possible to disassemble and reuse in other buildings.
- Buildings must incorporate at least 50 kg of sustainably sourced wood (FSC or PEFC certified), or other bio-sourced material
- Buildings must incorporate at least 100 kg CO2e of biogenic carbon storage in permanently installed building structures and materials.

Case Study London, UK

Jeffrey Smith CC and ACCESS Magazine

Citywide parking reform

- Greater London Authority eliminated minimum parking standards
- London's 33 boroughs updated their local plans
- 40% reduction in spaces
- Other municipalities reducing minimum parking standards

Parking and equity

• Market-based parking requirements

Case Study Seattle "Priority Green Expedited"

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Case Study <u>City of Somerville Zoning Ordinance</u>

- Passed in December 2019, updated 2021 with additional pathways to achieve 'net zero ready building' status
- Built off of success with affordable housing density bonuses

Includes:

- Requirements for buildings >25,000 sf to be LEED Gold certifiable and for buildings >50,000 sf to be LEED Platinum certifiable.
- Developers will be allowed to increase the unit count of their buildings if they meet Net Zero Ready requirements, which include a high performing building envelope and no fossil fuel combustion for heating or cooking.
- The Living Building Zero Carbon certification (and Passive House certification) are included as pathways to achieving "Net Zero Ready building" status to qualify for density bonuses.

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Takeaways

Pexels, 2017

- Zoning, land use, and city incentive programs can narrow the range of emissions **early on with long-term impact**
- **Cities** are in a great position to implement regulations regarding these sectors compared to on a national scale.
- Many different approaches: performance and prescriptive

Thank You!