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Waterfront Toronto and the Transformation of the Green Building Market

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This paper presents a case study of Waterfront Toronto's urban redevelopment efforts for the potential to address climate change by acting as a pathway to decarbonization within Bernstein and Hoffmann's (2016) framework. Waterfront Toronto, a federal-provincial-municipal development corporation, has been tasked with turning hundreds of hectares of underutilized land into residences, commercial spaces and parks. One goal of Waterfront Toronto is to catalyze market transformation to engender lower carbon urban development. This case study focuses on the role of exceptional or pilot urban space in catalyzing broader decarbonization. The analysis of the history and trajectory of Waterfront Toronto uncovers barriers to decarbonization as well as the possible pathways to systemic change that Waterfront Toronto may catalyze. The focus on the politics of decarbonization presents several important lessons, including the benefits and limitations of exceptional spaces of decarbonization. On one hand, exceptional spaces of decarbonization support the creation of space for lower risk learning, help build political coalitions since participation is incentivized and voluntary, and offer opportunities to reframe normal practices by raising the bar on the highest tier of performance. However, exceptional spaces of decarbonization are also limited since the exceptionality of the practices is maintained when attempts are made to catalyze broader entrenchment. Practices are therefore weakened when they are first scaled up or entrenched beyond the original intervention. In addition, this case illustrates the ways that conscious copying of decarbonization interventions in different places may lead to islands of decarbonization rather than widespread transformation.

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EXECUTIVE SUMMARY

The waterfront area in the City of Toronto is undergoing revitalization. Waterfront Toronto, a combined federal-provincial-municipal development corporation, has been tasked with turning hundreds of hectares of underutilized land into residences, commercial spaces and parks. In addition to spurring economic development, one of the goals of Waterfront Toronto is to catalyze market transformation to engender lower carbon urban development.

This case study focuses on the role of exceptional or pilot urban space in catalyzing broader decarbonization. Decarbonization is the shift away from carbon-based energy systems, and related human processes that increase CO₂ concentrations in the atmosphere, and supporting governance designs. This shift must disrupt heavily entrenched carbon lock-in, which is necessarily a political endeavor (Bernstein and Hoffmann, 2016). To understand that endeavor, Bernstein and Hoffmann's (2016) theoretical framework conceptualizes causal mechanisms that function along pathways to decarbonization. Importantly, the framework argues that a number of political processes are required to make the changes necessary to move systems along pathways to decarbonization. In the framework, political dynamics of carbon lock-in are altered through three mechanisms: creating normative change (normalization), building capacity (through resources or by changing institutions) and coalition building. One outcome of these political mechanisms is that a decarbonization intervention and/or the changes in the targeted system that it catalyzes scales up and becomes more entrenched over time. The cumulative or catalytic impact of scaling and entrenchment can create three possible trajectories: 1) reinforced carbon lock-in; 2) improved carbon lock-in (more efficient, but

still locked into a high carbon system); or 3) decarbonization.

Waterfront Toronto's activities are catalyzing broader improvements to building practices in the City of Toronto, but the changes represent an incremental improvement rather than transformation. In addition, Waterfront Toronto's work with other cities is contributing to a series of pilot low carbon urban spaces and, in this way, is catalyzing a chain of urban decarbonization islands internationally. Several lessons are drawn from the analysis of the politics of decarbonization in this case and the conceptualization of the political mechanisms at play as an intervention seeks to disrupt carbon lock-in.

About Waterfront Toronto

Waterfront Toronto is an independent corporation established in 2001 whose purpose is to redevelop 800 hectares (1977 acres) along Lake Ontario. Market transformation is a major element of environmental performance for Waterfront Toronto, which means that one can understand the waterfront redevelopment as an attempt to use the waterfront space to catalyze decarbonization beyond the physical boundaries of the waterfront precincts. Waterfront Toronto intends the waterfront neighbourhoods to be exemplary in terms of environmental performance through the requirement of high energy performance in buildings and the incorporation of smart technologies. Waterfront Toronto staff use several tools to try to achieve decarbonization within the redevelopment area, such as the Minimum Green Building Requirements (based on LEED Gold certification) and the Carbon Tool (which allows Waterfront Toronto staff to compare the GHG emission impact of various design options). Waterfront Toronto has achieved some progress toward decarbonization within the redevelopment area, including the

construction of four LEED Gold buildings with ten more awaiting review and the expectation that completed, under construction, and in design phase buildings will achieve 44% lower energy costs and an average energy use intensity of 174 kWh/m² (Waterfront Toronto, 2015c).

Political Mechanisms of Decarbonization

Capacity building has been an important part of the Waterfront Toronto story. In particular, Waterfront Toronto seeks to use the swath of city under its purview as an exceptional, pilot space for lower carbon building in order to forge new capacity in industry and regulatory sectors. For instance, Waterfront Toronto seeks to transform the market using the Minimum Green Building Requirements (MGBR), which are mandatory performance standards for new construction buildings. The MGBR are continually updated to push the bar on performance and build capacity within the industry. Through this process, industry develops decarbonization knowledge and skills. These pilot experiences can then inform broader urban governance and allow it to draw on the pool of increased capacity. Capacity building is multi-scalar in this case. City to city capacity building has consistently been an important dynamic for the Waterfront Toronto urban development. Waterfront Toronto does not just teach other places about decarbonization, but also learns from international urban experiences. In their pursuit of market transformation, Waterfront Toronto staff are trying to *normalize* building practices that are greener than practices adhering to the regular building standards of Ontario. Developers are the targets for these efforts. The main tool Waterfront Toronto is using to

achieve normalization is the Minimum Green Building Requirements. Waterfront Toronto has seen evidence that normalization of greener building practices is taking place through the acceptance of higher performance standards for development and the pursuit of LEED Gold certification in buildings nearby. ‘Smart city’ solutions, or the increased use of information and communication technology to achieve energy efficiency, are one approach particularly targeted for normalization to, in part, achieve decarbonization. *Coalition building* was less central in this case, but one way that Waterfront Toronto is building political coalitions of support in the development community is by garnering international attention for the urban development.

In the Waterfront Toronto case, there is evidence for wider entrenchment of piloted decarbonization practices in citywide standards. However, new green building standards developed for the waterfront have not been simply extended to apply to the whole city. Instead, there is evidence that the high bar set by the green building work in the pilot area created space for a new, higher normal across the city. The establishment of a new ‘average’ in market wide building practices was buttressed by the development of sufficient green building capacity in the industry and the demonstration of adequate political support (or at least lack of organized opposition) for higher green building standards. There is also evidence for entrenchment in industry practice beyond the pilot space. Developers have voluntarily pursued LEED certification for buildings outside of the Waterfront Toronto redevelopment area because the concentration of LEED buildings within the waterfront area has made green building a point of competition nearby. Because these buildings are outside of the control of the waterfront standards, however, they have not been required to meet the specific energy components Waterfront Toronto

requires in the achievement of LEED. Waterfront Toronto's creation of exceptional space did allow for capacity building and normalization of building practices that were closer to decarbonization than previous practices. However, the entrenchment of lessons learned in the pilot space into the broader city was system improving rather than transformative.

Lessons Learned

- The benefits of exceptional spaces of decarbonization include the creation of space for lower risk learning, support for political coalition building since participation is incentivized and voluntary, and the opportunity to reframe normal practices by raising the bar on the highest tier of performance. New capacity, new political coalitions, and improved normal practices can then be drawn on to support the scaling up and entrenchment of similar policies across a broader area.
- Exceptional spaces of decarbonization, on their own, have limited effects if the exceptionality of the practices is maintained when attempts are made to catalyze broader entrenchment. Practices may therefore weaken when they are first scaled up or entrenched beyond the original intervention.
- Capacity building can support chains of modular scaling (borrowing of practices in other developments), but this may lead to islands of decarbonization rather than widespread transformation. Only incremental decarbonization will be achieved unless the pilot experiences catalyze broader entrenchment beyond the exceptional space.

1. Introduction

Governments at multiple levels have targeted the waterfront area in the City of Toronto for revitalization. They have tasked Waterfront Toronto, a combined federal-provincial-municipal development corporation, with turning hundreds of hectares of underutilized land into residences, commercial spaces and parks. In addition to spurring economic development, one of the goals of Waterfront Toronto is to catalyze market transformation to engender lower carbon urban development.

This case study focuses on the role of exceptional or pilot urban space in catalyzing broader decarbonization. Decarbonization is the shift away from carbon-based energy systems, and related human processes that increase CO₂ concentrations in the atmosphere, and supporting governance designs. This shift must disrupt heavily entrenched carbon lock-in, which is necessarily a political endeavor (Bernstein and Hoffmann, 2016). To understand that endeavor, Bernstein and Hoffmann's (2016) theoretical framework conceptualizes causal mechanisms that function along pathways to decarbonization. Importantly, the framework argues that political processes are required to make the changes necessary to move systems along pathways to decarbonization.

As this paper demonstrates, the effort to catalyze decarbonization using the waterfront redevelopment area is multi-scalar. It comprises a series of neighbourhoods that are being built to higher environmental standards than the rest of the city. However, these efforts enroll city policymakers and developers in mutual learning, which is leading to impact beyond the spatial boundaries set out in Waterfront Toronto's redevelopment plan. Furthermore, Waterfront Toronto is both learning from and teaching other cities about urban low carbon pilot space development.

Waterfront Toronto's activities are catalyzing broader improvements to building practices in the City of Toronto, but the changes represent an incremental improvement rather than transformation. In addition, Waterfront Toronto's work with other cities is contributing to a series of pilot low carbon urban spaces and, in this way, catalyzing a chain of urban decarbonization islands internationally. The analysis of the politics of decarbonization in this case produces several lessons, including on how exceptional spaces provide opportunities for learning and possible limits to scaling of decarbonization practices from exceptional spaces absent supporting policies or incentives.

This paper first describes the theoretical framework on the politics of decarbonization in which this case study is embedded. The subsequent section explains the history of the Waterfront Toronto intervention. The paper then analyzes whether and how three political mechanisms – capacity building, normalization, and coalition-building – are activated in this case and whether they lead to scaling up and entrenchment of the intervention. Finally, the paper analyzes system outcomes in this case and lessons learned about the possible effects of exceptional urban spaces for trajectories toward decarbonization before concluding.

2. Theoretical Framework

This paper uses Bernstein and Hoffmann's (2016) theoretical framework on the politics of decarbonization. The framework seeks to explain the trajectories of interventions, or intentional attempts to catalyze decarbonization in a particular system. This paper acts as a case study within the politics of decarbonization research project to

further understand both the obstacles to decarbonization and the causal mechanisms that could trigger multiple pathways to decarbonization.

Decarbonization is the reversal of the entrenchment of fossil-fuel energy systems, and related processes and practices that depend on them, that has resulted from the co-evolution of technological and institutional systems in industrial economies or “carbon lock-in” (Unruh, 2000). Carbon lock-in is not simply a problem of particular technologies, but instead is integrated into modern societies across economic, transportation and energy sectors. As a result, decarbonization will need to take place along multiple pathways spanning across society (Levin et al., 2012). Disrupting carbon lock-in is a fundamentally political endeavor (Bernstein and Hoffmann, 2016). Instead of taking a deterministic or structural view of change to understand low-carbon transitions, the politics of decarbonization framework argues that a number of political processes are required to achieve the technological and behavioural change necessary to move systems along pathways to decarbonization.

Bernstein and Hoffmann’s (2016) theoretical framework identifies causal mechanisms that function along pathways to decarbonization. The political dynamics of carbon lock-in are altered through three mechanisms: creating normative change (normalization), building capacity (through resources or by changing institutions) and coalition building. Normalization is the alteration of the common sense of a system. Capacity building is developed through new skills, tools, institutions, and/or knowledge to act. Coalition building is the development of political support for action by building constituencies and empowering or incentivizing actors. It can be done through actions including directly enlisting support or building partnerships, altering incentives or using

market forces. These three mechanisms determine how and whether interventions and/or the technologies and policies they target will scale up or become entrenched. In this framework, an intervention catalyzes pathways to decarbonization by scaling up or more deeply entrenching the intervention itself and/or technologies, policies, or practices it promotes. The cumulative or catalytic impact of scaling and entrenchment system effects can create three possible trajectories: 1) reinforced carbon lock-in; 2) improved carbon lock-in (more efficient, but still locked into a high carbon system); or 3) decarbonization.

This paper focuses on Waterfront Toronto's efforts to transform the building market to reduce greenhouse gas emissions. Market transformation is a major element of environmental performance for Waterfront Toronto. As is prominently stated in Waterfront Toronto's Social Responsibility and Sustainability Report, "We hope that our work will create momentum for a shift away from business as usual to a new and more sustainable way of doing things in Toronto and worldwide" (Waterfront Toronto, 2015c). Therefore, one can understand the waterfront redevelopment as an attempt to use the waterfront space to catalyze decarbonization beyond the physical boundaries of the waterfront precincts. In the following sections, this case study analyzes whether the Waterfront Toronto intervention appears to be catalyzing a decarbonization trajectory.

3. The History of Waterfront Toronto

Waterfront Toronto is an independent corporation established in 2001 whose purpose is to redevelop 800 hectares (1977 acres) along Lake Ontario. This is a large area the same size as the existing downtown core of Toronto spanning from Bathurst to Sherbourne and Front to Bloor streets (Waterfront Toronto, 2015a). To meet this scope of

development, three levels of government promised Waterfront Toronto \$1.5 billion in seed capital in 2001. At the time of writing, expenditures of \$769.5 million from the public sector have unlocked \$10 billion of potential private sector investment (Waterfront Toronto, 2015a). Waterfront Toronto describes its driving mission as “reconnecting people with the waterfront, design excellence, sustainable development, economic development and fiscal sustainability” (Waterfront Toronto, 2015a). Waterfront Toronto has split the redevelopment area into distinct neighbourhoods, pictured in Figure 1.



Figure 1 Map of Waterfront Toronto precincts targeted for redevelopment (from waterfronttoronto.ca)

Waterfront Toronto is the most recent institution tasked with waterfront redevelopment, but there is a long history of failure to implement waterfront redevelopment plans in the city (Eidelman, 2013a). While the current redevelopment scheme has won awards and significantly improved public space in the city, it has also fallen behind schedule and cancelled a number of planned projects (Eidelman, 2013b).

However, since broader market transformation is a key goal, failure to deliver the entire planned development may not negate the decarbonization potential of this intervention.

3.1 Decarbonization Goals and Activities

Waterfront Toronto's Sustainability Framework (Toronto Waterfront Revitalization Corporation, 2005) outlines specific goals related to decarbonization. Waterfront Toronto intends to achieve "40% less CO₂ emissions per capita than current average by 2025" (Toronto Waterfront Revitalization Corporation, 2005). The developments are intended to have "significantly reduced levels of per capita energy consumption coupled with a greater use of low-impact renewable energy to meet energy demands" (Toronto Waterfront Revitalization Corporation, 2005). Planned actions to achieve those energy goals include use of compact and mixed use urban design, design of highly efficient buildings (LEED Gold and Platinum), and use of district energy systems. More specifically, the Sustainability Framework states that "all new residential and commercial buildings designed between 2005-2007 will be 40% more energy efficient than Canada's Model National Energy Code for Buildings (MNECB). All new buildings from 2008 onwards will be 50% more energy efficient than Canada's MNECB" (Toronto Waterfront Revitalization Corporation, 2005). Waterfront Toronto will increase renewable energy installation by conducting technical and feasibility studies, pursue plans to purchase off site renewables, and develop the waterfront communities into net exporters of renewable energy. Waterfront Toronto's Sustainability framework outlines goals to get 20% of energy from renewable sources by 2010 and to purchase 30% of electricity from low impact renewable energy by 2010, increasing to 80% by 2020. The

Framework also includes goals related to land use and urban design that take into account energy efficiency and goals about access to walking, cycling, and public transportation while discouraging car use (Toronto Waterfront Revitalization Corporation, 2005). The goals also highlight plans to bring attention to Waterfront Toronto's sustainability efforts as a global hub for innovation.

The most recent Corporate Social Responsibility and Sustainability Report at the time of writing (2015) highlights some indicators denoting progress in implementing decarbonization. Four LEED gold buildings have been constructed and certified and ten more buildings are awaiting review for LEED gold certification. Developers have demonstrated that buildings that are 40% more energy efficient than Canada's Model National Energy Code for Buildings (MNECB) can be achieved, and so the requirements have been increased to 50%. Completed, under construction, and in design phase buildings in the waterfront area are expected to achieve 44% lower energy costs than the MNECB and an average energy use intensity of 174 kWh/m² (Waterfront Toronto, 2015c). Note that these figures are based on energy models rather than performance measurement. Also based on modeling, Waterfront Toronto predicts that the West Don Lands neighbourhood will have 29% lower greenhouse gas emissions than a build-as-usual scenario due to the application of the minimum green buildings requirements (see Box 1 for more detail about the minimum green building requirements) (Waterfront Toronto, 2015c).

Waterfront Toronto intends for the waterfront neighbourhoods to be exemplary in terms of environmental performance (Waterfront Toronto, 2015c). Waterfront Toronto

staff use several tools to try to achieve decarbonization, such as the Minimum Green Building Requirements and the Carbon Tool.

3.2 Minimum Green Building Requirements

Application of the Minimum Green Building Requirements (MGBR) is the main tool used by Waterfront Toronto to require decarbonization practices by private developers. The requirements “mandate high performance buildings, smart technologies, and passive design” (Waterfront Toronto, 2015d). The MGBR are currently based on a LEED Gold certification plus mandatory inclusion of five extra LEED credits that are usually optional when pursuing LEED certification. All private developers building in Waterfront Toronto neighbourhoods where land is publicly owned must meet the MGBR. In fact, compliance is written into contracts with developers.

Box 1. Minimum Green Building Requirements Key Features

- *Energy Efficiency* – buildings must be 50% more energy efficient than Canada’s MNECB
- *Renewable Energy* – 3% of a buildings annual energy cost must come from on-site renewable energy (if not feasible technically, can achieve even higher energy efficiency instead)
- *Smart Building* – buildings must incorporate specific energy infrastructure and collect data, where the purpose is to allow residents to track, control and pay utility usage
- *Electric Vehicle Infrastructure* – goal is to reduce non-point GHG emissions from vehicles by providing EV infrastructure in 2% of tenant and commercial parking spaces (and requiring further EV expansion readiness)
- *Green Roof* – purpose is to address storm water, heat island reduction, and habitat goals by requiring 50% of roof space to be green (requirement is waived if roof is covered by photovoltaics (PV) or Solar Thermal)
- *Engagement and Support* – purpose is to provide residents with info needed to optimally operate and maintain building
- *Bike parking and storage* – purpose is to reduce vehicle emissions (1.2 spaces per

residence)

- *Waste management* – purpose is to divert waste from landfills, so residential buildings must have separate chutes
 - *District energy* – buildings must connect (through Energy Service Agreement) when district energy made available by Waterfront Toronto
 - *High efficiency appliances* – goal is energy and water efficiency through requiring Energy Star compliance
 - *Community integration* – development must consider how building design impacts adjacent buildings and community (i.e., transport integration, façade etc.)
 - *Long-term flexibility* – structure must be built to allow for changes without structural modifications
 - *Integrated Design process* – multi disciplinary teams
- (Waterfront Toronto, 2015d)

3.3 Carbon Tool

The Carbon Tool is another tool used to drive decarbonization in the Waterfront Toronto neighbourhoods. The Carbon Tool is made up of a series of spreadsheets that can be used during planning and design phases of development (Waterfront Toronto, 2015b). It allows Waterfront Toronto staff to compare the GHG emission impact of various design options. The tool was developed specifically for the Lower Donlands so that staff could analyze progress in reducing carbon emissions below zero, which was a goal set because it is part of the C40 Cities Climate Positive program.

4. Transformative Political Mechanisms

Capacity change, coalition building, and normative change are thought to be causal mechanisms that determine how and whether interventions scale up or become entrenched. The operation of these mechanisms can help one determine whether interventions are on trajectories that can reinforce systems lock-in to carbon, improve the

efficiency of the system without addressing carbon lock-in, or overcome carbon lock-in in the targeted system. In practice, these mechanisms interact, but they are separated in the following section for analytical purposes. These mechanisms can be used to help one make sense of how an intervention is disrupting carbon lock-in both within the targeted system as well as broader disruptive effects catalyzed beyond the targeted system.

4.1 Capacity Changes

Capacity building has been an important part of the Waterfront Toronto story. In particular, Waterfront Toronto seeks to use the swath of city under its purview as an exceptional, pilot space for lower carbon building in order to forge new capacity in industry and regulatory sectors. As a senior planning official with the City of Toronto explained, “generally speaking what happens on the Waterfront is seen as the best practice and new approaches can more easily be piloted there for a range of reasons including ownership, government investment but also market values.”¹ Waterfront Toronto seeks to transform the market using the Minimum Green Building Requirements by setting levels that build capacity within the industry and increasing those levels over time². Through this process, industry develops decarbonization knowledge and skills. These pilot experiences can then inform broader urban governance and draw on the pool of increased capacity.

Waterfront Toronto also acts as a learning and capacity building opportunity for other places. In some cases, capacity is shared directly between city officials.

¹ Interview with Senior Planner, City of Toronto, March 1, 2016.

² Interview with Waterfront Toronto employee, August 19, 2015.

Representatives from Vancouver and Mississauga have visited Toronto to learn from the waterfront experience.³ In this way, Waterfront Toronto transfers knowledge to ensure greater uptake and widespread adoption of higher building performance standards. In other cases Waterfront Toronto acts as a more distant case study. Waterfront Toronto participates in the C40 Cities Climate Positive program, for instance, as an exemplar of urban development with a net positive climate impact. One of the main purposes of the Climate Positive program is to encourage learning and demonstration to other cities.⁴

Capacity building is multi-scalar in this case. Waterfront Toronto does not just teach other places about decarbonization, but also learns from international urban experiences. City to city capacity building has consistently been an important dynamic for the Waterfront Toronto urban development. Input from the City of Vancouver and the Beddington Zero Energy Development in England originally influenced the development of Waterfront Toronto's Sustainability Framework (Toronto Waterfront Revitalization Corporation, 2005; Waterfront Toronto, 2015c). Furthermore, the sustainability approach taken by Waterfront Toronto was modeled on the experience of the City of Stockholm in its redevelopment of a neglected waterfront area into a sustainable community called Hammarby Sjöstad. Waterfront Toronto officials went to Sweden to tour the neighbourhood and learn from the experience of officials there (Swedish Expert Team on behalf of Swedish Trade Council, 2004). The Hammarby Sjöstad approach is branded as the Sustainable City Concept and the Hammarby Eco-Cycle and is actively exported by the City of Stockholm and Sweden in international capacity building exercises. Capacity building between the two places continued as Waterfront Toronto developed early

³ Interview with Waterfront Toronto employee, August 19, 2015.

⁴ Interview with C40 employee, August 28, 2015.

precinct plans for East Bayfront and West Donlands; in 2004, the Swedish Trade Council organized a review of the sustainability achieved in the Waterfront Toronto activities that had occurred to date (Swedish Expert Team on behalf of Swedish Trade Council, 2004).

Participation in international exchange to build capacity has continued over time:

We always look to other cities that have successfully implemented district energy, for example, or vacuum waste, or waste from energy, these types of things that in the city we haven't successfully been able to implement but that we're working towards. To look at how other cities have been able to achieve implementing certain technologies that we don't see here.⁵

International capacity building has helped Waterfront Toronto staff gain technological and policy expertise. Similar international capacity building takes place for smart city issues. Waterfront Toronto staff interact with staff from cities like Stockholm and Taipei and companies like IBM and Cisco in the Intelligent Communities Forum to try to capture and share new learning from efforts to build smarter cities.⁶

4.2 Normalization

In their pursuit of market transformation, Waterfront Toronto staff are trying to normalize building practices that are greener than practices adhering to the regular

⁵ Interview with Waterfront Toronto employee, August 19, 2015.

⁶ Interview with Waterfront Toronto employee, September 30, 2015.

Ontario building standards. Developers are the particular targets for these efforts. The main tool Waterfront Toronto is using to achieve normalization is the Minimum Green Building Requirements (MGBR). The MGBR are included as mandatory requirements in the development proposal requests issued by Waterfront Toronto, which means that developers know what they are bidding on and understand that they will have to meet the standards. The MGBR are then incorporated into development agreements.⁷ Integration into development agreements is the mechanism of enforcement for the standards. As such, Waterfront Toronto's eventual control over the land is an essential lever in this process of normalization. However, the impact of the MGBR extends beyond the property where Waterfront Toronto has direct control:

[Waterfront Toronto] can't force [developers of privately owned land] to do anything, but [developers] understand that the buildings going up across the street will be LEED Gold or in some cases LEED platinum. If you don't have a LEED gold building, and the customer is figuring out which building to buy in, you have to be competitive. So I think that's really pushing the market [towards higher performing green buildings].⁸

As this quote demonstrates, Waterfront Toronto has seen evidence that normalization of greener building practices is taking place.

One aspect that Waterfront Toronto is seeking to normalize within the MGBR is the increased use of information and communication technology (ICT) to achieve energy

⁷ Interview with Waterfront Toronto employee, August 19, 2015.

⁸ Interview with Waterfront Toronto employee, August 19, 2015.

efficiency. ‘Smart city’ or ‘intelligent community’ tenants are central in Waterfront Toronto’s development goals. According to the terms of development agreements, relevant ICT infrastructure must be installed within buildings and tenants must connect to Beanfield’s fibre infrastructure.⁹ (Beanfield is a private company selected by Waterfront Toronto to be the ICT provider for the whole waterfront development and it is providing some of the most competitive ICT infrastructure in the world.) Suite level energy metering is required, which is intended to provide residents with feedback on how they are doing related to energy use.¹⁰ The MGBR are successfully normalizing the installation of ICT in the target system to achieve decarbonization. More recently, Waterfront Toronto is following up by seeking to normalize participation in smart energy monitoring. Original development agreements required condos to connect to the system, but did not require any data to be released to Waterfront Toronto. It is interested in this data because it would like to analyze building performance once it is occupied and compare it to modeled energy use for that building. In the future, Waterfront Toronto will put a requirement into development agreements that energy use data must be shared with it in a format that respects privacy concerns.¹¹ It is working on developing digital platforms that allow for energy use data to be centrally collected and displayed engagingly for residents and businesses.¹²

4.3 Coalition Building

⁹ Interview with Waterfront Toronto employee, September 30, 2015.

¹⁰ Interview with Waterfront Toronto employee, August 19, 2015.

¹¹ Interview with Waterfront Toronto employee, August 19, 2015.

¹² Interview with Waterfront Toronto employee, September 30, 2015.

One way that Waterfront Toronto is building political coalitions of support in the development community is by garnering international attention for the urban development. Developers are interested in participating in the sustainability aspects of Waterfront Toronto partly because they like the “Clinton Climate Initiative buzz.”¹³ This connection is good for promotion for everyone involved since “people pay attention” when they see that the Lower Donlands neighbourhood is a C40 Cities Climate Positive Neighbourhood and the affiliation “raises [the project] above the local scenario.”¹⁴ Waterfront Toronto was also named Intelligent Community of the Year in 2014 by the Intelligent Community Forum, which is featured prominently in Waterfront Toronto materials to gain political support for the smart cities aspects of the development plans (Waterfront Toronto 2014).

5. System Effects

5.1 Scaling

The decarbonization initiatives pursued by Waterfront Toronto are scaling up over time as the development proceeds from neighbourhood to neighbourhood within the urban redevelopment area. Waterfront Toronto tightens requirements and increases standards over time, including increasing energy requirements from 40 to 50% better than the model national energy code and requiring updated versions of LEED.¹⁵ Capacity building is a key enabler of this scaling process. As Waterfront Toronto is reassured that

¹³ Interview with former Waterfront Toronto employee, September 30, 2015.

¹⁴ Interview with former Waterfront Toronto employee, September 30, 2015.

¹⁵ Interview with Waterfront Toronto employee, August 19, 2015.

the development community can meet requirements (adequate skills, knowledge etc.), the bar is raised higher for the next suite of buildings that are negotiated for development.

The experiences of Waterfront Toronto demonstrate how *modular scaling* can take place in a sequence. *Modular scaling* is when a new initiative is developed that emulates or learns from an existing initiative (Bernstein and Hoffmann 2016; van der Ven et al. 2017). The pilot waterfront space in Toronto copied pilot space in Sweden and is now propagating new pilot spaces itself. The exchanges between Waterfront Toronto and Hammarby Sjöstad in Stockholm indicate learning from the Swedish experience, which is widely heralded as a successful waterfront redevelopment with a substantial environmental component (Swedish Expert Team on behalf of Swedish Trade Council, 2004). Swedish experts were even asked to assess the degree of sustainability achieved in Waterfront Toronto's early activities and the resulting favorable report was still listed relatively prominently on Waterfront Toronto's website at the time of writing. Waterfront Toronto not only learns from other places, but also actively teaches other urban officials about decarbonization policies developed for the waterfront. In this way, Waterfront Toronto is trying to catalyze new instances of modular scaling.¹⁶ Waterfront Toronto's participation in the C40 Cities Climate Positive Neighbourhood program, for example, involves regular interaction with other participants to share information and solve common problems. Waterfront Toronto's Carbon Tool, in particular, has been shared with other cities.¹⁷ Waterfront Toronto staff have also met with officials from some Canadian municipalities, including East Gwillimbury, Mississauga, Wood Buffalo

¹⁶ Interview with Waterfront Toronto employee, August 19, 2015.

¹⁷ Interview with C40 employee, August 28, 2015.

(NWT), Markham, Vancouver, and Victoria and presented to international delegations.¹⁸

The pattern arising is a chain of pilot urban spaces targeting decarbonization. With each propagation between places, city officials personally interact to learn from previous experience.

5.2 Entrenchment

The most compelling entrenchment in this case is reflected in the evidence that Waterfront Toronto's higher standards have influenced the City of Toronto's Green Building Standards. This can be considered an example of lock-in entrenchment. *Lock-in entrenchment* occurs when a policy has immediate durability for structural or institutional reasons (Levin et al., 2012). Waterfront Toronto officials work closely with City of Toronto officials and share learnings from each other.¹⁹ A Waterfront Toronto employee described how "one of the goals of our green building requirements is market transformation. So we feel like we've achieved that in some respects because the Toronto green building standard came after ours."²⁰ Waterfront Toronto developed its Minimum Green Building Requirements first and then the City of Toronto released its Green Standards later incorporating many of the same standards. The Toronto Green Standard Tier 1 must be met by every development site and higher tiers are voluntary but encouraged with a significant financial incentive through a development charge refund.²¹ A City of Toronto planner concurred, saying that the activities of Waterfront Toronto are

¹⁸ Interview with Waterfront Toronto employee, August 19, 2015.

¹⁹ Interview with Waterfront Toronto employee, August 19, 2015; interview with Senior Planner, City of Toronto, March 1, 2016.

²⁰ Interview with Waterfront Toronto employee, August 19, 2015.

²¹ Interview with Senior Planner, City of Toronto, March 1, 2016.

frequently seen as “best practice” and “that any time something is built to a higher standard that provides a precedent and pushes the bar forward.”²² In the third version of the Toronto Green Standard that took effect in 2018, the highest voluntary tier incentivizes near zero emissions buildings. Furthermore, the joint governance structure of Waterfront Toronto, which incorporates all three levels of government, provides opportunities to embed new carbon positive practices in other levels of government.²³

Legal development contracts between Waterfront Toronto and developers incorporate decarbonization practice requirements, which also represents an immediate durability or *lock-in* entrenchment (Levin et al., 2012). It is important to note that practices are, to some extent, negotiated in each case, which can result in a weakening of the requirements as negotiations span over years.²⁴ The MGBR also require design that incorporates some degree of material flexibility. New kinds of infrastructure are incorporated into the developments (such as electric vehicle and district energy capability) so that decarbonization options are materially present even if they are not pursued at the beginning. This long-term flexibility is meant to accommodate options that might be important in the future, but it also represents new forms of (decarbonized) infrastructure lock-in.

There is also evidence of decarbonization practices entrenchment beyond the waterfront in the construction of LEED certified buildings. One interview described how private sector developers are voluntarily pursuing LEED certification for buildings near the Waterfront Toronto neighbourhoods in order to remain competitive.²⁵ This represents

²² Interview with Senior Planner, City of Toronto, March 1, 2016.

²³ Interview with C40 employee, August 28, 2015.

²⁴ Interview with former Waterfront Toronto employee, September 30, 2015.

²⁵ Interview with Waterfront Toronto employee, August 19, 2015.

positive reinforcement, which takes place when people choose to join the target population of the policy and reinforce the original target population (Levin et al., 2012). These private developments are not targeted by Waterfront Toronto since they have no authority over them. However, the concentration of LEED buildings caused by Waterfront Toronto's requirements may be driving private developers to achieve similar standards nearby to attract clients.

5.3 Contestation and Opposition

There was some concern that the higher environmental standards required by Waterfront Toronto would be contested by the development sector. However, this contestation did not take place. As a staff person in Environment and Innovation at Waterfront Toronto, described:

When we started off with LEED gold, everyone thought that was a stretch objective and our developers would push back so we thought there would be a little bit of resistance from the development community. But in our first RFP bid for land I think we received...somewhere between 10 and 15 bids.²⁶

Though there is some negotiation with developers, the overall approach of requiring decarbonization practices is not contested. In this instance, opposition from the development community was the expected outcome and therefore supportive coalitions actually took the form of non-opposition.

²⁶ Interview with Waterfront Toronto employee, August 19, 2015.

One of the most significant episodes of opposition faced by Waterfront Toronto was the attempt by the City, under Mayor Rob Ford's direction after the 2010 election, to retake control of the Port Lands to pursue an alternate vision. Public outcry demonstrated the support for the existing Waterfront Toronto plans, but prompted accelerated implementation (Eidelman, 2013b). Finally, academic critique of Waterfront Toronto's approach has focused on the integration of sustainability into gentrification practices, including the sale of public land to private interests (Bunce, 2009). The resulting social exclusivity of this approach is of particular concern (Bunce, 2009).

6. System Outcomes

Capacity building in particular has enabled chains of modular scaling for urban decarbonization pilot spaces. As this case has described, Waterfront Toronto represents one link in that chain. This shows that the catalysis of decarbonization practices is taking place, but the outcome can be more accurately described as islands of decarbonization in different places rather than widespread transformation. Because of the focus on exceptional pilot spaces, only incremental decarbonization will be achieved unless the pilot experiences catalyze broader entrenchment beyond the exceptional space. On their own, the pilots represent relatively small slices of urban systems.

Other literatures have dealt with exceptional urban spaces. One recent area of work has focused on urban living labs. Urban living labs can be both a geographic bounded space of experimentation and an approach that is collaborative across sectors (Voytenko et al., 2016). Key characteristics include “geographical embeddedness, experimentation and learning, and participation and user involvement” (Voytenko et al.,

2016). The work conducted through urban living labs is focused on learning and innovation and it is this focus on knowledge production that sets them apart from other kinds of policy experiments (Evans and Karvonen, 2013). Though there is concern with scaling up of strategies, the actual mechanisms by which ‘tested’ solutions will be expanded for broader application are not the focus. “There is an assumption that by producing knowledge ‘in the real world’ and ‘for the real world,’ urban laboratories can catalyze rapid technical and economic transformation” but this assumption is questionable (Evans and Karvonen, 2013).

Work drawing together urban living labs and transition management has argued that the ability to stimulate changes beyond the bounded space of the lab will depend on the structure of the partnership and the operationalization of the lab (Nevens et al., 2013). The focus on learning within the right kind of group of people implies a similar focus on capacity building, normative change and coalition building (though not explicitly). According to this urban Transition Lab approach, it is the group of actors experiencing change that will drive meso and macro changes through the accumulation of their experimental experiences (Nevens et al., 2013).

Though living labs scholarship has been cautious about the outcomes one should expect from living labs in terms of transformation of urban governance, there is not yet a sense that there is any inherent limitation in focusing on a smaller, bounded space. On the contrary, similar to strategic niche management scholarship, there is a sense that transformative innovation must come from this kind of bounded, protected environment. Instead, limitations are mainly approached as barriers to be overcome to spur broader societal transformation, such as the translation to market readiness (Baccarne et al., 2014)

and overcoming vested interested (Nevens et al., 2013). In other work on urban pilot projects, Hodson and Marvin (2007) point out how demonstration projects can be simply dropped into urban areas without the kinds of connections that would engender scaling up.

In the Waterfront Toronto case, there is evidence for wider entrenchment of piloted decarbonization practices in citywide standards. However, new green building standards developed for the waterfront have not been simply extended to apply to the whole city. Instead, there is evidence that the high bar set by the green building work in the pilot area created space for a new, higher normal across the city. The establishment of a new ‘average’ in market wide building practices was buttressed by the development of sufficient green building capacity in the industry and the demonstration of adequate political support (or at least lack of organized opposition) for higher green building standards. In the establishment of weakened standards for the first round of broader application, in this case the exceptional nature of the pilot project is maintained – what works in the pilot space is assumed to not work in the broader city precisely because of the exceptional nature of the pilot space.

There is also evidence for entrenchment in industry practice beyond the pilot space. Developers are voluntarily pursuing LEED certification for buildings outside of the Waterfront Toronto redevelopment area because the concentration of LEED buildings within the waterfront area has made green building a point of competition nearby. Because these buildings are outside of the control of the waterfront standards, however, they are not required to meet the specific energy components that Waterfront Toronto requires in the achievement of LEED. LEED standards can be achieved in many different ways, including configurations that might not have as significant an impact on

greenhouse gas emissions as the configuration required under Waterfront Toronto's Green Building Standards.

In the Waterfront Toronto case, the creation of exceptional space did allow for capacity building and normalization of building practices that were closer to decarbonization than previous practices. However, the entrenchment of lessons learned in the pilot space into the broader city was system improving rather than transformative. Nonetheless, in contrast to literatures on urban living labs and transition labs, the emphasis here on political mechanisms allows for a clearer understanding of *how* and *whether* practices in exceptional spaces influence broader practices.

7. Conclusion

This paper examined Waterfront Toronto's efforts to transform the building construction market to reduce greenhouse gas emissions. In considering the waterfront redevelopment as an attempt to use the waterfront space to catalyze decarbonization beyond the physical boundaries of the waterfront precincts, this case study analyzed whether the Waterfront Toronto intervention is catalyzing a decarbonization trajectory. The pathway unfolding in this case appears to be system improving, which means that the target system is made more efficient, but still locked into a high carbon system. Though capacity building and normalization mechanisms activated through Waterfront Toronto's activities did catalyze broader improvements to building practices in the City of Toronto, the changes represented an incremental improvement rather than transformation. In addition, Waterfront Toronto has been involved in international modular scaling of similar urban spaces. Because of the focus on exceptional pilot spaces,

however, this scaling appears to be taking the form of islands of decarbonization in different places rather than widespread transformation.

Important lessons can be gleaned from this paper's focus on the political mechanisms taking place as an intervention seeks to disrupt carbon lock-in. The first relates to the benefits and limitations of exceptional space. In terms of benefits, a focus on a pilot area within a city creates space for lower risk learning. For example, pilot space allowed Waterfront Toronto to test out requirements for higher performance against which they originally expected to encounter industry opposition. In addition, exceptional space supported political coalition building since participation is incentivized and voluntary. Industry is incentivized to participate in capacity building since it comes with access to particularly high value urban land. Both this new capacity and this new political coalition can be accessed to support the entrenchment of similar policies across a broader swathe of urban area. Since the pilot space has pushed the bar on green building practices higher, it creates space to create a new, higher normal for building practices broadly. However, this case has also demonstrated the limitations of exceptional spaces of decarbonization. In particular, the exceptionality of the practices is maintained when attempts are made to catalyze entrenchment. Actions are therefore weakened when they are first scaled up or entrenched beyond the original intervention. The second lesson is that capacity building can support chains of modular scaling, but this may lead to islands of decarbonization rather than widespread transformation. Only incremental decarbonization will be achieved unless the pilot experiences catalyze broader entrenchment beyond the exceptional space.

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