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Cities, Urban Property Systems, and Sustainability Transitions: Contested Processes of Institutional Change and the Regulation of Urban Property Development

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Abstract: Sustainability transitions research has emerged as one of the most influential approaches to conceptualizing the potential and practice of transformative system change to avoid climate catastrophe. Evolving from work on socio-technical systems via Geels’ multi-level perspective (MLP), this conceptual framework has contributed to understanding how complex systems in the contemporary world can be transformed. This paper contributes to the sustainability transitions literature in three main ways. First, the paper develops a conceptual framework focused on the urban property systems which regulate and support urban property, infrastructure and governance that are historically produced, are densely institutionalized, and through which public norms of property and governance are deeply embedded in and continually inscribed in urban space. Second, the paper suggests that urban property systems are continually and vigorously contested and demonstrate different modes of institutional change than those recognized by the existing sustainability transitions literature. Third, the paper illustrates the approach with a case study of the contested governance of property development in Toronto, Ontario, long one of the fastest growing cities in North America. The Toronto case suggests that institutions embedded in urban property systems are consequential and deserve more attention by those concerned with low-carbon transitions.

Keywords: low-carbon transitions; urban socio-technical systems; urban property systems; institutional change mechanisms; green buildings; strategic action fields; infrastructure



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1. Introduction

Sustainability transitions research has become one of the most influential approaches to conceptualizing the potential for transformative system change to avoid climate catastrophe, inspiring a large and rapidly growing literature [1]. Initially this research paid scant attention to cities, planning, and the built environment, even though cities consume energy and other inputs far greater than their share of the world population, that share is growing fast, and the total urban area is growing even faster [2]. It is projected that the world urban population will nearly double to 7bn by 2050 [3]. This ongoing boom of urban population and urban investment in which trillions of dollars are being invested in urban property and infrastructure globally will have lasting impacts on urban form and energy efficiency [4]. This creates both important opportunities if this investment can be leveraged to cut carbon emissions, or heightened risks if it contributes to the creation of enduring built environments that perpetuate higher emissions. We argue that the distinctive features of urban property institutions deserve more attention by those seeking to understand sustainability transitions.

Markard et al. usefully define sustainability transitions as “multidimensional, and fundamental transformation processes through which established socio-technical systems

shift to more sustainable modes of production and consumption” [5] (p. 956). The generative question posed by the sustainability transitions literature is: how can contemporary socio-technical systems be rapidly transformed to low or zero carbon emissions systems, given the basic understanding that socio-technical systems are complex and multifaceted, tend to form slow-changing regimes, and lack a single system operator with the power to command fundamental change?

Recent low-carbon transitions research is grounded in work on the irretrievably social nature of technical systems, which showed that technology is never neutral or independent of its creators and users, but is always socially constructed, and must, therefore, be understood as part of socio-technical (ST) systems [6–8]. Following Hughes, Geels described ST-systems as “a ‘seamless web’ in which physical artefacts, organisations, natural resources, scientific elements, legislative artefacts are combined in order to achieve functionalities” [9] (p. 1257). In this perspective, socio-technical transitions are major transformations of the way important social functions are organized. Geels’ early research on the multi-level perspective (MLP) (2002, 2004) framed a conception of how ST-systems transitions took place that inspired an outpouring of research (reviewed in Section 3). Initially this work was criticized as overly reliant on assumptions about product innovation models and market processes, and lacking attention to spatial variation, the roles of institutions, politics and power, cities and built environments, but as discussed below, that critique is no longer accurate. In particular, significant advances have been made in transitions research engaging geographic differentiation [10–13], politics and power analysis [14–20], institutional analysis [21–24], and factors specific to urban low-carbon transitions [25–28].

Yet, important characteristics of cities as socio-technical systems have remained unexplored. A fundamental aspect of the socio-technical systems we call cities is their role in contemporary capitalism as the location of capital investment in real property and urban infrastructure [29,30]. The assumption here is that urban property, and transitions in the way capital investment in urban property and infrastructure is regulated, have a key role to play in low-carbon transitions of cities, because transitions will require enormous investments in low-carbon technologies and systems. Capital investment in cities has long been a major focus of urban studies [31–33], as has the emergence of planning and development regulations as a key set of institutions that regulate city building [34–36]. Only relatively recently has the practice of urban planning been framed as a set of institutions shaping the meaning, rights, and potential of urban property by regulating what can be built where, and under what conditions [37–40]. As shown in Section 3, research on ST transitions has provided important insights about the potential for urban and institutional transitions, and has seen increasing attention to built environments, but has so far been silent about urban property, capital investment in property, and the institutions created to regulate such urban investment as a factor structuring low-carbon transitions.

This paper contributes to filling this gap with a conceptual framework for understanding the distinctive attributes of urban property systems (UP-systems) as the sets of institutions structuring and regulating urban capital investment, and the mechanisms of the institutional contestation over and change of UP-systems. The starting point is to see urban systems as densely institutionalized systems of property, infrastructure and governance that are historically produced and spatially differentiated, in which norms of property and governance are deeply embedded in and continually inscribed in urban space [41–43]. Urban built environments and the institutions regulating them have distinctive features that make them different from those of other ST-systems. As discussed in Section 4, urban property is distinguished by the fact that: 1. it cannot function without shared public and private infrastructure systems and governance capacities; 2. because of density and interdependence, changes to any element in an urban system always affects all the others to a greater or lesser degree; 3. simple changes to the rules regulating property can produce enormous changes in property value, as when a property is rezoned from low-density to high-density uses; 4. UP-systems support both use values and exchange values, that are

often in opposition; 5. cities are shared spaces in which people live and work, and give rise to strong attachments and normative convictions about how they should be managed.

A major consequence is that UP-systems are continually contested, both in their definition and in their application, and the mechanisms governing change to those institutions are themselves highly developed and intensely contested, as shown by the case study in Section 5. This framing of contested processes of urban governance counters the suggestion that built environments demonstrate ‘lock-in’ or that ‘sunk costs’ are the most important factor constraining low-carbon transitions. If the central preoccupation of ST transitions research is its focus on purposive systems change, a major concern must be the analysis of the institutions and institutional change mechanisms and processes specific to urban property, real estate, planning, and development regulation. The UP-system approach outlined here is a contribution to that project.

2. Materials and Methods

This paper contributes to Historical Institutional (HI) approaches to the analysis of sustainability transitions, with a focus on the evolution of institutions regulating and supporting property in cities which we refer to as the UP-system. We employ two primary research methods: a literature review in Section 3, and a case study in Section 5. Section 3 traces the evolution of sustainability transitions research over the last two decades, focusing on the increasing attention to institutional change processes, cities and geographical space, and multi-level governance processes. We argue that although this literature has grown exponentially and has developed valuable insights about the institutional change processes of socio-technical systems and urban sustainability transitions, there remains a major gap in this literature around issues of urban property and the regulation of capital investment in cities. This paper proposes a conceptual framework to fill that gap in Section 4, and tests it with a case study in Section 5. Section 6 discusses the implications of this perspective for our understanding of low-carbon transitions and related research agendas, and sets out the paper’s conclusions.

The case study traces the evolution of legal/administrative approaches to regulating land development and infrastructure systems in Toronto, Ontario, since World War Two. Research methods include document analysis of legislative changes, legislative debates, proposals by key actors, evidence of institutional change processes, and a review of the secondary research literature. We undertake a detailed process tracing of institutional change over 75 years of rapid urban economic growth. This allows the analysis of sequences of institutional change, key actors, mechanisms of change, and the emergence of a vigorously contested governance space. The focus is less on causal analysis and more on sequence analysis to examine the nature of institutional change processes, and the actors and mechanisms structuring institutional change [44–47]. Case studies are often selected to be representative of a larger phenomenon, but no claim is made here that this case is typical, or representative of other cases. The case study is used here primarily for theory development concerning processes of institutional change of urban property systems and their potential to advance sustainability transitions, and to generate hypotheses for further investigation.

It is helpful to see the UP-system as a ‘strategic action field’ as conceived by Fligstein and McAdam: “strategic action fields are the fundamental units of collective action in society. A strategic action field is a constructed meso-level social order in which actors (who can be individual or collective) are attuned to and interact with one another on the basis of shared (which is not to say consensual) understandings about the purposes of the field, relationships to others in the field (including who has power and why), and the rules governing legitimate action in the field.” [48] (p. 12). The Strategic Action Field is somewhat like Roberts and Geels’ policy regime [21], but suggests a more open framing of relevant actors and the ways actors can become engaged. Over time, major sets of institutions generate strategic action fields and attract sets of interested actors who seek to influence processes of change. The concept of the UP-system is elaborated in Section 4.

3. The Evolving Framing of Institutions and Politics in Sustainability Transitions

Central to the debate on socio-technical system transitions and how they can be governed is the Multi-Level Perspective (MLP). MLP is a meso-level theory, drawing on insights from evolutionary economics, technology studies, and institutional theory [49–51]. It is argued that transitions happen via dynamic processes within and between three analytical levels: niches as arenas of radical innovation, socio-technical regimes characterized by the path-dependent co-evolution of institutions and technologies underpinning an alignment of practices and materiality over relatively long periods, and the wider exogenous landscape that cannot be directly impacted by actors [9,49,50]. This conception has been productive, and helped inspire important debates about how to understand sustainability transitions.

Initially, it was suggested that changes at the landscape level (triggered by, for example, wars or extreme weather events) pose the potential to destabilize existing socio-technical regimes, and then innovations that have developed in protected niche spaces, supported by learning processes, price and performance improvements, and powerful groups, might break through to alter the socio-technical regime [49,52–54]. Aiming at a more differentiated understanding of transition dynamics, Geels and Schot [53] introduced four different transition pathways considering the timing and ways of possible multi-level interaction. While accounting for timing in transition processes and acknowledging the less disruptive forms of change, this approach still understood change as being driven primarily by market processes and put only limited emphasis on agency and institutions [19,55].

Institutions have been considered crucial elements in transition studies as they co-ordinate and structure activities within socio-technical systems [9,49–51]. They are understood as a semi-coherent set of ‘rules’ that co-evolves with the material dimensions of technologies and associated actors, all linked at the regime level, with tendencies to path dependency [49,50]. Building on sociological and organizational institutionalism and Scott’s [56] three pillars of institutions—cognitive, normative, and formal regulative ‘rules’—, Geels identified distinct but overlapping social and technical institutions as parts of the socio-technical regime that help to stabilize socio-technical systems [49]. Actors and organizations are understood as belonging to interdependent networks structured by specific and overlapping sets of rules. Powerful actors for whom the stability of the socio-technical system is in their interest can oppose change from within or through social regimes such as the market regime or the policy regime [19,49]. Socio-technical systems have a specific material structure embodied in artefacts and material infrastructure networks, which, once established, become increasingly difficult to change both because of sunk costs in skills and durable structures, and because people align their lifestyles accordingly [49]. Together these elements support powerful path dependent trajectories making systemic changes at the regime level difficult.

Most studies working with the MLP focus primarily on national systems and are aspatial in conception. This lack of attention to the significance of geography and spatial differentiation of transitions thinking was criticized, arguing that there is great diversity in transition processes and potentials in part because of past institutionalization processes, and that sustainability transitions are necessarily geographically varied, trans-local, and multi-scalar [10–13]. A useful contribution is the combination of the MLP with political science multi-level governance frameworks to understand the role of institutional configurations in the governance of urban sustainability transitions [13,16]. Shifting the focus to spatial components addresses institutional configurations that entail several interdependent socio-technical regimes, including both institutional elements of specific socio-technical regimes and general multi-level governance arrangements [55].

Early transitions research was also criticized as paying too little attention to politics, agency, and power relations as factors shaping transition processes [20,23]. That criticism was not entirely accurate as early work on the MLP [49] did pay attention to politics and agency [19]. Now it is widely accepted that sustainability transitions, and in particular low-carbon transitions, are political in nature as the dominant political-economic system

depends on the use of fossil fuels, and transitions involve not only the deployment of new technologies, but also the adaption of new social practices, policies, and governance mechanisms; they rely on political processes [57].

Kern argued that politics, political agency, and existing governance institutions are central to sustainability transitions and that conceptions of change based on market processes fit poorly with the reality that public policy changes often involve formal institutions that respond primarily to political decisions and re-alignments [14]. For example, the different political and institutional contexts in the UK and the Netherlands led to very different approaches to promote low-carbon transitions [58]. A major obstacle is that political will is needed to accelerate low-carbon transitions but political and economic interests have long benefited from the current arrangements [59], and incumbent policymakers tend to be part of existing socio-technical regimes [15,20].

Over time, the interest in institutional questions increased, drawing mainly on organizational and sociological institutionalism [49,53,60]. The engagement with other forms of neo-institutionalism gained momentum more recently, particularly through attempts to mobilize Historical Institutionalism (HI) in transitions research to develop the analysis of politics and agency in transitions [19,21,22,24,50,58]. HI is seen as a particularly good fit, with its focus on meso-level theorizing, processes of institutional change over time, institutions as contested sets of co-evolving rules, and self-reinforcing policy feedback mechanisms [21]. Geels, Kern et al. [19] attempted to integrate modes of gradual change in institutions (drift, conversion, exhaustion, displacement, and layering) in the transition pathway typology [53]. That resulted in a further differentiation of transition pathways and possibilities of shifts between transition pathways based on actors' struggles over technology deployment and institutions, and emphasized the non-linearity of transitions driven by sudden advances and setbacks, unintended consequences, and learning processes [19].

In a recent paper, Roberts and Geels [21] incorporated HI concepts, including policy feedback, the co-evolutionary and configurative characteristics of political processes, critical junctures, and the power-distributional implications of institutional stability and change. They also rehabilitated the idea of 'policy regimes' and reintegrated it into the broader socio-technical regime. 'Policy regimes' consist of institutional arrangements, shared ideas about problem definitions and policy goals, and the policy itself, and are externally influenced by firms and associated interest groups, mass public and (material) technologies, and infrastructures. They argue that changes in the 'policy regime' can be driven either by crisis-driven patterns (critical junctures) or coalition-driven patterns (power-distributional approach) [21]. To understand the politics of transitions, attention must be paid to meso-level political struggles within policy regimes, including the role of coalitions in supporting the political conditions for accelerated transitions, enforcing or hampering policy feedbacks, and place-specific political, economic, or cultural contexts [21]. This is a valuable avenue forward that fits well with the approach suggested here.

Little attention in sustainability transition studies has been paid to the significance of property institutions and urban built environments when attempting to understand sustainability transitions, although there have been attempts to use ST-systems approaches to built environments as significant sources of emissions, characterized by high levels of sunk costs in immobile buildings and physical infrastructures that are expensive to change [13,16,61].

4. The Urban Property System Perspective

This evolving literature on cities and ST-system transitions has been valuable in examining the necessity and challenges of urban low-carbon transitions, and in developing an increasingly sophisticated conception of transition processes. However, this literature has significant omissions regarding institutions and institutional change processes associated with urban planning, capital investment in cities, and particularly the sets of institutions associated with urban property and property development. This is unfortunate, as a focus on urban property systems as a component of ST-systems offers potentially significant

contributions to low-carbon transitions research. The claim here is not a normative one, that there ought to be (somehow better) urban property systems, but is that urban property systems (UP-systems) actually are a fundamental component of urban socio-technical regimes in all cities with capitalist property markets, that should be understood as crucial to sustainability transitions. The detailed conceptual framework framing urban property systems in terms of planning theory and of planning history is published elsewhere (see [43,62–64]); here, the goal is to adapt it for use in sustainability transitions research.

The UP-system concept is based on Historical Institutionalism (HI) and is premised on the idea that in cities, institutions (defined as the ‘rules of the game’ or the formal and informal rules, shared understandings, and norms that structure individual and collective behavior) [65] are important and have major impacts on the distribution of the costs and benefits of urbanization, and are, therefore, politically contested. HI is a meso-level conceptual framework for the analysis of processes of social change that focuses on institutions, how they are created, and how they evolve over time [65,66]. A key concept is path dependence, that self-reinforcing ‘positive feedback’ effects can in some cases support institutional continuity and make it harder or more costly to choose other pathways after they become established [63,67,68]. The insight that some institutions generate self-reinforcing positive feedback effects that promote path dependence has frequently been misunderstood as suggesting stasis or ‘lock-in’. It makes more sense to see institutions as dynamic and contested, but decisions conducted early in a process can have long-lasting impacts by constraining the available choices later in the process, producing developmental pathways of institutional evolution [63,67–71].

Much HI research focuses on the analysis of processes and mechanisms of institutional change. Institutions routinely produce unequal distributional impacts that can powerfully structure political opportunity and mobilization either in defense of particular institutions or in favor of reform [69]. Mahoney and Thelen argued that incremental institutional change is common, but that the nature of change is likely to be structured by the degree of discretion available in the implementation and enforcement of institutional rules, and the existence or not of veto points and players that can block institutional revision [71]. Fundamental is the suggestion that institutions evolve in historical processes in which particular critical junctures of institutional change are contingent, with outcomes that hinge on the specific timing, sequencing, and actors involved in institutional change processes [72]. The focus of case analysis is, therefore, on the nature of institutional change processes, the timing and sequencing of change, the mechanisms of change involved, and the key actors involved.

The basic concept here is that cities are distinctive ST-systems that are intensely institutionalized, and that UP-systems are sets of institutions representing a fundamental subset of urban ST-systems. UP-systems include those institutions that regulate capital investment in urban property, define property rights and duties, and regulate multiple services essential to the continued existence of cities. Crucially, processes of institutional change of UP-systems have distinctive characteristics, different from conceptions of broader ST-systems change.

The concept of UP-systems can be summarized in eight points:

1. Cities are made possible by the dense matrix of institutions associated with municipal governments. From the provision of infrastructure (streets, water supply, sewers, parks, schools), to municipal services (public health, waste removal, police and fire services, etc.) to planning, development regulation, and environmental management, cities work because of the hundreds of institutions municipal governments create, implement, and manage. Significantly, the UP-system is the set of institutions that regulate urban space, including essential infrastructures; it is not the infrastructures themselves. The UP-system is a key part of all cities with private property ownership and property markets, as without it private property in cities would have little use value or exchange value. That is, in a city without streets, garbage collection, or sewers, private property would be unusable and nearly valueless. It has been argued

that all this could be achieved through private contracts [73,74], but, in the vast majority of cities local governments are responsible for the development, finance, and maintenance of most urban infrastructure, and for planning and regulating investment within the constraints of multi-level governance systems.

2. UP-systems include three main sets of institutions, those related to *property* (property ownership norms, cadastral surveys and records, property taxes, building codes and their enforcement, planning, zoning and development regulations, etc.), institutions to plan, finance, and maintain shared *infrastructure* (transportation systems, including streets and transit systems, water supply and sewers, waste management, parks, schools, libraries, community centers, etc.), and institutions associated with *governance* processes (local governments and their agencies, boards, commissions that carry out various functions, powers delegated by senior governments, planning and regulatory functions, etc.) [43]. Not all of these are necessarily owned and managed by local governments, but all these systems are regulated by sets of rules and public policies created and implemented by governments. A fundamental characteristic of UP-systems is that these three sets of institutions (regulating property, infrastructure, and governance) are forever tied to the immovable reality of existing sets of property, infrastructure, and the local governance geographies of particular places. The linkage of the three components of the UP-system to specific sets of property and infrastructure is a major driver of path dependence in cities because of the powerful bias in favor of maintaining and/or increasing property values [43].
3. UP-systems are distinctive in that they touch every property in every city continuously over time, by regulating, e.g., property taxes, what can be built on each property, providing fire protection, maintaining streets and water supply, enforcing regulations, etc. They therefore act as the link between the meso-level of the UP-system and the micro level of individual properties. Changes to any given UP-system institution can have enormous impacts on affected properties, for better or worse.
4. UP-systems saw enormous experimentation from the late 19th and throughout the 20th century, with rapidly growing roles for local governments in spatial planning, managing public transit systems, water supply and sewers, expanding parks systems, etc. Even in the most determined ‘free market’ systems such as in the U.S., municipal governments directly own between one quarter and one third of all urban property in the form of streets and parks, and own and maintain vast amounts of infrastructure. Many attempts to mitigate market processes have been made, for example, in land banking at the urban fringe to supply land at low cost, and the building of social housing, community land trusts, etc. Although these mixed-economy models expanded the role of public ownership, they did not eliminate the centrality of private capital investment in urban property in cities.
5. UP-systems are contested, both the rules and their application. Historical institutionalists argue that institutions unavoidably distribute valued resources unequally, and such unequal distributional effects can powerfully structure both political opportunity and political mobilization [71]. Institutions should, therefore, be understood not as static sets of rules, but as the dynamic products of political conflicts and as the legacy of past struggles. The UP-system is, therefore, often a ‘strategic action field’ (or several) as conceived by Fligstein and McAdam. UP-systems can be understood as relational systems of property, infrastructure and governance that are historically produced, densely institutionalized, continually contested, and in which public norms about property and governance are deeply embedded and evolved, as compromises must be repeatedly forged [42].
6. UP-systems are in almost every case situated in multi-level governance (MLG) systems, as municipalities are tasked with administering rules embedded in legislation created by senior levels of government [16,25]. However, municipal governments can still have major impacts on outcomes through capacities they have developed, initiatives created, and opportunities exploited. As Mahoney and Thelen [71] produc-

tively argued, it is seldom possible for legislators to anticipate all possible situations, so there are often gaps or ambiguities, ‘soft spots’ in rules, or between rules and their enforcement that permit unanticipated approaches, and these can create openings for actors seeking change. This was clearly the case in the Toronto UP-system discussed below. Cities are also in some cases instrumental in lobbying for changes to legislation that affects them.

7. A major part of the value of urban property is due to the existence of municipal services, and the promise that these will continue to be provided into the future. UP-systems share a consistent bias towards growth, that is shared by all actors in the system, as growth supports property values and generates resources to maintain the system, and shrinkage can easily create self-reinforcing spirals of decline. Municipal governments are dependent on continued investment in urban property to maintain, but especially to continually upgrade, urban ST-systems. Capital investment in cities is essential to achieving urban sustainability transitions, both for public infrastructure (electrifying urban mobility, improving waste management systems, expanding green infrastructure for urban heating and cooling, etc.) and to improve the energy efficiency of private buildings and systems. UP-systems, therefore, tend to be biased in favor of development, but in some cases are able to extract significant public benefits from capital investment in property within their jurisdiction.
8. A key issue for UP-systems has been the conflict over the balance of public and private costs and benefits. As a whole, cities must invest continually in their infrastructure and other systems, and the value of private investments is reliant on such investment. However, for individual property developments, much higher profits can be achieved if the public costs associated with private developments are paid by others. The exact share of extra public costs attributable to individual developments is not easy to calculate, creating ample opportunities for conflict and negotiation. There are major social justice implications if the burden of such costs are shifted to other residents, to the poor, or to future generations.

5. Case Study: The Toronto Urban Property Development Regime

This section examines the evolution of the Toronto UP-system, focusing on ongoing conflicts over attempts by local governments, particularly the City of Toronto, to ensure that land and property developers bear a greater share of the costs associated with urban growth, especially infrastructure. As noted above, urban infrastructure investment (both public and private) is essential to urban function, and will also play a central role in low-carbon transitions. In the Toronto case, there is also a direct link to low-carbon transitions, as the Toronto Green Standards (TGS) have been implemented since 2006 as a means to incentivize lower carbon development and building systems. The TGS is implemented through the development control system, and since 2010 has included financial incentives by providing rebates to development charges that property developers must pay when new buildings are approved. The development charge system is the main focus here.

This case study is about conflicts over the distribution of the costs and benefits of property development, though that is just one aspect of a larger system that was relatively effective at managing rapid growth [75–78]. The focus here is on the regulation of land development and the financing of growth-related urban infrastructure with development charges (DCs), density bonuses, and other related exactions, the mechanisms and processes of institutional change of the development regulation regime, evolving norms about the distribution of the costs and benefits of urban growth, and the evolution of the strategic action field in which this contestation plays out. In Canada, cities are considered ‘creatures of the province’ and have no legal authority apart from that which is granted by a provincial government. For Toronto, the province of Ontario has unilateral authority to change the laws that enable and constrain municipal action, and has done so frequently.

The basic issue is that urban development requires major investments in a wide variety of capital-intensive infrastructure, and this raises difficult questions about who should pay

for it. In Ontario, as in most of North America, the main source of municipal revenue is property taxes, and secondarily fees for services like water supply, and grants from other levels of government [79,80]. Since the 1950s, the norm has developed that while property taxes pay for the maintenance of existing infrastructure and the delivery of municipal services, capital costs of new infrastructure should be paid for by charges applied to the new urban developments that trigger the need for such investments, summed up by the phrase ‘growth pays for growth’ [79]. The reasoning is that without the new development the investment would not be needed, so it is unfair to ask existing taxpayers to pay for it, while the new residents or businesses in the new development should contribute their share to the accumulated capital stock of the community. Such infrastructure is usually divided into that which is within each development site (such as the roads, sidewalks, water-supply, and sewer pipes in a new subdivision), and that which is outside the development, such as an enlargement to a high school or sewage treatment plant that is triggered by new development. In Ontario growth-related infrastructure is also commonly divided into ‘hard’ infrastructure, such as roads and pipes, and ‘soft’ infrastructure, such as libraries, fire, ambulance, and police services, etc. Although today all actors claim to accept the basic normative assumption that growth pays for growth, conflict over both the rules and their application has been continuous and often intense.

Ontario was relatively slow in developing its urban planning system, with Ontario’s first planning law granting municipal development control powers (*The Planning Act 1946*) passed well after those of most US states [81,82]. The timing of the 1946 law was important, as the legitimacy of large-scale government planning had been enhanced by successful wartime mobilization, and by the memory of widespread municipal bankruptcies during the 1930s that were attributed in part to the failure to plan and manage urban growth during the 1920s [83]. The second half of the 1940s also saw a severe housing shortage as little housing had been built during the 1930s and the war, there was widespread overcrowding in existing housing, and hundreds of thousands of demobilized troops were returning home, prompting what was described in the legislation as the ‘existing emergency in housing conditions’ [81] (p. 418). *The Planning Act 1946* was ambitious both in its scope and in the powers granted to local governments to make and implement plans.

Prior to 1946, the subdivision of land was a routine procedure that simply required a plan of survey, and most new housing lots were sold without improvements such as water supply, sewers, paved roads, or sidewalks [83]. Such infrastructure was supplied incrementally by local governments and financed with property taxes and borrowing against future revenue. *The Planning Act 1946* provided municipalities with the legal authority to set subdivision standards, review subdivision plans, and refuse permission for subdivision plans that did not conform with local plans or standards [81]. This enabled the use of subdivision control as a discretionary regulatory tool because land developers needed an approved, registered plan of subdivision to be able to sell lots [81] (p. 418) [84] (p. 136).

During the 1950s, local governments increasingly used their bargaining power in subdivision approval processes to require developers to build all on-site infrastructure for new suburban developments to municipal standards, including sewers, road paving, and sidewalks, and some larger developers also began making substantial contributions to the costs of off-site infrastructure, where that helped to speed up development approvals [83,85,86]. However, these requirements were uneven, with local governments in high-growth areas more able to make demands, and those in low growth areas often hesitant to ask too much. There were also concerns that increasing standards for infrastructure pushed up the costs of housing lots which were already increasing rapidly [87], and a major priority was to ensure the availability and affordability of housing. The 1946 Act was ambiguous, with few specifics about what was allowed, leaving broad discretion to municipalities, and many developers fought back against increased infrastructure demands in court or at the Ontario Municipal Board (OMB).

Ontario is unique in Canada in the broad powers granted to the OMB, a quasi-judicial administrative tribunal with authority to review conflicts over planning, land development, municipal boundaries, etc., and make binding decisions (subject to judicial appeal in limited circumstances) [88,89]. The OMB itself has been a deeply contested institution, with arguments that it undermines local planning authority, politicizes planning decisions, or is necessary to adjudicate planning conflicts and relieve the burden on the judicial system [88–90]. The ambiguity of provincial legislation, and particularly the availability of appeals to the OMB, created major opportunities for the successful contestation of municipal decisions, and contributed greatly to the growing engagement in the strategic action field related to the UP-system.

Numerous court and OMB challenges to the infrastructure requirements of municipal subdivision agreements were a major motivation for the passage of the 1959 revision to the Planning Act, which clarified the right of municipalities to require hard infrastructure through subdivision agreements, demand 5 percent of the land area of subdivisions for park facilities or an equivalent cash payment, and explicitly allowed local governments to require contributions to offsite services such as sewage treatment plants, schools, fire stations, etc. [84,91]. Such exactions became routine in the 1960s. Additionally, in the 1950s and 1960s, an oligopoly of large developers emerged that not only sold land, but also built and sold completed houses on a large scale [81,87].

Conflict continued through the 1970s, leading to a crisis in the early 1980s. The funding of off-site services remained particularly contentious, as local governments increasingly adopted the practice of requiring ‘lot levies’ or ‘development charges’ (DCs) in the form of a set dollar amount per housing unit sold charged to developers to pay for offsite infrastructure as a condition of subdivision approval [91,92]. In 1980, the Association of Municipalities of Ontario (AMO) proposed draft legislation designed to strengthen municipal authority to levy DCs. This approach was opposed by the development industry, represented primarily by the Urban Development Institute (UDI) and the Ontario Homebuilders Association (OHBA) [91]. This initiative eventually led to the passage in 1983 of a revision to the law, but that failed to sufficiently clarify the rules, which were defined in practice through large numbers of court cases [92]. The 1983 Planning Act also, with Section 36 of the Act (now Section 37), empowered municipalities to create by-laws to secure ‘facilities, services and benefits’ from developers in return for heights and densities that otherwise would not be allowed by zoning by-laws, creating a density bonus system for intensification [93]. Before this, exactions of DCs on new development had been restricted to the development of greenfield sites.

Battles over revisions to DC regulations continued. The Ministry of Municipal Affairs convened a working group in 1985, including the AMO, UDI, and OHBA, but failed to reach an agreement, and the Ministry published a report outlining the divergent positions of the key actors [94]. While municipalities wanted to be able to collect DCs for both hard and soft infrastructure, and sought to implement municipality-wide bylaws for DCs instead of applying them to each site, the development industry was deeply opposed to the extension of DCs to soft services and municipal-wide approaches, arguing that municipalities should fund soft services from property taxes, and that DCs were causing inflation of housing costs [92,95].

In 1989, a Liberal minority Ontario government passed the Development Charges Act (DCA), clarifying the rules in favor of municipalities. This law provided clear statutory authority for DCs, made them more widely applicable, and empowered municipalities to adopt municipal-wide by-laws requiring developers to pay for capital costs associated with growth, including both hard and soft services. The Act detailed what items developers could be charged for and methods for calculating charges, [91,95] (p. 147). It also expanded the scope of DCs by linking them to building permits instead of subdivision plans [95]. Negotiating on a site-specific basis was no longer permitted. Controversially, the 1989 DCA also empowered local school boards to levy their own DCs on new residential development in order to pay for new school buildings (Development Charges Act 1989, s.30). The OHBA

and UDI vigorously opposed these changes, arguing again that the burdens of DCs kept on increasing, and that local governments were using them to keep property taxes artificially low [96].

The next major legislative change was a result of the election in 1995 of a populist 'Progressive Conservative' majority Ontario government promising to reduce the size of government, and cut taxes and regulations in what they described as a 'common-sense revolution' [97,98]. In 1997, this government passed a major revision to the DCA of 1989 to explicitly exclude services not considered essential for new development, including cultural and entertainment facilities, tourism-related facilities, parkland acquisition, hospitals, waste management services, and administrative headquarters [96] (p. 23). The new law also cut the share of the cost of new facilities that could be funded to 90%, arguing that existing taxpayers should cover at least 10% of the costs, and made changes to the formula to reduce possible DCs [96]. Those changes were argued against by the Municipal Finance Officers' Association (MFOA) who claimed that the system left local governments financially strapped (MFOA 2013), particularly as the Ontario government made deep cuts in other financial supports to local governments at the same time. The OHBA argued that municipalities interpreted the 1997 DCA in unanticipated ways, increasing DCs significantly through by-laws [96,99].

After 8 years of majority government by the Progressive Conservative party, the opposition Liberal Party won a majority in the 2003 Ontario election with a platform that promised a much stronger approach to planning and environmental management, as well as the restoration of funding to schools and higher education, healthcare, and other services that had been cut by the conservatives. A nearly 1 million hectare Greater Toronto Area Greenbelt was created, the *Places to Grow Act 2005* and a Provincial Policy Statement mandating much stronger growth management by local governments, and the Big Move policy and creation of Metrolinx to expand and manage regional transit systems were important initiatives [100,101]. Major changes to DCs and the OMB were seemingly not a top priority, but in the Fall of 2013, the Ministry of Municipal Affairs and Housing consulted with municipalities, the building and development industry and other stakeholders to determine what changes to the DC system were needed. This consultation process included reviewing the DCA and related Planning Act provisions like Section 37 and parkland dedication [102]. This developed into another battle between municipalities (represented by the AMO and the MFOA) and developers (now represented by the Building Industry and Land Development Association (BILD)). Municipalities argued that they had struggled with cost recovery restrictions imposed by the 1997 DCA, particularly the ineligible services, 10% discounts, and historic averaging when calculating service levels. Developers countered that municipal governments had already found clever ways to increase rates [99].

In June 2018, after 15 years of Liberal government, Ontario again elected a majority Progressive Conservative government, which moved quickly to 'cut red tape' by enacting reforms to the planning system during its first year in office. Bill 108, the *'More Homes, More Choice Act, 2019'* received Royal Assent on June 6, 2019 [103]. This Act was pitched as part of the provincial government's broader strategy to address Ontario's housing crisis by incentivizing developers to build more housing, partly by putting limits on the use of DCs, and partly by eliminating Section 37 density bonus agreements [104]. Bill 108 amended 13 Acts, including the *Development Charges Act 1997*, and the *Planning Act 1990*. Apart from reducing the timeframe for municipalities to respond to various planning applications, Bill 108 replaced Section 37 with the Community Benefits Charge [103]. This amendment significantly changed how municipalities could generate infrastructure finance through development control. Moreover, Bill 108 again limited the scope of services that DCs could pay for to 'hard services' (water and wastewater services, stormwater management, highways, electricity, policing, ambulance services, fire protection, transit, and waste diversion), back to the position taken by the previous PC government in 1997 [104]. Bill 108 was again contested, with the City of Toronto particularly vocal about the severe negative

consequences of this approach, arguing that there were no measures in the bill that would ensure that reduced obligations on developers would lead to lower housing costs, and pointing out that DCs and Section 37 were essential to Toronto infrastructure budgets [105].

Bill 108 generated such intense opposition, including among the conservative base in fast-growing suburban areas around Toronto, that Bill 197, the '*COVID-19 Economic Recovery Act, 2020*' (another 'omnibus' bill amending dozens of other laws), again amended Schedule 3 of the Development Charges Act, 1997, and repealed and replaced several amendments made by Bill 108 (the '*More Homes, More Choice Act, 2019*') which was not yet in force. Bill 197 expanded the list of services for which DCs can be imposed, and clarified the relationship between DCs and the new Community Benefits Charge. It is too soon to know exactly how this flurry of legislation will impact the Toronto UP-system, as Bills 108 and 197 fail to take a consistent approach. Both bills require municipal councils to draft new bylaws to be able to collect DCs or the new 'Community Benefits Charge.' However, the goal was clearly to increase the profitability of the property development industry by reducing development charges.

This sequence of institutional changes over 75 years exposes an enduring divide in Ontario politics over the role of the state in managing urban growth and the division of responsibility between developers and property taxes in paying for growth-related infrastructure investments. The ambiguity in the 1946 Planning Act, that granted significant discretionary powers to municipalities, triggered a developmental pathway in which contention was focused on basic issues of who must pay for which costs of urban growth and intensification.

It is also clear that this is a highly active strategic action field, intensely contested, and played for high stakes.

6. Discussion and Conclusions

This paper makes three main contributions: First is the suggestion that a lack of attention to urban property and the UP-systems discussed here represent a major gap in the literature on ST-system transitions. Second is the claim that the core institutions associated with UP-systems are structured by processes and mechanisms of institutional change that have distinctive characteristics that call for further research. Third, the case study of the evolution of the Toronto UP-system is revealing of the nature of the path-dependent developmental pathways of urban property governance institutions. In this case, ambiguity in early legislation led to the creative use of available legal powers and the emergence of a contested governance space that allowed continued institutional change over many decades, but along a developmental pathway established by that legislation.

First, it seems clear that the set of institutions related to urban property and to the production of urban space described here as the UP-system—including property institutions, infrastructure institutions, and governance institutions—should be a major focus of the urban low-carbon ST transitions research agenda. Such a focus is justified in part by the scale of projected global urban growth and related urban capital investment in cities, in buildings, urban infrastructures, and natural systems expected over the next few decades. Given limited carbon budgets between now and 2050, a much better understanding of the institutions enabling and structuring such investment, and institutional change processes specific to UP-systems will be important for low-carbon transitions research. This is not just a question of who will pay for the investments required to achieve zero emissions, but is about the nature of contemporary urban capitalism, as UP-systems represent the 'rules of the game' regulating investment in urban property and structuring the division of costs and benefits of development between public and private actors.

Further, we argue that UP-systems are a fundamental part of the socio-technical systems called cities, because urban space and property of all kinds are inseparable from the UP-system described in Section 4, and simply cannot function without it. Framing the UP-system as an essential subset of urban ST-systems has a heuristic value, helping to make clear that the public and shared nature of space and infrastructure in cities is a fundamental

characteristic of cities, and that the set of UP-system institutions is central to transitions to low-carbon systems. The public and private parts of this system are inseparable. The UP-system outlined here is distinctive in providing a continuous linkage over both time and space between meso-level policy systems and micro-level decision-making at the scale of individual households and property-owners, through permits, inspections, taxes, fees, and services provided. This fact, that every property, public space, and infrastructure in cities is bound up in continuous 24/7 relations with place-specific institutions and services of the UP-system, establishes a distinctive and powerful kind of institutionalization.

This framing of the UP-system as a distinct subset of urban ST-systems brings to the fore long-running debates about the role of public investment, public infrastructure, public spaces, and public governance in adding value to urban space and urban property. It has long been argued that the public should own a significant share of any increased value of urban property due to public investment and urban growth, often referred to as 'betterment', the 'unearned increment', 'land value uplift', or 'windfalls' [106–108], that should be subject to land value capture mechanisms [109]. This idea that a significant share of any increase in the value of private property in cities is a product of public action and investment has a long history, that need not be detailed here.

We suggest that, in any given jurisdiction, the actual distribution of the public and private costs and benefits of urban investments and city-building among actors: is regulated by UP-systems; is a product of contingent past episodes of institutionalization and contestation; is likely to be highly path dependent; is a major component of public norms about urban property; should be understood to be a fundamental aspect of urban ST-systems; and should therefore be a major focus of research on low-carbon transitions. The Toronto case suggests that the distribution of the costs and benefits (and profits) of urban growth and development between public and private actors is contentious, and can change over time.

In this regard, it is worth asking: does the current climate crisis challenge earlier understandings about the public/private division of urban development costs/benefits? It seems likely that the public contributions of UP-systems to urban viability, resilience, health, and sustainability may be even more important than in the past because of the increased risk of extreme weather events (and other climate change-related risks) and the necessity of low-carbon transitions. It is not hard to imagine that all urban property in a city that has transitioned to low-carbon energy sources, has reduced total carbon consumption for mobility and heating/cooling, has excellent management of water, wastewater, and stormwater systems, and has excellent and healthy parks, public spaces, natural heritage systems, etc., will be more valuable than that in cities that have not achieved those goals. If so, this in turn might suggest that the contribution of UP-systems to the aggregate capital value of cities may be increasing during the climate crisis, and that a case may be made that requiring greater contributions by private development projects to overall public capital assets may not only be legitimate, but may also be both more profitable and produce greater social equity in the long run. We suggest that the framing of UP-systems in this paper as a distinct and important subset of urban ST-systems aids greatly in asking such questions.

Second is the claim that UP-systems see different modes of institutional change than those recognized by much of the existing sustainability transitions literature. As junior members of multi-level governance systems, cities are recipients of changes to legislation by senior governments. As seen in the case study, such legislative changes and the political processes that led to them have been a major factor in the evolution of the Toronto UP-system. Local governments have no choice but to work with legislative changes that affect them. Sometimes they develop creative workarounds and new institutional solutions to accomplish existing policy goals, and sometimes they simply have to move on and change their approach. In multi-level governance systems, institutional change and innovation is often in reaction to changes imposed from above.

However, municipalities do also have powers to create their own policies and regulations within the scope of the powers granted to them by provincial legislation. Municipal

governments can also exercise creativity in the interpretation and application of provincial laws where these are ambiguous, as was the case with subdivision agreements starting in the 1950s, and the Development Charges Law of 1989 and since, including the creation of the Toronto Green Standard to incentivize low-carbon building which uses DC rebates as incentives. These modes of institutional change all fall within the normal operation of democratic governments, and can be triggered by political shifts, changing public opinion, crises, and political windows of opportunity. Contrary to the MLP conceptions of radical change emerging from micro scale 'niches', therefore, in UP-systems radical change can be led from any level in the multi-level governance system, with especially the Ontario government, but also the Toronto government responsible for major changes of policy.

Property, and the institutions structuring it, also have legal and sometimes constitutional protections, so changes to UP-systems are sometimes subject to court challenges, which have not infrequently led to significant changes to legislation and its interpretation, particularly but not limited to countries with common-law legal systems where court verdicts serve as precedents that alter interpretations of law. In the Toronto case examined here, large numbers of court cases not only led to verdicts in specific cases, but also acted as a spur to changes to legislation to reduce the burden on the court system, for example the 1959 revision to the Planning Act, and the creation of the Development Charge Act in 1989. Ontario also has the Ontario Municipal Board, a quasi-judicial tribunal that is empowered to hear challenges to and overturn specific planning decisions, and can also review and require amendments to plans and municipal policies. It is extremely common for developers to appeal planning decisions at the OMB, and developers in Toronto often design buildings that are far larger than zoning allows, knowing that they have a good chance to win such appeals [88,89]. This has created a kind of wild card in Toronto planning, as everyone knows that zoning rules are not the final word, planners know they are negotiating from a position of weakness, and developers have major incentives to keep pushing the envelope for taller and denser buildings. In contrast to the idea that land-use zoning systems promise certainty and stability, Toronto zoning is now seen as just the starting point for negotiations, and developers can always jump to the OMB to short-circuit the process. This has led to continual change in the interpretation and application of the rules, and has led to relatively fluid and negotiative approaches to development regulation.

OMB processes also allow a significant role of changing professional norms in processes of institutional change, as one important criteria in evaluating OMB cases is the consideration whether the proposal under review represents 'good planning', an evolving and difficult to define concept. Standards of good practice developed by architects and civil engineers and other related professions can also influence the evolution of the UP-system, whether through the OMB or through political processes at municipal or provincial government levels.

Toronto clearly has some distinctive planning issues, with the OMB throwing a great deal of uncertainty into property regulation processes. However, for UP-systems, the combination of multi-level governance structures that see constant legislative change from above, judicial processes related to land and property rights that allow challenges to local policies and rules, democratic pressures on municipal governments to ensure that new developments pay their 'fair share', and evolving planning norms and goals that encourage contestation over local policy and practice, all add up to relatively dynamic and politicized policy environments. None of this fits comfortably within the conceptions of institutional change framed by the MLP. This supports the suggestion that UP-systems should be studied on their own terms as a distinctive subset of urban ST-systems with their own logics and processes of institutional change and of sustainability transition.

Third and finally, the Toronto case suggests that the institutions embedded in urban property systems are continuously contested, are consequential, and deserve more attention by those concerned with low-carbon transitions. Institutions that structure huge volumes of capital investment are obviously likely to generate highly engaged strategic action fields, particularly if those institutions are negotiable or flexible. As noted above, cities

globally are seeing an ever-increasing growth of capital investment, and that by itself suggests that conflict over the ‘rules of the game’ regulating such investment is likely to be intense. As the Toronto UP-system grew in its ability to regulate development and require increasingly significant financial and in-kind contributions (in the form of development charges, infrastructure obligations, and park space for example), the number and scale of actors engaged in the field grew. In the 1940s the main actors were the provincial government, municipal and township governments, a few planning advocates, civil engineers and architects, rural property owners and land brokers, and a highly fragmented housebuilding industry that built housing at a small scale. Over the course of the 1960s and 1970s in addition to these actors, several large-scale developers emerged, civil society organizations and professional bodies developed and grew in prominence, including the Ontario Home Builders Association, the Urban Development Institute, the Ontario Professional Planners Institute, the Association of Municipalities of Ontario, the Municipal Finance Officers Association, the Ontario Municipal Board and the lawyers and experts associated with it, large and small environmental groups, housing affordability and poverty advocacy groups, and many others, creating a very active strategic action field.

It also seems clear that ‘soft spots’ or areas of ambiguity in legal/administrative frameworks foster the most contested arenas for the development of public norms and public policy. One notable feature in this case is that the *Planning Act 1946* provision that allowed local governments to refuse approval of subdivision agreements led to a developmental pathway centered on contestation over private contributions to public infrastructure. Cash strapped local governments experiencing rapid urban growth in the 1950s seized on the opportunity to push some costs to developers. Some developers welcomed the chance to speed up their development by absorbing those costs, but in the longer run the industry as a whole began to push back against the ever-growing costs associated with such demands. This conflict became one of the defining dynamics of urban governance in Ontario. The Ontario case, thus, represents a useful example of a contingent critical juncture of institution formation that led to a particular developmental pathway of institutional evolution. Although continuously contested, with sometimes dramatic interventions and shifts of policy, over time the share of the costs of urban infrastructure borne by the development industry has grown significantly.

This further supports the suggestion that research on urban low-carbon transitions should focus on the nature and dynamics of contestation within strategic action fields related to the UP-systems that structure capital investment in urban space and the particular institutional change processes associated with them.

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