# Multi-level Governance in the Urban Context

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Welcome to this issue of the IGLUS Quarterly. In this issue, we will be travelling to three different continents in order to explore the ever-pertinent topic of integrated planning in different urban infrastructures. Integrated infrastructure planning is one of the top priorities city authorities have when dealing with complex urban challenges. But successfully implementing such planning is a significant challenge that cannot be taken for granted, and throughout this process, governance plays a significant role. This issue of the IGLUS Quarterly analytical bulletin looks at the different actors who play a role in transforming this abstract ideal into a reality.

The first contribution, by Ismael Aguilar-Barajas and his colleagues, discusses the complex and multi-level institutional framework that is behind water resource management in Mexico.

The second article featured in this edition comes from Robin Chang who introduces us to CultNature, an innovative brownfield redevelopment project in the Ruhr region of Germany that is struggling to take root due to a lack of citizen-stakeholder involvement.

In the third contribution in this issue, Fazil Rahiman and his colleagues take us to the Middle East to examine Dubai's Carbon Abatement Strategy and to investigate the many sustainability initiatives underway as the Emirate races to become the global capital of the green economy.

In the final article, Constanza Gómez Mont and her colleagues introduce us to PIDES: Social Innovation, an innovative "think-and-do-tank" in Mexico City. The authors present two compelling case studies from the organization where the coupling of citizen engagement, intersectorial collaboration and technological innovation result in exciting deliverables that have the potential to improve citizens' quality of life.

Each of these contributions presents an entirely different perspective on urban governance. But based upon these articles one thing is certain- urban development cannot happen in isolation; collaboration between the different level actors and stakeholders is essential for strong governance in an urban context.

We hope you find these articles interesting and invite you to join in on the discussion at www.iglus.org.

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Mohamad Razaghi - Rebecca Himsl

# Water Governance in Mexico: an Overview and the Case of the Monterrey Metropolitan Area

Ismael Aguilar-Barajas*, Nicholas P. Sisto**, Aldo Iván Ramírez-Orozco***

**ABSTRACT:** The fragmentation of Mexico's institutional framework constrains its capacity to face water challenges. Shortcomings appear clearly at the regional/local scale. The case of the Monterrey Metropolitan Area (MMA) is both exceptional and representative: good water services coexist with serious risk and crisis management deficiencies. Mexico requires a more coordinated and proactive water governance structure.

## 1. Introduction

According to the Global Risks Report 2015 (WEF, 2015), the world currently faces significant water-related risks in terms of both likelihood and impacts. The Report also makes it clear that in an increasingly urbanized world, public policy must reflect the critical connection between urban planning and water management. This is consistent with the longstanding literature that emphasizes the need for systemic planning, for example Bourne and Simmons (1978).

This paper presents a general overview of water governance in Mexico and offers a regional case study where risk and crisis management constitute the main issues. Section 2 briefly summarizes the water challenges the country faces. Section 3 critically addresses the salient features of the current national water management institutional framework. Section 4 shows how the framework's shortcomings play out at the regional/local scale in the case of the Monterrey Metropolitan Area (MMA). Section 5 evaluates this case within the national context, highlighting similarities and differences. Section 6 concludes.

## 2. Mexico's water challenges

Mexico is the world's 13th largest country by area (1.964 million km$^2$) and ranks 11th in population size (122.3 million inhabitants). Mean annual precipitation (741 mm) is below the global average (CONAGUA, 2014)

and population growth has reduced per capita water availability by 75 per cent since 1950 (OECD, 2013, p. 31). The spatial distribution of precipitation is uneven, from as low as 100 mm/yr in parts of the northwest to over 2000 mm/yr in the southeast. Population and economic activities, however, are not located accordingly, leading to severe water stress in several river basins. Surface and ground water quality has been degraded and a large portion of wastewater is released without treatment. Mexico is naturally exposed to water risks, both droughts (particularly in the arid north) and floods associated with cyclonic events (especially in the Caribbean and Gulf of Mexico regions). Just over 90% of the population currently has access to piped water and sewage services. By 2030, up to an additional 40 million people will require piped water, sewage and sanitation services (OECD, 2013 p. 17). The bulk of this demand will come from urban areas.

## 4. Water governance in Mexico

Water governance is a rich but intrinsically fuzzy concept. Consequently, evaluating the success or failure of governance regimes poses considerable theoretical and empirical challenges (Pahl-Wostl et al. 2010). Despite a lack of consensus on several important governance issues, notably the role of markets and private capital (Castro, J.E. 2007), considerable shared understanding does exist on key matters. First and foremost, the impossibility of a "governance panacea" is now widely recognized: each country must find specific solutions appropriate to its own natural and human contexts (OECD 2015, Rogers

*Ismael Aguilar-Barajas, Tecnológico de Monterrey, Mexico, iaguilar@itesm.mx
**Nicholas P. Sisto, CISE, Universidad Autónoma de Coahuila, Mexico.
***Aldo Iván Ramírez-Orozco, Tecnológico de Monterrey, Mexico.

and Hall 2003). Second, water management problems (for example, lack of access to water services) have more to do with ineffective governance than the natural availability of the resource (Bakker et al., 2008). Thirdly, governance failures represent a major hurdle for dealing with water risks (Bahri, 2011; UN-Habitat, 2013; World Bank, 2013; WEF, 2015).

Mexico faces significant water governance challenges, especially in terms of policy design, implementation and evaluation. These challenges stem mainly from a highly fragmented institutional framework. Figure 1 shows this framework and is divided into six separate levels:

1) International; 2) National; 3) River Basin; 4) State; 5) Municipal; and 6) Non-Governmental Actors. The figure also shows the nature of the work the institutions undertake (i.e. regulatory, financing, planning and strategy, or capacity building) as well as the kind of interactions they engage in (i.e. consultation, representation or information sharing).

The complex map of formal institutional roles and interactions does not completely describe reality, which is even more elusive. Figure 1 does not show the links between the Mexican section of the International Boundary and Water Commission (IBWC) and other govern-



**Institutional framework for water resources management in Mexico, 2013. Source: OECD (2013, Figure 1.3, p. 48)**
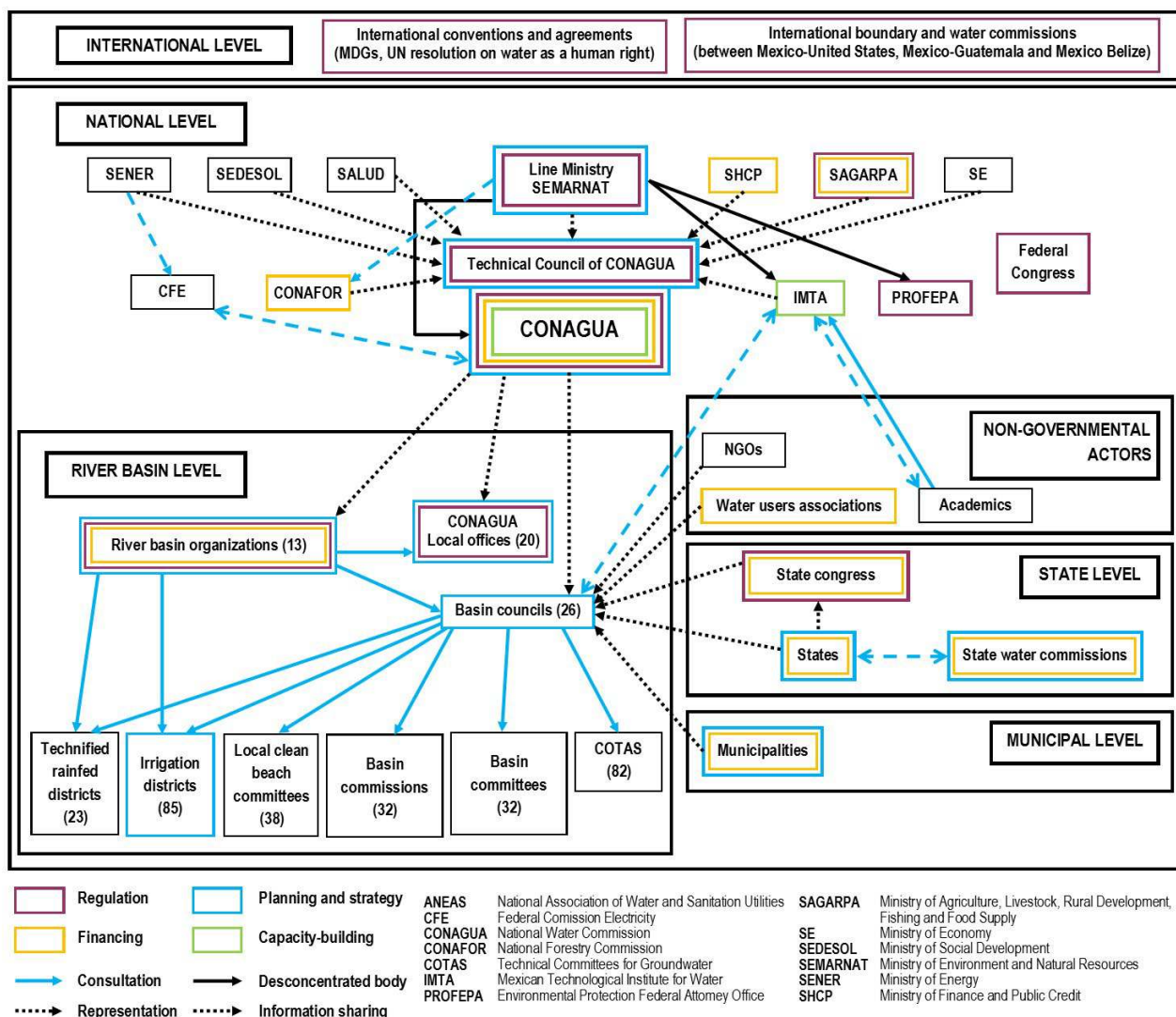
ment entities. The Federal Congress appears detached from the rest of the framework, although in reality it wields great influence over the water sector's budget. The National Water Commission (CONAGUA) plays a central role at the national and regional levels, but its work is limited or inhibited by non-water actors such as the powerful Ministry of Revenue and Public Credit (SHCP). The attraction of direct foreign investment (FDI) constitutes a primary goal for The Ministry of Economy (SE) but all too often it does not consult with CONAGUA.

The existing framework hinders co-ordination between institutions, with unfortunate consequences clearly seen at the municipal level. For example, CONAGUA and the Secretariat of the Environment and Natural Resources (SEMARNAT) regulate the use of flood prone land - although in practice, they generally lack the resources to enforce these regulations nationwide. Land use planning on the other hand is a municipal prerogative. Local political considerations often lead municipalities to show tolerance towards people settled on flood prone land, even if federal authorities prohibit such use. When floods strike and these settlements are affected, the resulting tragedy is patently man-made and not simply a fortuitous act of nature.

### 4 The Monterrey Metropolitan Area[1]

The MMA includes 13 municipalities of the state of Nuevo León (Northeastern Mexico). With over 4.1 million inhabitants, the MMA concentrates about 90% of the state's population and gross domestic product (GDP). Moreover it accounts for over 7% of Mexico´s GDP. It is commonly referred to as the nation´s industrial capital and in terms of FDI, is second only to Mexico City. Water supply for the MMA is thus of regional and national interest.

The MMA faces a relatively dry climate (mean precipitation: 622 mm/yr), recurring episodes of drought, and a limited local and regional availability of natural water sources. In 1954, 55% of the MMA's half a million inhabitants had access to piped water at home; today over

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1 This section briefly summarizes previous research by the authors, cited in the references.

99% of the population (now more than eight times larger) enjoys the service. The Monterrey Water Authority (Servicios de Agua y Drenaje de Monterrey, SADM – a public sector institution) achieved this through the development of multiple water sources (both surface and ground) and a massive increase in the size and reach of its conveyance and distribution infrastructures. Between 1954 and 2013, water supply to the metropolis increased 14-fold, from 25 to 347 million of cubic meters (MCM) per year.

In the 1990s SADM began implementing advanced supply management technologies, including District Metering Areas (DMAs), remote sensing and automated, real time monitoring of flows. These have substantially improved physical efficiency: in 2014 estimates of leakages amounted to only 5.8% of the total volume of water entering the system. Through a separate, dedicated distribution system SADM started offering treated wastewater to industrial users in 2002. In 2013, it sold 15.5 MCM of such water, 60% more than when the program started. Initiatives such as demand management measures, including water metering, unit water rates that increase with the volume billed, and mass media campaigns inform the public about the benefits of reducing water use, have also contributed to improving the system's overall efficiency. Water production per capita is now about half of what it was 25 years ago.

SADM is a pioneering organization in Mexico. The MMA is one of the few locations in Latin America that provides its inhabitants with 24/7 water services and treats 100% of its wastewater stream. Historically the federal government has played a vital role in funding the development of the MMA's water services infrastructure however a key element of success has been SADM's capacity to finance projects on its own.

SADM is one of the few water authorities in Mexico generating yearly operating surpluses. Favorable credit ratings from international agencies (such as Fitch Ratings) have allowed it to obtain loans from commercial and development banks on advantageous terms. For more than a decade, SADM has satisfied on average half of its yearly investment requirements without recourse to federal funds. Several innovative practices have

underwritten the institution's sound financial management. Water rates in the MMA are higher than in many other urban areas of the country but remain affordable to all: domestic customers who consume less than $10m^3$ a month only pay a modest fixed charge of less than USD$3. Differentiated rates compensate the cost of accessibility; for example, industrial customers pay on average almost 4 times as much per cubic meter as domestic ones do. Water rates are indexed yearly according to a formula linked to SADM's specific cost inflation and customers can pay their bills at many convenient locations, including banks and retail stores. Furthermore, several of SADM's administrative and technical processes have been certified by international institutions such as ISO (International Organization for Standardization).

However, all the above has not made the MMA immune to water governance woes, especially in terms of risk and crisis management. In August of 2013 after two years of drought, reservoirs were close to exhaustion and the supply system, on the brink of collapse. However at the time no concrete plans were in place at any level of the institutional structure (local, state and federal) to deal with the contingency. The crisis was avoided through pure serendipity when September rains replenished the reservoirs. A few years earlier in June of 2010, severe flooding triggered by remnants of Hurricane Alex caused widespread damages throughout the MMA. Private property was affected, especially in locations at risk from flooding - locations that, according to federal regulations, should never have been developed in the first place. Water services were fully restored by SADM within two weeks of the event however the reconstruction of bridges, motorways and other public infrastructure took up to 5 years to conclude, with a less than ideal level of coordination displayed by the numerous municipal, state and federal agencies involved.

The expansion of the MMA's water system has also occasioned governance issues. The El Cuchillo reservoir - the most recent addition to the MMA's portfolio of water sources and currently its main provider of surface water - began operation in 1994. Located within state limits, more than 100km from the metropolis, the reservoir captures water that previously flowed freely to the benefit of agricultural producers in the neighboring state of Tamaulipas. Bitter disputes between the two states have flared up over this water (Scott et al. 2007). A complex (and fragile) inter-state accord overseen by the federal government now establishes the rules for sharing the reservoir's waters.

In order to minimize risks and effectively manage crises in the future, much needs to be done in order to develop a less reactive and more proactive approach to both droughts and floods. A short list includes: learning from the experiences and shortcomings of the Reconstruction Council, created after hurricane Alex in 2010 to coordinate reconstruction efforts; fostering a stronger lobby with the federal government to secure financing for water conservation projects; renegotiating the agreement with Tamaulipas over the El Cuchillo reservoir, to provide more room for action in times of drought; improving working relations between water and urban planning authorities - coherent land use planning must be at the center of any new institutional arrangement; and, reducing the volume of non-revenue water. For various reasons SADM does not bill about 25% of the water it delivers to its customers, limiting the institution's capacity to fund new risk and crises management initiatives.

## 5 The regional case study in the national context

The MMA shares some of the governance challenges found at the national level, in particular institutional fragmentation. CONAGUA operates the three reservoirs that supply water to the city. The Federal Congress plays a key role in approving federally-funded projects for the MMA. As elsewhere in Mexico, the State Congress may facilitate or inhibit water and urban projects depending on national and local political circumstances. The roles identified earlier for the SHCP and SE hold in the MMA, as do conflicts over land use planning between water and municipal authorities. Furthermore the MMA has experienced conflict over water with other regional actors as have other large, extensive water systems, for example Mexico City, Guadalajara and most recently, Hermosillo.

The MMA also presents peculiarities. SADM is a state entity and serves the MMA through an integrated metropolitan system, an arrangement that has proven both efficient and cost-effective. This contrasts with most of the rest of the country where individual municipalities are responsible for water services, but in many cases lack the resources to do so effectively. Moreover, SADM benefits from an exceptional degree of independence from local political authorities. This has provided several advantages: water rates are not determined on the whims of local politicians and the institution's directors and managers tend to stay in office much longer than is the case elsewhere, where the 3-year municipal political cycle impedes the accumulation of organizational and managerial experience. In a nutshell, the MMA has avoided the vicious circle of low water rates -poor services - customers' unwillingness to pay (let alone accept rate hikes) that has impeded the water sector's progress in most of Mexico's urban areas.

## 6 Concluding remarks

The OECD identifies four essential drivers of change for water policy reform in Mexico: multi-level governance; river-basin governance; economic efficiency and financial sustainability; and, regulatory frameworks (OECD, 2013, p. 18). The case of the MMA shows that these issues emerge clearly at the local/regional scale. Though the metropolis has achieved relatively good urban water outcomes, it suffers from some of the same institutional ills that affect the country as a whole. Given the severe impacts of both droughts and floods on the well-being of the metropolis, there is a need to improve crisis management effectiveness. Beyond this and more importantly, its current governance model must evolve towards a more preventive approach that focuses on risk management.

Water governance in Mexico remains a work in progress. Major challenges need to be addressed and these cannot be resolved within the water sector alone. There is an obvious need for greater institutional coordination, not only between the numerous stakeholders but also

with respect to programs, laws and regulations. Recognizing this multidimensionality could represent in itself a major improvement. Clearly, the urban planning - water planning nexus must be at the center of any water governance reform.

The case of the MMA though instructive must be carefully assessed. Monterrey is the birthplace of several of Mexico's largest industrial and financial companies – CEMEX for example, today a leader in the global cement industry. This long-standing local tradition and culture of entrepreneurship and business and engineering know-how, has both created the need for good water services and provided the means to obtain them. Certainly, SADM's technical-managerial-financial model is a reflection of that specific local context and this makes it unfit for wholesale export and replication. As Mexico strives to improve its national water governance framework, its regions, metropolitan areas and individual cities will need to develop their own context-specific solutions.

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# CultNature: The Fate of Innovative Renewable Energy Concepts Without Community Ownership in Central Germany

Robin Chang*

**Abstract:** This article introduces a recent attempt to address both environmental, and socio-economic challenges in Germany's Ruhr region that innovatively integrates consideration for climate change, renewable energy and traditional landscape park programs. In parallel, this contribution discusses community based challenges that hinder such government driven innovation.

## 1. Introduction

The 1980s signaled the end of the industrial sector in central Germany but also the dawn of an innovative transition. With no inspirational precedence, the Ruhr region's communities and governments confronted significant environmental, economical, and social problems by prioritizing environmental rehabilitation through brownfield redevelopment and watershed denaturisation (Metropole Ruhr 2016b; Kunzmann 2013). As the earliest and most notable of programs, the Emscher Landscape Park mobilized a diverse range of actors to rehabilitate the regional watershed at the start of the 1990s (Shaw 2002; Metropole Ruhr 2016a). Projects ensuing the Emscher Landscape Park, not only improved the environment but also redeveloped a number of inactive brownfields sites. Examples include innovative and cost-effective forms of temporary and reuse such as industrial heritage parks, municipal landscape parks, Industrial Forests and new wild woodlands (Keil 2005; Lutzenberger, ed. 2013).

Subsequently, brownfield redevelopment is increasingly recognized as a key and sustainable means of land use management not only in Germany, but globally in North America, Western Europe, Japan, Australia, and emerging Eastern European, Latin American and other Asian markets (Singh et al. 2009; Vanheusden 2009; Williams and Dair 2007; Dorsey 2003; Dixon et al., eds. 2007; Meyer 2003). Indeed, the culmination of such interest is not limited to market analysis and national governments but is advanced with alacrity through infor-mation exchange events such as the annual Brownfield Conference – organized be the EPA (United States Environmental Protection Agency) and the ICMA (International City/County Management Association); and strategic tools such as remediation assessment frameworks, or programmatic investments and grants with the aim to encourage the "enhanced uptake of innovative and existing methods, technologies and decision-support instruments" (Science Communication Unit, University of the West of England 2013; Soule 2006; Chen et al. 2009). Nevertheless, the struggle to uniformly address brownfield redevelopment through policy and effectively integrate innovation and sustainability while assuaging preconceived fears about redevelopment failure is clear at global, regional, and local levels (Meyer 2003; Healey 1994; Greenberg et al. 2001; Nijkamp et al. 2002) – even in Germany, where the transformative legacy through brownfield redevelopment is so strongly exalted.

One current example of this is research that conceived the CultNature concept (an evolution of the landscape park) which began July 2012. Financially supported from the state level Ministry for Economy, Energy, Industry, SME and Trade of NRW, researchers from the Institute for Work and Technology (Institut Arbeit und Technik or IAT) based in Gelsenkirchen (NRW) evolved the idea of landscape parks even further by conceptualizing the "energetic reuse" and aesthetic redesign of brownfield sites as a key means of improving the environment while also addressing climate change as well as energy

* Robin Chang B.Pl, M.Sc. is currently a Research Associate at the Department of European Planning Cultures, Faculty of Spatial Planning, Technical University of Dortmund. She also works for the European Urban Research Association Secretariat. Email: robin.chang@tu-dortmund.de

transition (Krüger-Charlé 2015: 92; Lehner et al. 2011; Lehner 2013). The impetus for CultNature is substantiated by work documenting the region's historical decline from an industrial hub to a special economic zone now challenged with a lack of industries, low quality of life, further exacerbated by a high unemployment rate (comparable to eastern Germany), selective out-migration of educated young professionals, social and ethnic polarization and growing poverty region (Kunzmann 2013; Metropole Ruhr 2016b). As a step forward, the concept underlines a need to first address unattractive cityscapes (linked with negative locational factors) as a means to positively change the economic decline that plagues the largest and oldest post-industrial agglomeration in central western Germany (Lehner et al., eds. 2011; Metropole Ruhr 2016a; Kunzmann 2013). The originators of CultNature argue that a potential solution presents itself through the total of 576 brownfield sites that sum up to over 12 600 ha of unused but re-developable land that lie in the Emscher and Hellweg zones of the Ruhr (Lutzenberger, ed. 2013; Lehner 2013; Krüger-Charlé 2015). By tactically improving the landscape, and innovating the economy with renewable energy, future strategic and dramatic socio-economic improvements are attainable.

## 2. Conceptualizing CultNature

CultNature, like its predecessors strategizes to improve the landscape and provide additional quality public space but also innovatively integrate renewable energy. The objectives are three-fold (Lehner et al., eds. 2011; Lutzenberger, ed. 2013; Lehner et al. 2013a):

1. Repurpose brownfields as biomass plantation parks;
2. Develop urban micro-energy networks supported primarily biomass technology;
3. and to improve the cityscape while providing a potential context for entrepreneurial activities

The combination of alternative energy sources (solar and wind energy) with strategic temporary use enables potential for low-cost, environmentally balanced baseload power production comparable to 'Combined Power Plant' (Töpfer 2016) examples tested in other

parts of Germany. Building upon the socio-ecological ambitions of previous landscape projects, CultNature's idea presents a sustainable solution for economically declining agglomerations with a concentrated abundance of residual brownfield (Lehner et al., eds. 2011; Lutzenberger, ed. 2013). Initial studies conducted by Lutzenberger and Lehner (2013; 2013) identify higher levels of economic decline in cities of the Emscher and Lippe Zone that are accessed by a regionally unique honey comb patterned terrain (Figure 1) cut through by canals, rivers, and former railroad tracks.

Since an objective of the concept is to develop energy


**Honey Comb Patterned Terrain in the Ruhr Region (Source: KLA Kiparlandschaftsarchitekten)**

parks, bio-energy units as well as smaller areas of land facilitating localized scope and planning for project sites, access is key. The honey comb pattern in the Ruhr lends itself favourably to the infrastructural access demands and network building objectives of CultNature and thus convincingly illustrates the potential for green axes of development as shown in Figure 2 (Lehner et al. 2011).


**Green Axes of Development in the Ruhr Region (Source: KLA Kiparlandschaftsarchitekten)**

While CultNature's objectives seem simple, initial pilot projects and feasibility studies (completed in 2015) of its planning, implementation and methods still call for development (Krüger-Charlé 2015). Despite its high potential as a sustainable and integrated proposal to help the region address challenges with post-industrial transformation, it is questionable how CultNature's production model can be cost-effectively implemented and strategically included in sub-regional energy strategies. Furthermore, these questions are challenged by the meaningfully engagement of citizens to develop awareness and support for renewable energy projects (Krüger-Charlé 2015). While outreach opportunities to market the project and engage with officials and the press have been included up until now (Institut Arbeit und Technik 2013), the project has yet to demonstrate a strategy to facilitate community confidence and ownership.

## 3. CultNature in Practice

Prior to conducting pilot studies with the private developers and partners NRW.Urban and RAG Montan Immobilien, IAT researchers conducted an initial survey to gauge general appreciation and acceptance of CultNature. This survey was administered in February and March of 2013 to relevant stakeholders from politics, business, planning, the community, media, and also academia (Lehner et al. 2013b). The online survey was organized into 8 sections of which appropriate sections were directed at relevant actors. For example, the general information section was administered to all interviewees, while specific sections with more detailed and technical information was additionally administered to experts such as planners or academics (Lehner et al., 2013b). Over 160 surveys were administered and almost 20% of interviewees responded. Roughly 12% of the responses were complete. Survey questions aimed to evaluate the general acceptance of the CultNature concept as well as specific aspects including but not limited to location, scale, practicality, and feasibility (Lehner 2013; Lehner et al. 2013b). Key findings determined mostly by officials, professionals, and experts agreed that CultNature could be facilitated through

planning processes, but indicated that a concrete business model that included commercial uses would better convince communities to accept the concept. Also, survey findings confirmed the belief that the existing constellation of stakeholder could promote and forward the concept. However, this finding is undermined by the fact that the current constellation of actors is highly divided on certain issues, and thus any resulting conflicts would hinder any progress of CultNature.

Further initiatives intended to gauge appreciation and acceptance of the project included four events that took place between 2013 and 2015. These included two press release events to which few community citizens attended, and two public events introducing CultNature as part of exhibits (Institut Arbeit und Technik 2013). At these events, researchers presented CultNature to various audiences and exchanged information through question-answer and discussion round sessions (Institut Arbeit und Technik 2013). For the limited number of citizens who did attend, strong skepticism and opposition was demonstrated towards the government and institution driven project. In parallel, minimal effort was made to provide tools and outlets for meaningful engagement.

At the pilot study phase of the CultNature Project, five sites with project partners were proposed, and municipal projects were discussed in six municipal workshops (Lehner et al. 2013a). According to project documentation and interviews with researchers, meetings and workshops conducted for the pilot studies were not open to the public as municipal and state level officials and agencies were considered most relevant for facilitating feasibility studies and decision making processes. Further ground work investigated appropriate flora species for optimized biomass harvesting and also appropriate production models for CultNature (Krüger-Charlé 2015; Lehner et al. 2013a; Lehner et al. 2013b). Subsequent work with project partners resulted in an interactive scenario and mapping tool to support decision making. Again, information about this tool, was not revealed to the public until later through project documentation (Krüger-Charlé 2015).

## 4. Challenges with CultNature

Despite a demonstrated need for innovation in the Ruhr, communities in the region are still skeptical of CultNature (Krüger-Charlé 2015). Conceptually, the project introduces an exemplary vehicle for social entrepreneurship and learning required in 'communities of localities' facing social and economic challenges such as high unemployment, brain drain, and a need for economic diversification that desire to evolve into 'communities of interest' (Lehner et al. 2013b; Institut Arbeit und Technik 2013; Metropole Ruhr 2016b; Ratten and Welpe 2011). This micro level economic development takes advantage of existing infrastructure but draws on the community as a "social base in which a number of different types of enterprises can develop" (Ratten and Welpe 2011). In the long-term, however, this is a process that must be strongly linked with empowerment for the local communities – a weakness still evident even in reports from CultNature researchers (Krüger-Charlé 2015). Through 'citizenship' or 'empowerment,' renewable energy projects facilitate flexible control, social learning, influences, trust and commitment are necessary for successful renewable energy implementation (Ratten and Welpe 2011; Musall and Kuik 2011). This is significant but challenging due to CultNature's character as a government financed experiment and abstract concept that strives to offer policy solutions responding to long-term social and economic challenges. Regardless, it is necessary as projects like CultNature require grounded understanding in their 'communities of localities' to avoid local resistance or NIMBYism (Musall and Kuik 2011; Ratten and Welpe 2011).

Previous studies investigating local acceptance of renewable energy emphasize the significance of community ownership in planning and implementation processes for localized projects (Alvial-Palavicino et al. 2011; Musall and Kuik 2011; Walker et al. 2010). Models of community ownership for energy projects range from process oriented complex grassroots action, organizational bodies such as cooperatives, charities and trusts to simpler gifting of shares once planning and implementation is complete (Walker 2008). In most cases, increased involvement of local citizens in planning and implementation relate to increases in successful and positive outcomes of energy projects (Alvial-Palavicino et al. 2011; Warren and McFadyen 2010; Walker et al. 2010). While the majority of the studies referenced are relevant to rural contexts, some authors note that urban contexts share potentially similar characteristics (Walker 2008). CultNature currently does not align with documented models of community ownership, but the concept's survival and success compels us to consider and integrate elements from such models.

Undoubtedly, CultNature presents a 2.0 version of the landscape improvement programs historically employed in the Ruhr Region. It's beta innovations can further benefit communities through energy production and future economic spin-offs, and offer an enticing, feasible regional strategy to move forward as articulated through its pilot studies (Krüger-Charlé 2015). However, unlike the landscape improvement programs that preceded CultNature, questions arise with regards to its actual sustainability. Can such a project succeed without community buy-in and commitment – despite multi-government support? To what extent could such a project succeed? And how can public agencies and institutions improve its chances for implementation by addressing community ownership in parallel? Ownership in this case moves beyond agreeing and allowing local decision makers to choose the future, but references the motivation to take part in the future management of the project. As already identified by the CultNature research team, conflicts of interests and other concerns are already barriers to the project during its development (Krüger-Charlé 2015; Lehner et al. 2013a). If project members and key actors are to ensure CultNature's post-industrial legacy in the Ruhr, they need to consider the questions above, and must facilitate local acceptance and ownership instead of focussing only on the technical development, planning, and implementation of the concept.

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# Dubai's Ambitions for a Low Carbon Economy

Fazil Abdul Rahiman, Thomas Bosse, Shahda Al Taie, Dubai Carbon Centre of Excellence

**ABSTRACT:** The Dubai Carbon Abatement Strategy outlines the course of actions that are to be adopted by the Dubai Government in order to reduce GHG emissions for the year 2021 by 16%, as compared to its business as usual scenario. This strategy to reduce carbon emissions is the first of its kind in the region. The Dubai Carbon Abatement Strategy outlines the course of actions to be adopted by the Dubai Government in order to manage Dubai's GHG emissions for 2021 as compared to its business as usual scenario. This strategy to reduce carbon emissions is the first of its kind in the region.

## 1. The role of Cities in Climate Change

Close to half of the world's population is concentrated in urban settlements, which contribute to around 80% of global GDP and around 70% of global energy use and their associated greenhouse gas (GHG) emissions (The Global Commission on the Economy and Climate, 2014). The shift from rural towards more urban societies is a global trend that has noteworthy effects on GHG emissions and for climate change mitigation. Across multiple dimensions, the scale and speed of urbanization is unparalleled: each week the global urban population increases by 1.3 million people. Currently, there are nearly 1000 urban clusters with populations of 500,000 or greater; by 2050, the global urban population is expected to increase by between 2.5 and 3 billion, corresponding to 64 % and 69 % of the global population (IPCC, 2014).

Considering the relative longevity of urban infrastructures, it is evident that cities not only influence global economic performance and quality of life, they also decide the course global GHG emissions will take as well as their associated impacts. Currently, less than 20% of the world's 150 major cities have the elementary plans and road maps required for a low carbon or green economy (The World Bank, 2013).

Extreme weather conditions threaten human health and productivity, with natural disasters, such as flooding, wildfires and cyclones, becoming more frequent. More than 50% of the global population lives within 60 kilometers of the sea, and three quarters of all large cities are located on the coast. Melting ice caps will result in a rise in sea levels, which will threaten coastal infrastructure;

meanwhile softening soils will destabilize infrastructure in cities that are situated on permafrost. Climate change also affects local and regional weather patterns that can influence agricultural outputs and result in food shortages in cities. People living in slums, without enough urban infrastructure, are particularly vulnerable and will be amongst those that suffer the most from the adverse effects of climate change. Rising temperatures coincide with increased energy use for cooling. Loss of green cover in cities raises urban temperatures and also contributes to climate change (UNEP, 2009).

Clearly greater motivation, sustained by regulatory transformation, is needed so as to drive compact, connected and coordinated urban development. Well-planned, compact cities can be highly resource efficient and lead to lower per capita GHG emissions. As centers of expertise and innovation, cities can invest in greening sectors, such as transport, buildings and waste management, thereby creating jobs and supporting a sustained long-term economic growth. Also, as major decision-makers in the flow of goods and services, cities can be leaders in creating demand for sustainable consumption and products.

## 2. Dubai: Capital of Green Economy

An intensive federal strategy for economic progress is in place for the UAE, who seek to position as a competitive, knowledge-based international center; as is demonstrated by the multiple strategies and frameworks in place such as the UAE Vision 2021, the sustainability theme set for World EXPO 2020, and the UAE Green Economy for Sustainable Development Initiative. The

country's governance has directed its utmost attention towards ensuring that its urban setups be a foundation to support resource efficiency improvements.

Following the UAE vision, Dubai has made its ambition crystal clear: to become the world capital of the green economy. Dubai has taken progressive strides and has been a harbinger in addressing the global issue of climate change through exhibited initiatives in resource efficiency. Championed by the vision of His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, the Emirate has created a platform to drive specific programs and projects, where opportunities and innovation can address climate change challenges (The Ministry of Energy UAE, 2016). Through the 'Dubai Declaration', made at the inaugural World Green Economy Summit, the pledge and action plan have been established in order to move the Emirate towards green economic development to lead the transformation by 2021.



**Dubai's Sustainable Energy Model**

As is the case with any of the leading cities, energy is the single most important element that contributes to GHG emissions. Therefore, a much-needed emphasis is put on sustainable energy in the form of Dubai Sustainable Energy Model, which is based on the following 10 pillars:

1. Policy and Regulatory Framework
2. Capacity Building
3. Diversification of Energy Resources
4. Demand Side Management and Energy Efficiency
5. Energy Pricing and Consumer Behavior
6. Investment in Clean and Smart Technology
7. Stakeholder Engagement
8. Public Private Partnership
9. Energy Services Contracting (ESCO) employing Super-ESCO governance
10. Carbon Abatement Strategy

All these 10 pillars are encapsulated in the Dubai Integrated Energy Strategy 2030 (Dubai Supreme Council of Energy, 2016). This strategy doesn't stop at 2030; instead it is extended until 2050, through the Dubai Clean Energy Strategy 2050. The strategy is aimed to profile the Dubai energy sector by providing 75% of the city's energy from clean sources by 2050, thereby demonstrating a model that could be exported to the whole world. Dubai's goal is to become the city with the smallest carbon footprint in the world by 2050 (Gulf News, 2016).

The Dubai Clean Energy Strategy 2050 consists of five main pillars: infrastructure, legislation, funding, building capacities and skills. The infrastructure pillar comprises the launch of the Dubai Green Fund, which is worth Dh100 billion and will provide easy financing for investors in the clean energy sector. Infrastructure initiatives, such as the Mohammad Bin Rashid Al Maktoum Solar Park, make up another feature of the infrastructure pillar .The solar park is the largest generator of solar energy in the world from a single location and will have the capacity to produce 5,000 megawatts by 2030, representing a total investment of Dh50 billion. The infrastructure pillar also involves an all-inclusive innovation center that will be developed using 3D printing technology. Research and development specialized in the next generation of clean energy technologies, such as solar energy technology, drones, and solar-based desalination, will be highlight of the innovation center. Close to Dh500 million will be devoted to the research and development of smart grid integration, energy efficiency and electricity generation from solar energy. Last but not least, the infrastructure pillar also includes the

creation of the 'Dubai Green Zone', dedicated to attracting research and development centers as well as budding companies in the field of clean energy.

For any strategy to be successful, city governance must play a key role. The Dubai Plan 2021 describes the future of Dubai through holistic and complementary perspectives, starting with the people and the society who have always been, and always will be, the bedrock of the city (The Executive Council of Dubai, 2014). This plan describes the characteristics that Dubai's people need to have in order to deliver on the city's aspirations in all areas; it also examines the type of society needed to support and empower these individuals in order to achieve their goals.

The plan addresses the urban environment, including both natural and built assets, and looks at the living experience of the people of Dubai and its visitors through their interactions with the environment and the economic and social services provided. In addition, the plan also focuses on the economy, which is the city's development engine furling its march forward. Finally, the plan addresses the government as the custodian of city development in all aspects. These perspectives are divided into 6 themes, each highlighting a group of strategic developmental aims for Dubai, and together form the city's vision for 2021. The 6 themes are:

1. *The People*: City of Happy, Creative & Empowered People

2. *The Society*: An Inclusive & Cohesive Society

3. *The Experience*: The Preferred Place to Live, Work & Visit

4. *The Place*: A Smart & Sustainable City

5. *The Economy*: A Pivotal Hub in the Global Economy

6. *The Government*: A Pioneering and Excellent Government

**Dubai Carbon Abatement Strategy 2021**

In order to limit the impact of human activity on the climate system, the United Nation's Framework Convention on Climate Change (UNFCCC) has set a target of restricting the rise in temperature this century to 2°C.

Global action is fundamental and starts locally; therefore, the significance of establishing a low-carbon economy surpasses beyond the vision of Dubai who are contributing to a concerted global effort to meet this limit. The Emirate of Dubai is the fifth-fastest growing city in the world, with respect to 300 of the largest metropolitan economies, having experienced a 4.5% increase in per capita GDP between 2013 and 2014 (Brookings, 2014). Through the integration of smart technologies and conducive regulatory frameworks, Dubai's emission reduction programs include green building regulations, solar energy, waste reduction, a green mobility initiative, and increased usage of public transportation. With this, Dubai joins an elite group of cities that are vigorously managing their GHG emissions.

To design a targeted program for carbon abatement, the Dubai Carbon Abatement Strategy identified distinct sectors that are contributing to the carbon emissions, these are power and water, manufacturing, transportation and waste, as given in Figure 2. 2011 was chosen as the baseline year, as this is when most of the crucial strategies were developed. Based on an assessment of potential emission reduction and the ambition demonstrated across sectors, it was determined that by 2021 Dubai's GHG emissions could be reduced by 16% compared to business-as-usual estimations made for the same year. The reduction amounts close to 11 million tCO2-equivalent by 2021.

In order to establish the objectives of the Dubai Carbon Abatement Strategy 2021, engagement of stakeholders was vital in terms of setting the carbon-reduction targets in 2014 and for reaching the execution phase in 2015. The process commenced in 2011, when the Dubai Supreme Council of Energy (DSCE), along with the Dubai Carbon Centre of Excellence (DCCE), developed the first inventory of Dubai's GHGs. To realize Dubai's regional and global position, a benchmark was set for each sector to guide the level of determination and in order to learn from best practices. Since then, each sector has continued to improve data quality and collection methods. With four years of data to date, Dubai's emissions profile has been adjusted to accurately reflect the local environment. In 2015, these collaborative efforts were compiled into a detailed work plan with sector-based

targets; implementation of the work plan is currently underway. A technical committee reviews the progress and tracks the performance on a regular basis.
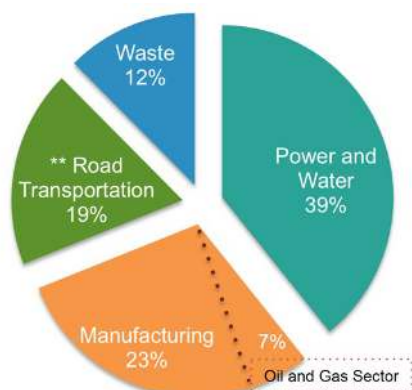


**Sectoral breakdown of Dubai GHG Emissions**

Progress is already being made, as demonstrated by reported savings in the comprehensive Demand Side Management strategy of Dubai. Between 2011 and 2014, electricity consumption savings exceeded their target and reached 1.9 TWh. Similarly, water consumption savings exceeded the target, saving 3.5 billion imperial gallons between 2011 and 2014. The power and water sectors are implementing various other initiatives in order to continue their emissions-reduction trajectories,; these include supply-side energy efficiency (investment in efficient technologies, and reduction of system losses in transmission and distribution networks, among others) and diversifying the energy mix by including renewable sources (25% of installed capacity is to be based on solar energy by 2030). Behavior science is also being used to influence the consumer behavior and is showing promising results.

The major manufacturing segment of Dubai, which is the aluminum sub-sector, has also met major milestones in its carbon-management strategy. Carbon intensity per production was reduced by 5.2% between 2011 and 2014. The road transport sector has also undergone significant expansion of its sustainable and alternative transportation plans. The expansion of the 75-kilometer Dubai Metro and the introduction of hybrid taxis (to make up 50% of the fleet by 2021), are major initiatives designed to lower fuel consumption and increase operational efficiency in the sector. In addition, the waste sector is also implementing measures and programs to increase the rate of recycling and decrease the volume of landfill waste.

There are several potential challenges for the success of the Dubai Carbon Abatement Strategy. Dubai is a fast growing city, especially within the context of hosting the upcoming World Expo 2020. Both population and GDP are on the rise at a rapid pace. By the end of 2030, the demand for electricity and water is expected to increase three-fold compared to figures from 2011. Apart from the growing population, the regular tourist influx adds further pressure on the transport systems. With an economy thriving primarily on non-oil resources, the manufacturing sector also has significant targets to be met. All of these requirements translate into increased waste sector needs. In spite of all these challenges, the strategy has set an ambitious target. To achieve this target, the action plan aims at improving current resource efficiency levels, adopting the latest cutting edge technologies, and improving the synergies between the sectors.

## 3. Conclusion

The Dubai Carbon Abatement Strategy 2021 highlights the importance of securing a sustainable future while maintaining strong economic growth. By pioneering one of the first comprehensive carbon-abatement strategies in the region, Dubai is placing itself at the forefront of the sustainability journey. The detailed work plan of the Dubai Carbon Abatement Strategy 2021 and its key performance indicators aim to decrease GHG emissions by 16%, compared to BAU in 2021 from government entities and industries. Therefore, Dubai is leading by example, with local steps that could influence global change. As the DSCE and DCCE embark on implementing emission-reduction programs, Dubai will enjoy increased resource efficiency across all sectors. In addition, the city is witnessing increased investment in innovative technologies and a strong motivation from the private sector to contribute to this low-carbon development agenda. The outcome of the Dubai Carbon Abatement Strategy 2021 will no doubt be the result of concerted efforts and high-level commitment from all the relevant stakeholders, as well as continuous monitoring to track progress being made towards Dubai's vision to become the capital of the world's green economy.

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# Driving Prosperity in Cities through Openness and Civic Innovation

Constanza Gómez Mont*, Marina González**, Guillén Torres***

**Abstract:** Cities play a crucial role in social and economical development of nations. In this short article, PIDES Social Innovation, a non-profit organization based in Mexico City, explores, through two case studies, how urban spaces are a fertile land for social innovation, and how creativity and intersectional collaboration present new ways of tackling pressing societal challenges. Mapatón and Trámites CDMX, the projects reviewed here, successfully mobilized open government processes, citizen participation and the use of technology as a tool to accelerate change, in order to solve two specific issues related to mobility and public services in one of the biggest and most complex cities in the world.

## 1. Introduction

To say that close to 70% of the world's population will be urban by 2050 (UN, 2014) has become a common strategy to drive attention towards the present problematic of urban areas. However, the immediate shocking power of this figure obscures another just as appalling fact: most of that future urban population will not live in neatly functioning cities like Hong Kong, Copenhagen, Amsterdam or Vienna, but in gigantic metropolises such as Lagos, Karachi, Sao Paulo, or Kinshasa (UN, 2014), where the quality of life of its inhabitants, at least presently, seems to diminish in direct proportion with population growth.

Picture Mexico City, for example, which between 2000 and 2010 grew by 9% (INEGI,2010). Its metropolitan area comprises the 16 boroughs of the Federal District, plus almost 60 municipalities from the adjacent states, where over 20 million inhabitants (INEGI, 2010) move in 14 million daily trips (SEMOVI, 2015), producing the 18th largest economic activity in the world (Brookings, 20014), more than half of which belongs to the informal sector (ILO, 2014). The functioning of such a complex urban system requires the articulation of three different levels of government, a powerful and dynamic private sector, and a plethora of formal and informal organisations, from housing associations to street sellers, passing by urban labs and think tanks. Although this governance process has not been capable of producing an economically, ecologically and socially sustainable city, Ciudad de México works; goods and stocks are ex-

changed, planes and buses depart, public infrastructure is built, laws are passed, and in general, collective life is organised on a daily basis, albeit in an opaque, inefficient and socially exclusive context.

The challenges implied by this problematic setting (and in general, by the growth of large urban systems such as Ciudad de México), cannot be tackled by isolated actors. For this reason, one of the goals of PIDES: Social Innovation has been to foster, through community empowerment, civic innovation and technology, the articulation of all the agents involved in the governance of urban areas around Mexico to solve pressing urban issues and producing open, sustainable, healthy and inclusive cities. Since 2008, the organisation has focused on the subjects of open and digital government, climate change, public health, and innovation in public space, building a strong network of institutional, civil society and private sector collaborators, both domestic and international.

### PIDES: Social Innovation

By 2008, the young Mexican democracy was showing signs of exhaustion. According to the 2008 National Survey on Political Culture and Citizen Practices, only 53% of the Mexican population thought democracy was preferable over other forms of government, and barely 48% believed Mexico lived under a democracy (SEGOB 2008). On the other hand, only around 15% of the population aged 18-29 manifested an interest in political participation. PIDES: Social Innovation was born in

*Constanza Gómez Mont, Founder and General Director, PIDES Social Innovation, constanzagm@pidesinnovation.org. **Marina Gonzalez, Program Director, PIDES Social Innovation, marina@pidesinnovation.org, ***Guillen Torres, Project Coordinator, PIDES Social Innovation guillen@pidesinnovation.org

this context, with the double goal of opening spaces for the Mexican youth to participate in public matters, and generating mechanisms to raise their interest in joining the political debate. The first challenge we undertook was securing young people's involvement in the formulation of climate change public poolicy. Since around 50% of the Mexican population is under 30 years old, the unavailability of participatory mechanisms for this sector was of particular concern, given they would face the future consequences of decisions taken without their involvement. Since then, PIDES has functioned as a Think and Do Tank and as a space for experimentation to produce intersectoral, interdisciplinary, and intergenerational solutions to pressing urban issues. Our main drive is to change the relationship between government and citizens, by transforming the latter, from simple beneficiaries, to strategic partners, with the help of technology as a tool to accelerate change and democratize processes.

PIDES: Social Innovation operates under the conviction that policies will always be shortsighted if developed without the inclusion of citizens. Therefore, we are constantly on the lookout for innovative mechanisms that not only guarantee the public's involvement, but also introduce a component of fun into the process of organising collective life, with the goal of making it interesting again for those who should be involved. In the next paragraphs we briefly describe two cases in which, after identifying a problem, we joined forces with actors from different sectors, and with the help of technological innovation and open government principles, we developed a solution.

### Case studies

### Improving Public Services through digital and open innovation: *Trámites CDMX*

Trámites is a Spanish word that refers to all the bureaucratic procedures and paperwork that citizens need to carry out during their everyday interactions with the government. Given the intricate structure of the Mexican state, trámites have a very particular place in the Mexican imaginary; they are complicated, time-consuming, and sometimes unnecessary. For example, before this project

was implemented, the 16 municipalities of Mexico City established dissimilar stipulations and requisites for the same bureaucratic procedure, producing around 5,000 different types of paperwork. Although this number is outrageous on its own, it becomes overwhelming when considering that the 8 million inhabitants of Mexico City (plus an important share of the 12 million who live in the Metropolitan Zone) carry out government related paperwork on a daily basis.

Trámites CDMX is an electronic platform developed with the goal of turning a redundant and highly inefficient collection of bureaucratic procedures, into a single, dynamic, flexible and real-time open catalogue. Less than two years after the implementation of the project, more than 5,000 processes were reduced to 2,400, improving government agility and efficiency. In addition, the 30% most used procedures were digitized and systematized in the new platform for easier access and higher publicity. The new platform is already helping citizens and public servants to save time and resources, while at the same time, increasing the transparency of bureaucratic procedures, whose intricateness had always been a major source of corruption throughout the country. The ultimate goal of Trámites CDMX is to help citizens to carry out their paperwork in an efficient and transparent manner, and thanks to geolocation, even allowing them to identify the closest institution where they can start the process. The continuous registration and homogenization of all the bureaucratic procedures across the local administration could allow the authorities to reduce the amount of work that public officials have on their hands, and erase institutional barriers preventing citizens from establishing a better relationship with the government.

During the implementation of Trámites CDMX, we identified cultural change as the biggest challenge to bringing about improvements within (and around) public administration. Surprisingly, building a technical solution to systematize and make sense of thousands of government documents proved easier than motivating the willingness to adopt the platform, both in the case of users and public officials. Therefore, we discovered that particularly in relation to obdurate social and power structures such as those present within Mexican institutions, cultural change is harder to achieve than the im-

plementation of technical innovations. Trámites CDMX not only represents the potential for vast improvement in the efficiency of public administration, it also directly affects opaque administrative practices that are deeply rooted in Mexican culture. By making bureaucratic procedures more transparent, the information asymmetries sustaining corruption diminish, ideally also reducing the incidence of illegal requests for payments to make the procedures "more agile".

Trámites CDMX represents an important milestone along the local authorities' transition to digital and open government, since it was guided by the recognition that going digital is only half the job. The rest consists of developing technological solutions that fulfill usability and design requirements that acknowledge that public officials and users are a diverse group with different levels of digital literacy. To make sure Trámites CDMX resulted in a truly open and inclusive project, PIDES became involved in two different ways: facilitating and evaluating capacity building workshops for 76 government institutions (involving 564 public servants), and directly developing the citizen electronic platform. PIDES also fostered the mapping and analysis of good practices used in other cities with similar experiences, and also facilitated the involvement of international experts who could contribute to the project.

### Crowdsourcing the first open database of the largest concessioned public transport system in the Western world: *Mapatón*

There are over 29 thousand units of licensed public transport (buses, microbus and vans) distributed throughout 97 routes, performing around 14 million trips around Mexico City's 7,866.1 square kilometres each day (SETRAVI, 2010). On average, every user of public transportation in the city invests 5.7 hours a week in travelling, and almost 20% of their monthly wage. In comparison, private vehicles account for only 29% of the daily trips. Nevertheless, despite the importance of licensed public transport, until very recently there was no homogenised and systematised database concentrating information about the number of licensed transport units or their daily routes.

As part of the Dialogues for an Open City, PIDES: Innovación Social, CETRAM, Mexico City's Lab (Laboratorio Para la Ciudad) and the Mobility Ministry (SEMOVI) conceived the Mapatón CDMX project to address the lack of information regarding licensed public transportation. The main goal of this effort was to generate an open, systematised and homogenised database through the recollection of precise information about routes with the help of innovative forms of public participation and gamification. However, this individual objective is part of a broader project within PIDES - the formulation of an urgently needed strategy to tackle the city's unbelievable congestion. Mexico City has been recently designated as the most congested city in the world (Annual Traffic Index 2016), which, according to the Institute for Transportation and Development Policy, results in economic losses of around 4.6% of the Metropolitan Area's GDP (ITDP 2015).

It has been long since Mexico City's congestion problem surpassed the metropolitan authorities' capacity to provide a proper solution. Since the city spans two states and three levels of government, there are many institutional obstacles that prevent the effective cooperation of the relevant actors. For example, although an Environmental Commission for the Megalopolis groups 5 states and Mexico City, it lacks the power to produce a single environmental policy due to the authorities' refusal to lose competencies. On the other hand, similar intergovernmental bodies tackling other pressing issues remain to be formed. Unfortunately, governments are not yet tapping into collective knowledge or action to tackle urgent issues, and their awareness of the existence of exponential technologies that could be potentiated as tools to implement innovative collaborative solutions is still rudimentary. In addition, local public institutions in the metropolitan area lack effective mechanisms for citizen participation so that they can provide feedback as the field-experts they are. In this sense, Mapatón was born as an experiment to prove that through new ways of collaboration between authorities and citizens, even gargantuan problems such as urban congestion can begin to be tackled.

Mapatón lasted for 17 days, during which 3,624 mappers divided into 690 teams, participated by download-

ing a mobile phone application designed specifically for the project, and mapping 4,110 routes by riding buses, microbuses and vans. Mapatón CDMX collaborators travelled the equivalent of 1.2 trips around the Earth during the collaborative exercise. This database was later processed by PIDES and a group of volunteers, and transformed it into three different publicly accessible products: an online dashboard in which all the traced routes, their prices and approximate schedules can be consulted; an open Application Programming Interface (API) to perform queries on the Mapatón Database; and a General Transit Feed Specification file that helps users correlate routes and schedules. The three products were later used in a two-day Hackathon organised by PIDES in Google offices, in which 84 programmers competed to develop applications that took advantage of the newly created database.

The best three applications were awarded cash prizes, the amount depending on whether the source code was open or closed. The first place winners created an application that made all the data available even to users of old non-smartphones, through the implementation of server-side code that reacted to queries sent by a simple SMS, and indicated to the user how to get from point A to point B. The other apps aimed at promoting the use of public transportation by means of gamification and real-time monitoring of the schedules.

Both the database and the apps produced by the Hackathon contestants are currently being evaluated by the local Mobility Ministry with the aim of improving public policies on the basis of the lessons learned in the Mapatón project.

### Final Remarks

As it can be seen through PIDES´ work, cities are fertile grounds to test innovative solutions to tackle some of the most pressing global development challenges. However, since no sector can solve these problems alone, it is only through collaboration and cooperation among all the relevant actors that societal issues may be solved in a sustainable and impactful way. In this sense, although both Trámites and Mapatón CDMX were carried out in close collaboration with the authorities, there are still challenges to be faced, such as institutional silos, the lack of a consolidated openness culture, and defective channels of communication and collaboration among sectors. It is only through the solution of these issues that projects such as those implemented by PIDES can leave their experimental status to become sustainable public policies that improve the quality of life of urban dwellers. Therefore, if local governments wish to keep up with citizen´s growing expectations, they need to implement better data generation and collection mechanisms, and reduce the institutional barriers that prevent the emergence of true collaboration mechanisms with citizens, academia and businesses. Organizations such as PIDES are already helping in this process by conducting social innovation experiments that are more difficult to develop within governmental offices, thereby mitigating the risks associated with the incorporation of emergent technologies into the process of organising public life, and at the same time exploring how technology and civic innovation can become foundations for lasting change for urban problems that are endemic to the Global South, such as inequality, corruption, congestions, climate change and obesity.

For organizations as PIDES and other social innovation labs around the world, a smart city is not one full of sensors, but one that can mobilize the power of data to democratize decisions and processes, while recognizing the power of collective thinking and action. Smart mayors and smart citizens understand that the paradigm of this century is collaboration and the co-creation of their cities by all stakeholders. The generation of creative solutions and innovative policies that transform cities into more open, sustainable and inclusive spaces through stakeholder engagement, citizen participation and the strategic use of technology is a paradigm that is transforming cities in the Global South.

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