Conclusion







This second report in our *Urban Efficiency* series set out to generate a detailed understanding into differing approaches taken in C40 cities (specifically those in the PBE network) to advance operational energy efficiency and retrofitting in existing, private buildings. As well seeking to unpack important aspects of each programme's functioning, we also aimed to build knowledge on success factors that can be designed into programmes, and also, innovative measures for coping with various obstacles and limiting factors.

Our findings unearthed a wide array of approaches. These ranged from carbon reporting and disclosure (Tokyo), large scale urban transformation (Shenzhen), finance support (Boston and Seoul), leadership programmes and energy reduction challenges (Chicago and London) and building certification schemes (Mexico City). Although at first glance these may appear as unique approaches with little in common, we drew attention in our analysis to similar policy functions (see Table 2.3) that run across programmes. In our survey of seven programmes, a noteworthy feature was that the majority were voluntary (or contained a voluntary component). A further interesting feature was that some of these voluntary programmes were targeting several thousand buildings, whilst others focused on capacity enhancement and intimate relationship building with relatively smaller and select participant cohorts (see Figure 2.1).

Coinciding with work of other researchers (Van der Heijden, 2017), this serves as convincing evidence that cities are continuing to experiment with voluntary approaches in attempts to govern energy efficiency in the built environment. The degree of stakeholder involvement in programme design, and the careful array of incentives designed to encourage building sector involvement (see Section 2.3) was noteworthy. This all suggests that voluntary governance instruments are continuing to play a vital complementary role alongside mandatory approaches. It may also be a reflection of the difficulty of engaging with the privately owned building sector. Cities are therefore undertaking a diverse range of mandatory and voluntary approaches.

However programmes (and their various instruments) for building energy efficiency and retrofitting are by no means "cast in stone". They should be understood as packages of evolving governance tools, that are constantly refined in response to accumulated data, knowledge and experiences. From this perspective, we also highlight that voluntary programmes can serve as ideal vehicles for later transitions to mandatory programmes. This transition can occur by building relations and trust with key building industry players, and by producing fundamental datasets to allow policymakers to understand their building stock. From another perspective, one area we were unable to explore—but nevertheless did draw attention to-is the role of "policy mixes" (Rosenow et al. 2016) and interactions that occur across the various programmes in a city to advance energy efficiency and retrofitting in buildings. We use this term firstly to illustrate that an individual programme is in fact a collection of various governance instruments (see Table 2.3). We also employ this concept to point out that cities possess multiple programmes targeting energy efficiency in buildings. One illustrative example is Chicago. The city's benchmarking ordinance plays a vital role in mandating that buildings larger than 50,000 ft² track and report annual energy and water consumption. As with all benchmarking schemes, buildings subject to this ordinance are under no obligation to actually improve energy efficiency performance each year or attain certain benchmarks. Retrofit Chicago Energy Challenge therefore plays an important complementary role by motivating and mentoring influential leaders in the building industry to improve operational energy performance and carry out retrofitting. Success in the Challenge thereby improves benchmarking performance for an individual building, which then drives success of the benchmarking ordinance as a whole. The question of How to design one programme to achieve optimal compatibility and synergies with another? is therefore a key challenge for policy makers to undertake. It is clear that a carefully designed policy mix for advancing energy efficiency and retrofitting in existing, private buildings will comprise of both "sticks and carrots" (i.e. mandatory and incentives or voluntary approaches). We saw this with Tokyo's Carbon Reduction Reporting Program (CRR), a hybrid mandatory and voluntary initiative. Efforts were made by policymakers to ensure synergistic links with other programmes such as the cap-and-trade system. A mechanism was established to allow sale of emissions credits gained from retrofitting projects implemented by CRR participants (small to medium buildings) to large buildings in the cap-and-trade. Care was also taken to provide incentives for buildings to implement energy saving measures by linking CCR to a free energy audit initiative. The sharing of strategies that enhance complementarities and synergies across various programmes and instruments in a city's policy mix is a key topic for future research and discussions.

Expectations are high for the surveyed programmes. Still related to the idea of policy mixes, many form integral components of wider city visions and targets for energy, climate change and sustainability. For example, the surveyed Building Retrofitting Program Loan Support Scheme in Seoul forms a vital component of the ambitious One Less Nuclear Power Plant (OLNPP) vision. First launched in 2011, OLNPP initially set out to reduce energy demand in Seoul by 2 million TOE (tonnes of oil equivalent) by 2014, which represents the equivalent annual output of a typical nuclear power plant. These energy reduction goals have since doubled in ambition, to 4 million TOE by 2020 from 2012 levels, for the second phase of OLNPP.

So how are the surveyed programmes doing? Our research uncovered some impressive evidence of outcomes and successes (Section 2.4). Far from being limited to environmental impacts such as reduced GHG emissions or energy consumption, we demonstrated that programmes were delivering significant outcomes of both a social and market nature. This too highlights the importance of broadening the appraisal of programme outcomes beyond traditional and narrow environmental indicators. Evidence also suggests that outcomes and successes are not incidental, but are rather designed into programmes. For instance, our report shed light on an array of innovative strategies used to boost success in programmes (see Section 2.5). Given the voluntary nature of programmes, the careful preparation of incentives to entice participation by the building sector was notable. To mention a few, in addition to financial incentives, these also included knowledge type incentives (e.g. provision of industry benchmarks, best practices for reducing energy consumption etc.) and the creation of opportunities for buildings to be publically recognised for their leadership and success in reducing energy consumption.

Finally, our report unearthed a range of obstacles and hampering factors that arise during both programme design and implementation stages. Here too, since "necessity is the mother of all invention", programmes demonstrated an array of innovative coping measures to overcome such challenges (see Section 2.6). To mention but a few, programmes showed much innovation in addressing splitincentive issues between tenants and owners. Boston has developed a finance mechanism to pass on the costs of energy efficiency retrofits to tenants, whilst assuring they receive the benefit of reduced energy expenditures once the project is paid off. The project also addresses lending institution reluctance to finance building energy efficiency upgrades by incorporating a performance guarantee into projects. In Mexico City, tenants are encouraged to invest in building energy efficiency by allowing certification of tenanted portions in the Sustainable Building Certification Program. Another commonly observed strategy was for cities to overcome resource limitations (e.g. personnel, financial etc.) by designing and implementing programmes in tandem with private and nonprofit sector partners. This was particularly observed, for example, in the Retrofit Chicago Energy Challenge. The integration of external expertise was also noticeable in Shenzhen's International Low Carbon City in Pingdi. Here, Dutch researchers worked closely with Shenzhen officials to design the vision and masterplan of the city (see De Jong, Yu et al. 2013; De Jong, Wang et al. 2013).

From perspectives such as these, *Urban Efficiency II* has provided a goldmine of information and insights into various approaches for governing energy and sustainability challenges in the existing building stock. In addition to this understanding we hope that our findings regarding strategies for increasing chances of success, and overcoming obstacles when encountered, will help other policymakers around the world design and implement programmes more effectively.

On behalf of C40 and the PBE Network, Tokyo Metropolitan Government hopes sincerely that this report serves as a tool for promoting information and experiences sharing, and that it also contributes to the development of additional resources and tools for this field.

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