

RESEARCH ARTICLE



WILEY

Trading off benefits and requirements: How do city networks attract cities to their voluntary environmental programmes?

Sayel Cortes Berrueta¹ | Jeroen van der Heijden^{2,3}

¹Environmental Policy Group, Graduate School of Social Sciences, Wageningen University & Research, Wageningen, The Netherlands

²School of Government, Victoria University of Wellington, Wellington, New Zealand

³School of Regulation and Global Governance, Australian National University, Australia

Correspondence

Sayel Cortes Berrueta, Environmental Policy Group, Graduate School of Social Sciences, Wageningen University & Research, P.O. Box 8130, 6700EW Wageningen, The Netherlands. Email: sayel.cortes@wur.nl

Funding information

Netherlands Organisation for Scientific Research, Grant/Award Number: 016165322

Abstract

Voluntary programmes provide city networks with a central link to their city members. These voluntary programmes provide cities with benefits (e.g., knowledge, recognition, access to resources) if they meet the city network's programme requirements. This article seeks to understand how city networks make trade-offs between programme benefits and requirements to attract cities to the programmes they offer. We do so by analysing 55 voluntary programmes offered by 22 climate-related city networks using qualitative comparative analysis (QCA). We are particularly interested in the design of voluntary programmes that attract large numbers of participants. We find three main insights. First, programmes with a clear, single benefit are more attractive to city members than programmes with a broad range of benefits. Second, the combination of programme requirements and commitments allows city networks to target cohorts of cities based on their capacities and needs. Finally, cities are attracted to programmes that do not explicitly ask for direct results.

KEYWORDS

city networks, climate action, qualitative comparative analysis (QCA), urban climate governance, voluntary environmental programme

1 | INTRODUCTION

In recent decades, city networks have played a central role in the global response to climate change. Within this article, we understand climate city networks as 'formalised organisations [working on urban climate governance] with cities as their main members and characterised by reciprocal and established patterns of communication, policymaking and exchange' (Acuto & Rayner, 2016, pp. 1149–1150). They facilitate cooperation between different cities and between cities and third parties, which is expected to help cities develop and implement urban climate action initiatives (Acuto et al., 2017; Gordon & Johnson, 2018). Following the emergence of city networks, scholars have begun to map, explore and interrogate their growth and diversification (Acuto & Rayner, 2016; Castán, 2017; Keiner & Kim, 2007) as well as their roles and implications within transnational governance (Acuto & Rayner,

2016; Kern & Bulkeley, 2009). Some scholars have explored city networks as a unit of analysis in themselves (e.g., Davidson et al., 2019 on C40), while others have focused on their functions (Busch et al., 2018; Lee & Jung, 2018) and their outcomes (Heikkinen et al., 2020; Woodruff, 2018).

The literature generally recognises the positive impact of city networks on the global climate regime and their value in the required transition towards climate change-proof cities (Bansard et al., 2017). Yet, the details of how city networks link with their member cities and help them develop and implement urban climate action initiatives remain unclear in the literature (Acuto & Ghojeh, 2019). Seeking to understand these issues better, scholars have begun looking at the interactions between city networks and their members. An example is Haupt et al. (2020) study on city-to-city learning programs within climate city networks. Haupt et al. (2020) find knowledge and

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2021 The Authors. *Environmental Policy and Governance* published by ERP Environment and John Wiley & Sons Ltd.



recognition benefits as the reasons cities participate in these programs. However, they also find a mismatch between time, economic, and technical expertise requirements and the benefits offered by the city network to their members. This article builds on this emerging literature by looking more broadly at the links between city networks and their member cities.

A central link between city networks and cities are the voluntary programmes offered by networks that support cities in overcoming their constraints to developing and implementing urban climate initiatives (Busch et al., 2018; Fuhr et al., 2018). We understand voluntary environmental programmes (VEP) as rule regimes where participants obtain exclusive benefits as incentives to voluntarily commit to reducing their environmental impact beyond the legal requirements stated by the programme rules (Lee et al., 2016; van der Heijden, 2015). Cities join city networks as members, which gives them access to participate in the VEP offered by the network. Some examples of these programmes in city networks are workshops for government officials, knowledge-sharing platforms, conferences and support to develop and fund projects. Joining such programmes is entirely voluntary for cities, but these voluntary programmes typically ask participants to commit to specified actions set by city networks in exchange for benefits or rewards (Potoski & Prakash, 2009). In short, to get access to a voluntary programme's benefits, member cities must meet the programme's requirements set by city networks. Thus, in voluntary programmes, city networks and their city members enter a voluntary but often (quasi-) coerced relationship. Voluntary programmes allow for some 'hardening' of (global) climate governance (here: voluntary participation and coerced performance in voluntary programmes offered by city networks), which is increasingly seen as pivotal in accelerating the transition to a climate change-proof society (Dupont, 2020; Romero-Lankao et al., 2018).

In this article, we are particularly interested in the design of the voluntary programmes, which we conceptualise as a trade-off between the benefits offered and the requirements stipulated by city networks to attract their members to participate in them. Such programmes need to provide benefits that are sufficiently attractive for cities to join. Simultaneously, they should avoid entry and participation requirements at levels that scare prospective participants away from joining. However, programmes that provide highly attractive benefits without asking much of member cities in terms of participation and activity are likely of little value. Whilst such 'easy' programmes are perhaps highly attractive to member cities, they would not have to take much local climate action to reap the benefits. Such programmes will ultimately not help much in accelerating the transition to climate change-proof cities and will, in the end, reflect poorly on the city networks' performance (and necessity) in the global climate regime. In designing voluntary programmes, city networks will likely have to find the right trade-off between benefits and requirements. Thus, we ask the following question: *In trading off voluntary programme benefits and requirements by city networks, what programme design(s) has been found most attractive for member cities?* We address this question through a qualitative comparative analysis (QCA) of a sample of 55 programmes from 22 climate-related city networks.

In what follows, we briefly present the conceptual framework underlying our study, followed by a discussion of the method used. We continue with a presentation of the research findings and conclude with a reflection on the main lessons learnt.

2 | CONCEPTUAL FRAMEWORK

Climate city networks 'provide space for local government to have an exchange on topics related to the governance of climate change' (Busch et al., 2018, p. 222). At the international level, city networks work as a platform that provides cities with indirect benefits: giving cities a large(r) voice in the international climate regime than they have individually, helping them to find like-minded cities and so on (Lee, 2019; Wurzel et al., 2019). City networks also provide one or more voluntary programmes for their member cities. City members can voluntarily participate in the programmes offered by the city networks they are part of, as long as they comply with the rules of the programmes. Such programmes help cities overcome the constraints they face in developing and implementing urban climate initiatives 'on the ground' (Fuhr et al., 2018; Hoppe et al., 2016; Hughes et al., 2018). The programmes offered by city networks provide members with direct benefits: knowledge on climate action (such as in workshops and knowledge-sharing platforms), support for implementation (such as support to access funds and to develop projects) and recognition for action taken (such as forums for policy leaders, public commitments and selecting best practices; Bellinson, 2018; Busch et al., 2018; Lee & Jung, 2018). Besides, some city networks give their member cities access to third parties through voluntary programmes, typically to non-city organisations such as well-recognised International Organisations (IOs) and (global) businesses. Such third parties may provide additional benefits in the form of collaborations, resources and additional knowledge (Acuto et al., 2017; KimDung et al., 2016). Voluntary programmes are not unique to urban climate action. A substantial body of work on VEPs is available in the (global) environmental governance literature (de León et al., 2009; Potoski & Prakash, 2009; van der Heijden, 2012). In this article, we draw inspiration from this body of work.

VEPs combine 'carrots and sticks' (collaboration and coercion) and can take different positions on the soft-hard continuum of (global) climate governance to achieve climate action (Oberthür, 2019). VEPs are, potentially, a useful instrument that mixes soft and hard governance characteristics to promote urban climate actions on the ground. VEPs typically seek climate action beyond the minimum requirements set by national or local legislation (Potoski & Prakash, 2009) and are attractive to both member cities, as they offer benefits, and to city networks because they set requirements for their members to meet (recall that as a provider of a *platform*, city networks often do not or cannot set requirements for their members to meet, whereas as a provider of VEPs, they can). VEPs' work when member cities meet (comply with) the requirements set by the city networks. The key challenge for VEPs is to find the balance between benefits and requirements that are of interest to both parties engaged – member cities and city

networks (Berliner & Prakash, 2015). In practice, this challenge boils down to providing sufficiently attractive benefits by the city network for member cities to commit to the programme, while simultaneously setting requirements for a member city to meet that help city networks achieve their aims (van der Heijden, 2019). City networks' programmes can show a range of levels in requirements and benefits. On the low requirements and low benefits side, we could count the C40 Cities Case Studies database, which allows cities like Kuala Lumpur to share actions, such as their strategy to become a 'climate-smart and low carbon city'.¹ In this way, this programme offers (low) reputational benefits by being showcased by C40 with the (low) requirement of providing suitable information. On the other side of the spectrum, the Carbon Neutral Cities Alliance Innovation Fund invested and leveraged funding from other sources for innovative city-led projects with high potential for decarbonisation.² While the requirements to participate in this programme are high, involving competing with other cities and developing innovative projects, the funds obtained are a significant benefit. Some common programmes are capacity-building programmes where city government officials attend workshops, such as the ones offered by CityNet network to their members.³ The requirements for these workshops are usually moderate, such as covering the expenses of attending, and the benefits are training and networking with other government officials and organisations.

The overall structure of VEPs allows city networks to develop programmes that are attractive to a variety of member cities. VEPs can offer different types and levels of benefits and set different types and levels of requirements for city members to meet. In theory, this allows city networks a varying degree of precision in mixing and matching benefits and requirements to the needs of their member cities (Oberthür, 2019). Given that most (member) cities have capacity constraints for the implementation of urban climate action, finding the right balance between benefits and requirements is essential (Castán, 2017; Fuhr et al., 2018). City members voluntarily join VEPs offered by city networks, so how well a VEP is capable of attracting members is an indicator of how well it is targeted and how aptly it is designed – in other words, how attractive it is to member cities (Lee et al., 2016). We also acknowledge that joining a VEP is no guarantee that a member city will also meet its requirements, but that issue is beyond this article's scope. We first wish to understand *what* types of VEPs provided by city networks are of interest to member cities before we can further explore *whether* these types of VEPs are successful in achieving high levels of urban climate action in the member cities (Coglianese & Nash, 2009; Lyon & Maxwell, 2007). In this article, we consider a VEP provided by a city network attractive to its members if at least 35% of the full membership base of the city network has joined it (we refer to this as 'high participation' – explained in more detail in what follows).

In overviewing the broader literature on city networks, we observe that city networks use VEPs to help cities create and disseminate knowledge, support the implementation and increased recognition of their urban climate actions as well as provide them access to third-party organisations such as (international) NGOs, IOs and businesses (Busch et al., 2018; Lee & Jung, 2018). These are akin to the

benefits provided by other VEPs, discussed in the broader literature – information, financial profit, public recognition, and access to third parties (Berliner & Prakash, 2015; van der Heijden, 2012). We expect that cities prefer programmes with multiple benefits over programmes with single benefits. After all, by joining a single programme, cities would receive multiple benefits, rather than having to invest time in different programmes to achieve the same set of benefits. Therefore, we expect that programmes with multiple benefits are the most attractive to member cities (i.e., attract at least 35% of the full membership base of the city network that offers the VEP).

In our analysis, we define these benefits as follows:

- *Knowledge Benefits (KN)*: City networks offer knowledge to their members through capacity-building programmes (Bouteligier, 2013; Castán, 2017), diffusing policies and best practices (Bouteligier, 2013; Harman et al., 2015), and promoting horizontal knowledge exchange (Castán, 2017; Kern & Bulkeley, 2009).
- *Implementation Benefits (IM)*: City networks support the implementation of urban climate action through programmes of experimenting and piloting (Lee, 2018; Smeds & Acuto, 2018), support in accessing funds or directly providing funds (Bouteligier, 2010; Bulkeley et al., 2012) and helping in development plans and policies (Bellinson, 2018).
- *Reputational Benefits (RE)*: City members improve their internal and external reputation at city networks' forums for policy champions (Castán, 2017) in branding programmes (Acuto, 2016) and by seeking public commitment (Heikkinen et al., 2020; Kern & Bulkeley, 2009).
- *Access to Third Parties (TP)*: City networks can implement the programme by themselves or in partnership with other non-city organisations. In the second case, participating in these programmes gives members opportunities to connect with other organisations that might provide further benefits.

In terms of VEP requirements, entry and participation requirements are generally set to prevent the benefits for each participant from decreasing excessively by restricting the number of participants ('congestion problem'). The VEP provider generally undertakes monitoring and enforcement to prevent participants from receiving benefits without complying with the requirements ('free-riding problem'; Berliner & Prakash, 2015; Potoski & Prakash, 2009). The effect of strict or lenient requirements on attracting members to a VEP is not clear-cut (Berliner & Prakash, 2015; van der Heijden, 2012). VEPs with low entry and participation requirements might attract more participants. However, to prevent congestion, these VEPs are likely to come with low benefits, which may make them not worth the effort to prospective participants. Likewise, VEPs with low monitoring and enforcement might attract more participants because participants are near certain to get the benefits irrespective of their performance; this might, however, decrease the legitimacy in the eyes of prospective participants (they run the risk of entering a VEP where free-riders crowd out willing participants), making them decide not to join. There is, however, some evidence in the literature that participants are willing to subject themselves to more stringent requirements if this yields more benefits (Lee et al., 2016). While the relationship between

requirements and the rate of VEP participation is not simple, we expect a trade-off: the more the benefits, the more willing members are to be subject to stringent requirements and monitoring, and vice versa.

In our analysis, we define these requirements as follows:

- *Stringent Entry Requirements (ST)*: Some programmes have a limited capacity to accommodate participants. These programmes require a selection process to join the programme; in this case, we consider the programme to have a strict entry requirement. We consider it to have a lenient entry requirement if any city network member can join the programme.
- *Stringent Monitoring (MO)*: Some programmes have public reporting and monitoring mechanisms with different degrees of detail and strictness to indicate compliance with the programme rules (Bansard et al., 2017). While networks have minimal coercion power over their members, publicly sharing the outcomes serves as an enforcing mechanism; when this is present, we consider the programmes to have MO requirements in place. When there is no public information about participants in a programme and whether they have complied with the programme rules, we consider it to have lenient monitoring requirements.
- *Direct Impact (DI)*: Some programmes require participants to implement policy changes or projects in their cities with longer-lasting effects to comply with the programme. These actions constitute an entry requirement because they require a more substantial commitment.

3 | METHODOLOGY

We use QCA to explore how the seven benefit and requirement conditions relate to high participation in 55 VEPs offered by 22 climate-related city networks. In our sample, the city networks have between one and five VEPs. Effectively, the number of VEPs per city network does not affect our findings – the variety in city networks simply excludes variety in city network characteristics as a causal condition in our study. QCA aims to trace configurations of conditions (here, combinations of benefits and requirements) related to a given outcome (here, VEPs with high participation). Because the membership of each condition is well defined, we apply ‘crisp-set’ QCA (csQCA) to our data. The fundamentals and background of QCA are well explained and documented in a series of textbooks and applications (Ragin, 2008; Ragin & Rihoux, 2009; Schneider & Wagemann, 2012; van der Heijden, 2017). Here, we describe some key points and offer a more detailed explanation in the Supporting Information.

QCA has its origin in set theory and Boolean algebra. Following Schneider and Wagemann (2012), we apply QCA as a method that conceptualises the VEPs under inquiry as sets of conditions linked to the outcome of interest. In QCA, a process of logical simplification is used to identify those sets of conditions that are logically related to the outcome of interest. These sets are termed ‘pathways’ and represent those configurations of conditions that, within the boundaries of the study, are sufficient to cause the outcome. The combination of

pathways is termed a ‘solution’ and represents all the configurations of conditions linked to the outcome within the dataset.

The individual pathways can be assessed in terms of their coverage (percentage of relevant observations included in a configuration) and their consistency (whether observations contradict a configuration), and minimum validity requirements for coverage and consistency are stipulated. Because QCA is interested in how combinations of conditions relate to the outcome (rather than in how individual conditions do), it captures the interactions between conditions (‘conjunctural causation’), which helps to maintain the qualitative nature of the observations (here, the VEPs under scrutiny). Furthermore, the set theory base allows for uncovering different configurations of conditions with the same outcome (‘equifinality’) – in other words, applying QCA allows for tracing different means to the same end.

In the Supporting Information, we provide a step-by-step explanation of the QCA undertaken to ensure full transparency.

3.1 | Data collection and preparation

We started by identifying an initial sample of 64 climate-related networks based on existing studies (Acuto & Ghoejeh, 2019; Bansard et al., 2017; Bouteligier, 2010; Lee & Jung, 2018; Lusk & Gunkel, 2018), conferences and online searches (see Supporting Information for details). Haupt and Coppola (2019) compiled eight criteria for an organisation to be considered a climate city network based on a revision of the literature and their own research: (a) members should be free to join or leave; (b) organisations should be self-governed; (c) its members directly implement the decisions made; (d) it is constituted by more than two member municipalities; (e) there is a certain degree of formalisation and institutionalisation so that members gain certain rights and (potentially) obligations and the city network has agency through a formal status and infrastructure; (f) it needs to be open to members from various countries; (g) climate action should be within the policy rationale of the organisations; and (h) the local level is the key target for climate governance to be operationalised. We also considered national networks, as their programmes exhibit the characteristics we are analysing to select our sample. Furthermore, climate city networks in our sample must promote urban climate action through subnational governments (in contrast with city networks that aim to promote urban climate action through international governance frameworks).

Our sample was limited to climate city networks with information in English or Spanish; however, we consider our sample diverse enough to represent various types of climate city network programmes for csQCA to draw conclusions (Schneider & Wagemann, 2012).

Twenty-two city networks, out of the initial 64 considered, met these requirements (see Supporting Information for source and criteria of disqualification for each network). For each network, information from their websites and public reports was extracted. We initially identified 65 VEPs provided by these networks. After identification and removal of logical contradictions in our data (see Supporting Information), we included in our analysis 55 VEPs for which enough information was available (i.e., a clear description of the

VEPs and their condition and an indication of the percentage of the members of the city network that participated in each programme). This set of programmes is considered a representative sample of the diversity of city networks' climate-related programmes.

Conditions were coded as follows:

- **Benefits:**
 - *Knowledge Benefits (KN)*: Coded as '1' for programmes that enhance local capacities, diffuse policies, engage in horizontal knowledge exchange or create knowledge from the city; coded as '0' otherwise
 - *Implementation Benefits (IM)*: Coded as '1' for programmes that support experimentation and piloting of projects and policies, project cooperation and assistance in getting funds or development of plans; coded as '0' otherwise
 - *Reputational Benefits (RE)*: Coded as '1' for programmes that are forums for policy champions and seek public commitments and peer accountability or certifications; coded as '0' otherwise
 - *Access to Third Parties (TP)*: Coded as '1' for programmes that engage third parties (non-city organisations), such as private companies, IOs, NGOs, verification organisations, research institutions or foundations; coded as '0' if the programme only connects cities among themselves
- **Requirements**
 - *Direct Impact (DI)*: Coded as '1' when the result of the programme directly reduces emissions or climate risk of the participant; coded as '0' when the programme increases the capacity for urban action in the participant, but no urban action needs to be made to comply with the programme
 - *Stringent Entry Requirements (ST)*: Coded as '1' when the programme requires completing a previous programme to join, has a formal selection process or high standards to select participants; coded as '0' when any member of the city network can join the programme
 - *Stringent Monitoring (MO)*: Coded as '1' when the participation in the programme is evaluated; coded as '0' otherwise

Our outcome of interest is programmes with high participation (HP), indicating that a VEP is attractive (enough) for cities to participate. Here we consider how many members of a city network have decided to join a VEP offered by that network as an indicator of the VEP's attractiveness. We consider VEPs that attract 35% or more of a city network's members as attractive and have coded these as '1'. Programmes below this threshold have been coded as '0'. A 35% threshold indicates that a VEP that meets it is well beyond the status of a niche or novelty within a city network (Rogers et al., 2005). Moreover, this helps us to understand, more generally, what cities are looking for in VEPs. It is important to emphasise that because of the qualitative nature of QCA, the relevance is not of the specific cut-off point chosen (i.e., 35%) but of the two sets that it differentiates. When comparing VEP membership rates within our study, we observed a clear distinction between a set of VEPs with fewer than 30% of the city network members participating and a set of VEPs with

more than 40% of the city network members participating. The mid-point between these two sets (35%) delineates VEPs with HP from VEPs with low participation. VEP participation rates were obtained from VEP and city network websites and public reports, where usually the number of cities that participate in a given programme is reported. This was then divided by the number of members to obtain the percentage of participating members (see Supporting Information A, step 4 for details of how the 35% was decided and Supporting Information C for the sources of information for each programme).

Although QCA uses numerical symbols, it is worth emphasising that QCA remains a qualitative method since each condition represents a complex set. The binary value of each condition, represented by '1' or '0', represents whether an observation is part of this set and thus describes an (often) qualitative state.

4 | RESULTS

Our raw data indicates that 47% of the VEPs studied met our cut-off point for HP ($n = 26$). Furthermore, our data has sufficient variance in the conditions of interest (between 30 and 70% of conditions are coded '1'), and we do not expect that our QCA will be biased because of excessive similarity in the VEPs studied. The full raw matrix of data can be consulted in the Supporting Information.

4.1 | Test for necessary conditions

An analysis of necessary conditions was conducted to identify whether a specific condition might explain most or all of the variance observed in the outcome of interest. If the outcome is present only when a specific condition or combination of conditions is present, it is considered a necessary condition or necessary combination of conditions – indicating that the outcome of interest will not be present without that condition(s) (Schneider & Wagemann, 2012, chapter 3.2). Table 1 presents the analysis of necessary conditions.

The consistency scores should be very high for a condition to be considered necessary; a cut-off point of 0.90 is recommended (Ragin & Rihoux, 2009, p. 45). Table 1 does not indicate that any of the conditions can explain the outcome by themselves.

TABLE 1 Analysis of necessary conditions

Outcome variable	High participation (HP)	
Conditions tested:	Consistency	Coverage
Direct impact (DI)	0.1154	0.2500
Stringent entry requirements (ST)	0.2308	0.2727
Stringent monitoring (MO)	0.3846	0.3704
Knowledge benefits (KN)	0.5000	0.3714
Implementation benefits (IM)	0.2308	0.2609
Reputational benefit (RE)	0.5000	0.5652
Access to third parties (TP)	0.3846	0.3571

4.2 | Test for sufficient conditions

We performed an analysis of sufficient conditions to understand whether and how conditions interact (conjunctural causation) and whether there is more than one set of conditions linked to HP in VEPs (equifinality). In this process, the data was analysed to logically reduce the empirically observed configurations related to the outcome of interest. From this process, we gain insight into issues of equifinality (multiple paths leading to the same outcome) and conjunctural causation (multiple conditions interacting on one path; Ragin & Rihoux, 2009, chapter 5, box 8.1; Schneider & Wagemann, 2012, chapter 11). Configurations are sufficient for the outcome when every time these configurations of conditions are present in the data, the outcome is also present (Schneider & Wagemann, 2012). The expression representing the sufficient configurations of conditions is the solution to the QCA analysis.

This process' first step was to depict all the possible configurations of conditions in a truth table (Table 2). After locating our empirical data in these possible configurations, they were logically minimised. Following Ragin (2008), all empirical observations were considered in the analysis (Schneider & Wagemann, 2012). From here on, a standard analysis was carried out in the software FS/QCA (Version 3.0, Ragin & Davey, 2016), leading to the results presented in the next section.

The truth table lists all the theoretically possible combinations of the conditions we considered, which in our case was 128 (2^7). We located the 55 VEPs in our data in rows 1–36 of these combinations based on how they were coded in our seven conditions. We counted how many observations fit in a specific configuration in the 'Frequency' column. Those possible configurations which were not observed in our data remain empty and are called logical remainders, as found in rows 37–128 (Schneider & Wagemann, 2012). Our data covers 28% ($n = 36$) of 128 possible configurations.

The result from the logical simplification of the truth table is the complex solution presented in Table 3. Further simplification can be undertaken to reach the simpler intermediate or parsimonious solutions using counterfactuals if the literature is robust enough to support this (Schneider & Wagemann, 2012). We decided to stay with the complex solution because the current literature did not give us enough confidence to push our analysis further (see above in the Section 2).

The solution presented in Table 3 directly presents the eight paths (causal configurations) related to VEPs with HP (outcome of interest). Each path is represented by a configuration of the conditions in which lowercase script indicates that the condition is absent, while uppercase script indicates that it is present in the causal configuration. The high solution coverage (1.00) indicates that the solution strongly relates to the outcome observed (Ragin, 2008; see Schneider & Wagemann, 2012, section 5.3). The solution consistency is high as well (1.00), indicating the high empirical importance of the solution in reaching the outcome. Table 3 indicates that, within our set of 55 programmes, only a limited number of configurations (ideal type designs of VEPs) relate to the outcome (HP) – eight out of the

theoretically possible 128 configurations. Table 3 also supports our expectations on equifinality (multiple paths) and conjunctural causation (all paths consist of multiple benefits and requirement conditions).

Each path can be considered a configuration that is sufficient to cause the outcome. More practically speaking, the eight different paths can be understood as 'ideal type' designs of VEPs that met the criteria of HP in our study. These eight paths can be considered an evidence-based typology of VEPs with HP (Fiss, 2011). The coverage (raw and unique) of each path indicates how much of our data was covered by each configuration of conditions. However, it is worth emphasising that our methodology did not allow us to extrapolate the coverage beyond our dataset. That being said, the higher coverage of paths with lenient requirements (lenient entry or monitoring requirements) is an interesting characteristic of our dataset that might be explored through different methodologies to see its relevance in the population of city network VEPs as a whole.

4.3 | Further simplification

Beyond the individual configurations of conditions in the solutions (Table 3), it is relevant to go back to the qualitative nature of QCA to understand the significance of the pathways. A close look at Table 3 allows for the identification of relations between the configurations of conditions showing insights beyond the individual paths. Table 4 shows the eight pathways again, grouping and labelling some common elements. The types of activities involved in each path allow for a more accurate picture of what each path and the full solution entail.

Table 4 indicates that VEPs with HP mainly cluster around one dominant benefit that they offer to their members: we observe a cluster of knowledge pathways, a cluster of implementation pathways and a cluster of recognition pathways. Within each cluster, paths have different levels of entry and monitoring requirements.

Overall, Table 4 indicates that our first initial expectation does not hold. Across the 55 VEPs studied, member cities appear attracted to VEPs with a single dominant benefit and not multiple benefits as we expected (see Section 2). It is worth mentioning that paths are not mutually exclusive and that similar overall activities are included in different programmes with varying levels of strictness. Still, when grouping the paths according to the first three conditions (knowledge benefits, KN, implementation benefits, IM and reputational benefits, RE), a general picture of the types of programmes that correspond to each of them arises.

- *Knowledge Pathways*: VEPs in paths 1 and 2 offer KN with no implementation or recognition benefits. These programmes have as their objective either to collect information from the cities and share it (such as greenhouse gas emission reports, climate action reports or case studies) or to improve the capacity of cities (through workshops or best practices sharing platforms). The levels of requirements vary depending on the standard for collecting the

TABLE 2 Truth table

	DI	ST	MO	KN	IM	RE	TP	HP	Frequency
1	0	0	0	1	0	0	0	1	4
2	0	0	1	0	0	1	0	1	3
3	0	0	0	1	0	1	1	1	3
4	0	0	1	1	0	0	0	1	2
5	0	0	0	0	0	1	0	1	2
6	0	0	0	1	0	1	0	1	2
7	0	1	1	1	0	0	1	1	2
8	0	0	0	0	1	0	1	1	2
9	1	1	0	0	1	0	0	1	1
10	1	1	1	0	1	0	0	1	1
11	1	0	0	0	0	1	0	1	1
12	0	1	1	0	1	0	1	1	1
13	0	0	0	0	0	1	1	1	1
14	0	1	1	0	1	1	1	1	1
15	0	0	0	1	0	0	1	0	4
16	1	1	1	1	1	1	0	0	3
17	1	1	1	0	1	0	1	0	2
18	0	0	1	1	0	1	1	0	2
19	0	1	0	1	0	0	0	0	1
20	0	1	1	1	0	0	0	0	1
21	0	0	0	0	1	0	0	0	1
22	0	1	0	0	1	0	0	0	1
23	0	1	1	0	1	0	0	0	1
24	0	0	0	1	1	0	0	0	1
25	0	1	1	1	0	1	0	0	1
26	1	1	1	0	1	1	0	0	1
27	0	1	0	1	0	0	1	0	1
28	0	0	1	1	0	0	1	0	1
29	0	0	0	1	1	0	1	0	1
30	0	1	0	1	1	0	1	0	1
31	0	0	1	1	1	0	1	0	1
32	1	0	1	1	1	0	1	0	1
33	0	1	1	1	1	0	1	0	1
34	0	1	0	0	0	1	1	0	1
35	1	0	1	1	1	1	1	0	1
36	1	1	1	1	1	1	1	0	1

Note: Rows: 37–128 are logical remainders.

Abbreviations: DI, direct impact; HP, high participation; IM, implementation benefits; KN, knowledge benefits; MO, stringent monitoring; RE, reputational benefits; ST, stringent entry requirements; TP, access to third parties.

information and how public this information will be afterwards (leading to increased monitoring by public scrutiny).

- *Implementation Pathways:* VEPs in paths 3, 4 and 5 offer support for implementing projects and plans. These VEPs neither provide KN nor necessarily recognition benefits. While these VEPs might assist in developing or implementing the projects (e.g., by providing expertise in developing the plans or support in accessing funds),

there is no indication that they aim for a long-lasting increase in the technical capacity of the cities. Instead, they focus on finalising and implementing a given policy or project. Since this implementation would require a higher level of commitment on the participant's part, it is natural to expect participants to have enough knowledge beforehand to decide on this commitment. The requirements of these VEPs vary from a commitment to hire staff and

TABLE 3 Complex solution

Path	Formula	Coverage		Consistency	Programmes in this path
		Raw	Unique		
Path 1	di*ST*MO*KN*im*re*TP	0.077	0.077	1	RAMCC-1, C40-5
Path 2	di*st*KN*im*re*tp	0.231	0.231	1	SALGA-4, CCAP-3, Under2Coalition-1, EUROCITIES-2, C40-2, C40-4
Path 3	di*ST*MO*kn*IM*TP	0.077	0.077	1	100RC-1, 100RC-2
Path 4	DI*ST*kn*IM*re*tp	0.077	0.077	1	CNCA-1, C40-1
Path 5	di*st*mo*kn*IM*re*TP	0.077	0.077	1	MobiliseYourCity-1, MobiliseYourCity-2
Path 6	di*st*mo*im*RE	0.308	0.231	1	SALGA-3, CityNet-1, Metropolis-1, Metropolis-2, Metropolis-3, ClimateMayors-1, ClimateMayors-2, EnergyCities-1
Path 7	di*st*kn*im*RE*tp	0.192	0.115	1	REDMUNICC-1, Under2Coalition-3, ClimateMayors-1, ClimateMayors-2, ClimateAlliance-1
Path 8	st*mo*kn*im*RE*tp	0.115	0.038	1	ClimateMayors-1, ClimateMayors-2, ClimateAlliance-2

Note: Solution coverage: 1.00. Solution consistency: 1.00. Uppercase indicates the condition is present; lowercase indicates the condition is absent. Abbreviations: *, logical AND; DI, direct impact; IM, implementation benefits; KN, knowledge benefits; MO, stringent monitoring; RE, reputational benefits; ST, stringent entry requirements; TP, access to third parties.

TABLE 4 A closer look at the paths

Dominant benefit	Requirements	Path	Benefit conditions	Requirement conditions	Core VEP focus
Knowledge	Strict	Path 1	KN*im*re*TP	*di*ST*MO	Greenhouse gas inventory
	Mixed	Path 2	KN*im*re*tp	*di*st	Workshop, climate report, knowledge sharing
Implementation	Strict	Path 3	kn*IM*TP	*di*ST*MO	Hire climate-related staff, policy implementation,
	Mixed	Path 4	kn*IM*re*tp	*DI*ST	Project implementation,
	Lenient	Path 5	kn*IM*re*TP	*di*st*mo	Plan preparation
Recognition	Lenient	Path 6	im*RE	*di*st*mo	Conference showcasing best practices, public commitment
	Mixed	Path 7	kn*im*RE*tp	*di*st	Public commitment, climate report
	Lenient	Path 8	kn*im*RE*tp	*st*mo	Public commitment, promotional campaign

Note: Uppercase indicates the condition is present; lowercase indicates the condition is absent. Abbreviations: *, logical AND; DI, direct impact; HP, high participation; IM, implementation benefits; KN, knowledge benefits; MO, stringent monitoring; RE, reputational benefits; ST, stringent entry requirements; TP, access to third parties; VEP, voluntary environmental programmes.

implement a resilient strategy (path 3) to a more flexible development of a plan following general guidelines, without monitoring provisions for its correct implementation (path 5).

- **Recognition Pathways:** VEPs in paths 6, 7 and 8 offer different ways in which a city can be recognised for its efforts and commitment to urban climate actions. These VEPs neither provide IM nor necessarily KN. The VEPs in this pathway include the marketing of public commitments or promotional campaigns that indicate interest on the part of the local governments in green issues that could help garner support for future implementation of urban climate actions. The requirement level is relatively low for VEPs in this pathway, probably because recognition is less costly for the city networks than knowledge or implementation benefits.

Our second initial expectation holds to some degree. There is some trade-off between benefits and requirements (see Section 2). Table 4 indicates that the more personalised the VEP benefits are for

a participating city and the more effort they ask of the city network (or participating third party), the stricter the entry and monitoring requirements set by the city network are. Thus, VEPs with a core focus on showcasing their participants' (public) commitments, best practices or conference presentations tend to have lenient entry and monitoring requirements. VEPs with a core focus on workshops and support for the development of plans (which require methodologies for participants on a specific theme and more effort from the city network) tend to have somewhat stricter requirements, albeit not the most stringent requirements (we term them 'mixed' in Table 4). Finally, VEPs with a core focus on greenhouse gas inventories and project implementation (which require longer commitment from participants and greater effort of city networks or third parties) tend to have the strictest requirements. However, within this general trend, we see variations in the strictness of the requirements for (apparently) similar programmes, which requires further research to unpack the programmes in more detail.

Now that we have simplified the eight paths further, it also becomes clear that access to third parties (TP) plays two distinct roles in the VEPs. In path 1, third parties verify information of a climate report, giving it increased credence, and thus path 1 is related to a strict monitoring mechanism. In path 3 and path 5, third parties bring increased resources to develop a plan (path 5) and the implementation of a strategy (path 3). This insight confirms the two roles for third parties previously pointed out in the literature: voluntary programmes literature emphasises the relevance of third parties in providing stricter monitoring of VEP participants (Potoski & Prakash, 2009), and transnational governance literature points out that third parties bring further resources which can help to achieve the ambitions of collaborative governance initiatives (Acuto et al., 2017). More importantly, our findings indicate that TP is a heterogeneous condition (i.e., it may fulfil different roles in VEPs and global climate governance more broadly) that should be unpacked in more detail to understand its precise relevance in urban climate action.

Finally, only path 4 includes VEPs that require DI. A closer look at the VEPs in our study that make up this path indicates that they all support 'city-led' urban climate action initiatives (e.g., by making funding available). Here, the VEP administrator (either the city network or third party) takes up a sponsoring role and thus has high stakes in ensuring that the city complies with the requirements set out in the VEP. Perhaps more striking is that the requirement 'direct impact' is explicitly absent in six of the eight paths uncovered, indicating that across the board cities are attracted to VEPs that explicitly do not ask for DIs. This finding is worrisome given that city networks call for and seek a rapid acceleration in urban climate action.

5 | DISCUSSION

As explained in Section 2, we started expecting that VEPs with a range of benefits would be more attractive to cities than VEPs with a single benefit. Contrary to our expectations, programmes that provide a single benefit are the most attractive to cities. This finding is relevant because it indicates that cities do not necessarily seek to maximise the benefits they receive by participating in a VEP as, for example, a simple rational choice logic would suggest. Instead, cities appear to prefer a clear form of targeted support over what may be perceived as fuzzy forms of multiple or mixed support. Arguably, cities require different types of support at different stages in the development and implementation of urban climate action (i.e., recognition of a willingness to act at the start, knowledge support while developing actions, implementation support whilst implementing actions and again recognition support once the action has been implemented and is achieving results). Alternatively, the choice for one program over another is made at the level of city units or even individual city staff. Thus, differences in the benefits cities seek might very well reflect the kind of support sought by specific units or individuals within the city government (Haupt et al., 2020). While further research is needed to understand whether either, both or none of these options explain how and why cities decide which programmes

they join, our study indicates that exploration of such conditions requires attention in future scholarship. Understanding what motivates cities to join voluntary programmes opens up an important scholarly question to be explored: what defines the type of support that cities need when implementing (voluntary) urban climate action, and do they find this support (sufficiently) with city networks? Exploring these interactions will likely uncover contextual factors affecting the connections between cities and city networks. These contextual factors would mean the links between cities and city networks are more complex than mere exchanges of benefits as currently acknowledged (Bellinson, 2018; Busch et al., 2018; Lee & Jung, 2018).

A second relevant insight concerns the role that third parties (such as international NGOs, IOs and businesses) play in city networks' voluntary programmes. Not only do such parties take up the role of providing additional benefits (such as knowledge sharing and collaboration in local urban climate actions), but they can also set additional requirements (e.g., as external verifiers of voluntary programmes; see path 1 above). In this way, third parties help 'harden' or 'soften' the voluntary programmes and help to keep them on the soft-hard continuum of (global) climate governance rather than pushing voluntary programmes to either extreme (Oberthür, 2019). For example, a third party can monitor the performance of a voluntary programme (increased requirement) while at the same time improve the programme's reputation by providing independent monitoring (increased benefit). City networks are thus advised to look at third parties not only as a means of providing benefits to their voluntary programmes but also as 'guardians' of them (Busch et al., 2018).

A third relevant insight is that while city networks should be clear about the benefits their programmes provide, they can fine-tune them through a particular set of participation and monitoring requirements. Thus we can see that well-designed programmes attract cities, a finding which resembles that of Lee et al. (2016) that well-designed voluntary programmes attract firms. This similarity supports the opportunity of using voluntary programmes literature to analyse city network programmes. Acknowledging our research design and data caveats, we observed a subtle link between the stringency of entry and monitoring requirements, the extent of benefits and the commitment levels asked of participants. Programmes with stricter requirements and higher benefits typically require a more sustained effort from participants (e.g., developing a greenhouse gas inventory, implementing policies or projects). Typically, programmes with less strict requirements and lower rewards require shorter commitments from participants (e.g., participating in a conference, making a public commitment, showcasing best practices already implemented). Equally relevant, typically stricter programmes with higher benefits also ask for higher levels of commitment on the part of city networks, for example, long-term engagement with member cities in developing knowledge or even the careful selecting of potential programme participants. This reminds us of the other side of the link between cities and city networks. In the same way that there is a trade-off between the benefits and requirements to participate in a programme (Potoski & Prakash, 2009; van der Heijden, 2012), there is also a trade-off at the city network level between the available resources

and the benefits offered by a programme. City network funders influence benefits through the resources available to implement programmes. These funders might be their members through membership fees (with some members contributing more than others) and also other organisations that promote their agendas by funding city networks. On the benefits' side, with limited resources, city networks have to balance between high-impact programmes targeting a low number of cities or low-impact programmes targeting a high number of cities (Potoski & Prakash, 2009; van der Heijden, 2012). This decision might be related to the outcome expected but also to the internal capacity of city networks to provide programmes to many members with limited resources. What is clear is that city networks have restrictions on the design of their programmes, and these restrictions should be better studied and considered. For example, based on their capacity and calculation of potential benefits, climate city networks might decide to offer their members a substantial and diverse set of programmes with relatively small benefits (a 'shotgun strategy'), or a small and targeted set of programmes with relatively large benefits (a 'sniper strategy'). The VEP perspective promoted in this paper can be used to further understand the conditions that make up the sort of individual programmes that city networks provide, and the strategies underpinning the full suite of programmes they provide.

A final insight relates to the city networks' potential to accelerate climate action on the ground through voluntary programmes. Overall, cities are attracted to programmes that explicitly do not ask for DIs (path 1, path 2, path 3, path 5, path 6, and path 7). The only programmes that require DIs and are popular among member cities support the implementation of 'city-led' initiatives (path 4). However, in precisely these programmes, city networks have very little influence on their members' climate actions. Combined, these are very worrisome findings given that city networks call for and seek a rapid acceleration in urban climate action. If our findings hold for a more extensive set of voluntary programmes provided by city networks, we (as a global community) have to question whether these networks should continue putting the time and effort into these programmes as they are doing now. More research is needed to understand whether city network programmes spark new urban climate actions in their participants, reinforce existing efforts for urban climate action or do neither. Furthermore, this issue touches on cities' sovereignty when the lack of democratic legitimation has already been considered a severe problem affecting climate city networks (Haupt & Coppola, 2019). More generally, it is important to understand the power dynamics that enable (or not) urban climate action to identify which actors can make a difference.

6 | CONCLUSIONS

We conducted a QCA of 55 voluntary programmes provided by 22 climate-related city networks to understand the trade-offs city networks make between programme benefits and requirements in the design of the voluntary programmes they offer and in particular what programme designs are attractive to member cities. We focused on

voluntary programmes with a high level of participation – programmes that attract 35% or more of a city network's members. Building on the voluntary programmes literature, we argued that achieving a high level of participation in a programme indicates that it is well-targeted and designed (Lee et al., 2016). Following this literature further, we unpacked 55 voluntary programmes as configurations of benefits for cities that join the programme (KN, IM, RE and TP) and as requirements to be met to get these benefits (ST, MO and DI). We found a finite number of configurations ('ideal type' programme designs) linked with HP in the voluntary programmes. These configurations indicate an intricate relationship between benefits, requirements and HP in city networks' voluntary programmes.

Our analysis resulted in four insights related to the programmes' characteristics that attract a higher number of participants. The first insight is that programmes that provide a single benefit are the most attractive to cities. We conjecture that the city's conditions drive a city towards a particular benefit, but further research is needed to understand this decision process and what kind of support cities need to implement urban climate action.

A second insight is related to the role of third parties in the voluntary programmes provided by city networks. Third parties, such as international NGOs, IOs or private organisations, have an active role in some city network programmes. Our analysis found that they provide additional benefits (such as knowledge or support to implement projects), additional requirements (e.g., as external verifiers) or both. City networks should understand and use third parties accordingly in their programmes.

The third insight shows that in the city network programmes there is not only a trade-off between the benefits and requirements for the participant cities but also a trade-off between available resources and benefits offered. This reminds us that the relation between cities and city networks is two-sided and affected by both cities and city network conditions. The role of funders and, more generally, city network's strategies should be further researched in light of this. The VEP perspective initiated in this paper is useful in providing a framework to understand the decisions of both participants and providers of the programmes.

Our final insight is worrisome. We found that overall cities are attracted to programmes that do not explicitly ask for DIs. The programmes that require DIs and succeeded in attracting many participants support city-led initiatives. So these programmes do not promote new urban climate actions but rather support existing ones. This puts the potential for city networks to promote a rapid acceleration in urban climate action at risk. More research is needed to understand how much impact on the ground city networks really have either by sparking new urban climate actions, reinforcing existing urban climate actions or neither.

To conclude, voluntary programmes are an essential link between city networks and their members. They offer city networks various possibilities to attract and incentivise (different cohorts of) member cities to take diverse types of climate action. Our analysis helps to understand the trade-offs between programme benefits and requirements made in the design of the voluntary programmes offered by city networks and particularly which programme designs are attractive

to member cities. By unpacking which programme designs are attractive to city members, our study recognises the need for soft, hard, and mixed governance instruments in urban climate action and in global climate governance more broadly.

ORCID

Sayel Cortes Berrueta  <https://orcid.org/0000-0003-4800-6885>

Jeroen van der Heijden  <https://orcid.org/0000-0001-6188-0556>

ENDNOTES

- ¹ C40 Case Studies database can be accessed at https://www.c40.org/case_studies. The case 'Kuala Lumpur as a Climate-Smart and Low Carbon City' can be directly accessed at https://www.c40.org/case_studies/kuala-lumpur-as-a-climate-smart-and-low-carbon-city.
- ² CNCA Innovation Fund general information, funded projects and key outcomes and deliverables can be found at <https://carbonneutralcities.org/what-we-do/innovation-fund/>.
- ³ Information on CityNet's capacity-building programme can be seen in their annual reports at <https://citynet-ap.org/publications/annual-report/>.

REFERENCES

- Acuto, M. (2016). Give cities a seat at the top table. *Nature*, 537(7622), 611–613. <https://doi.org/10.1038/537611a>
- Acuto, M., & Ghojeh, M. (2019). C40 cities inside out. *Global Policy*, 10(4), 709–711. <https://doi.org/10.1111/1758-5899.12760>
- Acuto, M., Morissette, M., & Tsouros, A. (2017). City diplomacy: Towards more strategic networking? Learning with WHO healthy cities. *Global Policy*, 8(1), 14–22. <https://doi.org/10.1111/1758-5899.12382>
- Acuto, M., & Rayner, S. (2016). City networks: Breaking gridlocks or forging (new) lock-ins? *International Affairs*, 92(5), 1147–1166. <https://doi.org/10.1111/1468-2346.12700>
- Bansard, J. S., Pattberg, P. H., & Widerberg, O. (2017). Cities to the rescue? Assessing the performance of transnational municipal networks in global climate governance. *International Environmental Agreements*, 17(2), 229–246. <https://doi.org/10.1007/s10784-016-9318-9>
- Bellinson, R. G. (2018). Connecting the dots: The politics of governing urban climate adaptation innovations through transnational municipal networks. In S. Hughes, E. K. Chu, & S. G. Mason (Eds.), *Climate change in cities. Innovations in multi-level governance* (pp. 183–202). Springer.
- Berliner, D., & Prakash, A. (2015). "Bluwashing" the firm? Voluntary regulations, program design, and member compliance with the United Nations global compact. *Policy Studies Journal*, 43(1), 115–138.
- Bouteligier, S. (2010). Beyond the north-south divide? Cities from the "Global South" in city networks of global environmental governance; IIEB Working Paper 38.
- Bouteligier, S. (2013). Inequality in new global governance arrangements: The north-south divide in transnational municipal networks. *Innovation: The European Journal of Social Science Research*, 26(3), 251–267. <https://doi.org/10.1080/13511610.2013.771890>
- Bulkeley, H., Andonova, L., Bäckstrand, K., Betsill, M., Compagnon, D., Duffy, R., ... VanDeveer, S. (2012). Governing climate change transnationally: Assessing the evidence from a database of sixty initiatives. *Environment and Planning C: Government and Policy*, 30(4), 591–612. <https://doi.org/10.1068/c11126>
- Busch, H., Bendlin, L., & Fenton, P. (2018). Shaping local response – The influence of transnational municipal climate networks on urban climate governance. *Urban Climate*, 24, 221–230. <https://doi.org/10.1016/j.uclim.2018.03.004>
- Castán, B. V. (2017). Urban governance and the politics of climate change. *World Development*, 93, 1–15. <https://doi.org/10.1016/j.worlddev.2016.12.031>
- Coglianesi, C., & Nash, J. (2009). Government clubs: Theory and evidence from voluntary environmental programs. In M. Potoski & A. Prakash (Eds.), *Voluntary programs. A club theory perspective* (pp. 231–258). MIT Press.
- Davidson, K., Coenen, L., & Gleeson, B. (2019). A decade of C40: Research insights and agendas for city networks. *Global Policy*, 10(4), 697–708. <https://doi.org/10.1111/1758-5899.12740>
- de León, P., Rivera, J., & Manderino, L. (2009). Voluntary environment programs: An introduction. In P. de León & J. Rivera (Eds.), *Voluntary environmental programs: A policy perspective* (pp. 1–10). Lexington Books.
- Dupont, C. (2020). Defusing contested authority: EU energy efficiency policymaking. *Journal of European Integration*, 42(1), 95–110. <https://doi.org/10.1080/07036337.2019.1708346>
- Fiss, P. C. (2011). Building better causal theories: A fuzzy set approach to typologies in organisation research. *Academy of Management Journal*, 54(2), 393–420. <https://doi.org/10.5465/amj.2011.60263120>
- Fuhr, H., Hickmann, T., & Kern, K. (2018). The role of cities in multi-level climate governance: Local climate policies and the 1.5°C target. *Current Opinion in Environmental Sustainability*, 30, 1–6. <https://doi.org/10.1016/j.cosust.2017.10.006>
- Gordon, D. J., & Johnson, C. A. (2018). City-networks, global climate governance, and the road to 1.5 °C. *Current Opinion in Environmental Sustainability*, 30, 35–41. <https://doi.org/10.1016/j.cosust.2018.02.011>
- Harman, B. P., Taylor, B. M., & Lane, M. B. (2015). Urban partnerships and climate adaptation: Challenges and opportunities. *Current Opinion in Environmental Sustainability*, 12, 74–79. <https://doi.org/10.1016/j.cosust.2014.11.001>
- Haupt, W., Chelleri, L., van Herk, S., & Zevenbergen, C. (2020). City-to-city learning within climate city networks: Definition, significance, and challenges from a global perspective. *International Journal of Urban Sustainable Development*, 12(2), 143–159. <https://doi.org/10.1080/19463138.2019.1691007>
- Haupt, W., & Coppola, A. (2019). Climate governance in transnational municipal networks: Advancing a potential agenda for analysis and typology. *International Journal of Urban Sustainable Development*, 11(2), 123–140. <https://doi.org/10.1080/19463138.2019.1583235>
- Heikkinen, M., Karimo, A., Klein, J., Juhola, S., & Ylä-Anttila, T. (2020). Transnational municipal networks and climate change adaptation: A study of 377 cities. *Journal of Cleaner Production*, 257, 120474. <https://doi.org/10.1016/j.jclepro.2020.120474>
- Hoppe, T., van der Vegt, A., & Stegmaier, P. (2016). Presenting a framework to analyse local climate policy and action in small and medium-sized cities. *Sustainability*, 8(9), 1–41. <https://doi.org/10.3390/su8090847>
- Hughes, S., Chu, E. K., & Mason, S. G. (2018). Introduction. In S. Hughes, E. K. Chu, & S. G. Mason (Eds.), *Climate change in cities: Innovations in multi-level governance* (pp. 1–15). Springer.
- Keiner, M., & Kim, A. (2007). Transnational city networks for sustainability. *European Planning Studies*, 15(10), 1369–1395. <https://doi.org/10.1080/09654310701550843>
- Kern, K., & Bulkeley, H. (2009). Cities, Europeanization and multi-level governance. Governing climate change through transnational municipal networks. *Journal of Common Market Studies*, 47(2), 309–332. <https://doi.org/10.1111/j.1468-5965.2009.00806.x>
- KimDung, N., Bush, S. R., & Mol, A. P. J. (2016). NGOs as bridging organisations in managing nature protection in Vietnam. *The Journal of Environment & Development*, 25(2), 191–218. <https://doi.org/10.1177/1070496516642499>
- Lee, E., Jung, C. S., & Hwang, M. S. (2016). Investigating supportive conditions for participation in voluntary environmental programs. *Journal of Environmental Planning and Management*, 59(7), 1323–1340. <https://doi.org/10.1080/09640568.2015.1074889>
- Lee, T. (2018). Local energy agencies and cities' participation in translocal climate governance. *Environmental Policy and Governance*, 28(3), 131–140. <https://doi.org/10.1002/eet.1798>



- Lee, T. (2019). Network comparison of socialisation, learning and collaboration in the C40 cities climate group. *Journal of Environmental Policy & Planning*, 21(1), 104–115. <https://doi.org/10.1080/1523908X.2018.1433998>
- Lee, T., & Jung, H. Y. (2018). Mapping city-to-city networks for climate change action: Geographic bases, link modalities, functions, and activity. *Journal of Cleaner Production*, 182, 96–104. <https://doi.org/10.1016/j.jclepro.2018.02.034>
- Lusk, K., & Gunkel, N. (2018). Cities joining ranks. In *Policy networks on the rise*. Boston University Initiative on Cities.
- Lyon, T. P., & Maxwell, J. W. (2007). Environmental public voluntary programs reconsidered. *Policy Studies Journal*, 35(4), 723–750.
- Oberthür, S. (2019). Hard or soft governance? The EU's climate and energy policy framework for 2030. *Politics and Governance*, 7(1), 17–27. <https://doi.org/10.17645/pag.v7i1.1796>
- Potoski, M., & Prakash, A. (Eds.). (2009). *Voluntary programs. A Club theory perspective*. MIT Press.
- Ragin, C. C. (2008). *Redesigning social inquiry. Fuzzy sets and beyond*. University of Chicago Press.
- Ragin, C. C., & Rihoux, B. (Eds.). (2009). *Configurational comparative methods. Qualitative comparative analysis (QCA) and related techniques*. Sage.
- Ragin, C. C., & Davey, S. (2016). *Fuzzy-Set/Qualitative Comparative Analysis (Version 3.0) [Computer software]*. Department of Sociology, University of California, Irvine, California. www.fsqca.com
- Rogers, E. M., Medina, U. E., Rivera, M. A., & Wiley, C. J. (2005). Complex adaptive systems and the diffusion of innovations. *The Innovation Journal: The Public Sector Innovation Journal*, 10(3), 1–26.
- Romero-Lankao, P., Burch, S., Hughes, S., Auty, K., Aylett, A., & Krellenberg, K. (2018). Governance and policy. In C. Rosenzweig, W. D. Solecki, P. Romero-Lankao, S. Mehrotra, S. Dhakal, & S. A. Ibrahim (Eds.), *Climate change and cities: Second assessment report of the urban climate change research network* (pp. 585–606). Cambridge University Press.
- Schneider, C. Q., & Wagemann, C. (2012). *Set-theoretic methods for the social sciences: A guide to qualitative comparative analysis*. Cambridge University Press.
- Smeds, E., & Acuto, M. (2018). Networking cities after Paris: Weighing the ambition of urban climate change experimentation. *Global Policy*, 9(4), 549–559. <https://doi.org/10.1111/1758-5899.12587>
- van der Heijden, J. (2012). Voluntary environmental governance arrangements. *Environmental Politics*, 21(3), 486–509. <https://doi.org/10.1080/09644016.2012.671576>
- van der Heijden, J. (2015). The role of government in voluntary environmental programmes: A fuzzy set qualitative comparative analysis. *Public Administration*, 93, 576–592.
- van der Heijden, J. (2017). *Innovations in urban climate governance: Voluntary programs for low-carbon buildings and cities*. Cambridge University Press.
- van der Heijden, J. (2019). Voluntary urban climate programmes: Should city governments be involved and, if so, how? *Journal of Environmental Planning and Management*, 62(3), 446–465. <https://doi.org/10.1080/09640568.2017.1406344>
- Woodruff, S. C. (2018). City membership in climate change adaptation networks. *Environmental Science & Policy*, 84, 60–68. <https://doi.org/10.1016/j.envsci.2018.03.002>
- Wurzel, R. K. W., Liefferink, D., & Torney, D. (2019). Pioneers, leaders and followers in multilevel and polycentric climate governance. *Environmental Politics*, 28(1), 1–21. <https://doi.org/10.1080/09644016.2019.1522033>

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

How to cite this article: Cortes Berrueta, S., van der Heijden, J. (2021). Trading off benefits and requirements: How do city networks attract cities to their voluntary environmental programmes? *Environmental Policy and Governance*, 1–12. <https://doi.org/10.1002/eet.1943>