

Lanfranchi, Gabriel; Herrero, Ana Carolina; Palenzuela, Salvador Rueda; Camilloni, Inés; Bauer, Steffen

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The new urban paradigm

Gabriel Lanfranchi, Ana Carolina Herrero, Salvador Rueda Palenzuela, Inés Camilloni, and Steffen Bauer

Abstract

This policy brief argues in favor of a new urban model that harnesses the power that cities have to curb global warming. Such a model tackles fundamental management challenges in the energy, building and transport sectors to promote the growth of diverse and compact cities. Such a model is essential for meeting complex challenges in cities, such as promoting a cohesive social life and a competitive economic base while simultaneously preserving agricultural and natural systems crucial to soil, energy, and material resources. With most of the population living in urban areas, the G20 should recognize the key role that cities play in addressing global challenges such as climate change. Improved measures taken by cities should be an indispensable solution. The G20 Development Working Group, Climate Sustainability Working Group, and Energy Transitions Working Group should incorporate an urban approach to discussions related to climate change.

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Authors

Gabriel Lanfranchi, Centro de Implementación de Políticas Públicas para la Equidad y el Crecimiento, (CIPPEC), glanfranchi@cippec.org

Ana Carolina Herrero, Centro de Implementación de Políticas Públicas para la Equidad y el Crecimiento, (CIPPEC)

Salvador Rueda Palenzuela, Agencia Ecología Urbana Barcelona

Inés Camilloni, National Scientific and Technical Research Council (CONICET)

Steffen Bauer, German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE)

Contributing authors: Florencia Yáñez (CIPPEC); José Antonio David (CIPPEC); Gabriela Iacobuta (DIE); Clara Brandi (DIE); Alfredo REDONDO (C40 Cities Climate Leadership Group); Agathe Cavicchioli (C40 Cities Climate Leadership Group); Nicolas J.A. Buchoud (Cercle Grand Paris de l'Investissement Durable); Asha Aravindakshan (MIT); Kanako Tanaka (Japan Science and Technology Agency); Koichi Yamada (Japan Science and Technology Agency); Melinda Maldonado; Benoit Lefevre (IADB); Lola Vallejo (IDDRI); Emma Castañós (MIT); Jyoti Parikh (IRADe); Jennifer Doherty Bigara Rodriguez (IADB); Oscar Huerta Melchor (OECD).

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Challenge

Urbanization has become a global megatrend as Earth’s populations continue to be drawn by the social and economic opportunities of cities. Urban living will be the dominant lifestyle of the future (Messner & Brandi, 2015) (WBGU, 2016). Urbanization is fundamentally linked to the three pillars of sustainable development: economic development, social development, and environmental protection (United Nations, 2014). The challenges of urbanization will be exacerbated by climate change. One of the priorities of the G20 Development Working Group is sustainable habitat, which is closely related to investments in infrastructure. At the same time, to face the impacts of climate change, low carbon and resilient urban infrastructure is urgently needed. To address the challenges of sustainable development and climate change, planned investments should incorporate the climate dimension.

Cities are currently home to 54% of the world’s population, which is expected to increase by 68%¹ by 2050 (<http://www.worldbank.org/en/topic/urbandevelopment/overview>). Even though urban areas cover less than 3% of the earth’s surface, they are responsible for an estimated 70% of greenhouse gas (GHG) emissions (World Bank, 2015). At the same time, urban land cover is increasing at a more rapid rate than population growth – between 2000 and 2030, urban land cover is projected to expand by 56–310% (Colenbrander, et al., 2018).

Urbanization is also crucial to whether a global shift toward sustainable practices within Earth’s planetary boundaries can be achieved (WBGU, 2016). To limit global warming to less than 2°C by 2050, carbon dioxide (CO₂) equivalent emissions must remain below 1,000 Gigatons (Gt). However, the global emissions budget available to keep global temperature rise below 1.5°C or 2°C will be depleted by about 2030/2040 if emissions continue to rise as expected (Northrop, et al. 2018). In the last 40 years, about half of the cumulative anthropogenic CO₂ emissions between 1750 and 2011 occurred. Since 1970, cumulative CO₂ emissions from fossil fuel combustion, cement production and flaring have tripled (IPCC, 2014).

GHG emissions in cities are released mainly from activities such as construction of buildings and infrastructure, transport, consumption, and production-driving energy demand (Mayr, et al., 2017). Infrastructure is a key component of urban areas, representing global carbon dioxide emissions from fossil fuel combustion, cement production, and other industrial processes. Together, buildings and construction are responsible for 36% of global final energy use and 39% of energy-related CO₂ emissions, when upstream power generation is included² (UN-Environment-and-International-Energy, 2017).

Therefore, “*planning-by-doing*” and “*business-as-usual*” are not viable options if the objectives of the Paris Agreement are to be honored and global warming is to be halted “*well below 2°C*”

¹ UN 2018 Revision of World Urbanization Prospects: <https://esa.un.org/unpd/wup/>

² It covers buildings and construction, including the manufacturing of materials and products for building construction (UN-Environment-and-International-Energy, 2017).

above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C”³. Urban development “offers an unprecedented opportunity to advance sustainable global development through creating sustainable, liveable, and dynamic cities” (OECD, Bloomberg Philanthropies, 2014). For the first time, the climate issue has been addressed under a new and specific G20 Working Group: The Climate Sustainability Working Group (CSWG), which has thus far been working closely with the Energy Transitions Working Group (ETWG). Such progress notwithstanding, an urban approach – that is, one oriented toward local, metropolitan, and regional government – is still lacking. In the case that such an approach is undertaken, the G20 Developing Working Group should also work closely with the CSWG and ETWG with the aim of stressing the benefits of a planned and climate-ecological urbanization.

Proposal

1. Developing an effective urban model against climate change

To meet the targets of the Paris Agreement, cities must renew existing systems and infrastructures; fast-growing cities need to improve and strive to develop urban decision-making skills in order to achieve zero emissions. At the same time, cities need to implement policies that foster emissions-free alternatives and also ensure SDG7, i.e. access to affordable, reliable, sustainable and modern energy for all by 2030 (WBGU, 2016). In line with this, G20 countries should take the lead on implementing low carbon urban development strategies by no later than 2020.

Key urban sectors for climate change mitigation

Cities offer a unique opportunity to implement cleaner energy and transport systems. Energy, transport and buildings are key areas for urban planning and they also have a large impact on GHG emissions. While the energy sector has long been a sector relevant for climate policy, the building and urban transport sectors could significantly contribute to both climate policy and sustainable urbanization. By 2010, emissions from the urban building and transport sectors accounted for about 10 GtCO₂e (Creutzig, et al., 2016). A global transformation to a highly energy-efficient and low-carbon building and construction sector is key to ensure global ambitions for a 2°C world or below. Potential energy savings for the 2°C Scenario in the building, industry and transport sectors would require an additional investment of USD 6.4 trillion between 2016 and 2050 (IEA & OECD, 2016).

Building sector

GHG emissions from the building sector have more than doubled since 1970 to reach 9.18 GtCO₂e in 2010. That number represents 19% of all global 2010 GHG emissions (Intergovernmental Panel on Climate Change (2015)) and without mitigation actions, it is

³ Decision 1/CP.21 Adoption of the Paris Agreement.

expected to double by 2050 (Musango, Currie, & Robinson, 2017). Buildings account for more than 40% of global energy use, and approximately 30% of energy-related GHG emissions (Polesello & Johnson, 2016). So far, 132 out of 193 countries explicitly mention the building sector in their Nationally Determined Contributions (NDCs). It should be noted that even though building energy codes, certifications and high-efficiency technologies are crucial to achieve the transition to sustainable buildings, the majority of NDCs do not specify any targets related to energy performance standards or efficient building technology deployment. (UN-Environment-and-International-Energy, 2017).

Reduction in building-related GHG emissions can be achieved by reducing the emissions intensity (F/M) of the building materials used or by reducing the consumption of building material per service unit (M/S) (WBGU, 2016). There are also other options to bear in mind during the design of low-energy buildings: building orientation, thermal mass; maximization of daylight, heating, cooling, ventilation and high-performance envelope specification, among others (Intergovernmental Panel on Climate Change (2015)).

In the near future, current trends in population growth will lead to a significant need for new buildings. The private sector is also a crucial actor to be considered in the decision-making group for climate change policies. The global real estate asset managers represent, for instance, around a US\$50 trillion industry (Polesello, V., & Johnson, K. (2016)). It seems timely to push for a Global Policy Framework for Sustainable Real Estate Markets supporting the implementation of the SDGs and especially SDG11 about cities. G20 countries should promote updating their building codes by incorporating mitigation and adaptation standards in order to address climate change in the building sector.

Transport sector

In the case of the transport sector, it produced 7.0 GtCO₂eq of direct GHG emissions (including non-CO₂ gases) in 2010, accounting for approximately 23% of total energy-related CO₂ emissions (6.7 GtCO₂) (Sims, et al., 2014). Of these emissions, direct emissions from urban transport account for 40%, mostly in higher-income countries (UNEP, 2017), but 90% of the growth in these emissions is from transport systems in lower-income countries (Mayr, et al., 2017). Furthermore, according to the OECD/ITF, 2017, the share of urban trips by private vehicles is projected to increase in all developing regions by 2050. Even so, globally, modifications to urban transport could represent nearly half of the sector's cumulative energy savings and more than two-fifths of cumulative emissions reduction in the 2°C scenario by 2050 (IEA & OECD, 2016). It is important to integrate urban transport planning with urban land-use planning for successful sustainable development by focusing on mobility promotion instead of infrastructure development.

Development of a new ecologically-based urban model: compact in its morphology, complex in its organization, metabolically efficient and socially cohesive

The built environment has a profound impact on our natural environment, health, well-being and economic productivity. In a context of asymmetrical globalization, the challenges of human settlement in the 21st century are much too complex to draw ultimate conclusions on urban

development. While the principles of the “Athenas” Charter appeared progressive and bold in their time, they always lacked a sense for the human scale of urban development. In any case, the principles of the ‘Charter’ have not been honored, and, above all, they fail to address the challenges that cities, and therefore the human civilization, are facing in the 21st century (Rueda, 2018b).

Today, cities need to be rethought by governments at all levels by enhancing resources that allow them to focus on becoming well-functioning spatial structures and energy efficient systems. How cities are planned, built, and managed will determine the result of our efforts to “transform our world⁴” towards sustainable and harmonious development tomorrow, since it has become clear that climate change has effects on urban growth (Polesello & Johnson, 2016). The spatial, temporal, and sustainability-related qualities of urbanization are important for understanding the emerging opportunities when addressing climate change. Urban population is already facing direct impacts of climate change, such as floods, heat waves and loss of lives, among others.

Compact, connected and coordinated cities

The emissions avoidance opportunities for cities arising from the link of compact urban planning and climate change action are significant if we use a holistically and integrated approach: improving transit options, increasing and co-locating employment and residential densities, and increasing green spaces. Creating more compact and less car-oriented infrastructures are urban policies that could significantly contribute to climate change mitigation (Seto, et al., 2014). In this sense, urban planning that envisages containment encourage cities and their peripheries to grow inwards and upwards rather than to sprawl outwards (Pendall, Martin, & Fulton, 2002) (Fernández, Herrero, & Martin, 2010). More than two-thirds of the world’s population live in a G20 country and are producing 80% of total GDP. Since urban population will continue to grow, mostly in developing countries in Asia and Africa, G20 countries should work on guidelines contemplating climate standards for urbanization planning in order to achieve a low carbon and climate-resilient development pathway compatible with keeping global warming below 2°C.

Spatial planning and strategic infrastructure investment

Sprawling, disconnected urban development requires more urban infrastructure investment since there is a need to extend infrastructure, basic services and public transport into peripheral areas (Godfrey & Zhao, 2016). To avoid this and to achieve compact and connected cities, a polycentric approach can provide cities and their societies with more creative freedom at the subnational level to shape development pathways (vertical embedding of the cities plus local scope for shaping and planning) and to enable them to network horizontally. It also promotes the participation of local civil society and collaborative governance, making cities more attractive and avoiding the disadvantages of excessive urban concentration and densification

⁴ UN (2015): Transforming our world: the 2030 Agenda for Sustainable Development; Resolution adopted by the General Assembly on 25 September 2015.

while mobilizing the advantages of decentralized settlement patterns. Polycentric spatial structures favor a better use of urban systems, such as water, food and energy, by eliminating transportation over long distances (WBGU, 2016). G20 Development Working Group should explore and document the economic, social and environmental benefits of promoting compact and connected cities and the potential of its contribution towards climate change mitigation and adaptation.

According to The New Climate Economy (NCE), compact urban growth can create cities that are economically dynamic and healthy, generating savings that could amount to US\$3 trillion from 2015 to 2030⁵(Godfrey & Zhao, 2016).

Another very important aspect of infrastructure are environmental services. Several opportunities arise from planning and design of green spaces in urban landscapes, especially related to the impacts of climate change. In recent years, the potential role of green infrastructures to respond to climate change has gained interest and popularity (Dawson, et al., 2014).

2. Work towards the implementation of the New Urban Agenda

There is enormous potential for co-benefits to arise from the mutually supportive implementation processes of the 17 Sustainable Development Goals (SDGs) elaborated in the 2030 Agenda, the Nationally Determined Contributions (NDCs) and the New Urban Agenda (NUA) (Brandi, Dzebo, & Janetschek, 2017). G20 should identify the link of the Paris Agreement, the New Urban Agenda and the SDG's by highlighting the co-benefits of their implementation and also ensuring an interconnected work among the G20 working groups in order to potentiate and harmonize actions on urban and climate issues.

The analysis of the main problems that urban systems face today has led the United Nations institutions, on a continental and planetary scale, to meet on several occasions since the 1970s to find solutions. The most recent meeting took place in Quito in 2016, where the NUA was approved. The intention of the NUA is remarkable, and it establishes the vision of the future of cities, but it wasn't designed as a consensual framework that deliberately channels technical, technological, regulatory, economic, financial, organizational, institutional and educational instruments, to meet the objectives and principles for different environmental, economic and social realities. How to implement the NUA is right now the main challenge.

In addition, the SDGs deal with climate change not only explicitly in SDG13, but also implicitly in other goals, such as those related to ending poverty (SDG1), ending hunger (SDG2), building infrastructure (SDG9), and improving cities and human settlements (SDG11) (UNEP, 2017). This reflects the need for the development of energy-efficient buildings and construction models as well as the promotion of energy conservation and efficiency in line with the New Urban Agenda and the Paris Agreement.

⁵ Based on assumptions of highly ambitious low-carbon reduction strategies.

Moreover, as impacts of climate change become increasingly certain in the post-2030 period, it has become clear that the efforts made in order to achieve many SDGs will be seriously threatened by climate change if no action is taken.

A new model of urban governance is required, where cities have the role that corresponds to their contributions and vulnerabilities and where urban leadership has a legitimate and valuable place. By defining a new urban Charter, the G20 should recognize unique perspectives and innovative local solutions to global issues that mayors and heads of local governments can provide, including ambitious long-term GHG emissions reduction and climate resilient strategies. Greater recognition and engagement of local leadership in intergovernmental and global policy-making processes can also help secure more resources for local climate action, enhance the support-base of ambitious local climate leaders and foster greater climate ambition in peers, national governments and other stakeholders.

3. Enhance empowerment of cities

According to former UN Secretary General Ban Ki Moon “*Our struggle for global sustainability will be won or lost in cities*”⁶. This statement is especially pertinent to dealing with climate change. The vulnerability of cities to climate-related disasters is shaped by many variables, such as cultural, economic and demographic characteristics of residents, together with local governments’ institutional capacity, the provision of ecosystem services, the built environment and human-induced stresses. (Rosenzweig, et al., 2015). By taking climate action, exceptional opportunities are arising for cities in ways that generate growth and employment, and savings from avoided health costs and expenditures on fossil fuels. The mobilization of funds for sustainable urban development is a key component of urban planning that requires special attention. Also, climate change negotiations are starting to recognize the efforts made by subnational governments in order to reduce GHGs emissions and carrying out climate resilient actions. G20 should work on enhancing empowerment of cities particularly bearing in mind the key role that they play in the implementation of NDCs, SDGs and the New Urban Agenda.

To enhance the budget for cities

Six hundred cities generated 60% of global GDP in 2007 (Seto, et al., 2014); however, they do not have the financial return they need to address the grand problems that humanity faces today, which are mainly generated by cities (Rueda, 2018a). The ongoing financing challenges for cities constrain city-level decisions on infrastructure investment and financing (OECD, Bloomberg Philanthropies, 2014). G20 should ensure that financing challenges for cities should not constrain city-level decisions for investing in low carbon and climate resilient infrastructure having also in mind their role in the NDC’s implementation.

National urbanization strategies should be developed by city governments, cross sectorally and with an assigned budget. National governments should assist them in developing sustainable urban infrastructures across different jurisdictions by establishing legal frameworks that favor

⁶ Remarks to the High-level Delegation of Mayors and Regional Authorities, in New York, 23 April 2012.

sustainable urban infrastructure. They should also consider other means to further empower cities, including providing subnational governments greater fiscal autonomy and creating channels to engage directly with national development banks (Godfrey & Zhao, 2016).

Gualtieri et al. (2014) highlights the importance of considering all of the relationships *between the components and agents of the urban metabolism, including the interaction between green, blue and grey infrastructures, and the need to develop indices for assessing this systemic approach* (Dawson, et al., 2014). Furthermore, up to a third of the remaining global carbon budget will be determined by urban infrastructure investment decisions made over the next five years (Godfrey & Zhao, 2016). G20's CSWG together with ETWG and DWG should work on the development of a framework that promotes driving investments into low carbon and climate-resilient development strategies.

In addition, the Global Commission on the Economy and Climate estimates that around US\$90 trillion will need to be invested in infrastructure globally by 2030 and around three-quarters of this will be related to urban areas (Godfrey & Zhao, 2016). Notwithstanding, the New Climate Economy estimates that low-carbon urban actions present a global economic opportunity of US\$17 trillion by 2050 (Godfrey & Zhao, 2016). The creation of new jobs will be a part of this opportunity (Watts, et al., 2017). G20 should assess the opportunities for boosting jobs creation and capacity building arising from investing in climate resilient infrastructure. Mobilization of public and private resources for financing climate actions and specifically NDCs should be speed up.

However, in many cities, especially in developing countries and emerging economies, it is first necessary to build up active and assertive administrations that can be more autonomous and positioned to make effective use of the financing instruments at their disposal. In this sense, municipal administration and its financial base must be strengthened; private capital for urban infrastructure must be mobilized and international financing of development and climate mitigation must be coordinated and geared consistently toward sustainable urban development (WBGU, 2016).

To give cities a significant role in the international arena

The role of cities in the international arena and in the decision-making process must be elevated if the issue of climate change is to be tackled successfully. A new governance is required where cities have the role that corresponds to their contributions and vulnerabilities (Rueda, 2018b). G20 should interpret climate-city-focused initiatives as a strong signal of the critical role cities play to address global issues such as climate change. NDCs have to be implemented using a multi-level governance approach. *There is a gap between 2030 emission levels and those consistent with least-cost pathways to the 2°C and 1.5°C goals respectively. The 2°C emissions gap for the full implementation of both the conditional and unconditional NDCs for 2030 is 11 to 13.5 GtCO_{2e}. In the case of the 1.5°C target the gap represents 16 to 19 GtCO_{2e} (UNEP, 2017). In this sense, G20 could share common knowledge on practices focused on actions of subnational and non-Party actors (such as cities, which have the potential to reduce the emissions gap by a few gigatonnes CO_{2e}/year by 2030. It is necessary to deepen information about the impact of subnational and non-state action (UNEP, 2017).*

There is a growing number of references to non-Party stakeholders in the climate change negotiations by recognizing them as relevant actors. Climate governance is not exclusive attribute of national governments anymore (Chan, Brandi, & Bauer, 2016). In this sense, the Talanoa Dialogue under the UNFCCC process has provided a space for the engagement of non-state and subnational actors within the international climate negotiations arena.

Supportive national policies and incentives

In order to ensure that city-level initiatives have sufficient resources and the potential to produce meaningful change, supportive national policies and incentives are required (OECD, Bloomberg Philanthropies, 2014). Often local governments are in a better position to influence consumer and producer behavior than national governments. Also, local authorities have a key role in coordinating actions between different partners, stakeholders and in terms of facilitating community involvement with policy programs (Bulkeley & Betsill, 2005).

There is often a lack of institutional capacity to manage urban expansion in many developing countries, where rapid urbanization is taking place. Similarly, at the city level, the World Bank estimates that *only 20% of the world's largest 150 cities have the basic analytics for low-carbon urban planning* (Godfrey & Zhao, 2016). Cities need to develop the skills to react systemically to challenges resulting from urban expansion. However, there are some encouraging trends, especially after increasing involvement by local leaders in the climate agenda through cities' initiatives.

Cities should develop a scientific basis for shaping a coherent, low-carbon urbanization policy. In this sense, research results should be integrated into the decision-making process based on participatory exchange between scientists, decision-makers and the urban population.

The reinforcement of local capacity-building is critical in times of rapid metropolitan transformations, which involves cross-jurisdictional functional issues and several local governments altogether.

Formalize an Urban related affinity group

An urban related affinity group should be considered as formal engagement group in the G20 system, in order to enrich the discussion related to this field in the G20. Cities are key non-state actors that play a relevant role in achieving international pledges related to issues such as climate change, sustainable development, and urbanization. Together, cities can develop a joint position that would address important achievements that will lead to inclusive, low-carbon, resilient cities. In its statement, the newly initiative called U20 affirms that *“the profound transformations generated by globalization, urbanization and digital innovation hold the potential to boost large-scale well-being, resource efficiency and economic growth. However, leveraging these opportunities can be challenging unless cities are part of the conversation”*⁷. The U20 statement also highlights the commitment of cities, for example, delivering ambitious climate-related strategies, to mitigate and adapt to climate change while driving economic

⁷ U20 Joint Statement available at http://www.buenosaires.gob.ar/sites/gcaba/files/joint_statement_u20_english.pdf

growth, competitiveness, innovation and job creation (U20, 2018). The G20's Development working group is also supporting urban related issues by focusing in habitat and urban-rural linkages as one of their main priorities.

G20 Proposals

Given this new urban paradigm, the G20 should recognize the key role that cities play in addressing global challenges such as climate change, ranking the mitigation at the top of the urban agenda. As such, the G20 should:

1) Foster the development of a new ecologically-based urban model to tackle climate change: compact in its morphology, complex in its organization, metabolically efficient and socially cohesive. Cities offer an extraordinary opportunity to implement cleaner energy and transport systems as well as refurbish and create new climate-resilient infrastructure. In this context, the G20's DWG, ETWG and CSWG should explore the benefits of a planned and climate-ecologically urban development.

2) Make strides toward the implementation of the New Urban Agenda (NUA). Given the role cities have as economic, social, and political actors, the G20 should promote the implementation of the NUA while accounting for the current challenges that hinder such development, such as the need to revive and transform existing urban systems that contribute to unsustainability. To achieve this, the G20 should work in accordance with the Paris Agreement, the NUA and the SDG's highlighting the benefits of implementation and promoting cooperation among the G20 working groups toward measures on urban and climate issues. G20's Development Working Group should also share experiences related to the climate benefits of compact and connected cities instead of sprawling models of urbanization.

3) Focus on empowering cities. Most of the SDGs and NDCs are to be implemented in urban areas. Thus, swifter decision-making, financial support, and local government planning are key. G20 should enhance and promote the participation of cities in the international arena, particularly bearing in mind the critical role cities play in the implementation of NDCs, SDGs and the NUA Agendas. Moreover, the G20 should work to ensure that financing challenges do not constrain city-level decisions for investing in low carbon and climate-friendly infrastructure. Mobilization of resources for financing climate actions, particularly those related to NDCs, should be sped up. Under the Finance Track additional financing critical to the implementation of NDC's and low-carbon development strategies should also be secured.

Furthermore, we propose to **formalize an urban affinity group**. The newly launched U20 initiative would be a formal engagement group within the G20 system that seeks to enrich discussion and debate. Cities are key non-state actors that play a relevant role in achieving international pledges related to issues such as climate change, sustainable development, and urbanization. Together, cities can develop a joint position that would address important achievements that will lead to inclusive, low-carbon, resilient cities.

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