

# The Legal Implications of Urban Governance Approaches for Mitigating Climate Change in Tehran Metropolis, Iran

Ali Mohammadnejad  
Commission of Environment, Industry and Infrastructure  
Affairs  
am.urban.geographer@gmail.com

UCCRN Case Study Docking Station (2026)  
DOI: 10.7916/eces-ge41

<b>Keywords</b>	Climate change, GHG emissions, urban governance, Tehran
<b>City Population</b>	9,000,000
<b>City Area</b>	730 km <sup>2</sup>
<b>City GDP</b>	15,912 billion USD
<b>Climate Zone</b>	BSk (cold semi-arid)
<b>ARC3.3 Linkage</b>	Governance, Enabling Policy Environments, and Just Transitions

**Introduction.** Climate change is becoming the most significant challenge of the 21st Century, emanating from the emission of greenhouse gases (GHG) (UN-Habitat, 2011a). The most important source of greenhouse gas emissions in urban areas relates to the consumption of fossil fuels. On the other hand, changes in land use patterns in cities are also involved (Hoornweg et al., 2011; UN-Habitat, 2011b). Between 40 and 70 percent of the greenhouse gas emissions caused by human activities come from cities (UN-Habitat, 2011a).

Urbanization provides many opportunities to expand action in the form of mitigation and adaptation approaches to climate change (Satterthwaite, 2010; Dodman, 2009; IPCC, 2014). Mitigation refers to actions that help to lessen the magnitude of climate change by reducing human generated greenhouse gas emissions or land use changes that contribute to climate change (Grafakos et al., 2018; UN-Habitat, 2011a). In connection with the reduction of climate change factors, urban managers and other activists in many cities of the world (in both developed and developing countries) have generated a range of strategies and measures to reduce greenhouse gas emissions in different policy sectors.

Research shows that the mechanisms that encouraged and led to the implementation of these decisions in the public domain - that is, the governance approach - are divided into two categories. The first category is known as the urban governance approach, which includes the approaches of self-governing, provision, regulations, and enabling factors (Bulkeley & Kern, 2006; UN-Habitat, 2011b). The second category, due to the growing importance of companies, private sectors, and civil society activists in urban development and public-private

and public-private governance methods, includes voluntary, public-private provision, and mobilization approaches (Bulkeley and Newell, 2010; Broto & Bulkeley, 2013; UN-Habitat, 2011b). The aim of this research is analyzing the legal requirements of municipal and public – private modes of governance approaches in the Iranian urban system with emphasis on the capital city, Tehran, as a case study, in relation to climate change mitigation.

**Emission of greenhouse gases in Tehran, Iran.** The Tehran metropolis is the largest population and activity center in Iran. The ever-increasing population of Tehran and the increase in the ownership of personal cars (especially worn-out cars in the urban transport fleet), low-quality fuels, and excessive consumption patterns in various industrial, domestic and commercial-office sectors collectively lead to high fuel consumption in Tehran. The city’s total fossil fuel consumption reached more than fourteen billion cubic meters (equivalent to 148 million barrels of crude oil) in 2016. The main consuming sectors of these types of fuels, with a consumption rate of more than 70%, are the household, commercial, and public sectors (Tehran Planning and research Center, 2016:52)

New research shows that the metropolitan area of Tehran has emitted 104 million tons of global carbon dioxide, which per capita emission is 8.2 tons per person. In this respect, Tehran ranks fourteenth among 13,000 cities surveyed globally with the highest greenhouse gas emissions (Moran et al., 2018).

The emission of carbon dioxide from gasoline consumption increased from 8.4 million tons in 2005 to 9.7 million tons in 2016. The emission of carbon dioxide from diesel also increased from 3.4 million tons in 2005 to 4.8 million tons in 2016. In general, the highest amount and growth of fossil fuel consumption and greenhouse gas emissions in Tehran is related to the land use sectors (residential, commercial, and public building) and transportation; the share of industry, power plant, and agriculture sectors is small. Considering that these two parts have a complex relationship; it can be said that the discrete spatial structure of Tehran metropolis, urban sprawl, and car-oriented access with current patterns of fossil fuel consumption have caused an increase in greenhouse gas emissions in this metropolis (Tehran Planning and Research Center, 2016: 52).

**Methods.** Quantitative content analysis methods can be used to explain the legal requirements of urban governance approaches for Tehran. In this method, there are two main elements of analysis: the unit of analysis and the category of analysis. The analysis unit is the combination of the legal articles approved by the Islamic Parliament of Iran and the

Urban Cluster	Country	Population	Footprint (mt CO <sub>2</sub> )	Footprint per capita	Global Rank
Tehran	Iran	8.2 ±2.2	12,671,000	104.4 ±28.2	14

**Table 1.** *Tehran per capita emissions.*

purpose of the climate change mitigation policies and actions. The category of analysis is the scale at which it takes place, either national or urban. To determine the legal requirements, four general policies and seven laws have been quantitatively analyzed, since these laws and policies have related directly to the discussion of climate change (from 2000 to 2020). After compression and classification, there are 38 legal articles and policy clauses, of which 25 and 13 articles and clauses relate to the national and urban scale, respectively.

**Discussion of Results.** In total, 38 articles and clauses of the general policies and laws were extracted, which after compressing and classifying them, 25 articles / clauses are related to the national scale and 13 articles / clauses are related to the urban scale. This indicates that the requirements of the laws and general policies to reduce climate change further emphasize the national scale. The Energy Consumption Pattern Law with five legal provisions for cities has the highest share in the legal requirements and indications for reducing climate change in cities, followed by the Clean Air Act with three legal provisions.

For a more detailed analysis, the relationship between governance approaches and their policies and mechanisms, on one hand, and the codes derived from laws and general policies, on the other hand, were compared and measured. According to the table and graph below, the regulation and enabling approaches each have ten codes extracted from laws and general policies, followed by the provision and self-governing approaches, which have nine and five codes, respectively. In the public-private governance method, the public-private provision approach has four relevant codes, while the voluntary and mobilization approaches have no codes derived from laws and general policies.

**The relationships between climate change mitigation regulations and urban governance within the Tehran context.**

- Metropolitan management in Tehran has not yet institutionalized the issues and challenges related to mitigation and adaptation to climate change in its policies, programs, plans, and actions.
- There is no integrated urban management in the trans-sectoral areas of environment, transportation, and housing.
- A direct connection and communication of metropolitan management with global organizations such as the World Bank, UN-Habitat, and other institutions has not been formed.
- A local government capable of instituting mitigation and adaptation policies at the local level has not emerged.

- There is a lack of necessary platforms and mechanisms for mobilizing citizens' resources and capacities. Bilateral rights and duties between citizens and city management have not been defined.

Therefore, we can say that the policies and legal actions of the government and municipal sectors alone are not enough to face climate change, and they must be expanded to all urban sectors and spaces. In other words, the small spatial and geographical scope of government and municipal laws does not adequately cover all aspects of urban planning in addressing climate change.

According to the comparison and analysis of governance approaches with laws and policies to reduce climate change in Tehran, the following have been observed:

1. A high carbon footprint of Tehran citizens in the last decade and the need for citizens to play a role in reducing the carbon footprint;
2. Vulnerability of citizens to the consequences of climate change such as floods, droughts, heat waves, land subsidence, dust storms, and an outsized burden of these consequences on low-income groups and urban slums;
3. The dominance of the urban governance mode and its approaches (with characteristics such as elitist, technocratic, mandatory, regulatory, top-down and without regard to target groups) on the policies, laws, regulations, and plans of the metropolis of Tehran, when responding to climate change;
4. The lack of spatial and geographic coverage of government and municipal actions on all planning aspects and the entire city space.

**Solutions.**

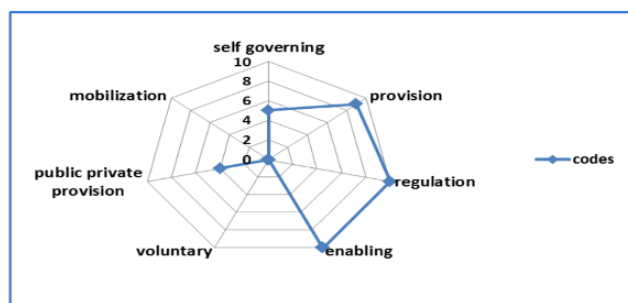
1. City-oriented policies in Tehran:
  - Establishing an integrated city and region management institution regarding environmental, transportation, and urban development issues;
  - Strengthening multiple urban centers in the metropolitan area, with a proportion of the population and employment opportunities in each one;
  - Avoiding sectional, case-by-case, partial and car-oriented policies in transportation and urban development issues;
  - The coordination of policy-making and service-providing institutions at various levels, vertically and horizontally, in metropolitan scale.

**Table 2.** *The comparison of governance approaches and policies with extracted codes*

Extracted Codes	Policies and mechanisms	Governance approaches
<ul style="list-style-type: none"> <li>- Clean energy purchase regulations</li> <li>- Clean energy demand management</li> <li>- Small-scale renewable energy Renewable power plants</li> <li>- Diversity of energy sources</li> </ul>	Local real estate management; Purchasing policies	Self governing
<ul style="list-style-type: none"> <li>- Reduce energy losses in building</li> <li>- Green management in government buildings</li> <li>- Supply of electricity from renewable sources</li> <li>- Increase efficiency of power plants</li> <li>- Energy audit of office buildings</li> <li>- Municipal Green Building Regulations</li> <li>- Green building and urban planning regulations</li> <li>- Urban green public transportation</li> <li>- Modification of production and consumption pattern</li> </ul>	Municipal infrastructure; Green Consumer Services	Provision
<ul style="list-style-type: none"> <li>- Carbon reduction plan in the transport fleet</li> <li>- Creating urban space and green belt</li> <li>- Increasing per capita urban green space</li> <li>- Environmental attachment in urban plans</li> <li>- Plans to reduce urban travel and fuel consumption</li> <li>- Criteria for reducing traffic and urban fuel consumption</li> <li>- Collection of tolls for the development of urban public transport</li> <li>- Increase public transportation in cities</li> <li>- Integration of urban public transport</li> <li>- Requirement of environmental standards</li> </ul>	Taxation; Land use; codes and standards	Regulation
<ul style="list-style-type: none"> <li>- Establish a national network of weather events</li> <li>- Identify renewable capacity</li> <li>- Support for renewable energy</li> <li>- Facilitate urban pedestrian and cycling</li> <li>- Establish a rapid alert system</li> <li>- Adaptation approach</li> <li>- The focus of climate in land management</li> <li>- Recognizing the effects of climate change</li> <li>- Climate disaster management system</li> <li>- Climate change management</li> </ul>	Increase awareness; incentive; Partnerships	Enabling
-	Targets and standards; Changing practices; Demonstration projects	Voluntary
<ul style="list-style-type: none"> <li>- Public and governmental participation in controlling desertification</li> <li>- Regional and transnational cooperation in dust management</li> <li>- Reduce carbon in urban transport</li> <li>- Low carbon industry</li> </ul>	Urban infrastructural systems; low carbon technologies and services	Public-private provision
-	Information and awareness-raising; capacity-building; incentives	Mobilization

## 2. Physical policies in Tehran:

- The implementation of renovation plans for existing houses and new urban development in order to increase energy efficiency in the city;
- The application of land use planning to increase the efficiency of energy consumption in the construction and transportation sectors;
- Urban development in old tissue and degraded areas, to encourage increased density and mixed used development.
- The integration of land use planning with the transportation system, along with giving priority to public transportation;
- Measures aimed at increasing the desire to use the public transport fleet, bicycles, and pedestrian routes, reducing the demand for cars;
- Replacing the fossil fuels used by the public transport fleet with clean fuels and renewable energies.



**Figure 1.** The distribution of extracted codes regarding to governance approaches

---

## References

- Broto, V., & Bulkeley, H. (2013). A survey of urban climate change experiments in 100 cities. *Global Environmental Change*, 23(1), 92–102.
- Bulkeley, H., & Kern, K. (2006). Local government and the governing of climate change in Germany and the UK. *Urban Studies*, 43(12), 2237–2259.
- Bulkeley, H., & Newell, P. (2010). *Governing climate change*. Routledge.
- Dodman, D. (2009). Blaming cities for climate change? An analysis of urban greenhouse gas emissions inventories. *Environment & Urbanization*, 21(1), 185–201.
- Grafakos, S., Pacteau, C., Delgado, M., Landauer, M., Lucon, O., & Driscoll, P. (2018). Integrating mitigation and adaptation: Opportunities and challenges. In C. Rosenzweig, W. 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. 101–138). Cambridge University Press.

- Hoornweg, D., Sugar, L., & Gomez, C. L. (2011). Cities and greenhouse gas emissions: Moving forward. *Environment & Urbanization*, 23(1), 207–227.
- Intergovernmental Panel on Climate Change (IPCC). (2014). *Climate change 2014: Mitigation of climate change*. Cambridge University Press.
- Moran, D., Kanemoto, K., Jiborn, M., Wood, R., Többen, J., & Seto, K. (2018). Carbon footprints of 13,000 cities. *Environmental Research Letters*, 13(6), 064041. <https://doi.org/10.1088/1748-9326/aac72a>
- Satterthwaite, D. (2010). The contribution of cities to global warming and their potential contributions to solutions. *Environment and Urbanization Asia*, 1(1), 1–12.
- Tehran Planning and Research Center. (2016). *Tehran city state of environment (SOE)*.
- UN-Habitat. (2011a). *Planning for climate change: A strategic, value-based approach for urban planners*. Earthscan.
- UN-Habitat. (2011b). *Cities and climate change: Global report on human settlements*. Earthscan.

---

## Acknowledgments

We thank Mousa Pazhuan for reviewing this case study.

---

## Additional Data

- **Population Density:** 11,600 people/km<sup>2</sup>
- **Per Capita Gross National Income (GNI):** 19,820 USD (Upper Middle Income) [2023]
- **Gini Coefficient:** 35.5 [2023]
- **Human Development Index (HDI):** 0.77 (High) [2025]
- **Type of Climate Intervention:** Mitigation