

Challenges and Strategies for Translating Urban Planning for Climate Change

Wen Li¹

¹ Xi'an Polytechnic University, Shaanxi, China

Correspondence: Wen Li, Xi'an Polytechnic University, Shaanxi, China.

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Abstract

The chapter 1 and 2 of the scientific and technical text *Urban Planning for Climate Change* are translated as the original text from English to Chinese under the guidance of Newmark's text type theory, and the translation methods and techniques used in the translation process are analyzed through different cases. The results of the analysis show that literal translation, annotation and amplification employed to render terminologies and proper nouns in scientific and technical texts may be helpful to ensure the accuracy of information transmission from the original text to the translated text, while the application of conversion and word order adjustment is useful to guarantee the coherence of information expression in the translation. In addition, the translation practice report describes the translation task and process, summarizes the difficulties encountered in the translation practice and countermeasures to solve the difficulties, and confirms the applicability of Newmark's text type theory in the translation practice of scientific and technical texts relevant to urban planning. It is expected that the translation practice may helpful to further expand the scope of the applicability of the text type theory, and provide reference for the translation of related texts in the future.

Keywords: scientific and technical texts, Newmark's text type theory, translation methods

1. Task Description

The translation report is based on a translation project. The original text of the translation project is excerpted from the first and second chapters of *Urban Planning for Climate Change*¹ published by Routledge in 2023. It is a science and technology text. The two chapters tackles the future challenges and opportunities for planning our cities and towns in a changing climate, and recommends key actions for more resilient urban futures. With the increasing impact of climate change and extreme weather and climate events,

the economic and social development in the future will face more and more challenges of climate change. Scientific and rational urban planning can effectively mitigate the impact of climate change and reduce greenhouse gas emissions. Therefore, more and more countries are exploring how to cope with urban planning under climate change.

This translation practice is guided by Newmark's text type theory, and appropriate translation methods and techniques are used to convert the content of chapters 1 and 2 of the original text

¹ Norman, B. (2023). *Urban Planning for Climate Change*.

London: Routledge.

from English to Chinese.

According to Newmark's text type theory, the original text of this translation practice belongs to informative text, and its target readers are general public readers. The purpose of this translation practice is to: 1) grasp the characteristics of scientific and technical texts, analyze the translation examples based on the text type theory, try to solve the problems of the translation of proper nouns, terminologies and long complex sentences in scientific and technical texts, and explore and summarize the translation methods and techniques of scientific and technical informational texts; 2) improve the translator's literature research ability, translation skills and English writing ability in English; 3) extend relevant knowledge about climate change to the public.

Since the content of this original text is relevant to the current hot issues, this translation practice is meaningful. In today's society, science and technology texts on urban planning to cope with climate change play an extremely important role in promoting the overall development of modern urban planning. Through this translation practice, advanced foreign actions and proposals to address climate change will be introduced to China, providing a reference for urban planning in China, thus helping enhance the capacity of relevant government departments and professional scholars in China to deal with climate change, raise the environmental awareness of the general readership, build livable cities, and enhance human health and well-being.

At the same time, this translation practice will help the translator better understand the stylistic characteristics, translation characteristics and sentence construction of scientific and technical texts, and improve his/her translation ability. This translation practice may further expand the scope of the applicability of the text type theory, and provide reference for the translation of similar texts in the future.

2. Task Process

This part is an indispensable part of the translation practice process, including the preparation before translation, the translation process and the proofreading after translation. During the translation process, the translator needs to seek out relevant information about text type theory and urban planning in response to climate change in order to translate the selected text accurately and faithfully to the original text,

based on a grasp of the characteristics of scientific and technical texts.

2.1 Preparation Before Translation

The translation of any article is inseparable from the understanding of the original text. "Especially for science and technology articles, the accuracy of the understanding of the original text directly determines the quality of the translation" (Liu Xu, 2013). The text was read repeatedly before the translation to deepen the understanding of the words and sentences in the original text. The terminologies, and phrases involved were circled and marked when reading the original text for the first time, and the long and complicated sentences in the original text were underlined. The terminologies were organized and summarized in a certain order and a small thesaurus was created for future reference when translating. Meanwhile, under the guidance of the tutor, the meanings of relevant terms were queried with the help of various tools, such as Baidu Encyclopedia, CNKI translation, electronic dictionaries, etc. In the process of term query, the translator's understanding of the original text was deepened, and the efficiency of translation was improved to a certain extent, which made the later translation work go smooth.

In addition, translation preparation also involved the selection of translation theories, which laid a good foundation for a faithful and fluent translation. The relevant theories of translation were thoroughly studied, and the most suitable theory for this translation practice was selected. This original text is an informative text, which fits well with the informative text proposed by Newmark in the theory of text types, so the Newmark's text type theory was selected as the guiding theory in translation practice to solve the problems encountered in translation practice. After completing the translation practice task, Newmark's theory of text type was selected according to the characteristics of the scientific and technical texts.

Newmark divided the functions of language into six categories including the expressive function, the informative function, the vocative function, the aesthetic function, the phatic function, and the metalingual function. Among these functions, the former three ones are main functions (Newmark, P., 1989). Based on the "functional theory of language" of Jakobson of the Prague School, the British translator Newmark further

divided all texts into three categories: expressive texts, informative texts, and vocative texts, and put forward the theory of text types (Newmark, P., 2001). Newmark combined the theory of language function with translation research, innovatively studied translation from the perspective of text types, and proposed the concepts of “semantic translation” and “communicative translation”, i.e. the theory of text type translation, which had a significant impact on the translation industry and the translation community. For different types of translated texts, corresponding translation methods should be adopted. The main purpose of translating informative texts is to convey information accurately and coherently. Therefore, the translation’s fidelity to the original text (accuracy of information transmission) must be given the priority during the translation procession. And at the same time, considering the acceptability of the translation to the target reader, coherence in translation should also be affixed much value to. To achieve this, different translation methods need to be chosen flexibly. According to the function and language characteristics of the informative text, the text type theory has a certain guiding effect on the translation of informative text.

Reading more relevant parallel texts before translation is a shortcut for translators to improve translation quality. This original text is about climate change and urban planning, which involves some climatological knowledge and contains a lot of terminologies. Therefore, relevant parallel texts on urban planning under climate change were searched and read through CNKI and Baidu Encyclopedia. By reading the parallel texts, a general understanding of the features of texts on climate change and urban planning was gained, and some relevant knowledge was accumulated, which was of great help to the translation.

2.2 Translation Process

After the pre-translation preparations, the translation began. The entire source text was reviewed during the translation process, the sentence structure was clarified, and the appropriate translation methods were selected.

Compared with other English genres, the scientific and technical texts in English are characterized by strict lexical meaning, long and difficult sentences, frequent use of the passive voice, and more terminologies.

First of all, the original text contains many terminologies related to climate change and urban planning. In the process of translation, a lot of authoritative articles in the relevant fields written in both English and Chinese were studied, and the typical terms and names of organizations in such texts were recorded, as well as the language style, which has laid a good foundation for a faithful and fluent translation of the original texts.

Secondly, there are long complex sentences in the scientific and technical text. In the translation process, appropriate translation methods and techniques, such as conversion and adjustment of word order, were used to ensure the faithfulness to the original information and coherence of the translation under the guidance of the text type theory.

In the process of translation, the original text was translated part by part. When there were difficult problems in the translation progress, the translator asked the tutor for advice, so as to get the most accurate and appropriate translation.

2.3 Proofreading After Translation

After the first draft of translation of the text was completed, the translation was proofread several times. First, the Chinese translation was checked word by word and sentence by sentence against the original text to ensure that there were no omissions or mistranslations, that the phrases flowed smoothly, that punctuation marks were used correctly, and that there were no misspelled words in the translation. Then, the translation was proofread in isolation from the original text, to ensure that the translation was coherent and smooth, and that it conformed to Chinese expression habits. Finally, the proofreading was done based on parallel texts.

Then, the translation was handed over to the other students in the same group for proofreading, and the uncertainties were discussed, and the most appropriate expression was chosen after listening to others’ suggestions.

Finally, the translation was delivered to the tutor, and according to the tutor’s suggestions, the translation was further embellished and revised to improve the accuracy and readability of the translation.

3. Case Analysis

According to Newmark’s text type theory, informative texts attach importance to content transmission, and a good translation is supposed

to convey the information of the original text accurately and coherently. Therefore, this chapter proceeds to discuss the translation methods and techniques used in the translation practice from two aspects: the accuracy of information transmission and the coherence of information in the translation.

3.1 Accuracy of Information Transmission

Accuracy of information transmission means keeping semantics and syntactic structure of the translation as close as possible to the source text to accurately express the original meaning. Therefore, this section explores how to achieve the accuracy of information transmission by the employment of different methods and techniques.

3.1.1 Literal Translation

Literal translation refers to a translation method of maintaining the original content, sentence structure and style as much as possible in the translation, while the version also needs to be fluent and easy to understand for the target reader (Fan Zhongying, 1994). In other words, literal translation is more about keeping the content and form of the original text, and it is not a rigid or dead translation of word-for-word and sentence-for-sentence, but a direct and clear expression of the information of the original text in a smooth and natural way. In the process of literal translation, overly pursuit of the consistency of the structure between the translation and the original text should be avoided, while ignoring the flexibility of the language. Problems concerning incoherent and obscure effects of translation will lose the meaning of translation (Lin Haiqing, 2020).

Example 1

Original: (i) Climate-resilient development as defined by the IPCC as the overall guiding framework for urban sustainability in a warming environment. (P37)

Version: (1) 国际气候变化委员会 (IPCC) 将气候适应型发展定义为温室效应下实现城市可持续性的总体指导框架。(P21)

In this example, "IPCC" in the original text is an abbreviated term for an international organization, referring to "国际气候变化委员会". In the process of translation, translators should make full use of dictionaries to check such terms and make sure they are correct. Since the target reader is the general public, who may not be familiar with the proper noun, under the

guidance of Newmark's text type theory, literal translation is employed here to ensure both the accuracy of the information and the readability of the translation.

Example 2

Original: Below is a discussion of some of the key issues that will influence urban planning for climate change in the near future including carbon-neutral development for our cities and towns, coastal planning and management for communities at risk of inundation and partnerships and collaboration to ensure leading practice across the globe. (P41)

Version: 以下是对一些影响城市规划的关键性问题展开的讨论, 以便能更好地应对近期的气候变化。其中包括我们城镇的碳中和发展、面临洪水风险的社区的沿海规划和管理, 以及为确保全球领先实践而建立的伙伴关系和开展的协作。(P24)

In this example, the word "carbon-neutral" in the original text is a term used for energy conservation and emission reduction, which means that the carbon dioxide or greenhouse gases emitted are offset by afforestation, energy conservation and emission reduction. Although "carbon-neutral" is a terminology, it is widely used in daily life and can be understood without much difficulties by the general readers besides professionals. Therefore, literal translation is adopted here, and the word order of the original text remains unchanged after translation to ensure the accuracy of information transmission.

3.1.2 Annotation

The target readers of this translation practice are the general public who may not be familiar with some terminologies, proper nouns or difficult words in the original text. Annotation refers to a translation technique of adding some explanatory notes on the base of the original information and context. Annotation is employed to add related and indispensable information such as background information, the origin of words, and so on, to facilitate the target reader's understanding. Annotation is a way to help the target readers remove the understand obstacles and better understand the translation without changing the structure of the translation.

Example 3

Original: Urban planning for climate change is central to implementing climate action in human settlements across around the world-be it in global cities, secondary cities, regional centres, townships, villages and hamlets. (P30)

Version: 应对气候变化的城市规划是在世界各地人类住区实施气候行动的核心,无论是在全球城市(又称世界级城市,指在社会、经济、文化或政治层面直接影响全球事务的城市)、二级城市(指人口在 300 万以上或经济较发达、消费水平较高的大中城市或一般省会城市)、区域中心、城镇、村庄还是小村落。(P16)

In this example, “global city” and “secondary cities” are economic terms. The first one refers to a city that directly influences global affairs at a social, economic, cultural or political level, and the second one refers to large and medium-sized cities or general provincial capitals with a population of 3 million or with a more developed economy and higher consumption level. Given the importance of global cities and secondary cities, it is worth explaining what they means to the general readers, so the notes are added here. Global city and secondary city are the new term, so it’s worth defining them for the readers, who might get confused if there are no extra explanation. Guided by the Newmark’s text type theory, annotation is used here to make the translation clearer, while ensuring the accuracy of the information transmission from the original text to the translated text.

Example 4

Original: There is now a demand for the detail on the ‘how’ — that is how do we implement climate action through everyday decisions concerning land use activity in urban environments? This can range from big city plans to urban designs for precincts and neighborhoods to net zero carbon buildings and smart infrastructure. (P30)

Version: 现在,人们需要了解“如何做”的细节即我们如何通过城市环境中土地使用活动有关的日常决策来实施气候行动,这包括从大城市规划到小区域和社区的城市设计,再到净零碳建筑[指采用综合建筑设计方法,不用常规污染性能源(零能)和不损失绿化面积(零地)的建筑,在不消耗煤炭、石油、电力等能源的情况下,全年的能耗全部由场地产生的可再生能源提供]和智能基础设施。(P16)

The term “net zero carbon buildings” may be new to the target reader and it is necessary to define it for the reader to reduce the understanding difficulties and enrich their knowledge. Therefore, with the annotation, the reader can understand the specific meaning of the term, so that the translation can effectively convey the information of the original text.

3.1.3 Amplification

Amplification refers to a translation technique of

adding necessary words, phrases, clauses or even sentences on the base of the original text to serve the following purposes: to provide the target reader extra information to facilitate their understanding; to make the translation conform to the target-language conventions while conveying the original meaning completely, including both denotative meaning and connotative meaning (Li Fengqi, 2021).

Example 5

Original: There is also a deeper understanding that the impacts of climate change will fall unevenly on communities, leaving some vulnerable communities even more vulnerable. (P39)

Version: 人们也更加深刻地认识到,气候变化对不同社区的影响是不均衡的,会使一些脆弱的社区更加脆弱。(P22)

In this example, the original sentence has no subject. Judging from the contextual background, “a deep understanding” actually refers to “people’s deep understanding”. In order to accurately convey the information in the translation and conform to the expression habits of the target language, “人们” is added in the translation. The use of amplification here may clarify the actor of the original text and reproduce the logical relationship of the original text, so that the target reader can clearly and accurately understand the specific content of the prescribed expression.

Example 6

Original: The focus is particularly on developing nations, where the most rapid process of urban growth and development is occurring due predominantly to urbanization, that is, rural to urban migration. (P35)

Version: 该议程特别关注发展中国家。城市化,即农村向城市的迁移是这些国家城市增长和发展迅速的主要原因。(P19)

Due to the differences in expressions between English and Chinese, the translation should supplement and add the omitted parts in the original text to conform to the Chinese expression habits and ensure the accuracy of information transmission. In this example, based on the context, the subject “该议程” is added here to make the translation complete and to convey the information in the original accurately, so that the target reader can better understand the original text.

3.2 Coherence of Information

Under the guidance of Newmark's text type theory, the translation of informative text mainly focuses on two aspects: the accuracy of information transmission from the original to the translated text, the acceptability of translation among the target reader, that is, the information conveyed is accepted by readers. To realize this, what is the most important is to achieve coherence in the translation. The coherence of the translation demands that the translated text be textually connected and read naturally, so that the paragraphs and chapters become a tightly-connected whole. In the process of translation, full consideration should be given to the main functions of words and sentences in the text to ensure the coherence of the text and make it natural in the target language, making it easier for the target reader to understand (Zhang Wenying, 2019). In this part, under the guidance of text type theory, the conversion and the adjustment of word order are used to achieve this purpose.

3.2.1 Conversion

Conversion occurs "when the translation equivalent of a SL item is a member of a different class from the original item" (Catford, J. C., 1965). In English, there are numerous words with more than one part of speech. Therefore, in E-C translation, conversion can make the translation more understandable and readable. Besides, some collocations in English does not actually exist in Chinese. In order to find equivalence in the target language, translators can consider using conversion (Meng Fanyu, 2020). Conversion here refers to a translation technique of shifting part of speech of the original words in order to translate the original text accurately, systematically, and effectively. At the same time, by comparing English and Chinese, it is obvious that there are great differences in the expression of lexical meaning and language structure. Therefore, in order to achieve coherence and flexibility in translation, it is necessary to attach great importance to the role of conversion. Informative texts have strong textual logic and focus on textual coherence. This section mainly discusses the use of conversion to achieve the coherence in translation under the guidance of Newmark's text type theory.

Example 7

Original: This book is a contribution to better understanding the role of urban planning in achieving the global climate emission reduction

targets and minimising risks to urban communities in the Global North and Global South. (P31)

Version: 这本书有助于读者更好地了解城市规划在实现全球气候减排目标以及最大限度地减少全球北方和南方城市的社区风险方面所起的作用。(P16)

In this example, the noun "contribution" is translated into verb in Chinese. The word "contribution" in the original sentence is a noun derived from the verb "contribute", and if the noun is not translated into a verb, the translation will be "这本书是读者更好地理解城市规划在实现全球气候减排目标和最大限度地减少全球北方和南方城市社区风险方面的作用的一个贡献" in Chinese. Such a translation is semantically incoherent and does not conform to Chinese expression habits; Therefore, under the guidance of Newmark's text type theory, the original noun is converted into a verb in Chinese, which makes the translation coherent and fluent.

Example 8

Original: Urban planning for climate change needs immediate action by governments preferably in partnership with other sectors working with affected communities. (P32)

Version: 针对气候变化的城市规划需要政府立即采取行动, 最好是与其他部门合作, 与受影响的社区共同应对。(P17)

In this example, the word "action" is a noun, and if the original is translated as "政府需要立即有.....行动" in Chinese, although the target readers can understand the content, it is not quite in line with the Chinese expression habits, and the text is not coherent and acceptable in Chinese. Therefore, under the guidance of text type theory, it is converted into a verb "立即采取行动....." in Chinese. Thus, the translation is coherent, clear, and consistent with the language habits of the target language.

3.2.2 Adjustment of Word Order

"The order of words in a language is called word order, and word order plays a crucial role in both English and Chinese expressions. English and Chinese express the same thing in different order due to the different living environment and thinking habits of native speakers (Meng Fanyu, 2020)." "The biggest difference between languages is not only in pronunciation, vocabulary and grammar, but also in the order of sentence elements, which is often called word order (Hu Wei, 2020)." Therefore, in E-C

translation, under the guidance of the text type theory, word order adjustment is used to conform to the logic and structure of Chinese expressions, so as to reach the coherence of information in translation.

Example 9

Original: It is also increasingly recognised as vital to action on climate change. (P36)

Version: 人们也日益意识到, 城市规划对应对气候变化来说至关重要。(P20)

In this example, if the original word order is maintained in the translation, the version would be “人们也日益意识到, 城市规划重要对应对气候变化”, which is not readable at any degree in Chinese. So the word order has to be adjusted in the translation to ensure the coherence of information in the target language.

Example 10

Original: The form and structure of urban settlements has evolved as cities have grown and urban governance has developed to respond to increasing complexity. (P32)

Version: 随着城市的发展和城市治理的加强, 城市住区的形式和结构也发生了变化, 以应对日益复杂的问题。(P17-18)

In this example, if the original word order is retained in the rendition, the version would be “城市住区的形式和结构也发生了变化, 随着城市的发展和城市治理的加强以应对日益复杂的问题”, which is not readable and does not conform to Chinese expression habits. Therefore, the word order has to be adjusted to conform to the Chinese expression habit and make the translation natural and smooth.

4. Summary

In this translation practice, *Urban Planning for Climate Change* is translated as an example to study the E-C translation of scientific and technological texts under the guidance of Newmark's text type theory. And then, different translation methods and techniques used are analysed and justified to ensure accuracy of information transmission and coherence of information in the translation. In this process, valuable experience has been gained.

Firstly, for the translation of scientific and technological texts, a proper theory is supposed to be chosen to guide the translation. It has been proved that Newmark's text type theory is a good choice for the translation practice of scientific and technological texts which are informative texts.

Secondly, when translating scientific and technological texts, the translation should be faithful to the original text, as well as the accuracy and acceptability of the translation needs to be attached great importance. At the same time, it is necessary to make the translation consistent with the target reader's reading habits. In addition, appropriate translation methods and techniques should be adopted flexibly, including literal translation, conversion, annotation, amplification and word order adjustment, to achieve the accuracy of information transmission in original text and the coherence of information in translation.

There are still some shortcomings in the translation and analysis, including inadequate theoretical knowledge, and limited professional vocabulary of the translation. Due to these deficiencies, the case analysis may be not as thorough as it is expected and the translation can be improved further. In the future, efforts need to be made to learn and improve. In particular, further reading and study of Newmark's translation theory and scientific and technical texts is necessary to enhance the translator's English expression ability and improve the overall quality of the translation.

Finally, it is hoped that this translation practice, on the one hand, can provide references for Chinese urban planning, by introducing foreign advanced measures and suggestions on coping with climate change, thus helping enhance the ability of relevant Chinese government departments and professional scholars to cope with climate change, and improve the public's awareness of environmental protection. On the other hand, the translation practice is expected to provide reference for the translation of similar scientific and technological texts in the future.

References

- Catford, J. C. (1965). *A Linguistic Theory of Translation*. London: Oxford University Press, 78.
- Fan Zhongying. (1994). *A practical coursebook on translation* (p. 96). Beijing: Foreign Language Teaching and Research Press.
- Hu Wei. (2020). Word order adjustment in English-Chinese translation. *Modern Communication*, (4), 98, 97.
- Li Fengqi. (2021). *Research on the application of translation theory in undergraduate translation teaching* (p. 180). Chengdu: Sichuan

University Press.

Lin Haiqing. (2020). A comparative discussion of literal translation and free translation. *Journal of Elegance and Classic*, (2), 27–29.

Liu Xu. (2013). *The treatment of sentence structure in the translation of scientific and technical articles* [Master's thesis, Dalian Maritime University].

Meng Fanyu. (2020). *A Chinese translation practice report on The History of the Harvard College Observatory During the Period 1840–1890 under the guidance of Catford's translation shift theory* [Master's thesis, Beijing Foreign Studies University].

Newmark, P. (1989). *A Textbook of Translation*. Shanghai: Shanghai Foreign Language Education Press, 38–39.

Newmark, P. (2001). *Approaches to Translation*. Shanghai: Shanghai Foreign Language Education Press, 45–69.

Yang Liu, & Ma Xuemei. (2021). A brief discussion on the method of word order adjustment. *Sinogram Culture*, (22), 11–12.

Zhang Wenying. (2019). Textual coherence and translation strategies in English-Chinese translation. *Contemporary Educational Practice and Teaching Research*, (20), 242–243.

Appendix A

Translated Text

应对气候变化下的城市规划（节选）

城市规划是有效应对气候变化的关键手段之一。全球人口现在主要生活在城市，这种城市化趋势预计将持续整个 21 世纪。我们城市、城镇和村庄的未来规划和设计提供了一个独特的机会，为可持续、宜居和繁荣的未来奠定基础，与自然合作，并与当地社区一起就气候变化采取实际行动。

这本书囊括了本人在沿海规划、区域发展、可持续城市发展和气候变化适应方面的研究和工作。充分利用本人在城市和区域规划方面的主要学科背景知识，旨在为应对气候变化和更广泛地实施联合国可持续发展目标（SDGs）做出积极的贡献。这本书在我上一本书《我们城市和地区的可持续道路：地球边界内的规划》（诺曼，2018）的基础上，拓展了对城市可持续性的全球化视角。

这本书更加强调“如何做”，也就是，城市规划为何是应对气候变化行动的基础。因此，此书特别着眼于当前的实践和探究未来创新和能力建设所面临的机遇。此书旨在吸引广大读者，这包括寻找更多可持续解决方案的下一代，在气候风险地区面临

日益复杂的土地使用和规划的决策者和私营和公共部门主要参与者，以及参与设计城市未来的广大参与者。

应对气候变化的城市规划是一个快速发展的空间，这有助于深入地了解在为 城市社区开发更可持续性解决方案时所面临的挑战和机遇。这项研究源自我上一本书《可持续城市和地区：地球边界内的规划》（诺曼，2018）。虽然上一本书采用了更全球化的视角，研究了更广泛的问题，但这本书的重点更多地放在城市规划作为应对气候变化的有力工具的贡献力上。一些意想不到的事件影响了这本书的创作，包括全球大流行的病毒和在我的国家澳大利亚发生的两起极端事件：2019–2020 年的大火和 2022 年的洪水。火灾影响了我个人，洪水影响了我的同事和朋友。真正出乎意料的是，虽然我在规划领域学习和实践了 40 多年，但我没有预料到这些事件对城市社区集体产生的巨大影响，其中有一些人则成了这三个事件的受害者——火灾、洪水和 COVID-19。

好处是认真反思了城市规划对气候变化潜在的贡献，并希望未来会变得更好。另一个结果是南半球涉及的问题更多，因为在撰写本文的大部分时间里，国内边界都是封闭的，同时，该地区的极端事件受到气候变化的影响，或者有人说，受到气候变化的增压。幸运的是，由于数字技术的发展，我们进行了一些精彩的采访，以保持对这些问题的全球视角。政府间气候变化专门委员会（IPCC）的 6 份报告也已发表，提供了包括各地区在内的最新的气候科学评估。应对气候变化的城市规划是在世界各地人类住区实施气候行动的核心，无论是在全球城市（又称世界级城市，指在社会、经济、文化或政治层面直接影响全球事务的城市）、二级城市（指人口在 300 万以上或经济较发达、消费水平较高的大中城市或一般省会城市）、区域中心、城镇、村庄还是小村落。（Example 3）区域和地方气候计划支持的全球气候协定和国家气候战略对缓解和适应气候变化产生了巨大的影响。

现在，人们需要了解“如何做”的细节即我们如何通过与城市环境中土地使用活动有关的日常决策来实施气候行动，这包括从大城市规划到小区域和社区的城市设计，再到净零碳建筑[指采用综合建筑设计方法，不用常规污染性能源（零能）和不损失绿化面积（零地）的建筑，在不消耗煤炭、石油、电力等能源的情况下，全年的能耗全部由场地产生的可再生能源提供]和智能基础设施。（Example 4）关键是，我们开发、建造和建设的一切，从机场到人行道，都应融入气候行动，即寻求减少碳排放，并旨在适应未来不断变化的气候。气候变化适应力应该是长期目标。

气候变化是一个庞大的领域，我们试图通过了解气候变化更好地理解气候科学、对人类和地球带来的影响以及对所有部门的政策影响。这本书有助于读者更好地了解城市规划在实现全球气候减排目标

以及最大限度地减少全球北方和南方城市的社区风险方面所起的作用。(Example 7)

这本书全方位探讨了对应对气候变化的行动以及城市规划在实施中可以发挥的作用,包括减缓(例如减少温室气体排放),以及与灾后恢复和重建以及社区适应相关的气候变化适应力。这本书,有一章特别关注气候引起的重新安置问题。我早期关于可持续城市和地区的书中,涉及到了相当多的可再生能源、电力运输和更绿色的建筑环境放方面的内容(诺曼 2018)。在本书中也有更新;但是在我看来,社会环境远远无法适应气候变化所带来的不良现象。然而,人们不断强调,任何适应行动也应寻求减少温室气体排放,同样,任何缓解行动都不应导致适应不良。

自从基布尔将城市规划定义为“安排土地使用、建筑和交通路线的特征和选址的艺术和科学,以确保最大限度的经济、便利和美观”(基布尔, 1969:

1)以来,城市规划发生了重大变化。当代城市规划涉及社区参与、社会公平考虑和环境保护,包括气候变化,这些是城市可持续性的关键要素。城市规划的价值在于其综合性和未来规划能力。从空间角度来看,这一点可以让多方参与者更好地理解城市系统中的行动对人和地方的影响。

目的

本书旨在使人们更深入地了解优化城市规划过程中以应对气候变化所面临的挑战和机遇。本书探讨了从渐进式变化到转型的一系列可能性,以及一些城市社区搬迁的真实可能性。一些城镇确实会消失,规划需要从这些社区开始,以确保其所在城市的未来发展。就像英国新城镇摆脱“工业混乱”的传统一样,本书为应对气候变化的城市规划制定了一系列行动,以应对气候变暖并与之共存。本书的五个目标如下:

- 1) 更深入地理解和认识城市和区域规划在使社区能够更好地准备和适应预计的气候变化方面的重要作用。
- 2) 扩展关于气候变化规划对城市社区影响的讨论。
- 3) 重点关注一些城市社区由于气候风险的不同和/或累积影响而面临的不可避免、复杂多变的重新安置问题。
- 4) 将包括气候变化城市规划关键要素的框架作为适应气候风险和长期可持续发展的模式。
- 5) 开发适应气候变化的城市住区的下一步措施概述。

针对气候变化的城市规划需要政府立即采取行动,最好是与其他部门合作,与受影响的社区共同应对。(Example 8)就像全球大流行病一样,我们需要做好准备。与全球大流行病不同的是,我们已经知道未来将会发生什么,然而,如本文所讨论的许多原因那样,我们还没有准备好。

城市规划

城市规划自人类有定居点开始以来就一直非正式地存在着。随着城市的发展和城市治理的加强,城市住区的形式和结构也发生了变化,以应对日益复杂的问题。(Example 10)几个世纪以来,有序的城市物理布局(道路、排水、水、土地使用)一直是其核心(希腊、罗马);20世纪中叶,随着国家城市规划立法,如英国1947年的《城乡规划法》,城市规划得到了正式的承认。此后,城市规划发展到更广泛地考虑社会、环境和文化层面因素,以创建一个更可持续发展的城市——这其中包括居民、居住地和居住环境。城市设计和场所创造是当下的方法,也是使用新的数字工具进行城市分析和公民参与的方法。

就本书目的而言,鉴于可用于应对气候变化的工具范围,城市规划定义必然是一个宽泛的定义。它包括战略规划(城市规划)、城市规划法(分区、规则和条例)和指导方针(通常用作叠加,如遗产或城市设计考虑)。所有这些要素都可能影响城市住区的规划和设计,并为气候行动提供可能的解决办法。实现城市增长和发展仍然是全球面临的一大挑战,其复杂的政策挑战是如何安全地将未来的城市发展定位在远离气候变化预计影响的地方——远离海岸边缘地带、远离极端高温地区、远离洪水易发区和野火风险区。

在二十一世纪,城市规划者主要关心的是建设城市住区,为所有居民、居住地和居住环境提供可持续的未来。城市规划的作用从早期的作为城市形态和结构的技术基础如建设“花园城市”上已经得到了极大的扩展。城市规划越来越注重让社区和企业积极参与到其所在城镇制定未来设想方案的制定过程中。

随着城市规划越来越强调与伙伴间的合作,城市规划必然变得更加跨学科化。城市规划包括一系列的策略——大到改造城市的可再生能源,提高社会包容性,创建更多适合自行车骑行的健康城市,小到可再生能源选择(微电网和电动汽车充电)和社区花园规划等。

也许皇家城市规划研究所(RTPIUK)对城市规划的演变本质总结得最好。在《规划我们需要的世界》一书中,皇家城市规划研究所将城市规划的贡献描述为“创造一个更美好的地方”,其起源可以追溯到公元前希腊和罗马时期的早期城市,当时的城市规划为现代规划奠定了基础——包括街道的网格模式、水网、土地利用的分离等等。城市规划对现代城市更重要的影响来自于20世纪初为应对伦敦等拥挤城市的健康危机而进行的改革(RTPI2021)。为应对21世纪大流行的COVID-19,皇家城市规划研究所在最近的一份报告中重新审视了规划更美好世界的贡献,强调了可持续性、适应性和包容性等新兴主题;气候正义被视为日益重要的考虑因素(同上)。

人们还认识到,城市规划不能解决城镇所面临的所

有问题。在我看来，这是一个重要的转变，是从早期的“物理决定论”的信念，到对城市规划在复杂的城市体系中的贡献更全面的理解。正如哈佛大学设计研究生院高级研究员苏珊·费恩斯坦所言：

“规划的初衷有一个隐含的前提，即一个精心设计、全面规划的城市将是一个社会改善型城市。换句话说，它倾向于环境决定论。规划的目标随后变得更加适度，认为物理环境能够深刻影响社会行为的观点也随之减弱。然而，规划作为一种实践和准则，依靠公共政策来创造一个更加公平和有吸引力的环境，虽然不会从根本上改变人类行为，但仍有助于提高大多数人的生活质量。”

然而，正如你将在本书中看到的，人们越来越认识到城市规划在提供应对气候变化的战略和工具方面的价值。城市规划可以提供必要的粘合剂，将一系列广泛的行动更好地联系到一个城市或城镇的连贯计划中。

在全球层面，与城市最相关的总体框架是由联合国人类住区规划署（人居署）带头制定的《联合国新城市议程》。该议程特别关注发展中国家。城市化，即农村向城市的迁移是这些国家城市增长和发展最迅速的主要原因。（Example 6）这是全球政策框架的城市部分。2016年，联合国人居署通过了《新城市议程》，并为后续的城市倡议制定了框架，包括促进可持续发展的城市规划方案。《新城市议程》的主要目标是解决不平等问题，针对气候变化采取变革性行动，提高所有人的生活质量。在关于实施《新城市议程》的联合国高级别会议（2022年4月28日）上，确定了四个行动重点领域：

- 1) 消除贫困和不平等现象，重点是保障住房和获得基本服务。
- 2) 通过创新方式促进公平和可持续发展的城市经济，并为可持续城市发展提供可预测的融资。
- 3) 城市化与环境污染脱钩，将社区与数据和资金联系起来，以加强气候适应和抵御能力。
- 4) 促进参与性城市规划，以采取有效和包容性措施预防和应对城市危机。（2022年联合国人居署）

秘书长在提交给本次高级别会议的报告中指出，城市规划是气候行动的重要工具：城市规划是实现气候减缓和适应、公平，经济生产力提高以及难民、移民和其他边缘化群体（联合国人居署，2022：8）的保护和社会融合的有力工具。在向联合国大会提交的关于加速实施《新城市议程》的最后建议中也强调了参与性规划的重要性，以及地方政府（地方和区域）参与国家规划进程的重要性：

（e）鼓励各成员国有意识地运用《新城市议程》，加强保护我们地球生态系统。推进转型升级和应用关键驱动因素，有助于各国加快气候行动，保护生物多样性和减少污染。应探索专门措施，以探讨国家城市层面、气候变化恢复力和适应性、基于自然

的解决方案和海洋污染。

总之，城市规划作为一种协调和整合行动的机制，正在复兴，且越来越被视为创建可持续的城市未来的核心。人们也日益意识到，城市规划对应对气候变化来说至关重要。（Example 9）在许多方面，应对气候变化的规划包括管理到经济、公平和环境等方面。正如世界经济论坛（WEF）《2021年全球风险报告》（GPRS）所强调的：气候变化——没有人能够免疫，世界也无法预防它——继续是灾难性的：“气候行动失败”是《全球风险报告》中确定的影响最大、可能性第二高的长期风险（世界经济论坛，2021：16）。气候变化现在是全球企业的一个核心问题，应对气候变化的规划是企业的主要责任。第26届联合国气候变化大会和全球格拉斯哥协定只是通过全球企业加入全球非政府组织和主要政府推动和加速应对气候变化的行动而证实了这一点。

在城市层面，气候行动市长处于气候行动的前沿。C40是全球和中型城市在气候行动方面的合作。作为城市领导人，他们有能力在实地领导变革，与当地社区合作实现长久变革。在第二十六届缔约方会议（COP26）召开之前，他们发布了一份主要报告，概述了“绿色和公正复苏”的议程，一项旨在为全世界带来变革性经济、健康和减排效益的全球绿色新政（C40，2022）

在第二十六届缔约方大会上，C40加速了其“城市零排放竞赛”，有110个城市加入该计划。这是会议上达成的最重要的合作之一，将此次110个城市整合起来，无论城市大小。

C40还发起了“重建更美好家园”和“建设更清洁的建筑未来”两项重要的提议。正如上文所讨论的，现在，应对气候变化的城市规划成为最新气候适应报告中的一个关键主题。这些国际合作成为城市未来研究和实践的前沿问题。利用智能数字技术的新平台可以在未来促进我们更广泛地参与这些进程。这一开篇为接下来关于应对气候变化的城市规划的章节——科学、全球背景和当代城市规划的发展——奠定了基础。第一章介绍了一些重要的基础主题：

（1）国际气候变化委员会（IPCC）将气候适应型发展定义为温室效应下实现城市可持续性的总体指导框架；（Example 1）

（2）将基于自然的解决方案作为建筑环境制定适应气候的应对措施的指导原则；

（3）时而被人们遗忘的公共领域，在制定应对气候适应型城市未来的整体应对措施时，又成为了建筑环境不可或缺的组成部分；

（4）不让任何人掉队依旧是联合国为可持续发展目标和任何未来城市规划和发展制定的总体原则；

（5）合作、共同设计和伙伴关系在想象和创造可持续和有韧性的城市未来方面变得越来越重要。

在最后一章中,我将再次回到这五个主题,将研究结果整合在一起,并讨论如何为我们的城市气候未来进行更好的城市规划。可以说从一开始,尽管未来会面临一些看起来很艰巨的挑战,但如果我们共同面对,尽快进行变革,并且城市规划能在发展更可持续的城市未来方面发挥重要和积极的作用,那么我们仍然有希望。

影响

应对气候变化的城市规划不是在真空中进行的。它包括一系列有助于减缓和适应气候变化以及长期社区变化适应力的城市规划政策、战略和工具,这些方面在本书中都有探讨。这些城市规划行动的实施框架包括三个重要的全球考虑因素:

- 1) 联合国可持续发展目标。
- 2) 联合国人居署牵头的《联合国城市议程》。
- 3) IPCC 报告,包括最新的 IPCC6 系列报告。

可持续发展目标、政府间气候变化专门委员会和世界城市议程的含义是,城市未来的规划和设计现在被视为应对气候变化行动的一个重要组成部分,城市规划被视为解决方案的一个非常重要的部分。在这方面,城市规划已经通过这些最近的进程从一个主要的监管角色提升为潜在的强大干预工具,以使一个城市或城镇朝着更适应气候变化和更宜居的未来转变。另一项重要贡献是认识到,城市未来的可持续发展,需要一种更全面和系统的城市管理方法,需要综合考虑对社会、经济、文化和环境等多方面因素。这一贡献最初由可持续发展目标提出,最近由政府间气候变化专门委员会和《城市议程》确认。正是在这一背景下,以下章节深入地探讨了应对气候变化的城市规划,以及在不久的将来可以实现的目标,以便进一步推进人类和环境的可持续发展。

关键信息

- 1) 城市规划是变革的有力工具,特别是当与社区行动和公共投资相结合时。气候行动和宜居城市和社区的综合方法可以为更具韧性和健康的社区奠定基础。
- 2) 虽然关注的焦点必然是减少排放以遏制未来气候变化的影响,但已经存在的影响,会严重影响一些脆弱的社区。
- 3) 《格拉斯哥气候公约》特别指出,“规划”是气候行动的关键。各级应对气候变化的城市规划对制定气候解决方案至关重要,这是城市规划向前迈出的非常重要的一步。现在是采取行动的时候了!
- 4) 在城市层面,社区领导人应处于气候行动的最前沿。作为城市领导人,他们有能力在当地领导变革,与当地社区合作,实现持久的变革。
- 5) 共同合作、共同设计和建立伙伴关系在展望和创造更可持续、更具韧性的城市未来方面

变得更加重要。使用智能数字技术的新平台可以促进未来各方更广泛的参与。

结论

总体而言,在认识到应对气候变化的行动与城市可持续性和适应气候变化的发展密不可分方面,全球和国际层面正在取得相当大的进展。在城市层面也有相当多的方案和项目正将自然、社会正义和包容性、合作以及人与各地方结合起来。人们也更加深刻地认识到,气候变化对不同社区的影响是不均衡的,会使一些脆弱的社区更加脆弱。(Example 5)可持续发展目标、联合国城市议程和政府间气候变化专门委员会的报告为以下探讨这些方面的章节设定了总体框架。本书的总体目标是制定一套应对气候变化的城市规划,为建设一个宜居的世界做出积极贡献。

幸运的是,在过去 50 年左右的时间里,城市规划取得了进步,将对社会公正、社区参与以及现在的气候变化等纳入了重要考虑范围。正如第一章所讨论的,所有这些对于城市和地区的可持续发展都至关重要。以下内容是关于应对气候变化的城市规划的更详细的讨论,有助于加深我们对建筑环境的可能性的理解。

应对气候变化的城市规划提供了一个转型的机会,以改变我们在城市未来的生活方式和居住地点(诺曼等, 2021; 诺曼, 2021)。这些挑战的范围广泛,包括全球气候迁移,面临气候风险(火灾、洪水、风暴、干旱、高温等)的大规模城市扩张,由于炎热和缺乏遮阳而日益不适合居住的城市定居点,被洪水和海水淹没的城市居住区以及对现有城市居点的改造。我们还有很多工作要做!

了解挑战的难度规模: 目前据估计到 2050 年,气候移民可能超过 10 亿 (IEP: 2020),主要集中在亚洲、非洲和太平洋地区。然而,加拿大、美国和澳大利亚等发达国家也面临着风险。这个极具挑战性的问题是第四章的重点。这是一个棘手的问题,现在就需要开始交流和规划。世界银行和亚洲开发银行等主要全球机构正在积极调查气候变化对已经或可能需要在不久的将来重新安置的城市和农村人口的影响。

本章参考发达国家和发展中国家的国际经验,提供了当前气候变化的有关知识和实践经验。

其中包括《城市和地区的可持续发展路径》一书的最新研究。作为一名长期从业人员和学者,我感到沮丧的是,城市气候研究应该更注重实施。我赞同!随着全球排放目标的增加,如何将科学和知识成功地转化为政策、规划和项目才是现下面临的挑战。

城市规划是实现与未来城市适应气候变化和实施减排目标的核心。IPCC 正在推进这项实践研究,在 2022 年底的《联合国气候变化框架公约》第二十七次缔约方大会上,将更加关注适应问题。气候适应必须与建筑环境、公共室外场所和空间、绿色基础设施以及适应气候未来的城市和城镇的土地

使用决策过程相联系。应对气候变化下的城市规划通常被认为是一个地方性的问题，需要当地提供解决方案。基本情况都是如此。然而，随着世界继续城市化，以及气候变化的影响在未来几十年如影随形，城市规划现在也是一个非常重要的全球问题。

显然，任何对气候变化采取行动的方法本质上都是跨学科的，任何实施都需要在设计时考虑到复杂性和关联性，并对城市解决方案采取综合方法。要做到这一点，城市规划系统需要转变；将应对气候变化的行动融入到每一级决策的土地利用规划决策中。以下是对一些影响城市规划的关键性问题展开的讨论，以便能更好地应对近期的气候变化。其中包括我们城镇的碳中和发展、面临洪水风险的社区的沿海规划和管理，以及为确保全球领先实践而建立的伙伴关系和开展的协作。(Example 2)

The Original

Urban Planning for Climate Change (Excerpts)

Urban planning is one of the key instruments for effective action on climate change. The global population now largely lives in urban settlements with this trend of urbanisation expected to continue through the twenty-first century. The future planning and design of our cities, towns and villages provides a unique opportunity to lay the foundations for a more sustainable, liveable and prosperous future, working with nature and delivering real action on climate change with local communities.

This book brings together my research and work in coastal planning, regional development, sustainable cities and climate change adaptation. It draws upon my primary disciplinary background of urban and regional planning and is intended to be a positive practical contribution to action on climate change and more broadly implementing the United Nations' Sustainable Development Goals (SDGs). It builds on my previous book *Sustainable Pathways for Our Cities and Regions: Planning within Planetary Boundaries* (Norman 2018), which had a wider global perspective on urban sustainability.

This book focuses more deeply on the 'how', in this case how urban planning is fundamental to action on climate change. In doing so it particularly looks at current practice and opportunities for innovation and capacity building in the future. It is designed to appeal to a broad audience. This includes the next generation searching for more sustainable solutions, decision makers and leading private and public sector participants facing increasingly

complex land use and planning in regions of climate risk and the broad array of participants involved in designing better urban futures.

Urban planning for climate change is a rapidly evolving space and this is a contribution to provide a deeper understanding of the challenges and opportunities to be found in developing more sustainable solutions for urban communities. This research builds on my previous book *Sustainable Cities and Regions: Planning within Planetary Boundaries* (Norman 2018). While the earlier book took a more global perspective and examined a wider range of issues, the focus this time is more on the contribution of urban planning as a valuable instrument for action on climate change. A couple of unexpected events influenced the writing, including a global pandemic and, in my country of Australia, two extreme events: the wildfires of 2019-2020 and the floods of 2022. The fires affected me personally, and the floods affected my colleagues and friends. What was really unexpected was that although I have studied and practised in planning for over 40 years, I did not anticipate the enormous impact these events have had collectively on urban communities, some of whom have been affected by all three events-fires, floods and COVID-19.

The upside has been some serious reflection of the possible contribution of urban planning for climate change and with that, the hope for a better future for all. The other result is that there is more content from the southern hemisphere due to both closed domestic borders for most of the period of writing and at the same time a region of extreme events influenced or some would say, supercharged by climate change. Fortunately, due to digital technology some great interviews were able to be undertaken to retain a global perspective on these issues. The Intergovernmental Panel on Climate Change (IPCC) 6 reports were also published, providing up-to-date climate science assessments including for regions. Urban planning for climate change is central to implementing climate action in human settlements across around the world — be it in global cities, secondary cities, regional centres, townships, villages and hamlets. (Example 3) Enormous effort has gone into global climate agreements and national climate strategies supported by regional and local climate plans covering mitigation and adaptation.

There is now a demand for the detail on the 'how' — that is how do we implement climate action

through everyday decisions concerning land use activity in urban environments? This can range from big city plans to urban designs for precincts and neighborhoods to net zero carbon buildings and smart infrastructure. (Example 4) The key point is that everything we develop, build and construct from airports to pedestrian walkways should embed climate action, that is to seek a reduction in carbon emissions and be designed to adapt to the changing climate in the future. Climate resilience should be the long-term goal.

Climate change is an enormous field where we seek to better understand the science, the consequences for people and the planet and the policy implications for all sectors. This book is a contribution to better understanding the role of urban planning in achieving the global climate emission reduction targets and minimising risks to urban communities in the Global North and Global South. (Example 7)

This book takes a holistic approach to action on climate change and the role urban planning can take in implementation. This includes mitigation (e.g. reducing greenhouse gas emissions), and climate adaptation and climate resilience in relation to disaster recovery and rebuilding and community adaptation. In this book there is a strong focus on adaptation with a chapter specifically on the issue of climate induced resettlement. In my earlier book on sustainable cities and regions there was considerable coverage of renewable energy, electric transport and greener built environments (Norman 2018). This is updated here too; but in my view, there continues to be a serious lag in adapting our built environments to the already locked in impacts of climate change. Nevertheless, it is continually emphasised that any action of adaptation should also seek to reduce greenhouse gas emissions and equally any action on mitigation should not lead to maladaptation.

Urban planning has evolved significantly since Keeble defined it as 'the art and science of ordering the use of land and the character and siting of buildings and communication routes so as to secure the maximum practicable degree of economy, convenience and beauty' (Keeble, 1969, p. 1). Contemporary urban planning involves community engagement, social equity considerations and protection of the environment, including climate change, as key elements to urban sustainability. The value of urban planning can be found in its integrating nature and its future planning capability.

Presenting this in a spatial perspective allows the multiple players to better understand the implications of actions in an urban system for both people and place.

Purpose

The purpose of this book is to provide a deeper understanding of the challenges and opportunities to be found in better urban planning for climate change. The book explores the range of possibilities from incremental change through to transformation and the very real possibility for some urban communities of relocation. Indeed, some towns will be lost and planning will need to start now with those communities to secure their urban future. Just like the tradition of the British New Towns escaping the 'industrial mess', this book develops a set of actions for urban planning for climate change, responding to and living with a warming climate.

The five aims of this book are to provide:

- 1) A deeper understanding and appreciation of the important role of urban and regional planning in enabling communities to be better prepared and better able to adapt to projected climate change.
- 2) Expand the discussion on the implications of planning for climate change for urban communities.
- 3) A specific focus on the complex challenge of inevitable resettlement for some urban communities due to different and/or cumulative impacts of climate risks.
- 4) A framework including key elements for Urban Planning for Climate Change as a model of adaptation to climate risks and long-term sustainable development.
- 5) An outline of the next steps for developing climate adapted resilient urban settlements.

Urban planning for climate change needs immediate action by governments preferably in partnership with other sectors working with affected communities. (Example 8) Just like the global pandemic, we need to be much better prepared. Unlike the global pandemic, we already know what is coming our way and yet, for many reasons discussed herein, we are unprepared.

Urban planning

Urban planning has been informally around since the beginning of settlements. The form and

structure of urban settlements has evolved as cities have grown and urban governance has developed to respond to increasing complexity.

(Example 10) The physical orderly layout of cities (roads, drainage, water, land use) has been at its core for centuries (Greece, Rome); more formally recognised mid twentieth century with national urban planning legislation, such as the UK Town and Country Planning Act 1947. Urban planning has since evolved to consider more widely the social and environment and cultural dimensions to creating a more sustainable city — its people, the place and its context. Urban design and place making are contemporary approaches as well as the use of new digital tools for urban analysis and civic engagement.

For the purposes of this book, the definition of urban planning adopted is necessarily a broad one given the range of tools available to act on climate change. It includes strategic planning (city plans), urban planning laws (zoning, rules and regulations) and guidelines (often used as overlays such as heritage or urban design considerations). All these elements can influence the planning and design of an urban settlement and provide possible avenues for climate action. Managing urban growth and development remains one of the big global challenges with the complex policy challenge of where to safely locate future urban development out of harm's way from the projected impacts of climate change-away from coastal edges, away from extreme heat, away from flood prone areas and wildfire risks.

In the twenty-first century, urban planners are primarily concerned with shaping urban settlements that provide a more sustainable future for all — people, place and the environment. The role of urban planning has considerably broadened from its earlier technical base of city form and structure, for example the 'garden cities' movement. Urban planning increasingly places emphasis on the active participation of the community and business in developing urban future scenarios for their towns and cities.

Urban planning has necessarily become more interdisciplinary with increasing emphasis on collaboration, co design and working with partners. Urban planning can involve a whole raft of strategies — retrofitting urban places for renewable energy, improving social inclusion, creating more bike friendly walkable, healthy cities down to detail such as planning for

renewable energy options (microgrids and EV charging) and community-based gardens.

Perhaps the Royal Town Planning Institute (RTPI UK) summarises the evolving nature of urban planning best. In *Plan the World We Need*, the RTPI describes the contribution of urban planning as 'creating a better place' dating its origins back to early cities of Greece and Rome B.C. when some of the foundations of modern planning were laid down — grid pattern to streets, water reticulation, separation of land use and so on. The more significant impact on modern cities stems from the reforms of the early twentieth century responding to a health crisis in crowded cities including London (RTPI 2021). The RTPI in responding to the twenty-first century pandemic COVID-19, has revisited the contribution of planning for a better world in a recent report highlighting the emerging themes of sustainability, resilience and inclusivity; climate justice is seen as an increasingly important consideration (ibid.).

There has been also a recognition that urban planning cannot solve all problems in cities and towns. This is an important shift away from earlier beliefs of 'physical determinism' to, in my view, a more balanced understanding of the contribution of urban planning in a complex urban system. As Susan Fainstein, Senior Research Fellow at the Harvard University Graduate School of Design, puts it:

Planning in its origins had an implicit premise that a well-designed, comprehensively planned city would be a socially ameliorative one. In other words, it tended toward environmental determinism. The goals of planning have subsequently become more modest, and the belief that the physical environment can profoundly affect social behaviour has diminished. Nevertheless, planning as practice and discipline relies upon public policy as an instrument for producing a more equitable and attractive environment that, while not radically altering human behaviour, nonetheless contributes to improvements in the quality of life for a great number of people.

However, as you will see in this book, there is an emerging pattern of an increasing appreciation of the value of urban planning in providing the strategies and tools for action on climate change. Urban planning can provide the necessary glue to better link a wide range of actions into a coherent plan for a city or town.

At a global level, the most relevant overarching framework for cities is the UN New Urban Agenda spearheaded by the United Nations Human Settlements Programme (UN-Habitat). The focus is particularly on developing nations, where the most rapid process of urban growth and development is occurring due predominantly to urbanization, that is, rural to urban migration. (Example 6) It is the urban part of the global policy framework. The New Urban Agenda was adopted by UN Habitat in 2016 and has framed subsequent urban initiatives including urban planning programmes to facilitate more sustainable development. The key objectives of the Urban Agenda are to address inequalities, take transformative action on climate change and improve quality of life for all. At a UN High Level Meeting (28 April 2022) on the implementation of the New Urban Agenda four areas of focus for action were identified:

- i. Ending poverty and fighting inequalities, with a focus on affordable housing and access to basic services.
- ii. Boosting equitable and sustainable urban economies and predictable financing of sustainable urban development through innovative approaches.
- iii. Decoupling urbanisation from environmental pollution and linking communities to data and finance to strengthen climate adaptation and resilience.
- iv. Promoting participatory urban planning approaches for effective and inclusive urban crisis response and prevention. (UN-Habitat 2022)

In the report of the Secretary General presented to this High-Level Meeting, urban planning was confirmed as a crucial tool for climate action: 'urban planning is a powerful tool for achieving climate mitigation and adaptation, equity and economic productivity and the protection and social integration of refugees, migrants and other marginalized groups' (UN-Habitat, 2022, p. 8). It also featured in the final recommendations to the General Assembly to accelerate implementation of the New Urban Agenda, emphasising the importance of participatory planning and the engagement of sub national governments (local and regional) in national planning processes:

(e) Member States are encouraged to use the New Urban Agenda in a more intentional manner to strengthen efforts to protect our planetary ecosystems. By advancing the trans-formative

commitments and applying the key drivers, countries can accelerate climate action, protect biodiversity and reduce pollution. Dedicated efforts to strengthen the urban dimension of nationally determined contributions, climate resilience and adaption, nature-based solutions and marine pollution should be explored.

In summary urban planning is experiencing the beginnings of a renaissance as a mechanism for coordination and integration of actions, increasingly seen as central to implementing a more sustainable urban future. It is also increasingly recognised as vital to action on climate change. (Example 9) Urban planning for climate change in many ways, planning for climate change can include everything from governance to economy to equity to the environment. As highlighted by the World Economic Forum (WEF) Global Risks Report 2021 (GPRS): climate change — to which no one is immune, nor can the world vaccinate against it — continues to be catastrophic: 'climate action failure' is the most impactful and second most likely long-term risk identified in the GRPS (WEF 2021, p. 16). Climate change is now a central issue to global business and planning for climate change a major corporate responsibility. COP26 with the Global Glasgow Pact only confirmed this with global business joining global NGOs and major governments to advance and accelerate action on climate change.

At the urban level, the Mayors for Climate Action are at the forefront for climate action. C40 is a collaboration of global and medium sized cities working collectively on climate action. As city leaders they have the capacity to lead change on the ground working with local communities for lasting change. In the lead up to COP26 they released a major report outlining an agenda for a 'green and just recovery' — a Global Green New Deal to deliver transformative economic, health and emission reduction benefits across the world (C40 2022).

At COP26, C40 accelerated its 'cities race to zero campaign' enlisting 110 cities to the programme. It was one of the most significant collaborations at the conference bringing together local action from large to smaller cities. C40 also launched two significant initiatives — 'building back better', and 'building a cleaner future for construction'. And as discussed above, urban planning for climate change is now a key theme in the most recent report on adaptation. These international collaborations are at the forefront of

leading research and practice for urban futures. New platforms using smart digital technology can facilitate wider engagement in these process in the future.

This opening chapter sets the stage and context for the following chapters on urban planning for climate change — the science, the global context and the development of contemporary urban planning. In doing so, it introduces a number of important underlying themes: (i) Climate-resilient development as defined by the IPCC as the overall guiding framework for urban sustainability in a warming environment, (Example 1) (ii) nature based solutions as a guiding principle for developing climate adapted responses for the built environment, (iii) public realm as sometimes forgotten but an integral partner to the built environment in developing holistic responses to climate-resilient urban futures, (iv) leave no one behind continues as the overall principle set down by the United Nations to the SDGs and as such, any future urban planning and development, and (v) collaboration, codesign and partnerships that are becoming even more important in making it possible to imagine and create more sustainable and resilient urban futures.

I return to these five themes in the last chapter to bring together the findings and discuss them in the terms of better urban planning for our urban climate futures. I can say from the outset that while there are sometimes seemingly daunting challenges ahead, there remains hope if we collectively accept that change needs to happen urgently and that urban planning can play a significant and positive role in developing a more sustainable urban future.

Implications

Urban planning for climate change is not undertaken in a vacuum. It includes a range of urban planning policies, strategies and tools that can contribution to climate mitigation and adaptation and longer-term community resilience. These aspects are all discussed throughout this book. These urban planning actions occur with the broader framework of three important global considerations:

- 1) The UN Sustainable Development Goals.
- 2) The UN Urban Agenda spearheaded by UN-Habitat.
- 3) The IPCC reports including the latest IPCC 6 series.

The implications of the SDGS, the IPCC and the World Urban Agenda are that the future planning and design of cities is now seen as a vital part of action on climate change and that urban planning is seen as a very important part of the solution. In that respect urban planning has been elevated through these recent processes from a predominantly regulatory role to potentially a powerful tool of intervention that can transform a city or town towards a more climate responsive and liveable future. The other important contribution, initially by the SDGS and confirmed more recently by the IPCC and the Urban Agenda, is the recognition of the need for a more holistic and systems approach to urban management with social, economic, cultural and environmental considerations to developing sustainable urban futures. It is within this context that the following chapters explore more deeply urban planning for climate change and what can be achieved in the near future to develop more sustainable for humanity and the wider environment.

Key messages

- i. Urban planning can be a powerful instrument for change especially when combined with community action and public investment. An integrated approach to climate action and liveable cities and neighbourhoods can provide the basis for more resilient and healthy communities.
- ii. While attention has necessarily been on reducing emissions to contain the impacts of future climate change, there are already 'locked in' impacts that may severely aspect some vulnerable communities.
- iii. The Glasgow Climate Pact specifically stated 'planning' as key to climate action. This was a very significant step forward clearly stating that urban planning for climate change at all levels is central to climate solutions. The time for action is now.
- iv. At the urban level, community leaders are at the forefront for climate action. As city leaders they have the capacity to lead change on the ground working with local communities for lasting change.
- v. Collaboration, co design and partnerships are becoming even more important in making it possible to imagine and create more sustainable and resilient urban futures. New platforms using smart digital technology can facilitate wider engagement in these processes in the future.

Conclusion

Overall, there is considerable progress being made at the global and international level in recognising that action on climate change is inextricably linked with urban sustainability and climate-resilient development. There is also considerable activity at the urban level with programmes and projects now incorporating nature, social justice and inclusion, collaboration and people and place. There is also a deeper understanding that the impacts of climate change will fall unevenly on communities, leaving some vulnerable communities even more vulnerable. (Example 5) The SDGS, the UN Urban Agenda and the IPCC reports set the overarching framework for the following chapters that now explore these aspects. The overall goal of this book is developing a set of actions for urban planning for climate change that can make a positive contribution to a more liveable world.

Fortunately, urban planning has advanced over the last 50 years or so to encompass important considerations on social justice, community engagement and now climate change. As discussed in Chapter 1, all of these are critical to more sustainable cities and regions. The following is a more detailed discussion on urban planning for climate change as a contribution to deepening our understanding of what is possible with the built environment.

Urban planning for climate change provides a transformational opportunity to change the way we live and where we live in our urban future (Norman et al., 2021; Norman, 2021). The challenges of managing urban growth in the context of climate change continue only to increase as our cities expand and the world warms from anthropogenic climate change. The challenges are wide ranging including global climate migration, large scale urban expansion into lands at climate risk (fire, flood, storms, drought, heat...), increasingly uninhabitable urban settlements due to heat and lack of shade, flooding and coastal inundation and the retrofitting of existing urban settlements. There is much to be done!

To give an understanding of the scale of the challenge, it is currently estimated that climate migration could be over one billion by 2050 (IEP 2020), predominantly in the Asian, African and Pacific regions. However developed nations such as Canada, USA and Australia are also at risk. This very challenging issue is the focus of

Chapter 4. It is a tough issue, but the conversations and the planning need to commence now. Key global agencies such as the World Bank and the Asian Development Bank are actively investigating the impacts of climate change on urban and rural populations that are already or may need to resettle in the near future.

This chapter provides current knowledge and practice for climate change with reference to international experience in both developed and developing countries.

This includes an update on the research for book Sustainable Pathways for our Cities and Regions. As a long-term practitioner and academic, a common frustration expressed to me is that urban climate research should be more focused on implementation. I agree! The ongoing challenge with increasing global emission targets is to take the science and knowledge and transfer it successfully to policy, planning and projects.

Urban planning is central to achieving an urban adapted future and implementing the emission reduction targets. The IPCC is advancing this research on implementation by sector and there will be an increased focus on adaptation at COP27 in late 2022. Climate adaptation must be linked to land use decision making processes for the built environment, public outdoor places and spaces, green infrastructure and retrofitting cities and towns for climate adapted futures.

Urban planning for climate change is often discussed as predominantly a local problem facing local communities with local solutions. This has been largely the case. However, as the world continues to urbanise and the impacts of climate change become increasingly locked in for decades to come, it is now also very much a global issue at the highest level.

It is clear that any approach to acting on climate change is inherently interdisciplinary and any implementation needs to be designed with the complexity and connections in mind and take an integrated approach to urban solutions. To do this the urban planning system requires transformation; embedding action on climate change into land use planning decisions at every level of decision making. Below is a discussion of some of the key issues that will influence urban planning for climate change in the near future including carbon-neutral development for our cities and towns, coastal planning and management for communities at risk of inundation and partnerships and collaboration to

ensure leading practice across the globe.
(Example 2)