

Futurama Redux

Urban Mobility After Cars & Oil

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Introduction

For VIENNA DESIGN WEEK's 2015 Future Urban Mobility Initiative, the directors of the think tank Smarter Than Car were asked to curate an exhibition on post-carbon urban mobility. In response, they formed an interdisciplinary team of researchers and designers to consider the systemic implications of such a transition and how the design challenge of future urban mobility might be approached. The automotive age appears to be entering its twilight, but what will follow? Futurama Redux: Urban Mobility After Cars and Oil examines how a transition to post-carbon urban mobility could foster urban resilience while creating new qualities of life.

Futurama Redux is simultaneously inspired by and a critique of the original Futurama exhibit from the 1939 World's Fair in New York. It broadly follows a best-case thought experiment that moves the present-day to 2050, when Vienna has become a leading city in post-carbon transition. But rather than providing a prescriptive vision of a simple solution to complex problems, the exhibition proposes a multifaceted loop of consideration, experimentation, participation, and adaptation. Steve Jobs famously described design as not only what something looks and feels like, but how it works. Future urban mobility will require systemic change, meaning that it will not only look and feel different, it will need to work differently. This is the challenge for design.

The exhibition begins by revisiting the Futurama and the changes it inspired before conducting a brief overview of the age of cheap energy and its possible end. A toolbox of urban strategies and concepts for post-carbon transition is then sketched out and the city is reframed as an urban ecosystem. Next, we pull back from planning and design for a moment to consider collapse, urbanity, resilience, and utopia. Finally, we step into a different sort of vision of the future, a Futurama Redux, dynamic and urbane, not predefined by a rigid system but responsive to changing conditions and our own evolving preferences.

簡介

「維也納設計週」籌辦「2015年未來都市流動計劃」時，邀請智庫機構「比車牛」的負責人環繞後碳時代的都市流動策劃一場展覽，有見及此，「比車牛」召集研究及設計人員組成專業小組，思考能源過渡所帶來的系統性影響，並考慮如何從設計角度應對未來都市流動所帶來的挑戰。汽車時代似乎正步向黃昏，但隨之而來的會是什麼？「Futurama Redux：後汽車與石油時代的都市流動」的目標，就是探討要是人類社會過渡至後碳時代，怎樣才能夠促進都市韌性，並同時創造新的生活質素。

Futurama Redux既受1939年紐約世界博覽會的「未來世界」（Futurama）展覽啟發，也同時以批判角度反思當時展覽的精神。Futurama Redux整體上沿襲最理想願景的實驗模式，將現狀推算至2050年，讓維也納成為後碳過渡的領先城市，但目的並不在於闡述指導性的願景，奢想單憑簡單的方法就能解決眾多複雜的問題，而是提出多面向的循環演繹，兼顧到思考、實驗、參與、適應的元素。喬布斯曾有名言，形容設計並非局限於物件的外觀及感覺，也包括其運作原理。未來都市流動將涉及系統性的變革，意味着未來流動不但外觀不同、感覺不同，運作上也會大不同。這正是設計的挑戰所在。

這次展覽的第一部分，將重新探索「未來世界」展覽及其引發的變革；第二部分將簡短概括廉價能源時代及其終結；第三部分將描繪一系列推動後碳過渡的都市策略及概念，同時將城市重塑為都市生態系統；第四部分將暫時脫離規劃與設計，轉而把目光放在都市崩壞、都市特性、都市韌性及烏托邦；最後一部分將進入另一種動態的、都市化的未來願景，亦即Futurama Redux，這個願景不以固化的系統為前設，而是會因應週遭不斷變化的條件以及人類自身不斷進化的喜好而調整。

Back to the Futurama



Until the first decades of the 20th century, the city street was simply public space. As cities filled with cars, traffic accidents and deaths rose sharply. Either cars needed to be tamed or streets needed to be redefined and redesigned. By the late 1920s the propaganda machine of automotive interest groups was succeeding in changing public perception. Cars came to mean progress, prosperity, and above all freedom. The Futurama, designed by Norman Bel Geddes for the General Motors exhibit at the 1939 World's Fair in New York, was an enormous, immersive model of the city redesigned for automobiles at a time when such an idea was still radical.

More than 15 million people saw the exhibit in person, and as they exited each was given a button that read, "I have seen the future." By 1960, the year in which the exhibit was set, American cities had indeed transformed themselves according to the vision laid out by Bel Geddes. The rest of the world would soon follow, redefining not only streets but entire cities, mobility systems & practices, and social relations in the process. Sociologist John Urry described this multifaceted "car-system" as an endless growth paradigm based on steel, oil, and suburbanization that has become "locked-into" modern ideas of progress and civilization.

Bel Geddes claimed that "automobiles are in no way responsible for our traffic problem. The entire responsibility lies in the faulty roads, which are behind the times." But consider the absurdity of the following equation: "10 tonnes of resources are turned into 1 tonne of car which transports about 100 kg of humans at an average speed of 15 km/h for an average distance of 1 km per trip."¹ This is the very definition of unsustainable, and only possible as long as high-density energy is abundant and cheap. So, what is the future of our real-life Futurama?

¹ Zbicinski, I. (2006) Product Design and Life Cycle Assessment.

簡介

直至20世紀初葉，城市街道仍只屬於公共空間，但隨着城市內車輛日漸充斥，交通意外及相關的死亡數字急劇上升，社會於是面臨選擇：要麼控制汽車，要麼就重新定義並設計街道。1920年代後期，汽車利益集團的輿論宣傳機器成功改變了大眾認知，汽車成為進步、繁榮，尤其是自由的象徵。通用汽車委託工業設計師貝爾格迪斯（Norman Bel Geddes）設計的「未來世界」於1939年的紐約世界博覽會亮相，參展人士置身這座龐大的城市模型之中，看見街道都為了汽車而重新設計，以當時的標準衡量，這樣的理念相當前衛。

參觀「未來世界」展覽的人數超過1,500萬，每個人離場時都會領到一枚胸章，上面寫着「我看見了未來」。到了1960年，即當年展覽所預設的年份，美國各大城市的確像貝爾格迪斯所構思那樣，改頭換面過來。不久後，世界其餘國家亦加入這個行列，過程中不僅將街道重新定義，改變的還包括整座城市、其交通體系及習性，以至人際關係。社會學者厄里（John Urry）將這種多面向的「汽車體系」形容為建基於鋼鐵、石油及城市郊區化的無限增長，與進步及文明的現代理念「聯為一體」。

貝爾格迪斯宣稱「汽車絕非我們交通問題的肇因，責任完全歸咎於落後於時代的和問題叢生的道路」。不過，以下的數據即可揭露汽車現象之荒謬：「10噸資源製成1噸重的汽車，承載重量約100公斤的人，以平均時速15公里前進，每次行程距離平均1公里」。這正正是不可持續發展的典型例子，而且非得在高密度能源供應源源不絕且價格廉宜時，才可維持得到。那麼，我們真實生活中的「未來世界」又會如何呢？

¹ Zbicinski, I. (2006) Product Design and Life Cycle Assessment.

The Energy Bubble

能源泡沫



“There are almost no activities that presuppose movement that do not now rely on oil,” wrote sociologist John Urry, “and there are almost no activities that are significant in the modern world that do not entail movement of some kind.”² Urry wrote extensively about the impact of fossil fuels, particularly oil, on society in the past, present, and future. Today, oil produces an estimated 95% of the energy used in transportation, while its byproducts are converted into countless necessities of daily life: plastics, electronics, food preservatives, agricultural pesticides & fertilizers, medicines, deodorants, cosmetics, and shoes, to name but a few. Urry may well be right that “burning fossil fuels to generate heat, power and movement is the most significant feature of the modern world.”³

Two existential threats are casting doubt on even the mid-term future of that world: climate change and resource depletion. In order to maintain an 80% chance of limiting global warming to 2°C, carbon emissions from 2015 until forever must not exceed approximately 450 gigatonnes. If business as usual continues, we will reach 450 GtC in about 30 years. Even if the miraculous happens and new technologies for capturing and storing carbon (CCS) are scaled up enough to allow fossil fuels to continue being burned, the depletion of finite stocks of both fossil fuels and rare earths will likely make the carbon era economically untenable before the end of the century. Post-carbon transition is therefore both inevitable and essential, but as John Urry points out, “there is currently no Plan B, no potential system in place which could begin to replace oil-based systems.”⁴

Renewable forms of energy generation are increasing and show great potential, but renewables are unlikely to neatly replace fossil fuels, especially oil, for several reasons: they have generally lower net energy rates and are difficult to store and transport; the incredible resource-intensiveness of reconfiguring electrical grids is problematic; and most renewable technologies remain ironically dependent on fossil fuels for the extraction of essential rare earths, production of materials, assembly, maintenance, and transportation from the point of manufacture. Renewables have a key role to play, but the most likely future we face is one of both energy transition and overall energy descent. The carbon age of cheap & abundant energy may well be a historical aberration, a one-time energy bubble.

社會學者厄里說：「現在幾乎沒有一種以移動為前設的活動不依賴石油，現代社會也幾乎沒有任何一種富意義的活動不包含某種移動」。厄里撰寫的大量文章，主題都環繞化石燃料，尤其是石油，對過去、現在及未來社會的影響。根據推測，如今人類交通所耗用的能源，95%產自石油，石油的副產品亦轉化成日常生活中各種不可或缺的物品，比如塑膠、電子產品、食物防腐劑、農業殺蟲劑及肥料、醫藥、除臭劑、美容品、鞋履等等。厄里說「燃燒化石燃料產生熱力、能源及動能，是現代世界最重要的特徵」，這段話不無道理。

世界能否於中期可見的未來延續下去，取決於兩大威脅：氣候變遷以及資源枯竭。由於溫室效應的影響，人類如果要有八成把握將氣溫上升幅度限制在2°C的話，那麼從2015年起直到以後，碳排放量絕對不能超過約4,500億噸，然而人類如果不改變現有活動，約30年內我們的碳排放量就將達到4,500億噸。即使奇蹟降臨，收集並儲存碳的技術突飛猛進，容許人類可以繼續燃燒化石燃料，但化石燃料及稀土資源有限，最終亦將枯竭，碳時代經濟可能在本世紀結束前就無以為繼。基於以上原因，後碳過渡已經成為不可迴避的重要課題，只是正如厄里所說，「現在沒有後備方案，沒有具備潛力的體系能夠開始取代以石油為基礎的體系」。

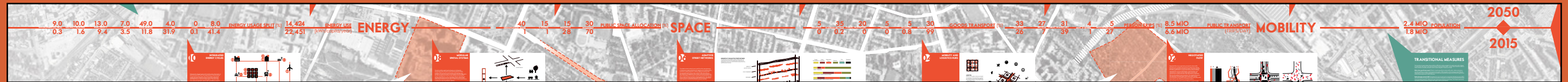
全球正在加強生產可再生能源，有關技術亦展示巨大潛力，但可再生能源依然未能全面取代化石燃料，取代石油尤其困難，原因不外乎以下幾點：可再生能源的淨能源率一般較低，而且難以儲存、運輸；重新配置電網需要耗用大量的資源，因此形成障礙；諷刺的是，絕大部分可再生能源技術從提取關鍵稀土、物料生產、組裝、維修保養、以至能源由生產地往外運輸，各個環節都仍然依賴化石燃料。可再生能源的角色毋庸置疑，但我們未來最有可能要面對的，不僅是能源過渡的機遇，還會有整體能源衰減的境況。能源廉價而又充裕的碳時代，大有可能只是歷史中的一段反常插曲，一次絕無僅有的能源泡沫。

2 Urry, J. (2012). "Changing transport and changing climates". Journal of Transport Geography. 24, 533-535.
3 Urry, J. (2014). "The Problem of Energy". Theory, Culture & Society. Vol. 31(5), 3-20.
4 Urry, J. (2012). "Changing transport and changing climates". Journal of Transport Geography. 24, 533-535.

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A Post-Carbon Urban Toolbox

為明日智慧城市而設的後 碳都市流動解決方案



Smart City Vienna Goes Post-Carbon: 2015-2050

In the 35 years since 2015, when its Smart City Framework Strategy was enacted, Vienna has become a global leader in post-carbon urbanism and a model for cities worldwide. Designed in conjunction with the City Development Plan (STEP) 2025 and expanded with STEP 2050, the Smart City Framework Strategy is notable for having largely avoided the bias toward technological fixes for social and environmental challenges that hindered so many Smart City strategies during the first decades of this century. The three core aims of the strategy are:

- (1) radical resource preservation
- (2) development and productive use of innovations/new technologies
- (3) high and socially balanced quality of living

Key to realizing these aims was the Urban Resilience Plan (URP), part of the Smart City Framework Strategy since 2020, and its Zero-Carbon Mobility Initiative, which sought to eliminate fossil fuels from the city-wide mobility footprint. The extraordinary ripple-effect of the resulting transition in urban mobility enabled and encouraged broader transformations in climate mitigation and adaptation, energy and food security, and social wellbeing.

Vienna in 2050 is now a far more resilient city than in 2015. Not every strategy or intervention has been successful, but the process of trial and error has helped the city identify a set of principles and practices that together form a post-carbon urban mobility toolbox. The list of tools is not intended to be exhaustive, and each tool must be evaluated in terms of the context of its application. Additionally, transitional measures may be required to make certain tools feasible. The tools themselves, while important, cannot be effective without strong public and political will and long-term commitment and the involvement of the broader populace.

智慧城市維也納進入後碳時代：2015-2050年

自2015年通過「智慧城市策略框架」後，維也納在35年間已一躍成為全球後碳都市主義的領先城市，亦是全球城市的典範。「智慧城市策略框架」設計之初就結合「城市發展方案（STEP）2025」，其後再跟隨「城市發展方案2050」而擴大，當中值得注意的特點，是此策略很大程度地避免借助科技去解決社會及環境挑戰，不再重蹈本世紀初困擾眾多智慧城市策略的覆轍。策略在2015年定出的三大核心目標：

- (1) 徹底保育資源
- (2) 按照發展及生產的宗旨使用創新科技
- (3) 追求優質及平衡的社會生活質素

要實現這三大目標，關鍵在於自2020年已開始納入「智慧城市策略框架」的「都市韌性方案」（URP），以及「都市韌性方案」中所提到，致力在全市流動足跡中消除化石燃料的「零碳流動計劃」。都市流動能源過渡後引發非凡的漣漪效應，在減緩及調適氣候變遷、能源及食物安全、社會福祉方面都推動並激發了更廣泛的變革。

2050年的維也納，都市韌性比2015年時遠遠提高，雖然當中的部分策略或干預措施未能成功，但這些嘗試並從錯誤中學習到的過程，令這座城市得以釐定一整套原則及實踐方法，結集成一個後碳都市流動藍本。藍本並不追求詳盡徹底，每項原則或方法也需要按照實際的應用環境而審視，此外，也可能需要落實過渡性措施確保原則或方法最終變得可行。這些原則或方法本身雖然重要，但要達至成效的話，必須有強烈的公眾及政治意願做後盾，也需要長期堅持，並且得到民間廣泛支持。

A Post-Carbon Urban Ecosystem

後碳都市生態系統



Climate change and decarbonization are global challenges, and thus beyond the scope of urban planning alone to solve. Yet they are challenges cities must prepare themselves to meet, and to which cities can contribute much. How will urban areas reduce the heat island effect, protect against extreme weather events & changing weather patterns, reduce air pollution exacerbated by rising temperatures, provide sufficient food & potable water, and maintain vital ecosystem services and goods? How will they adapt to declining total & net energy, diminishing global flows of goods & services, and reduced individual mobility?

It is important to understand urban mobility as contextualized locomotion; that is, the movement of people and goods in a city happens in relation to physical spaces, perceived places, social practices, and a complex set of dynamic macro-, meso-, and micro-level conditions. The design challenge of post-carbon urban mobility, then, is to facilitate the mobility needs of people while inviting the production of urbanity and enhancing adaptive capacity. In practice, this means rejecting the car-system in cities in favor of redesigning streets, former parking areas, and networks of streets so that the greatest proportion of urban dwellers can maintain a high quality of life even as energetic, environmental, and economic conditions change.

Biologists use the term behaviorally-mediated trophic cascade to describe the ripple effect down the food chain triggered by changes to an apex species. The reintroduction of wolves in Yellowstone, for example, is thought to have stabilized river banks by reducing overgrazing by elk. In an urban ecosystem, prioritized modes of mobility play a similar role by defining public space and inviting or discouraging public life. By removing an invasive species such as the car and restoring people and human-powered mobility to the apex position, the post-carbon city street could trigger a trophic cascade that nourishes the entire urban ecosystem.

氣候變遷與去碳化是全球共同面對的挑戰，不能單憑都市規劃解決，然而城市必須做好準備迎接這些挑戰，貢獻自己的重要力量。那麼，都市地區如何能舒緩熱島效應，保障自己免受極端氣候及變幻莫測的氣候模式威脅，降低因氣溫上升而帶來的空氣污染，提供充足的食物和可飲用水，同時維持必不可少的服務及商品生態系統？當能源總額和能源淨額減退，全球商品及服務流動下降，以及個人流動減少時，都市地區又會怎樣適應？

我們需要明白的一個重點是，都市流動其實是一個在眾多影響因素下從事運動的概念，亦即城市內眾人及商品流動時，需要考慮與之相關的實際空間、認識的地點、社會習性以及一整套錯綜複雜的宏觀、中觀、微觀條件。正因如此，設計後碳都市流動的挑戰在於促進人類的流動需求之餘，同時提升都市特性與都市適應力。從實踐的層面而言，這意味着城市需要放棄汽車體系，重新設計街道、原有停車場及道路網絡，藉此讓最大比例的都市人群在能源、環境、經濟條件改變的情況下，仍能維持優質生活。

生物學家會使用行為介導營養級聯這個說法，去形容食物鏈頂端的獵食物種一旦出現變化，食物鏈下級所發生的漣漪效應。舉例來說，黃石公園重新引入狼群後，緩解了麋鹿過度啃食河岸植被的現象，河岸亦得以穩定下來。在都市生態系統裏，透過釐定公共空間，提倡或者阻止某種公共生活方式，鼓勵居民使用不同的流動方式，相信也可以發揮類似的作用，消除汽車等具侵害特性的物種，恢復人群與人類推動流動方式之間的平衡，後碳城市的街道可以引發營養級聯，繼而造福整個都市生態系統。

After Cars & Oil

後碳都市生態系統

01 Collapse

The way of the world is to change. Dynamism is a sign of health, stasis a harbinger of death. What economist Joseph Schumpeter labeled creative destruction and ecologist C.S. Holling the adaptive cycle is in fact the same multifaceted process of growth, collapse, and reorganization that can be found in all thriving ecosystems. Collapse need not be an end, however. An essential part of resilient systems involves the collapse of rigid components, which provides an opportunity of innovation and new approaches. To be resilient is to continue playing even when the game changes.

And yet, to equate the serpentine path of resilience with success is to defy the prevailing myth of our time. Writer John Michael Greer describes the narrative of human progress as “the belief that all human history is a linear trajectory that has risen up from the squalor and misery of the prehistoric past through ever-ascending stages of increased knowledge, prosperity, enlightenment, and technological sophistication, and will inevitably continue to do so into a limitless future.”⁵

All bubbles burst, however. While the past several centuries of continuous growth and innovation appear to support a linear view of progress, the work of progress requires energy, and put simply it is the abundance of cheap, high-density energy stored in fossil fuels that makes the modern world -- from transportation to industry, agriculture to healthcare, construction to communications -- and its myth of limitless growth possible.

5 Greer, J.M. (2013) Not the Future We Ordered. Karmac Books.

01 崩塌

世事常變，恆動象徵健康，停滯則意味死亡。經濟學家熊彼得（Joseph Schumpeter）所說的創造性破壞以及生態學家侯靈（C.S. Holling）所說的適應循環，其實都是同一個增長、崩塌及重組的多面向過程，這個現象亦可見於所有蓬勃發展的生態系統。不過，崩塌不一定等於終結。韌性體系的其中一個關鍵部分就涉及固有元素的崩塌，繼而為創新和新的方向提供機遇。說得上堅韌，就是即使遊戲規則改變時，仍能繼續參與其中。

然而，如果將堅韌地迂迴前進視作成功，就即等於蔑視我們這個時代普遍為大眾所接受的迷思。作家格瑞爾（John Michael Greer）把人類進步的論述形容為「堅信所有的人類歷史都是依循線型軌跡前進，透過累積知識、創造繁榮、接受啟蒙與創新科技這些持續進步的階段，擺脫以往史前的骯髒和痛苦，而且這個軌跡必將持續至無盡的未來」。

只是，所有泡沫都會爆破。過去幾個世紀的持續增長和創新，雖然表面上支持線型的進步觀，但這個過程需要能源，換言之，造就現代社會從運輸到工業、從農業到醫療、從建築到通訊各方面不斷增長的，就是儲存在化石燃料中源源不絕且廉價的高密度能源，也正因如此，現代社會可以無止境增長的迷思才得以繼續守下去。

5 Greer, J.M. (2013) Not the Future We Ordered. Karmac Books.

After Cars & Oil

02 Reclaiming Urbanity

Allan Jacobs, in his seminal work *Great Streets*, makes the obvious but profound observation that “some streets are better than others: to be on, to do what you came to do.”⁶ Great streets, for Jacobs, are ones that help make community by being open to many different types of people and activities. Great streets are physically comfortable, with protection against the elements, and they encourage participation and social interaction. Great streets are memorable, never anonymous. They always seem imbued with some inexplicable magic, a subtle alchemy that draws people in and invites them to stay. But Jacobs was not simply waxing philosophical. He was concerned with the physical, designable aspects of streets – width-height ratios, plinths, street furniture, trees, signage, materiality – and the social life such aspects might encourage or discourage. There are decipherable reasons why some streets are better than others.

Urbanity is the socio-spatial condition that emerges from the interaction of a great diversity of people and activities occurring in close proximity. Because mobility systems can define the character and spatial allocation of streets and the sorts of activities that seem welcome on them, they exert enormous influence on the public life and overall urbanity of cities. Contrary to the prevailing view of cars and traffic as synonymous with urbanity, the car-system actually contributes to the suburbanization of cities. As Enrique Peñalosa famously says, a city can be friendly to people or it can be friendly to cars, but it can't be both.

Streets are semiotic constructions; their design is never neutral. With so many demands on limited space, the design of a street must by necessity prioritize certain activities over others and even suggest where and how those activities should occur. By doing so, a street materially manifests the values of its makers. “In essence,” wrote Alain de Botton, “what works of design and architecture talk to us about is the kind of life that would most appropriately unfold within and around them. [They] hold out an invitation for us to be specific sorts of people.”⁷ Who, then, do we want to be at the dawn of the post-carbon age? What sort of social practices should streets invite? What sort of urbanity and mobility should they foster and which societal challenges should they address?

⁶ Jacobs, A. (1993). *Great Streets*. The MIT Press, Boston.
⁷ De Botton, A. (2007). *The Architecture of Happiness*. Penguin Books, London

後碳都市生態系統

02 重拾都市特性

傑科布（Allan Jacobs）在他的重要著作《城市大街》（*Great Streets*）中提出一個顯而易見但又深刻有力的觀點，「一些街道比其他的街道好：讓你樂於置身其上，讓你做你上街想做的事」。傑科布認為，好的街道有益社區，向形形色色的人和活動開放。好的街道提供舒適的環境，可以遮風擋雨，並且鼓勵人群參與以及互動；好的街道令人留下印象，不會籍籍無名，似乎總是充滿某種難以形容的魅力，猶如微妙的魔法能引人前來，然後逗留。傑科布並不是故作深奧，他關注街道各種實質的、設計上的特質，比如寬高比例、基座、街道設施、樹木、標誌、物質特性，也關注這些特質所鼓勵或窒礙的社會生活。這些明確的理由能夠解釋為什麼有些街道勝於其他街道。

都市特性是一種社會空間條件，源於相鄰地區中多元人群與活動之間的互動。由於流動體系能夠決定街道特性和空間分配，也能決定較能迎合哪些活動，因此對公共生活以至城市的整體都市特性有巨大影響。與社會普遍認為汽車和交通等同都市特性的觀點相反，汽車體系其實導致了城市郊區化。哥倫比亞波哥大市市長佩尼亞洛薩（Enrique Peñalosa）就有名言，說城市可以方便人群，或者方便汽車，但不能兩者兼得。

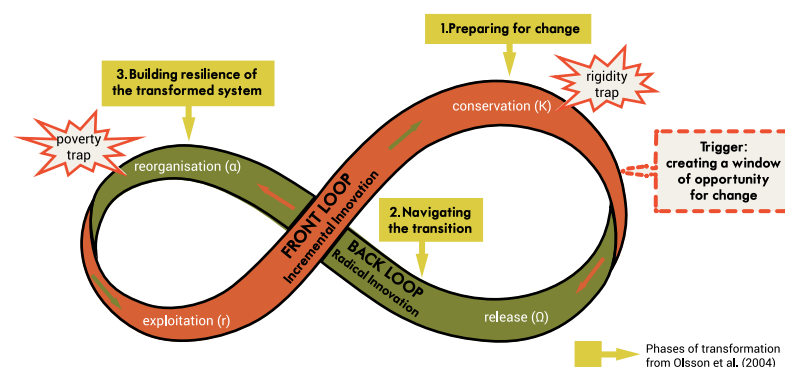
街道是符號建築，其設計永遠不會中立。空間有限，需求太多，因此街道設計時必須優先考慮某些特定的活動，甚至暗示這些活動應在哪裏進行、如何進行，這樣一來，街道以物質的形式宣示了建造人的價值觀。作家迪波頓（Alain de Botton）說，「從本質而言，設計和建築告訴我們的是，在這些設計和建築裏面或者周圍應該開展哪一種生活。〔它們〕邀請我們成為特定類別的人。」那麼，我們希望在後碳時代成為哪一類人？街道應該迎來哪些特定的社會活動？街道應該培養哪一類都市特性和流動特性，同時應該回應哪些社會挑戰？

⁶ Jacobs, A. (1993). *Great Streets*. The MIT Press, Boston.
⁷ De Botton, A. (2007). *The Architecture of Happiness*. Penguin Books, London

After Cars & Oil

03 Resilience: An infinite game

Sustainability (the ability to endure) requires resilience (the ability to absorb shocks without collapsing), and resilience depends in turn on adaptive capacity (the extent to which adaptation is possible). Referring to Holling's adaptive cycle, the particular type of human civilization shaped by the age of oil and cheap energy is nearing the end of the conservation (K) phase. Even as change begins, disordered collapse and extreme disturbances are testing our adaptive capacity. Our collective response will determine whether we slip into the rigidity trap and cling to the existing system until it collapses utterly, or trigger the opening of a window for change that leads to release, radical innovation, and reorganization.



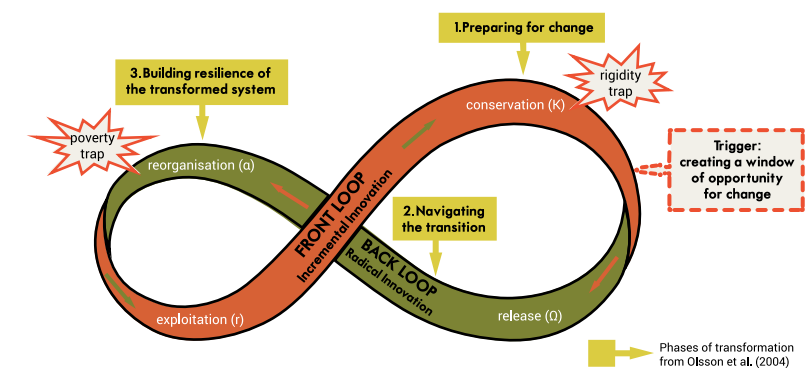
The scholar James Carse describes actions in life as being part of either finite games, which are played to be won, or infinite games, in which the goal is the continuation of the game. A multitude of factors, not least the seemingly inexhaustible supply of cheap fossil fuel, have led us to confuse the two for over a century. Material growth and the exploitation of non-renewable resources are finite games. Post-carbon urban mobility, in contrast, aims not for victory but for the resilience to negotiate the plot twists of the adaptive cycle and continue playing. After all, that's the only way to truly see the future: to make sure you can keep playing.

Given that oil is the source of focused energy we most depend on, that we are already within the period of peak oil, that the transportation sector uses the greatest share of oil, and that nearly all transportation energy comes from oil, a transition to post-carbon transport and mobility is key to building adaptive capacity. Urban mobility in particular provides an excellent opportunity for testing post-carbon concepts in minimally disruptive ways before scaling them.

後碳都市生態系統

03 韌性：無盡的遊戲

達至可持續發展，需要具有耐力作長期發展，並有賴於城市本身的發展彈性，能夠適應任何環境，調整發展的方向。參照侯靈的適應循環概念，這種由石油及廉價能源所塑造的人類文明已經接近節約（K）階段的尾聲。即使變革正在開始，無序的崩塌以及極端的紛擾也正在挑戰我們適應的能力。我們全體如何回應將決定我們的未來：墜入固步自封的陷阱，繼續抓緊現有體系不放，直至體系徹底崩塌？還是觸啟機遇之窗，走向釋放、大膽的創新以及架構重整？



學者卡斯（James Carse）把生命的種種行動分為兩類，一種是作為有盡遊戲的一部分，目標是勝利，另一種是無盡遊戲的一部分，目標是繼續參與。種種因素，尤其是廉價化石燃料似乎無窮無盡的假象，令我們過去一個多世紀以來把兩種遊戲混淆起來。物質增長與不可再生能源的開採是有盡遊戲，相反後碳都市流動並不以勝利為目標，而是堅韌地克服及適應循環中的種種變數，以及將繼續參與設為目標。歸根結底，能讓我們真正看見未來的只有這種方法：保證自己能繼續參與其中。

石油是我們最依賴的能源之源，加上我們已進入頂峰石油時期，運輸業又耗用了最大比重的石油，而且幾乎所有運輸能源都來自石油，鑒於以上各個因素，培養適應力的關鍵是過渡到後碳運輸及流動。都市流動尤其為我們提供了絕佳的機遇，讓我們在調整後碳概念的規模前，以最小干擾的方法測試這些概念。

After Cars & Oil

後碳都市生態系統

04 Utopia is not a place

There is a myth in Estonia about Ülemiste vanake, the old man of the lake. From time to time he emerges from his watery home and walks among the people of Tallinn, asking whether the city is finished. He would drown the city with a great flood, but not until the city is complete. The people of Tallinn know this, so they tell Ülemiste vanake that Tallinn is not finished, that there is still much to do, and he retreats once more into the depths. The moral of the story is that completion is death to a city. Urban ecosystems, like all other ecosystems, are dynamic. They are never static. Resilience is always being cultivated or diminished as cities navigate the various phases and traps of the adaptive cycle.

Utopia was originally a satirical term used by Sir Thomas More to mean “no place.” Indeed, perhaps the great mistake of utopian urban design has been the confusion of process with place. Utopia as a destination can never be reached because the moment of its arrival is also the moment of its death. “The way of the world is to bloom and to flower and die but in the affairs of men there is no waning and the noon of his expression signals the onset of night.”⁸ This is at once a warning against overshoot and acceptance of inevitable collapse. It is a call to know the difference between games that are finite and games that are infinite.

If cities are to endure, if they are to be worth sustaining, then utopia must be understood as a journey without end, a game in which to win means to continue playing. A truly “smart” city is one that embraces the adaptive cycle while learning to avoid its traps. Because urban mobility systems shape both spatial and social practices, and because streets are the primary form of public space in cities, a transition to post-carbon urban mobility is critical to the development of adaptive capacity. The future is a canvas upon which we will paint either the evolution of our better angels or the onset of night.

⁸ McCarthy, C. (1985). Blood Meridian. Vintage.

04 烏托邦並非地方

愛沙尼亞有一個關於湖邊老人Ülemiste vanake的傳說。傳說中，這個老人會不時離開他水中的屋子，來到城鎮塔林，然後問居民城鎮是否已經建成，一旦得悉城鎮建成的話，他就會引發洪水淹沒城鎮。塔林的居民知道他的心思，所以會告訴他城鎮還沒建成，還有很多事情要做，於是老人會回到水裏。這個故事的寓意是，城市完成建設的同時也就迎來末日。都市生態系統和其他生態系統一樣，都是動態的，永不靜止。城市在經歷適應循環的不同階段和陷阱時，韌性或在提升，或在削減，但總不會毫無損益。

摩爾（Sir Thomas More）最初發明烏托邦這個詞彙時，諷刺地包涵了這個地方子虛烏有的意思。的而且確，烏托邦都市設計的最大錯誤就是混淆了過程與地方。烏托邦是永遠無法到達的終點，因為到達的同一剎那也將走向滅亡。「世道本就是綻放、盛開、死亡，然而凡人營役不知虧盈，如日方中亦是日落西山的先兆」。這段文字既警告我們不要過度追求，亦要求我們接受無可避免的崩塌，也就是判斷哪些遊戲有盡，哪些遊戲無盡。

如果城市希望持久，希望自己值得持續，那麼必須把烏托邦理解為無盡的旅程，亦即一場繼續參與就是勝利的遊戲。真正「智慧」的城市會接受適應循環，同時學習避免墜入陷阱。由於都市流動體系同時塑造空間和社會活動，也由於街道是城市內公共空間的主要形式，因此培養適應能力的關鍵就是過渡至後碳都市流動。未來是一幅畫布，我們可以在上面描畫自己昇華，也可以描畫自己走向終結。

⁸ McCarthy, C. (1985). Blood Meridian. Vintage.

Futurama Redux



"How do we build systems that truly make us free in cities? Sometimes it takes a radical shift in the urban imagination to point the way."⁹ Visions of the future are rarely mundane -- where would the fun be in that? Whether utopian or apocalyptic, aspirational or cautionary, the future is nearly always envisioned as an extreme case. If Stendhal was right about beauty being the promise of happiness, then the Futurama was unquestionably beautiful in the context of its time. It is less so now that we have found that both the happiness and the freedom of the car-system is fleeting, and that its continuation may be a threat to our future and that of our children.

Embracing the transition to post-carbon urban mobility can mean stepping away from this dark path and changing how we view our relationship with our world, our city, and each other. It would allow for radical greening, improving our resilience to extreme weather. It would facilitate the production of urbanity by activating public space and inviting public life, and the production of food in urban areas by freeing up space and providing green urban infrastructure. If designed well and in collaboration with residents, post-carbon transition could help make us happier, healthier, and more productive.

The Futurama Redux presented here is a reimagining of an unremarkable city street in Vienna. It draws from the thinking presented throughout this exhibition and the approaches detailed in the post-carbon urban mobility toolbox. Futurama Redux is a critique of both the mechanistic technophilia of the original Futurama and the post-apocalyptic visions that dominate popular discourse concerning the end of fossil fuels and energy descent. Choosing to end the carbon age and write a bold new chapter to human history is a daunting challenge, but it is also an extraordinary opportunity. In the words of David Harvey, "The right to the city is far more than the individual liberty to access urban resources: it is a right to change ourselves by changing the city."¹⁰

9 Montgomery, C. (2014). The Happy City: Transforming Our Lives Through Urban Design.
10 Harvey, D. (2008) "The Right to the City". New Left Review 53. pp. 23-40.

Futurama Redux

「我們要怎樣構建不同的體系，才能讓我們在城市裏得到真正的自由？有時候，我們可能需要徹底調整心目中所想像的都市，才能找出方向」。未來的願景往往都不會平淡乏味，否則這還有什麼趣味可言？不管是未來是個烏托邦還是末日，征途上眾人意志高昂還是小心翼翼，我們所想像的未來幾乎總是各走極端。如果斯湯達（Stendhal）沒有說錯，美就是幸福的承諾，那麼「未來世界」在它所屬的時代毫無疑問是美麗的。只是到了現在，我們發現汽車體系中的幸福和自由都是曇花一現，而且這個體系再延續下去的話，更將威脅我們自己和子孫的未來，所以「未來世界」的美才開始褪色。

接受後碳都市流動過渡，可以代表我們正離開這條黑暗的道路，改變我們審視自身與世界、城市及人際關係的方式，也會讓身邊的環境有機會徹底綠化，同時提升我們對極端氣候的韌性。活化公共空間，迎接公共生活，繼而促進都市特性，也可以釋放空間，提供綠色都市基建，從而讓食物可以在都市地區生產。如果設計得宜，同時得到居民協助，後碳過渡可以讓我們更幸福，更健康，擁有更高生產力。

這裏呈現的Futurama Redux，重新塑造了維也納一條普通的城市街道，背後的靈感源自於這次展覽所展示的理念，使用的方法也在後碳都市流動的都市策略及概念中有所說明。Futurama Redux同時批判兩種思維，第一種是原本「未來世界」展覽所建基的機械論科技狂熱，另一種則是在有關化石燃料終結及能源衰減的公眾討論中佔了主導地位的後末世觀。選擇結束碳時代，同時為人類歷史開展新的一章，這個挑戰非常艱鉅，但也是極其難得的機遇。借用哈維（David Harvey）的話，「享用城市的權利遠大於個人享用都市資源的自由：這是透過改變城市從而改變我們自己的權利」。

9 Montgomery, C. (2014). The Happy City: Transforming Our Lives Through Urban Design.
10 Harvey, D. (2008) "The Right to the City". New Left Review 53. pp. 23-40.

Project Credits



Futurama Redux: Urban Mobility After Cars and Oil was initially developed within VIENNA DESIGN WEEK 2015 and has since been also shown in variations at the Urban Future Global Conference in Graz, at the United Nations Habitat III Regional Meeting for Europe and North America and the Future Urban Mobility Day of Stadtwerke Wien.

Futurama Redux: Urban Mobility After Cars and Oil was only possible because of the incredible support of our sponsors, the design and advisory teams, and of course VIENNA DESIGN WEEK. Many people contributed countless unpaid hours to the project for no reason other than their commitment to leaving the world, or at least some small part of it, better than they found it.

Curators: Florian Lorenz & Joshua Grigsby / Smarter Than Car

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Smarter Than Car is a Think Tank for future urban mobility and post carbon urbanism. Our work includes research, curation, moderation, event-coordination, education and design across various scales. We see mobility as key factor for prosperous urban development in light of climate change and resource depletion. We investigate, develop, test and communicate new approaches for the layout and use of urban spaces and the organisation of mobility.

Smarter Than Car was founded in 2010 in Beijing, China and is since 2012 also operating from Vienna, Austria. It is an Associate Partner of the United Nations World Urban Campaign, partner in the Sustainable and Low-carbon Transport (SLoCaT) Partnership and Content Partner of the Low Carbon City Forum.

Key projects (selection):

- Beijing VIP Bike Parking (2016)
- Futurama Redux: Urban Mobility After Cars + Oil (2015)
- Fourth World Bicycle Forum. Medellín, Colombia. (2015)
- Bicycle Urbanism Unit. Skopje, Macedonia (2014)
- Accessibility of Vienna's Bikesharing System „CityBike Wien“ (2014)

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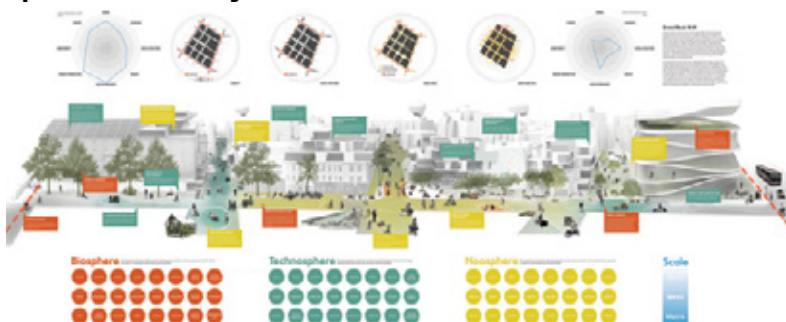
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SMARTER THAN CAR

URBAN MOBILITY AFTER CARS AND OIL

The exhibition explores the impact of energy transition on urban mobility in Vienna to create a new vision for a post-carbon city in 2050.



EXHIBITION DETAILS 展覽詳情

DATE
日期 30/9/2016 - 16/10/2016
2016年9月30日至10月16日

VENUE
地點 3/F City Gallery, 3 Edinburgh Place, Central
中環愛丁堡廣場3號展城館三樓

OPENING HOURS
開放時間 10am - 6pm (closed on Tue except Public Holidays)
上午10時至下午6時 (逢星期二休館，公眾假期除外)

SEMINAR

研討會

DATE
日期 30/9/2016
2016年9月30日

VENUE
地點 3/F City Gallery, 3 Edinburgh Place, Central
中環愛丁堡廣場3號展城館三樓

TIME
時間 6:30pm - 8:30pm
下午6時30分至8時30分

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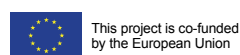


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