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开采景观的再造

The Reworking of Landscapes of Extraction

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摘要 ……

在不断推进的城镇化、粮食与水资源紧缺、能源资源消耗、环境退化等种种现实下，区域主义再次成为我们审视那些构成当代景观的驱动力和参与者的批判框架。在这一背景之下，本文的核心内容为“流的重组”，该方案为“转变中的城市——低碳未来（2012）”国际设计竞赛的获胜方案[①]。这一方案构想了一种工业过程、生态系统与文化网络的流相互交织的动态空间布局方式。通过对区域尺度上的各种叠加的参与者、场所和活动的可视化与设计，“流的重组”以目前废弃的产品为资本，将其转化为有价值的资源。由此，方案的重点从设计结构定式和硬性基础设施转变为提出干预策略，以激活存在于现状景观结构中的潜力。

关键词 ……
人类纪；区域主义；开采景观；流的重组

Abstract ...

With the realities of ongoing urbanization, food and water scarcity, depleting energy resources and environmental degradation, regionalism is re-emerging as a critical framework to study the forces and actors that shape our contemporary landscapes. Within this context, this paper focuses on Reassembling Flows; the winning entry of a recent international design competition entitled "Transiting Cities — Low Carbon Futures (2012)"[①]. The project envisions a dynamic spatial arrangement of interconnected flows of industrial processes, ecological systems, and cultural networks. By visualizing and designing the various overlapping actors, loci and activities on a regional scale, Reassembling Flows capitalizes on currently discarded waste products and transforms them into valuable resources. Here, the emphasis shifts from designing fixed and hard infrastructures to strategic interventions that activate latent potentials of already existing landscape structures.

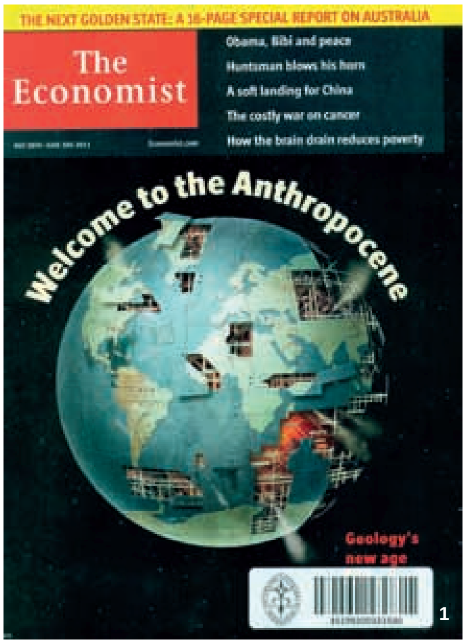
Key words ...
Anthropocene; Regionalism; Landscapes of Extraction; Reassembling Flows

人类纪的设计

我们面对的不再是一种孤立的自然，而是社会过程与自然过程交织在一起而难以区分的环境。诺贝尔奖获得者化学家保罗·克鲁岑创造出了“人类纪”[1]一词，以表述在过去的两个多世纪中人类活动对地球的地质与生物圈状况及过程带来了显著的改变（图1）。至20世纪早期，为获取燃料（资源开采）和粮食生产（农业）而进行的大规模土地开垦，导致世界上一半的陆地生态系统由自然的系统转变为人类活动产生的系统[2]。在“千年生态系统评估”所评估的24项生态系统服务中——诸如食物和淡水供给、病虫害防治、养分循环和气候调节——15项已严重退化或其利用方式不可持续[3]。这意味着社会不能再仅仅依靠自然的产品和服务来为未来的世代提供可持续的基础。在对食物、水、垃圾和能量的流动进行修复、设计以及公平分配中，我们应担当起主动的、负责的角色。在这一点上，概念竞赛为探索新的途径和策略以解决紧迫的社会、经济和环境问题提供了关键的平台。同样，它们提供了一个去重温、重构或应用理论框架以应对特定的场地挑战的机会。

在这一语境下，本文探讨了国际竞赛“城市转变——低碳未来（2012）”的获奖设计方案“流的重组”。该竞赛由墨尔本皇家理工大学都市转型研究办公室举办，要求设计者为澳大利亚维多利亚州拉筹伯市如何从煤炭资源型经济转型为可再生能源和替代能源型经济提出方案。拉筹伯市中坐落着许多世界上CO_2排放量最高的发电厂，拉筹伯的工业土地目前的利用方式导致城市环境付出了巨大的代价（图2）。除了温室气体排放之外，矿藏的开采是地表水和地下水污染的主要来源。江河溪流和地下含水层中大量的水被抽取以满足采矿以及以灌溉为主的农业的需求，这致使土壤状况不稳定、河岸崩决的几率增加。而且，密集的养牛业产生了大量的粪便，这些粪便目前堆积于面积有限且径流和下渗能够进入土壤和地下水的池塘中（图3）。

作为年轻的从业者和学者②，我们对在景观、生态和城市化的交叉点来发展空间策略有着共同的关注，并被竞赛说明中所展现的复杂性深深吸引。在资源稀缺（能源、食物、水和矿物）、环境退化、气候变化、金融动荡、生物多样性丧失和人口持续增长的现实中，该竞赛提供了一个机会让我们来设想如何再造开采景观，使其既具生产性，又能使人类利用与自然资源管理之间保持可持续性的关系。德国有一些被广为报道的项目（例如北杜伊斯堡景观公园和国际建筑展览会场地），主要为将废弃矿区转型为文化景观的策略，除此之外，也有一些探索从活跃的采矿业转型为替代形式的生产性景观的案例。因此，在为该项目广泛地搜寻解决方案时，我们重温了历史先例和方法——尤其是20世纪早期至中期在美国和欧洲发展起来的区域性规划方法。



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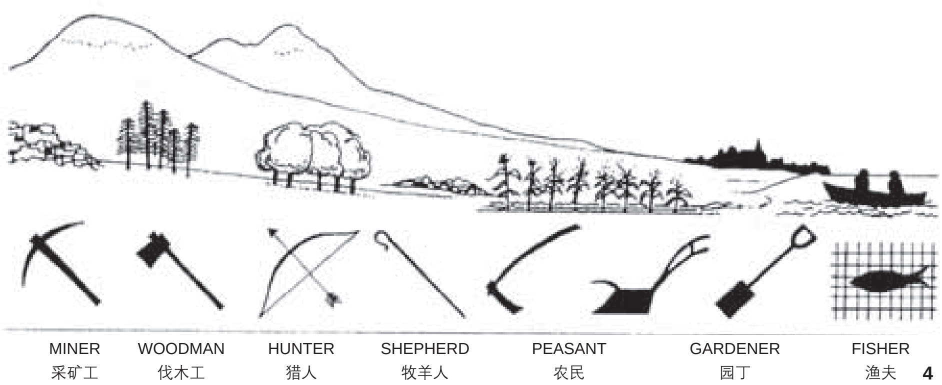

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区域主义：山谷剖面和地质技术学

100多年前，苏格兰社会学家及城市规划专家帕特里克·格迪斯写道：“城市建设需要整个区域的支持”[4]。格迪斯因为将“山谷剖面”引入规划与设计领域而声名鹊起，他提供了一种基于地理、生态、经济和人类定居的动态关系的对城市景观进行解读的方式（图4）。格迪斯与他的同时代人——包括霍华德·奥德姆、刘易斯·芒福德和本顿·麦凯耶——最早认识到城市中心依赖于更广大的地理区域的资源和服务，而不是将城市视为一个孤立隔绝的单元。芒福德认为，区域主义者“试图规划这样一个地区，其所有的场地和资源——从森林到城市，从高地到水平面——得以良好发展，人口将会被分散，自然优势将得以利用，而非消减或摧毁……人口、工业和土地将被视为一个整体。”[5]

因此，这些区域主义者们注重利用和激活已存在的景观结构的潜在可能，而非采用大量的建设工程。尤其是麦凯耶，他认为区域性景观是通过物质和服务的流相连结的。通过跟踪这些经济和生态活动并将其可视化，麦凯耶试图实施能从根本上改变和重构区域逻辑及运作的机制（图5）。麦凯耶强调地貌演化和技术过程在塑造景观中的重要性，创建了结合“地理学、林业和保护、工程、定植、区域规划和经济学”的综合学科——地质技术学。地质技术学关注生物物理过程和灵活的组织方式，而非设计建筑物和结构的固定形态。麦凯声称：“规划是发现而不是发明。这是一种新的探险，其精髓是将现实中已存在的潜力显现出来……工程师在规划时，他所画的不仅是横跨山脉的一条线；他规划的是人和物质的流动。所以总体而言：规划最后规划的不仅是地区或土地，而是流动或活动。”[6]

再造地理：流的重组

我们追随这些早期区域主义者，将拉筹伯理解为一个由工业过程、生态系统和文化网络的流相互联系在一起的动态空间

1. 《经济学家》杂志封面——“欢迎来到人类纪：一个人造的世界” © The Economist, 2011
2. 堤防失效后的雅洛恩矿区的洪水 © Office of Urban Transformations Research, 2012
3. 毗邻黑泽伍德电站及冷却池的农业牧场 © Office of Urban Transformations Research, 2012
4. 山谷剖面 © Patrick Geddes

1. A cover of *The Economist* — Welcome to the Anthropocene: A Man-made World © The Economist, 2011
2. Flooding of the Yallourn Coal Mine after stream bank failure. © Office of Urban Transformations Research, 2012
3. Agricultural pasture with Hazelwood Power Station and Cooling Pond in the background © Office of Urban Transformations Research, 2012
4. The Valley Section © Patrick Geddes

组织。通过绘制和可视化多个尺度上各种不同的、重叠的参与者、场所和活动，我们能够将文化、环境和经济重要的场地和网络可视化（图6）。同时，还对现有工业和农业实践所产生的废物（诸如粪便、加工废水、温室气体）的位置和数量进行了深入调查。因此，该方案的一个关键部分旨在把这些目前废弃的“废”品转变为宝贵的资源——在负担中创造机遇（图7，8）。

（1）能源生产：方案包括了在各种尺度操作的可再生能源技术，以解决区域电力需求并提供离网型电力机遇。来自江河溪流的水被存储和利用起来以供给新的黑泽伍德抽水蓄能电站，而从吉普斯兰的奶牛农场收集的粪便，成为雅洛恩矿西部的氢电设施的燃料（图8）。

（2）防洪和蓄水：为了减少洪涝灾害，一个新的滨水缓冲区和防洪公园系统沿着主要的河流水系布置，通过洪泛区域来截获、滞留、净化和再利用水资源，用于生态系统发展和能源生产。洛依扬电站和雅洛恩矿的东部被改造为巨大的“湿地机器”和防洪公园。此外，设计了开放的石灰石管道以中和酸性的矿区排水，为水净化提供了一个长期的解决方案（图8）。

（3）创新农场实践：牛奶、牛肉和牛犊肉是吉普斯兰最重要的农产品，占该地区总产值的75%。农场不仅仅是食物来源，而且也是拉筹伯的替代能源项目中重要的组成部分，牛粪中的甲烷气体可转变为电力（氢能及其他能源），出售给当地电网（图9）。

（4）城市发展和研究：煤矿的关闭以及对创新型能源生产设备的引进为城市的发展和吸引受过良好教育及培训的劳动力提供了巨大的机会。弃用的铁路轨道被改装成高速电车线，连接起莫韦尔和莫依的城市中心。这一系统将成为串联起新的文化、教育和研究枢纽的中心轴线（图9）。

（5）休闲和栖息地发展：将现有的交通线下部的空间转变为一个线性公园，连接起现有的和未来的城市中心的电力线路将迈进新的替代型能源发展模式。而且，采矿点修复区和滨河缓冲带将成为重要的野生动物廊道，被现有的采矿业和农业活动切断的栖息地将被连接起来，以保证栖息地的连续性（图9）。

通过将开采景观逐渐转变为一个社会、环境和经济交流不断发生的可持续的网络，这一项目改变了现有基础设施的用途，使资源利用最优化，并将生态系统服务结构性地整合进各个尺度上的设计过程中。在此，项目的重点从设计结构定式或者硬性基础设施转变为能够激活区域景观中已存在的潜力的策略和干预（图10）。同时，通过设计生态基础设施，该项目的目标是重新建立人类与动态的景观过程之间的联系，并对传统的基础设施进行拓展使其发挥新的功能。因此，这些新的空间组织，在人类尺度和常常存在于人类感知范围以外的更大的（基础设施的）环境之间建立起联系。**LAF**

致谢

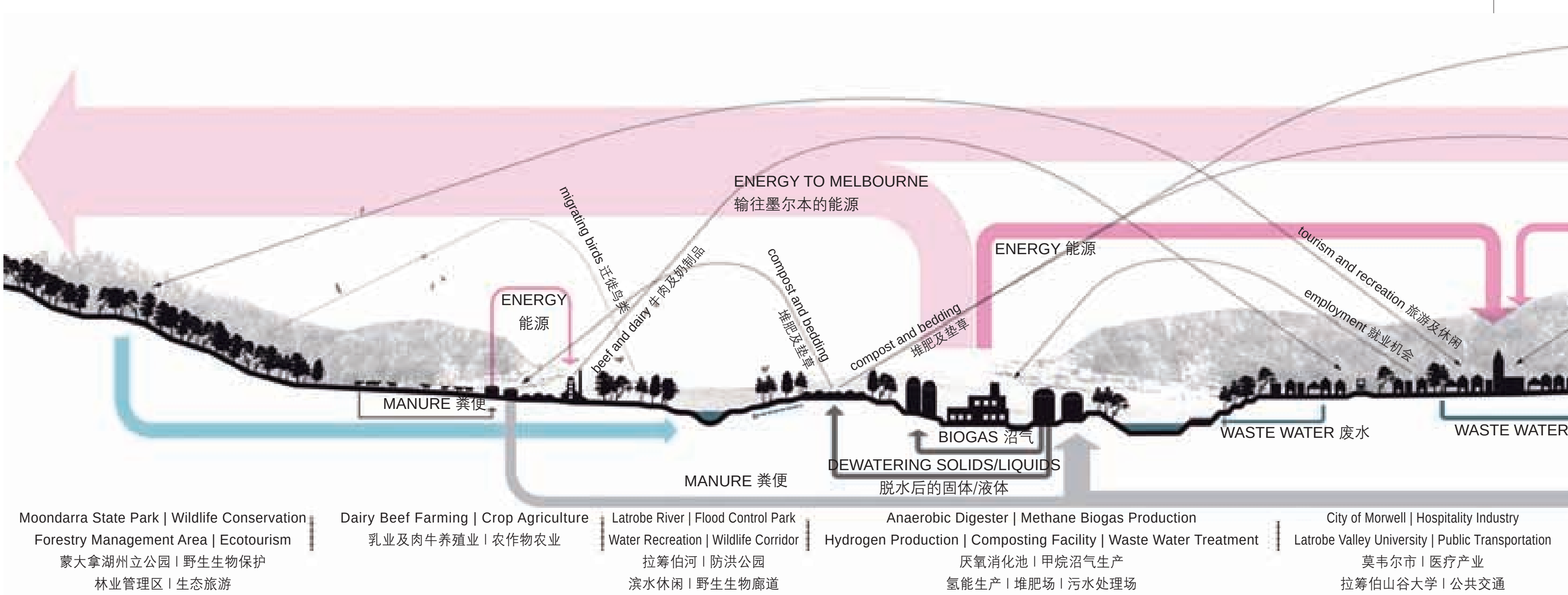
感谢丁宇和梅丽莎·郝与我在“流的重组”的概念方案和设计中的密切合作。

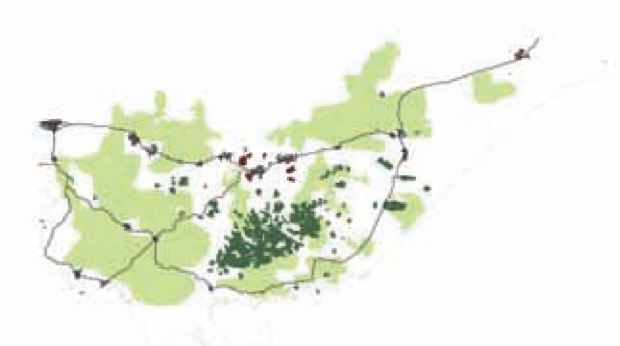
注释

① 本摘要部分来源于该设计竞赛的获胜团队——Parallax Landscape设计团队——所撰写的内容。

② 该方案是由来自纽约Michael Van Valkenburgh and Associates设计事务所的丁宇，圣路易斯华盛顿大学建筑学院助理教授基斯·洛曼，以及纽约Ken Smith景观事务所的研习设计师梅丽莎·郝共同合作完成。

5. 可视化隐藏的关系 © Parallax Landscape
6. 流的重组：资源最优化 © Parallax Landscape
5. Visualizing Hidden Relationships © Parallax Landscape
6. Reassembling Flows: Resource Optimization © Parallax Landscape





Production

Utilize decommissioned coalmines to develop innovative and alternative energy generation systems.
Design linkages so that waste from one industry becomes a resource for another.
Limit externalization of industrial processes, including emissions, waste fluids and sewer outflows.
Capture and process manure from dairy farm industry. Expand of agro-forestry networks.

产品

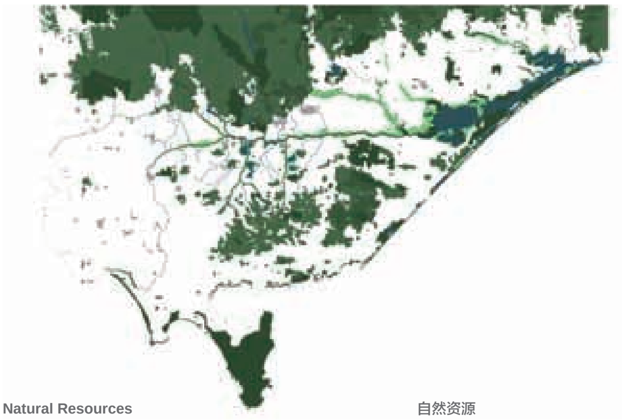
利用停产的煤矿来开发创新型和替代型的能源生产系统。
用设计建立起联系，将一种工业中的废物转变为另一种工业中的资源。
限制工业生产过程，包括废弃物、废液以及污水管道排放。
收集并处理来自奶牛养殖业中的粪便。扩展复合农林网络。

Mobility

More frequent V / Line train service.
Expanded regional bus routes and connections.
Improved regional biking and hiking trails connecting Latrobe to Gippsland Lake, Wilsons Promontory National Park and Alpine National Park.
Development of camp sites, bed / breakfast establishments and other hospitality accommodations.

流动性

增加V/Line列车的发车频率。
增加区域公交线路和联系。
完善区域自行车及步行线路，将拉筹伯市与吉普斯兰湖、威尔逊岬国家公园、以及阿尔卑斯山国家公园连接起来。
发展露营区、住宿/早晨设施，以及其他疗养住宿。



Natural Resources

Expand natural resource management programs.
Continue habitat restoration projects and provide new wildlife corridors.
Develop interwoven system of riparian buffers to slow down and cleanse agricultural water runoff.
Limit urban development in flood plains.
Utilize decommissioned mines as places for water storage and waste treatment.
Involve communities in environmental stewardship and education initiatives.

自然资源

扩展自然资源管理项目。
继续发展栖息地修复项目并提供新的野生动物廊道。
建立交织的滨水缓冲带系统以减缓和净化农业径流。
限制洪泛区域内的城市开发。
将废弃的矿区改造为储水和污水处理的场地。
使社区参与到环境管理和教育的活动中来。

Networked Ecologies

Reassembling Flows strengthens existing networks while proposing new systems that establish connections among multiple distributed sites. These connections facilitate movements and activities that gain complexity by their spatial relationship to each other.

生态网络

“流的重组”在扩展现有的网络的同时，提出了一个建立分散的场地间联系的新系统。这些联系促进了流动与活动，通过它们相互之间的空间关系来提升场地生态的复杂度。

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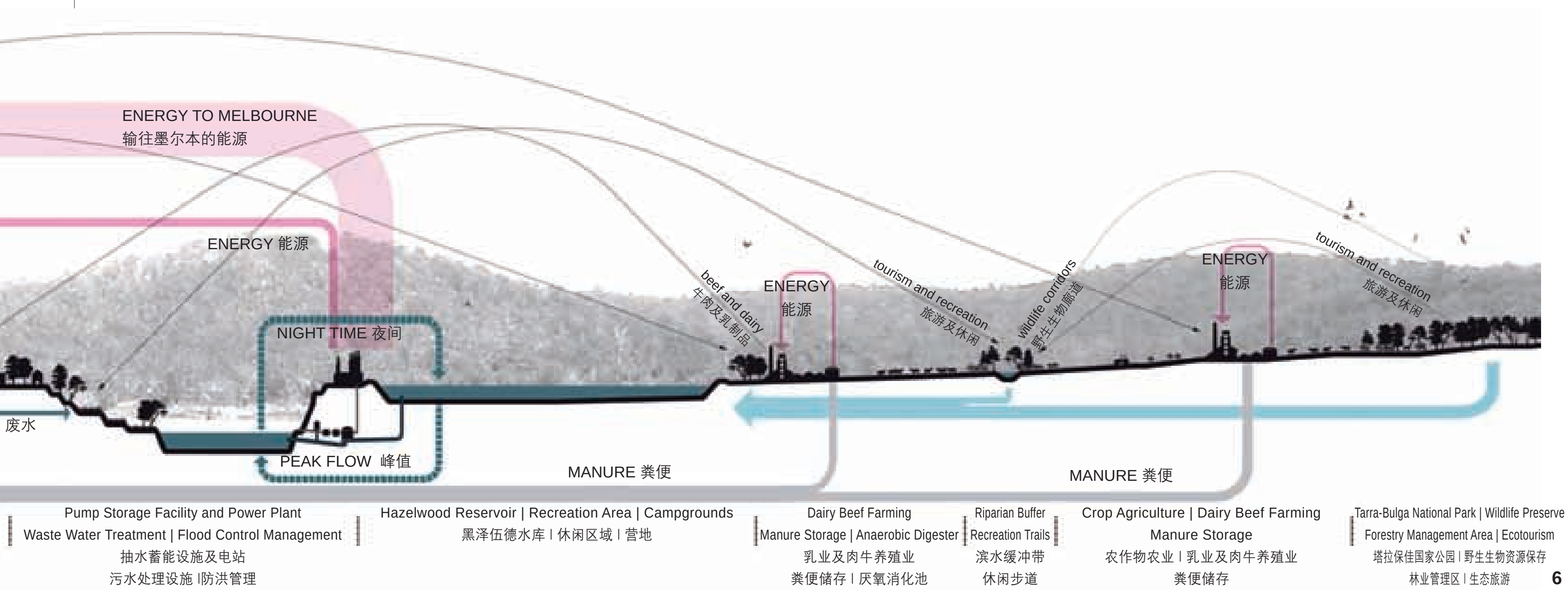

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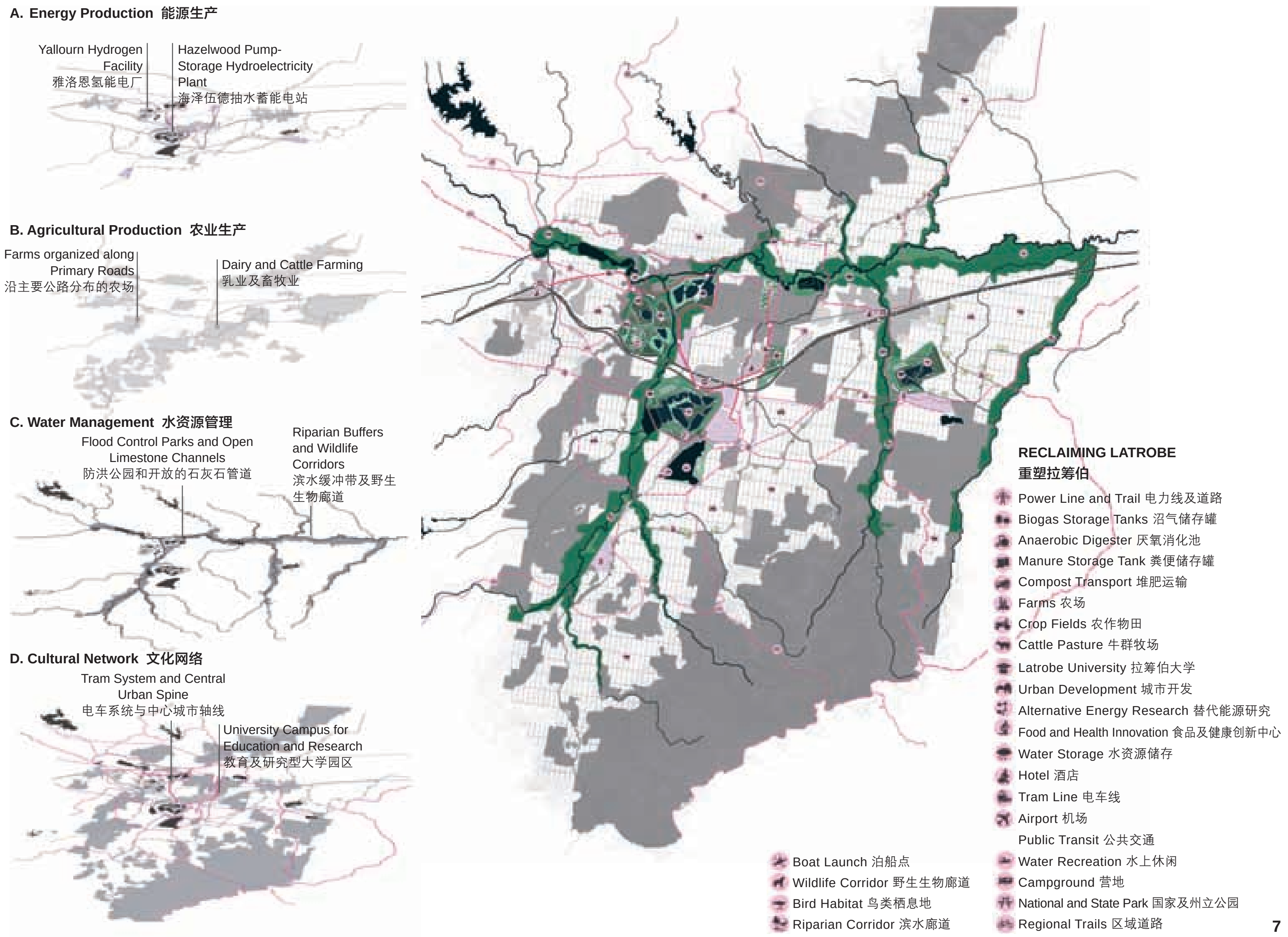

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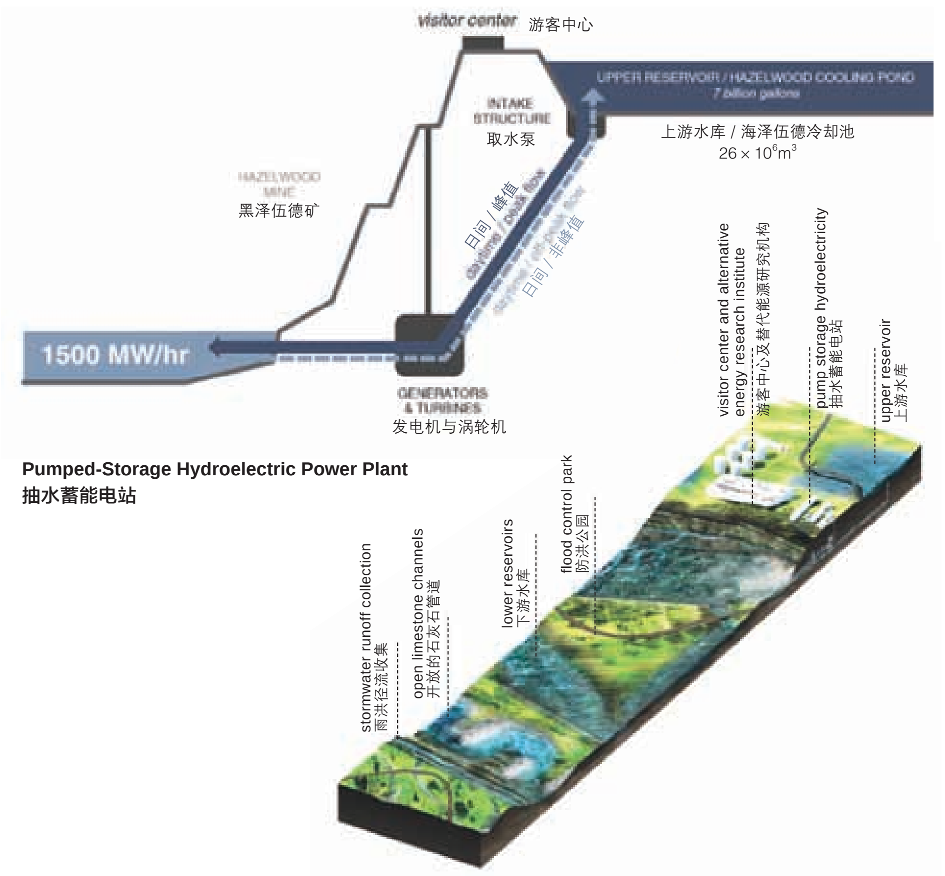
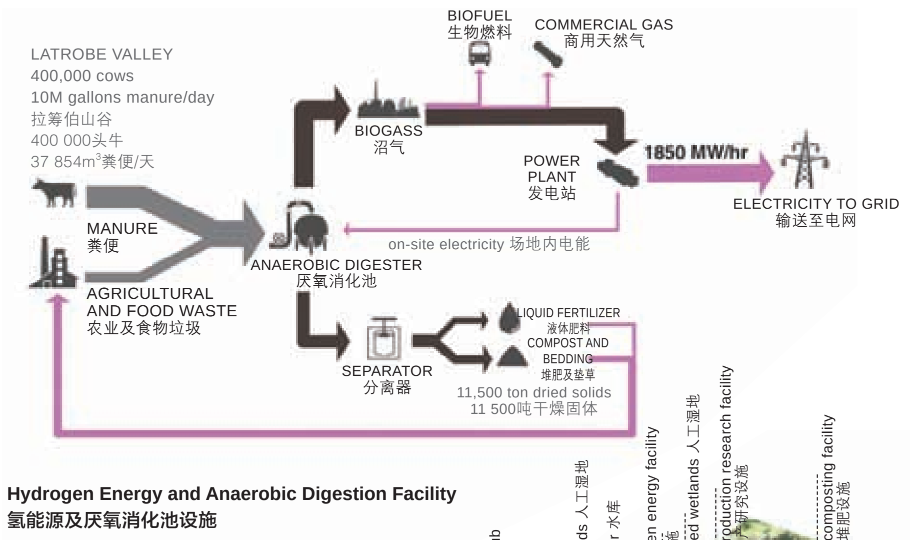
Design in the Anthropocene

We are no longer confronted with an indifferent kind of nature but with an environment characterized by a profound blurring of social and natural processes. Nobel Prize winning chemist Paul Crutzen coined the term Anthropocene[1] to denote that over the past two centuries human actions have significantly altered the earth's geologic and biospheric conditions and processes (Fig. 1). By the early 20th century, as a result of large scale land-clearing operations for the purposes of securing fuel (resource mining) and food production (agriculture), half of the world's land ecosystems had already been converted from mostly natural to anthropogenic[2]. Of the 24 ecosystem services assessed by the Millennium Ecosystem Assessment — such as provisioning of food and fresh water, disease and pest control, nutrient cycling, and climate regulation — 15 were found severely degraded or used unsustainably[3]. This means society can no longer solely rely on natural goods and services to provide a sustainable basis for future generations. We need to take an active and responsible role in restoring, designing, and equitably distributing flows of food, water, waste and energy. Here, ideas competitions provide critical platforms for exploring new approaches and strategies to address pressing social, economic and environmental issues. In the same way, they offer an opportunity to revisit, reframe or apply theoretical frameworks to meet specific site challenges.

Within this context, this article explores Reassembling Flows, the winning design proposal of the international design competition Transiting Cities — Low Carbon Futures (2012). Organized by the Office of Urban Transformations Research at Melbourne's RMIT University, the competition challenged designers to propose how Latrobe, a city in Victoria, Australia, could transition from a coal-based economy to an economy based on renewable and alternative energy resources. Home to a collection of the highest-emitting carbon dioxide power plants in the world, current industrial land use practices in Latrobe come with tremendous environmental costs





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7. 社会-经济系统 © Parallax Landscape
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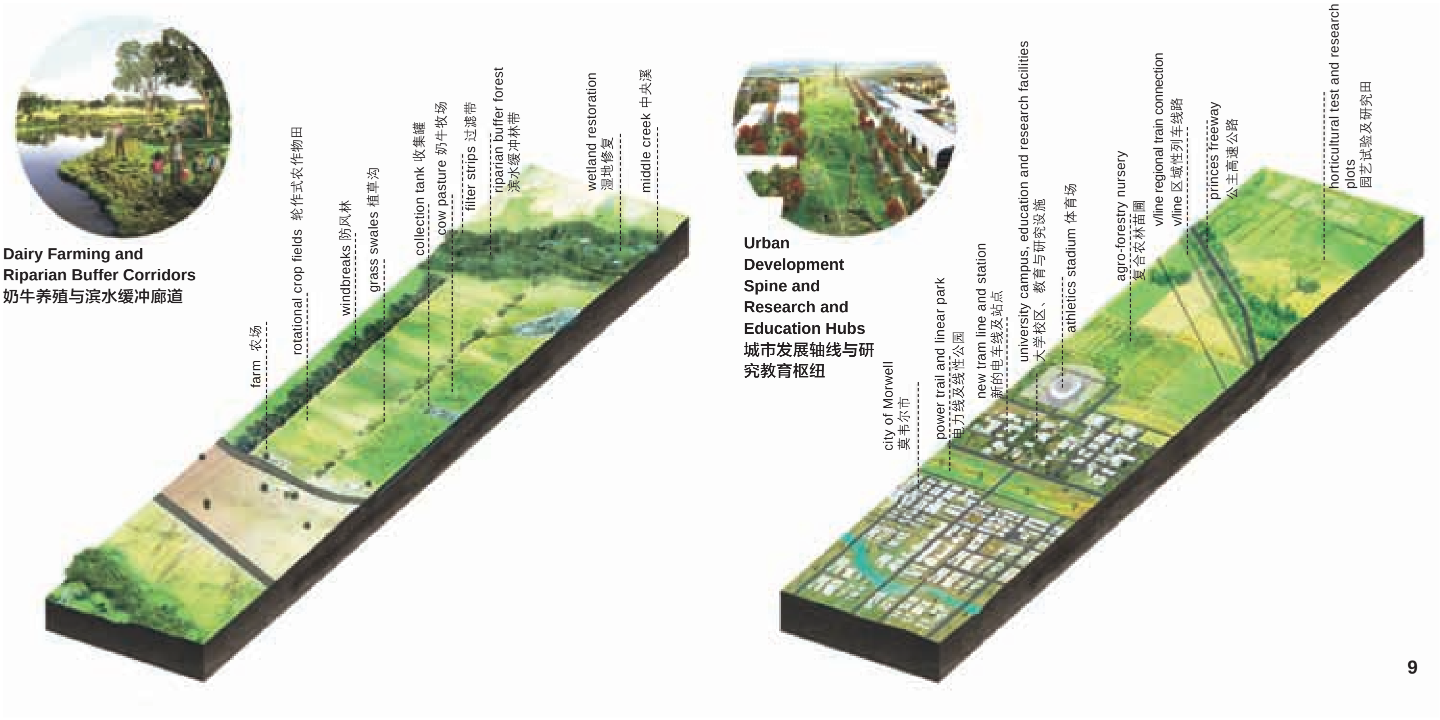
7. Social-ecological systems © Parallax Landscape
8. Renewable energy technologies and water management © Parallax Landscape

(Fig. 2). Beyond greenhouse gas emissions, mining operations are the major source of surface and groundwater pollution. Large amounts of water are extracted from rivers, streams and aquifers for mining operations and irrigation-based agriculture, causing destabilization of soil conditions and increasing chances of riverbank failures. Moreover, intensive cattle and dairy farming operations produce large amounts of manure, which is currently contained in inadequately sized lagoons that allow for runoff and infiltration into the soil and groundwater (Fig. 3).

As young practitioners and academics② with a shared interest in developing spatial strategies that operate at the intersection of landscape, ecology, and urbanism, we were intrigued by the complexity of the issues presented in the competition brief. Amidst the realities of resource scarcity (energy, food, water and minerals), environmental degradation, climate change, financial instability, loss of biodiversity, and ongoing population growth, the competition offered an opportunity to imagine how landscapes of extraction could be reworked to allow for productive, yet sustainable relationships between human occupation and natural resource management. Besides a number of well-documented projects in Germany [such as Landschaftspark Duisburg-Nord and the Internationale Bauausstellung (IBA) Fürst-Pückler-Land] that deal primarily with strategies to transform abandoned mining areas into cultural landscapes, there are few examples of projects that explore the transition from active mining operations to alternative forms of production landscapes. As such, in search of informative ways to approach the project, we revisited historical precedents and methods — specifically regional planning approaches developed during the early to mid-20th century in the United States and Europe.



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Regionalism: The Valley Section and Geotechnics

More than a century ago, Scottish sociologist and urbanist Patrick Geddes wrote: “it takes a whole region to make the city”[4]. Widely known for introducing the ‘Valley Section’ to the fields of planning and design, Geddes provides a reading of the urban landscape based on dynamic relationships among geography, ecology, economy and human settlement (Fig. 4). Instead of looking at the city as an isolated unit, Geddes and his contemporaries, including Howard Odum, Lewis Mumford and Benton MacKaye, were among the first to recognize that urban centers are dependent on resources and services provided by a larger geographic area. According to Mumford, the regionalist “attempts to plan such an area so that all its sites and resources, from forest to city, from highland to water level, may be soundly developed, and so that population will be distributed so as to utilize, rather than to nullify or destroy its natural advantages.... It sees people, industry and the land as a single unit.” [5]

As such, instead of proposing extensive building projects, these regionalists focused on harnessing and activating latent potentials of already existing landscape structures. MacKaye, in particular, understood regional landscapes as connected through flows of materials and services. By tracking and visualizing these economic and ecological movements, MacKaye sought to implement mechanisms that would fundamentally shift and re-order regional logics and operations (Fig. 5). Emphasizing the importance of geomorphological and technological processes in shaping landscape, MacKaye invented the hybrid discipline geotechnics, which combines “geography, forestry and conservation, engineering, colonization, regional planning, and economics”. Geotechnics focused on biophysical processes and flexible organizations, rather than planning fixed configurations of buildings and structures. MacKaye stated: “Planning is discovery and not invention. It is a new type of exploration. Its essence is visualization a charting of the potential now existing in the actual.... The engineer plans for something more than a line across the mountain; he plans for movement of freight and passengers. And so with planning generally: the final thing planned is not mere area or land, but movement or activity”.[6]

Reworking Geography: Reassembling Flows

Following these early regionalists, we began to see Latrobe as a dynamic spatial arrangement of interconnected flows of industrial processes, ecological systems, and cultural networks. By mapping and visualizing the various overlapping actors, loci and activities on multiple scales, we were able to visualize the sites and networks of cultural, environmental and economic importance (Fig. 6). At the same time this methods also provided insight on the location and quantity of waste products generated by existing industrial and agricultural practices (such as manure, processed waste water, greenhouse gases). Consequently, a key component of the proposal aimed to transform these currently discarded “waste” products into valuable resources — creating opportunities from liabilities (Fig.7, 8).

(1) Energy Production: the proposal incorporates renewable energy technologies that operate on various scales, addressing

both regional power demands and off-grid opportunities. Water from rivers and streams is stored and used as part of the new Hazelwood Pump Storage Hydroelectricity Power Station, while manure collected from the dairy farms across Gippsland becomes fuel for a Hydrogen Electricity Facility in the western part of the Yallourn Mine (Fig. 8).

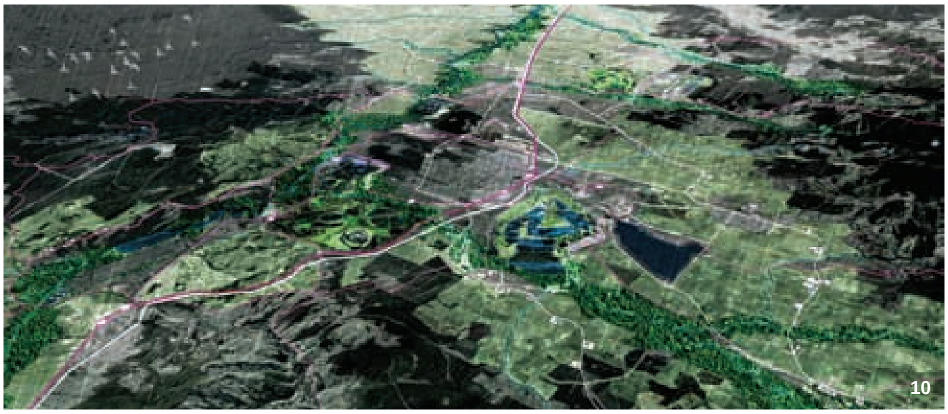
(2) Flood Control and Water Storage: in order to mitigate floods, a new system of riparian buffers and flood control parks along major rivers and creeks within flood plains capture, detain, cleanse and reuse water for ecosystem developments and energy generation. Loy Yang Power Station and the eastern area of Yallourn Mine are repurposed as enormous wetland machines and flood control parks. In addition, open limestone channels are designed to neutralize acid mine drainage, offering a long-term solution for cleansing water (Fig. 8).

(3) Innovative Farming Practices: milk, beef and veal are Gippsland's most important agricultural products, contributing up to 75 % of the region's gross product. More than just food sources, farms become important components in Latrobe's alternative energy program, converting methane gas from cow manure into electricity (hydrogen production and others) that can be sold to local power grids (Fig. 9).

(4) Urban Development and Research: the closing of the coal mines and introduction of innovative energy production facilities provides opportunities for urban development and expansions of a well educated and trained workforce. Decommissioned railroad tracks are retrofitted into a high-speed tram line, linking the urban centers of Morwell and Moe. This system becomes the central spine into which new cultural, education and research hubs can be connected (Fig. 9).

(5) Recreation and Habitat Development: the spaces below existing transmission lines are transformed in linear parks, celebrating the power trail that connects existing and future urban centers to the new alternative energy developments. Furthermore, the system of reclaimed mining sites and riparian buffers function as important wildlife corridors, connecting and providing continuity to habitats currently cut off by mining operations and agricultural practices (Fig. 9).

By proposing a gradual shift over time from a landscape of extraction to a sustainable network of social, environmental and economic exchanges, the project repurposes existing infrastructures, optimizes resource utilization, and structurally integrates ecosystem services into design processes across multiple scales. Here, the emphasis shifts from designing fixed or hard infrastructures to strategies and interventions that activate the hidden potentials already existing in regional landscape (Fig. 10). Moreover, through the design of ecological infrastructures, the project aims to reconnect people with the dynamic landscape processes as well as incorporating the performative aspects of traditional infrastructures. As such, these new spatial arrangements create an interface between the human scale and larger (infrastructural) environments that often exist outside the range of human perception. LAF



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① The author of this abstract was part of the winning entry by the Parallax Landscape design team.

② The design collaborative consisted of Yu Ding, designer at Michael Van Valkenburgh and Associates in New York; Kees Lokman, assistant professor of landscape architecture at Washington University in St. Louis, Mo.; and Melissa How, designer at workshop of Ken Smith Landscape Architect in New York.

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