

## Aula de Título

### Urbanismos Productivos en Madera.

### Flujos Metabólicos y la Construcción del Territorio

Aula de Título Marzo 2015

Facultad de Arquitectura, Diseño y Estudios Urbanos de la Pontificia Universidad Católica de Chile.

**Tomás Folch** – Universidad Adolfo Ibañez

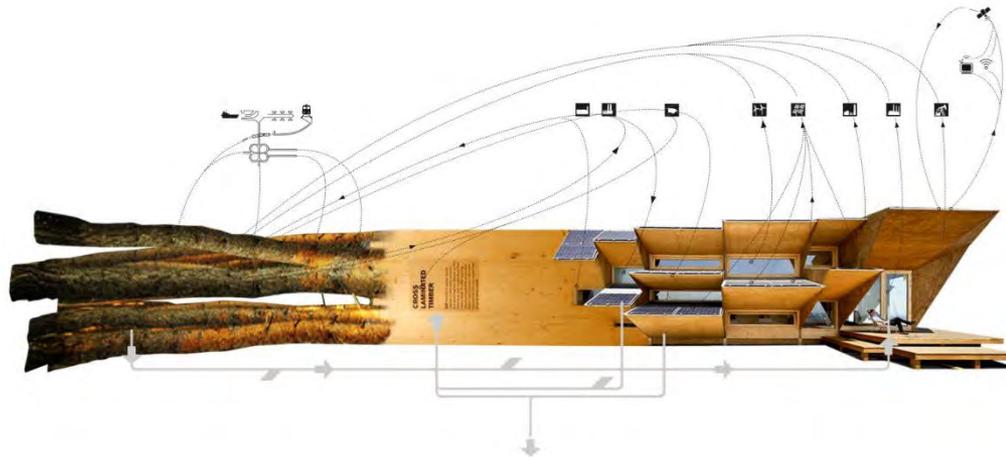
**Daniel Ibañez** – Harvard University Graduate School of Design

con

*Centro de Innovación y Desarrollo de la Madera – Pontificia Universidad Católica*

*Centro de Ecología, Paisaje y Urbanismo UAI*

*Energy and Environment Design Lab – Harvard GSD*



## Material

De los múltiples flujos y lugares que forman parte del metabolismo de urbano de ciudades y sus arquitecturas, la madera ofrece múltiples singularidades de gran relevancia para arquitectos, diseñadores, paisajistas, urbanistas y planificadores territoriales: primero que la madera es tanto flujo material como flujo energético. La madera es un material para construirse un alojamiento, a la vez que un recurso energético combustible; segundo, la madera a escala molecular posee unas capacidades que la sitúan como buen material estructural, y a la vez, como buen aislante, es decir, es un material autosuficiente, algo no muy frecuente en las arquitecturas multicapilares actuales; tercero, la madera, es un flujo con formas visibles en varios momentos de su ciclo material, es mapeable y auditable, desde su régimen forestal o su materialización en una arquitectura hasta un mueble; y por último, es un flujo material que comparte ciclos temporales más alineados con los ciclos del entorno construido. Un árbol tarda 20 a 30 años en crecer, tiempo medio de la vida de un edificio genérico oscila los 40-50 años.

# au

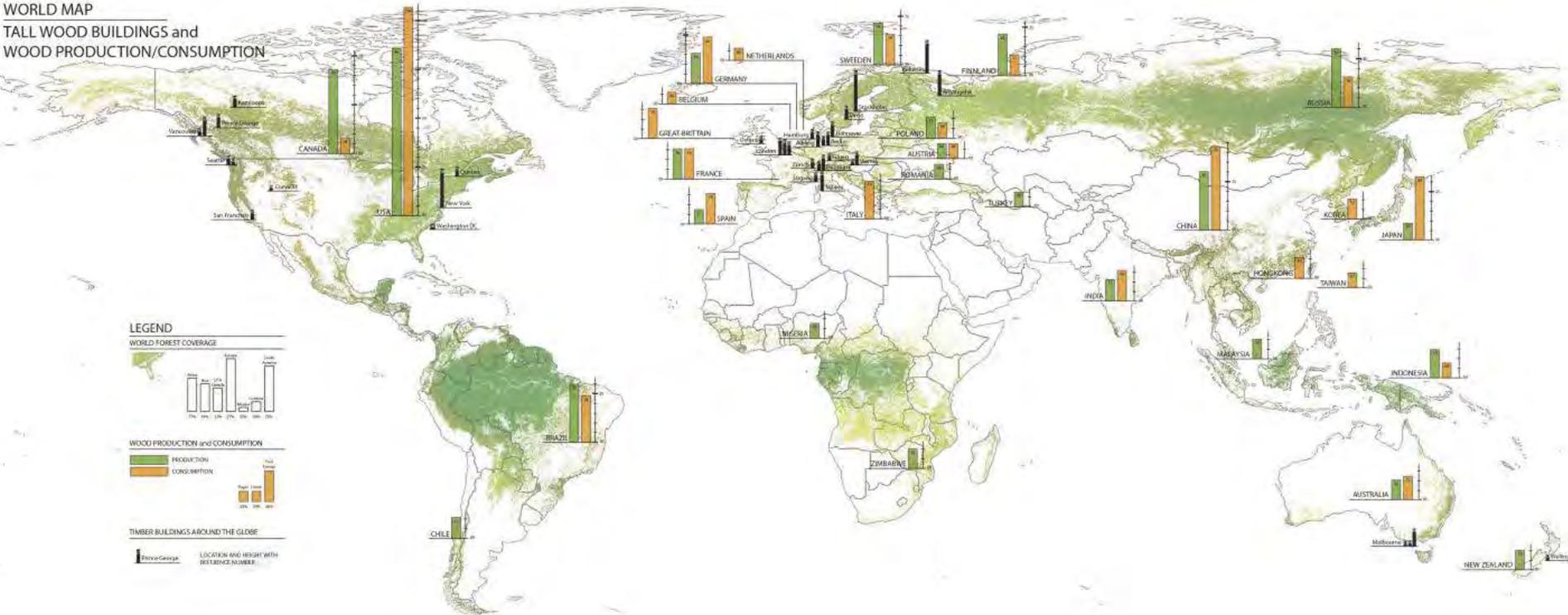


HARVARD UNIVERSITY  
FRANCES LOEB LIBRARY  
GRADUATE SCHOOL OF DESIGN

JUL 14 2014

New Landscapes of  
Wooden Architecture

**WORLD MAP**  
**TALL WOOD BUILDINGS and**  
**WOOD PRODUCTION/CONSUMPTION**



**LEGEND**

**WORLD FOREST COVERAGE**

Region	Forest Coverage (%)
Europe	38%
North America	32%
South America	28%
Asia	22%
Africa	18%
Australia	12%
Oceania	10%

**WOOD PRODUCTION and CONSUMPTION**

Year	Production (Million m³)	Consumption (Million m³)
2007	100	100
2008	110	110
2009	120	120
2010	130	130
2011	140	140
2012	150	150

**TIMBER BUILDINGS AROUND THE GLOBE**

Location and height with reference building.

**TIMELINE**  
TALL WOOD BUILDINGS and  
IMPORTANT EVENTS

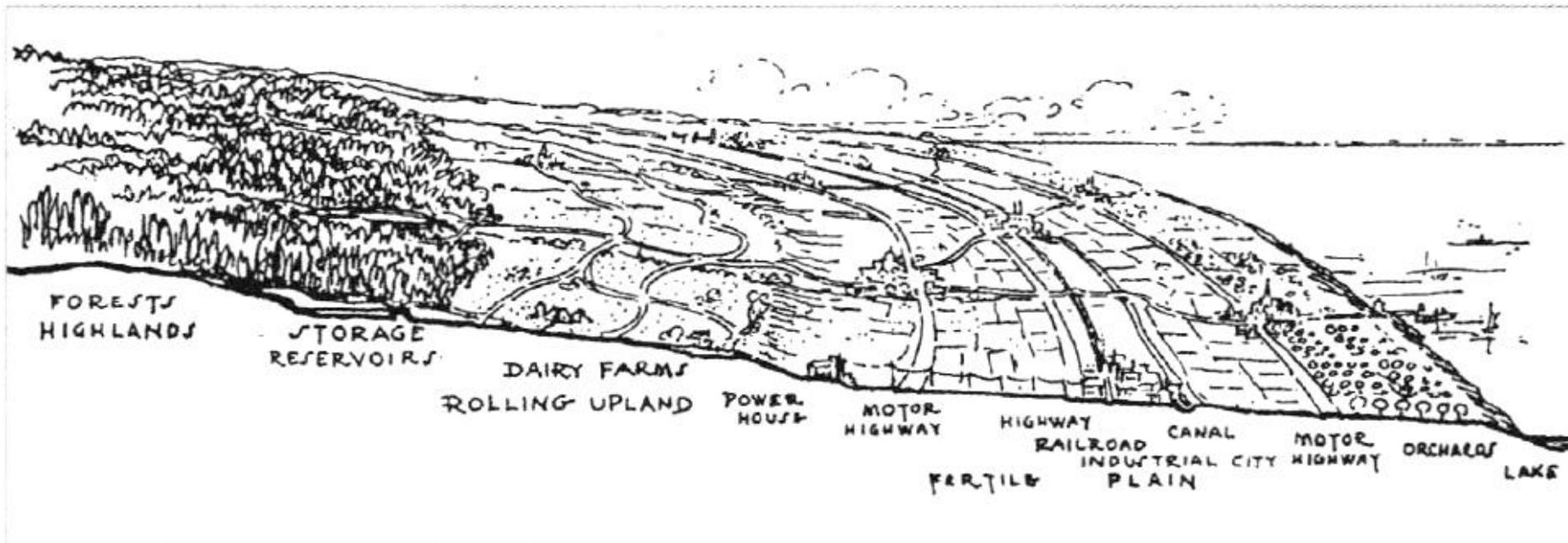




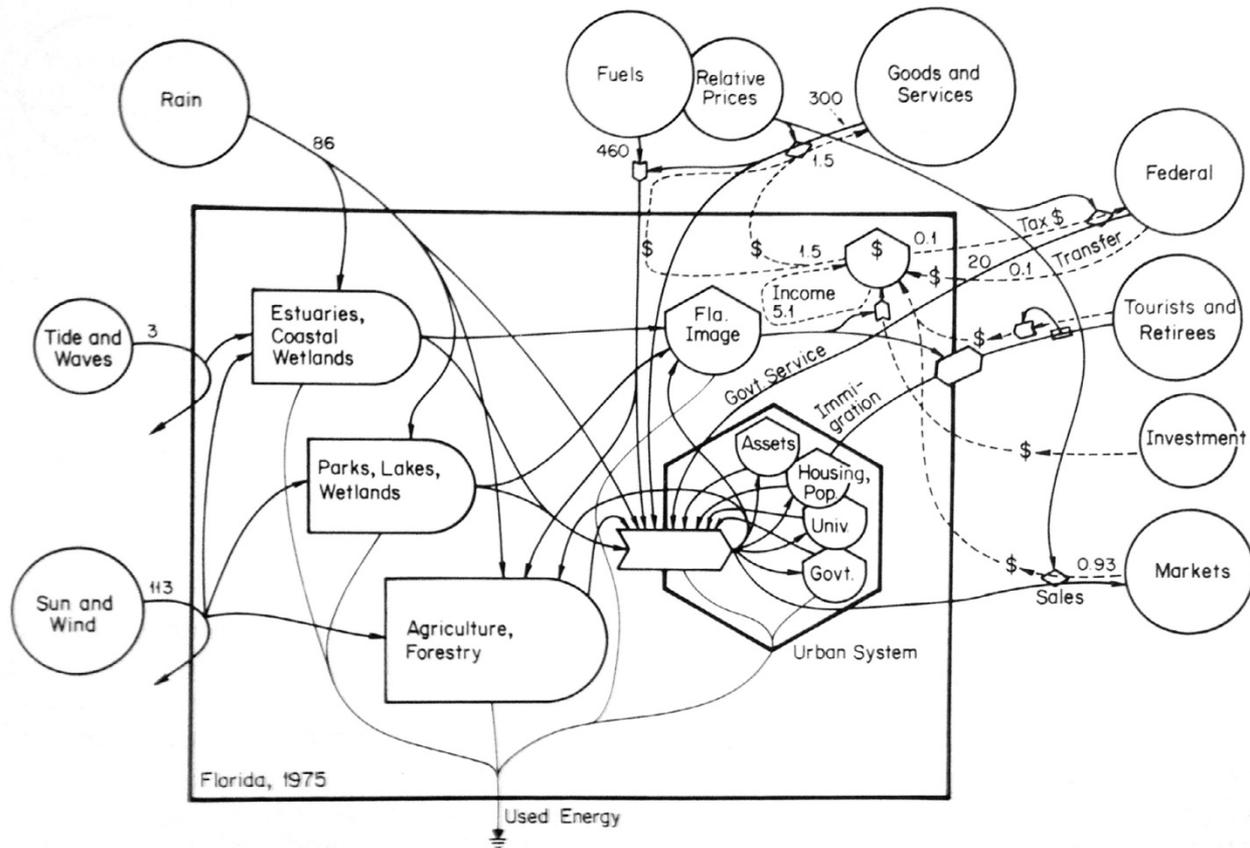
## Territorio

Se requiere entender la industria de la madera como la ecología, basado en visión sistémica. Hacerlo de esta manera nos ayudará a entender los actores, las acciones y de los flujos que los conecta. La escala territorial de la industria y sus operaciones no se puede separar de las comunidades a las que están vinculados, los valores ecológicos de los paisajes, las condiciones sociales o los mercados a los que sirven. Partiremos entonces definiendo el área de investigación y operación desde la base de la economía forestal del país. Tan solo en tres regiones del Chile; VII Maule, VIII del Bío Bío y IX de la Araucanía concentran el 77% de los bosques plantados entre los que se encuentran las especies más relevantes del mercado maderero como es el *Ecucalyptus globulus*, *Pinus Radiata* y *Eucalyptus nitens*.

El objetivo será el desarrollo de una comprensión sistémica de esta ecología, es decir, la visualización de la dinámica de la madera a partir del material, la economía, el valor social, la importancia del medio ambiente y más, no desde un punto de vista independiente, sino como un sistema dinámico que aborda no sólo los elementos sino también las funciones y las interconexiones de la ecología que llamamos madera.



Benton MacKaye's Valley Lecture.



**HOWARD T. ODUM**  
 Systems of Nature and Humanity  
 Evaluated Model of Florida  
 1975

## **Lugares:**

En la cultura social, el bosque es generalmente representado de una manera neutra, genérica, pintoresca e incluso romántica. Sin embargo, con este marco conceptual podemos observar que las áreas forestales son lugares de alta intensidad económica, social y ecológica. En un primer acercamiento desde el marco propuesto nos permite encontrar diversos programas, intensidades y formas en relación a la industria o metabolismo de la madera, esto son los prototipos de lugar en los que trabajaremos:

### **Parques nacionales y destinos de consumo (eco)turístico**

Bosques productivos madereros.

Bosques pequeños cooperativos de gestión indígena/local

Bosques de producción energética para biomasa.

Ciudades cercanos/contiguos a zonas con industria madereras

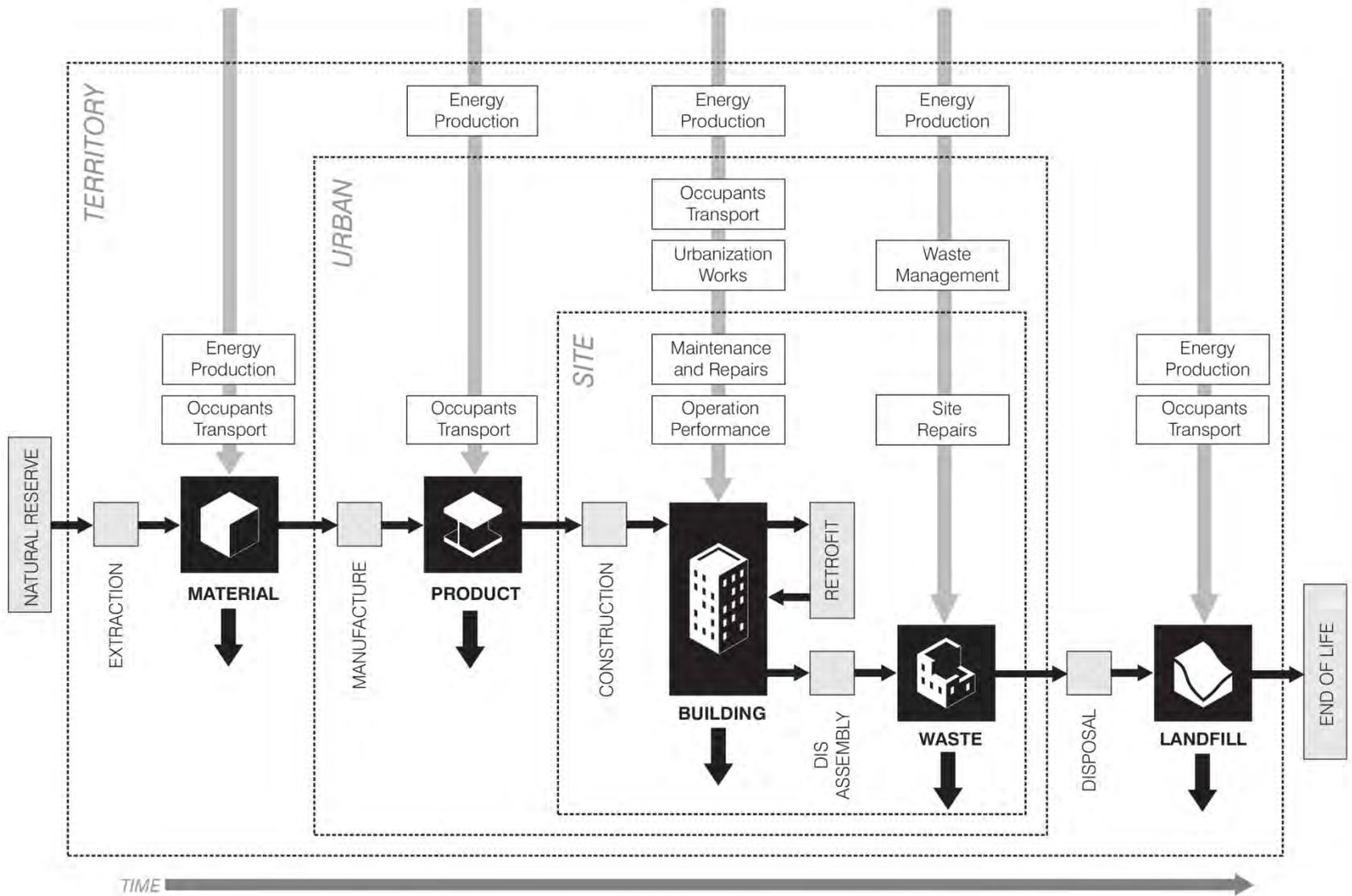
Asentamientos para trabajadores del sector madereros

El bosque como lugar recreativo: resorts y estaciones de esquí.

Centros educativos o de investigación asociado en territorio forestal



**BUILDING**

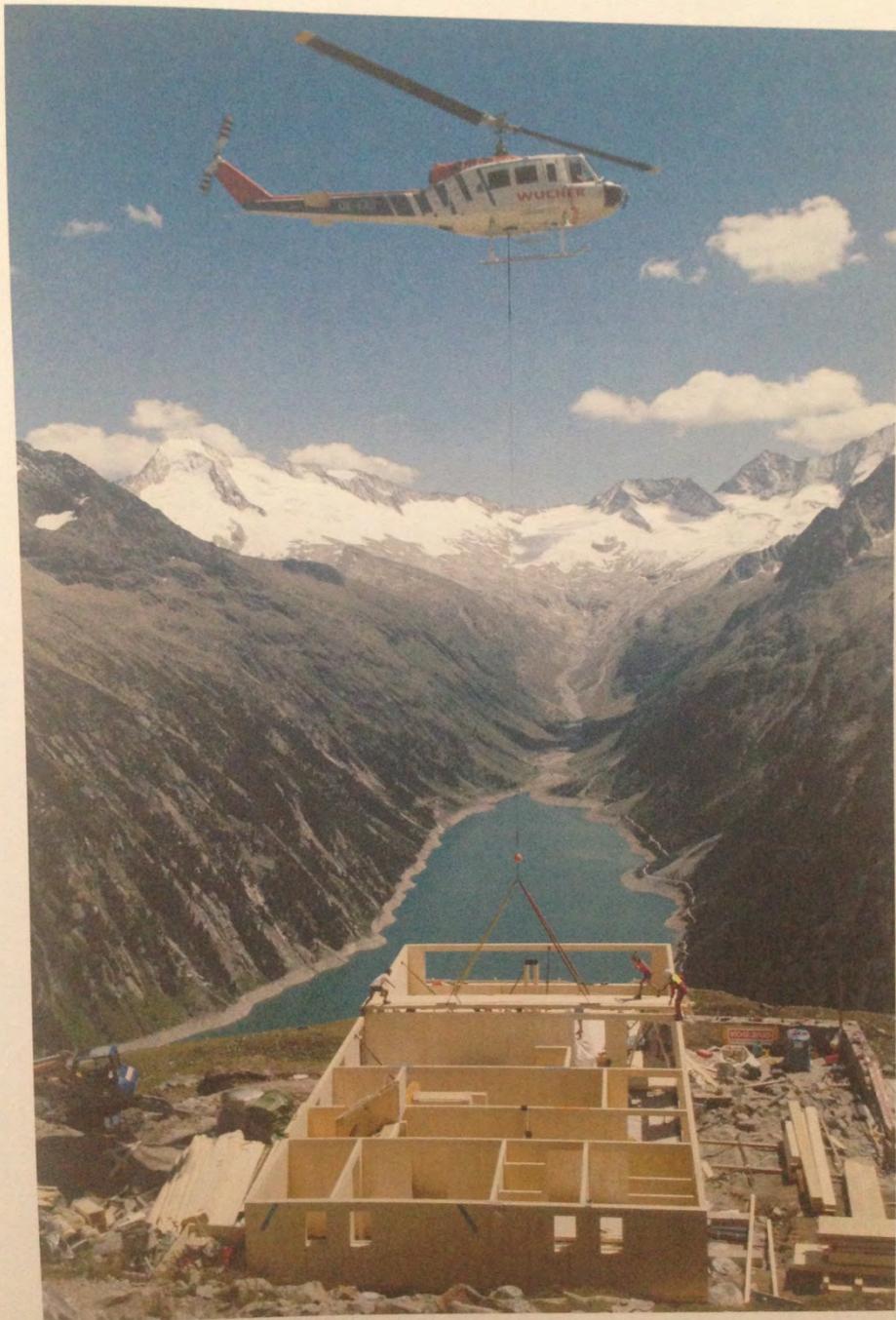


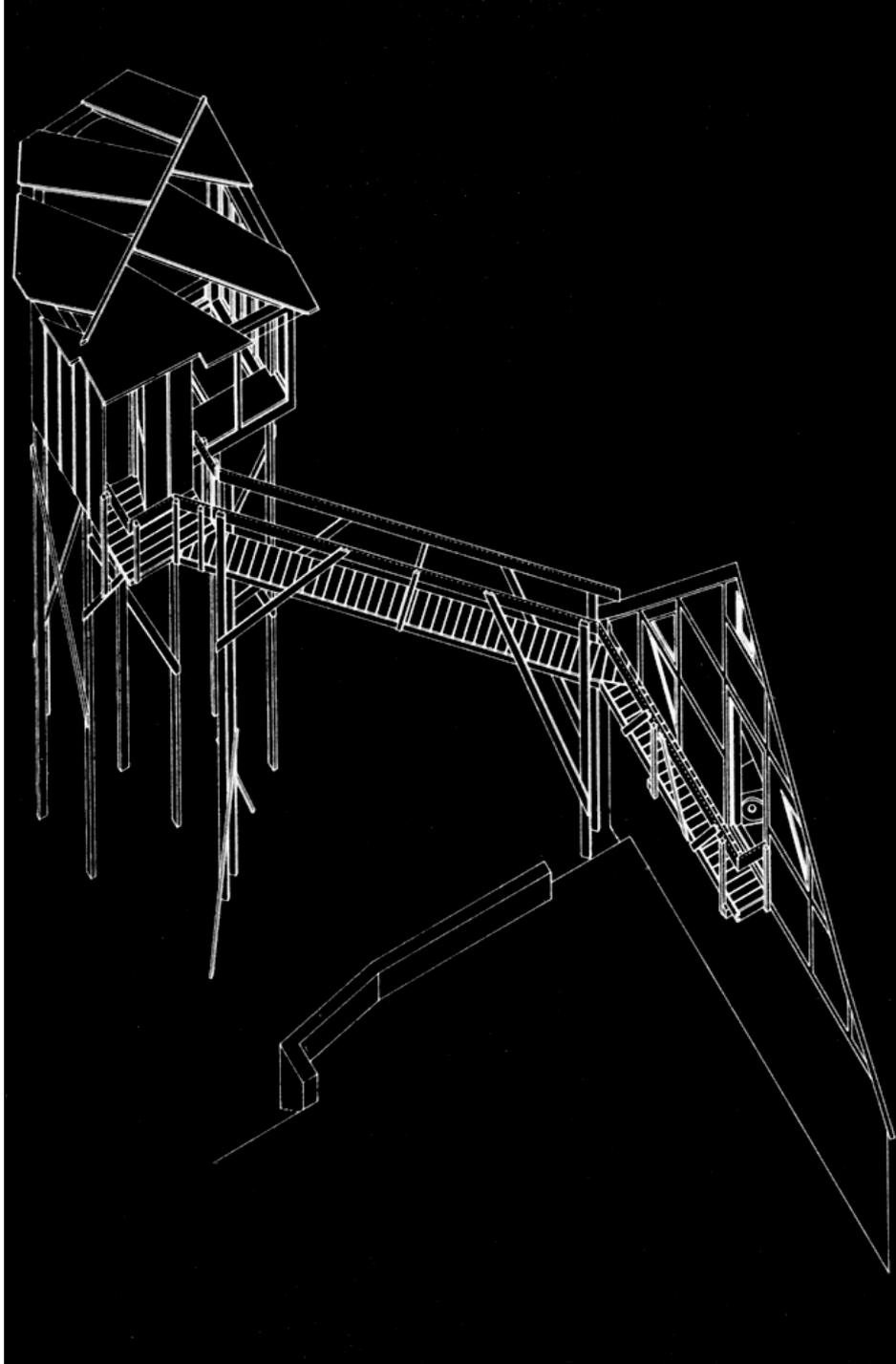
*Expanded temporal and spatial energy boundaries in design.*

## **Proyectos:**

El proyecto, por tanto, consistirá en desarrollar arquitecturas y urbanismos del paisaje que permitan repensar el alojamiento y las actividades productivas en cada uno de los lugares dados. Tomaremos como tipología el campamento vertical, por su condición de alojamiento fluido, para repensarlo y llevarlo al extremo de sus posibilidades en dos dimensiones fundamentales, la horizontal y la vertical. ¿Cómo diseñamos un campamento vertical? ¿Cómo convertimos un asentamiento en una estrategia de intensificación horizontal a lo largo del territorio? ¿Cómo diseñamos un proyecto con un metabolismo en constante retroalimentación con el territorio, que no solo es sostenible, sino que multiplica sus capacidades socio-ecológicas?

Además, todas las intervenciones deberán tener un componente educacional y de transparencia sobre los procesos asociados a la construcción material de cada uno de ellos. ¿De donde vienen los recursos materiales del proyecto? ¿Cómo el proyecto amplifica y hace visible las condiciones ecológicas y sociales del lugar? ¿Cómo se representan los procesos dinámicos del proyectos, desde los flujos energéticos (aire, temperatura, soleamiento, etc...) a los movimientos materiales (materiales de construcción, desmontaje, gente, suministros materiales de funcionamiento, etc...) a lo largo diversos ciclos temporales? ¿Quién construye proyecto, cómo y quién lo opera? ¿Cómo visualizamos los contextos que gobiernan el proyecto; políticos o culturales, legislativos o históricos, geográficos o espaciales, materiales o tecnológicos, sociales o mitológicos?







## **Etapas:**

### **1. Siguiendo el flujo de la madera:**

- Siguiendo el flujo de la madera: una especie un objeto cotidiano.
- Cartografiando su metabolismo territorial

### **2. Diseñando flujos de Madera:**

- Mapeo especulativo para la detección de programa y áreas de intervención.
- Diseñando nuevos metabolismos. Materia, energía y programa.
- Referenciando arquitecturas vernaculares

### **3. Estrategias de diseño horizontales:**

- Modelado de prototipos. Topografía, ecología, y programa.
- Desarrollo de propuestas de arquitectónicas y de paisaje en áreas detectadas

### **4. Estrategias de diseño vertical:**

- Modelado de prototipos. Clima, materialidad y programa.
- Desarrollo de propuestas arquitectónicas verticales en áreas detectadas

## Resultados Esperados

- Una nueva metodología y conceptualización para redefinir el contexto donde operamos como arquitectos, paisajistas y urbanistas
- Una visión metabólica sobre los procesos urbanos y sus dinámicas temporales.
- La intervención en contexto remotos alejados del *locus* tradicional del arquitecto
- El pensamiento proyectual a múltiples-escalas.
- La madera, no solo como material constructivo, sino además como flujo territorial y flujo con atributos específicos de cada especie de madera.
- Los potenciales de la madera para la edificación en altura.
- Conceptos de diseño de máxima potencia ecológica y social, las retroalimentaciones y los sistemas metabólicos abiertos.
- Principios básicos de ecología y paisaje.
- Proyectar el comportamiento, evoluciones, la flexibilidad, la adaptabilidad y la capacidad de recuperación del sistema en el territorio
- Representar, analizar, proyectar, intervenir en base a la madera como contexto económico, político, ambiental y social.

SUPPORTED BY  
ENERGY, ENVIRONMENTS, AND DESIGN LAB (EED) AT THE HARVARD GRADUATE SCHOOL OF DESIGN  
CENTRO DE INVESTIGACION Y DESARROLLO DE LA MADERA (CIDM) UNIVERSIDAD CATOLICA DE CHILE  
DAVID ROCKEFELLER CENTER FOR LATIN AMERICAN STUDIES (DOLAS) AT HARVARD UNIVERSITY

**SPEAKERS**

SAL CRAIG / ELIZABETH COLBURN / ULRICH DANGEL / BILLIE FAIRCLOTH  
TOMAS FOLCH / JANE HUTTON / DANIEL IBÁÑEZ / SEAN MAHONEY  
KIEL MOE / STEVE ROBERGE / THOMAS SHERMAN  
ANDRÉS SIERRA / JUAN JOSÉ UGARTE / ANDREW WAUGH

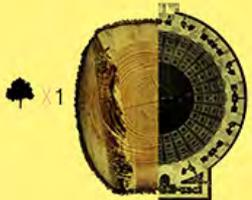


x 4.000 x 10<sup>6</sup>

# WOOD URBANISM

FROM THE MOLECULAR TO THE TERRITORIAL

GSD Colloquium and Lecture. **September 25-26th, 2014**  
Stubbins and Piper Auditorium. Harvard University. Graduate School of Design  
48 Quincy St, 02138 Cambridge, MA





NEW GEOGRAPHIES 06: GROUNDING METABOLISM

**GROUNDING METABOLISM**  
NEW GEOGRAPHIES 06

ISBN 978-1-934510-37-7



9 781934 510377 >

**06**



Harvard University  
Graduate School of Design

Felipe Correa and  
Tomás Folch

# Resource Extraction Urbanism

and the Post-Oil  
Landscape of  
Venezuela

Felipe Correa is a New York-based architect and urbanist. He is Associate Professor and Director of the Urban Design Degree Program at the Harvard University Graduate School of Design. At Harvard he also directs the South America Project, a transcontinental applied research network that endorses the role of design within rapidly transforming geographies. Correa edited the book *A Line in the Andes* (ARD, 2013), which explores the transformative role of the first metro line currently being built in Quito, Ecuador. He is currently working on a second book titled *Beyond the City: Resource Extraction Urbanism in South America* (ARD Press, forthcoming 2014). Correa is also the cofounder of Somatic Collaborative, an award-winning research-based design practice.

*Foregrounding challenges for design in the restructuring of crucial but often neglected territorial links in the greater hinterlands of metabolic processes.*

Tomás Folch is a Chilean architect and landscape architect. He is a Professor at the Design Lab at the Universidad Adolfo Ibáñez in Chile. Through his years of professional experience, his work has ranged through urban renovation, heritage, urban infrastructure, social housing, and landscape architecture. His studies and research focus on landscapes of extraction, going beyond reclamation to incorporate ecological processes and environmental externalities as values for the equation of production. His professional work has been recognized and presented in the Chilean Biennale of Architecture 2008, the Shanghai Exposition 2010, and the Venice Biennale 2010, among others.

The rapid urbanization of regions outside of consolidated metropolitan areas is a ubiquitous global condition. Within this context, the South American hinterland is experiencing processes of extreme rapid urbanization tied to the extraction of natural resources that are drastically altering the physical and experiential identity of traditionally remote locations. Although the scale and speed of this transformation is unprecedented, the relationship between urbanization and extraction has a long history that has positioned the city as a critical staging ground for a productive hinterland. From colonial Jesuit missions in present-day Paraguay to Belo Horizonte—a nineteenth-century planned city built as the new capital of gold and iron ore in the state of Minas Gerais in Brazil—to oil cities of the postwar era in Venezuela, the urban project has established crucial links between the city and the larger metabolic processes of resource extraction in open territories.

Of the many territorial inscriptions of resource extraction within twentieth-century South America, the effects of oil within the nation-state of Venezuela are among the most extreme. The discovery of large quantities of crude in the early 1920s, followed by its rapid global commercialization, gave way to the largest cultural, economic, social, and territorial reorganization in the country's history. Although oil exploitation by national enterprises dates back to the turn of the twentieth century, it is the discovery of the Barroso #2 Well in 1922, near Cabimas, that marks the beginning of this global export industry. Parallel to the discovery of the well, the Venezuelan government granted three large-scale international extraction contracts. Standard Oil, with its two subsidiaries Lago Oil and Creole Petroleum; Gulf Oil, with its subsidiary Mene Grande; and Royal Dutch-Shell Oil Company became the three most influential private actors in the construction of Venezuela's oil landscape. The revenue from oil generated a new type of wealth, bringing vast structural changes. Traditional affluence, generally represented by large land holdings and artisanal agricultural production, was rapidly

superseded by new oil-driven investment centers, where land ownership was no longer the key to prosperity. These new hubs, which relied on international commercial networks, required basic urban services, promoting the rapid development of cities and prompting a radical shift from a predominantly rural society to an oil boom town. The story of two planned cities—Ciudad Guayana in the Venezuelan south and El Tablazo, proposed for the eastern edge of Lake Maracaibo—highlights the attempt of economic diversification through urbanization in Venezuela's immediate post-oil-boom landscape. The experience of these two cities underscores the critical agency of design in the context of new urbanization frontiers.

This drastic shift from agriculture to a newly emerging urban culture had three significant impacts on the territorial development of Venezuela. The first was the sweeping migration from the hinterlands to existing and newly formed cities, primarily along the northern half of the country. From 1920 to 1940, the urban population in Venezuela increased from 200,000 to more than 4 million. By the early 1980s, the country had a population of 3 million, of which more than 50 percent lived in cities—most with approximately 100,000 inhabitants.<sup>51</sup> The second impact was the vast disparity between rich and poor caused by the oil and hydrocarbon industry. Despite the vast public and private investment that resulted from the oil boom, crude proved to be a profitable business only to the foreign companies allowed to extract in the region and to the various governments that granted the concessions. Only a small percentage of the broader Venezuelan society benefited from this enterprise. Crude as an industry generated minimal increases in the overall labor force, helping accentuate an unfortunate layer of urban poverty in the very cities it helped to create. And third, the hydrocarbon industry created a deep socioeconomic divide between northern and southern Venezuela. By the 1950s, a territorial band that covered the western border of Colombia all the way to Barcelona and Puerto La Cruz was characterized as a national corridor with pockets of extreme wealth, where

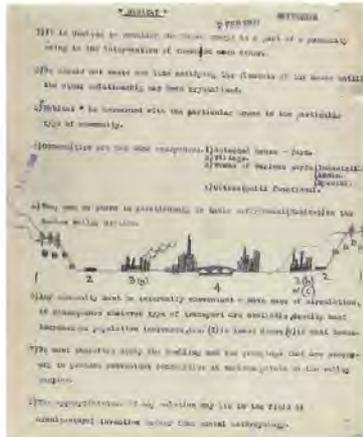


Figure 01. Alison and Peter Smithson, Draft for a statement on Habitat, 1954.

substituted in presentations.<sup>63</sup> Thus despite the rejection of habitat as a theme, the format for the presented work clearly reflected the Geddesian urban ecology of human development, even if the focus remained on formal solutions rather than biological processes.<sup>64</sup> Le Corbusier, undeterred that no progress had been made during CIAM 8 toward drafting a Habitat charter, officially dedicated the ninth congress to the project. CIAM had embarked on a policy of actively encouraging students and graduates to join the organization after the war, and an unexpectedly large contingent of younger members participated in the preparatory sessions for CIAM 9 held in Sigtuna, Sweden, during June 1952.

In an effort to smooth over some of the discord in advance, the executive council issued a statement that acknowledged the varied nuances that the word habitat assumed in the dominant languages of CIAM. Where in French the term denoted “the living conditions of any creature,” the statement somewhat misleadingly explained, in English it implied “something larger than ‘housing’ and smaller than ‘neighborhood’—in other words, the setting of daily human life.”<sup>65</sup> In the event, the arguments at Sigtuna focused on the ideological

difference implied by the prioritization of the new concept of habitat over the older one of *habitation*, exacerbating the generational rift.<sup>66</sup> Indeed these terms would still be deployed in partisan fashion at the next congress. Although the preliminary meeting may have done nothing to impart a commonly acceptable working definition for habitat as an architectural agenda, it did promote a sense of cohesion among the younger members, who at least could agree that the term suited the desired change in focus from the object to the expanded field of the immediate environment.

At the ninth congress, held in Aix-en-Provence during the summer of 1953, disagreement over the future of CIAM came to a head. This was the largest meeting to date, as well as the last at which the “founding fathers” would be present. It was a chaotic, at times confrontational, event and no charter was drawn up. Instead, a team of the younger members was put in charge of the tenth congress to be broadly based, still, on the search for an “ideal Habitat, fully cognizant of social and climatic conditions.”<sup>67</sup> As Alison Smithson would recount this group, to be known as Team X, recognized its shared concerns first through participation in a CIAM working group (known in the organization as a commission), dedicated to building the new charter.<sup>68</sup> The report of this commission concluded that since achieving even the most basic conditions of dwelling was a luxury unobtainable by most world populations, habitat must serve as a “permanent contract between society and the individual with reciprocal rights and obligations.”<sup>69</sup>

As before, the report was vague on the form this contract would assume, but the issue of implementation was more specifically addressed in two appendices submitted by the Dutch and English youth contingents. As indicated by the need for addenda, variance of opinion expressed in terms of national difference would continue even within the most vocal of the pro-habitat crowd. The high stakes of the habitat debate culminated in the collapse of the institutional body that had been formed to promote the tenets of modernism. Thus the debate over the concept of habitat directly influenced the trajectory of postwar practice. The support of the youngest CIAM generation for the cause of habitat was further instrumental in the shift to the ecosystem model of the city championed by neo-avant-garde practitioners of the 1960s and 1970s.

Figure 02. Alison and Peter Smithson, Diagrammatic section of the Golden Lane housing complex, ca. 1952.

