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## WEEK 4 – From Smart Buildings to Smart Cities

### Urban Farming

Urban agriculture, urban farming or urban gardening is the practice of cultivating, processing, and distributing food in or around a village, town, or city. Urban agriculture can also involve animal husbandry, aquaculture, agroforestry, urban beekeeping, and horticulture. These activities occur in peri-urban areas as well, and peri-urban agriculture may have different characteristics.

Urban agriculture can reflect varying levels of economic and social development. In the global north, it often takes the form of a social movement for sustainable communities, where organic growers, 'foodies,' and 'locavores' form social networks founded on a shared ethos of nature and community holism. These networks can evolve when receiving formal institutional support, becoming integrated into local town planning as a 'transition town' movement for sustainable urban development. In the developing south, food security, nutrition, and income generation are key motivations for the practice. In either case, more direct access to fresh vegetables, fruits, and meat products through urban agriculture can improve food security and food safety.

Wikipedia. *Urban Agriculture*. [online]

< [https://en.wikipedia.org/wiki/Urban\\_agriculture](https://en.wikipedia.org/wiki/Urban_agriculture) > [accessed at 01 Sep. 16]

### Energy Embodiment

Embodied energy is the sum of all the energy required to produce any goods or services, considered as if that energy was incorporated or 'embodied' in the product itself. The concept can be useful in determining the effectiveness of energy-producing or energy-saving devices, or the "real" replacement cost of a building, and, because energy-inputs usually entail greenhouse gas emissions, in deciding whether a product contributes to or mitigates global warming. One fundamental purpose for measuring this quantity is to compare the amount of energy produced or saved by the product in question to the amount of energy consumed in producing it.

Embodied energy is an accounting method which aims to find the sum total of the energy necessary for an entire product life-cycle. Determining what constitutes this life-cycle includes assessing the relevance and extent of energy into raw material extraction, transport, manufacture, assembly, installation, disassembly, deconstruction and/or decomposition as well as human and secondary resources. Different methodologies produce different understandings of the scale and scope of application and the type of energy embodied.

Wikipedia. *Embodied Energy* [online] < [https://en.wikipedia.org/wiki/Embodied\\_energy](https://en.wikipedia.org/wiki/Embodied_energy) > [accessed at 01 Sep. 16]

## Stock and Flow

The stocks and flows concept originated in economics in the 1960s. Stocks are quantities that do not move, whereas flows are quantities that move. Flows are measured in quantities per time. This differentiation between statics and dynamics makes the principle applicable to architecture, urban design and territorial planning. Among the stocks and flows needed to understand the functioning of a city are those of people, water, material, energy, finances, health, density, information and livability. The stocks and flows this course focus on are climate, energy, water, ecology and their contribution to livability (G. Schmitt, 2015).

Economics, business, accounting, and related fields often distinguish between quantities that are stocks and those that are flows. These differ in their units of measurement. A stock variable is measured at one specific time, and represents a quantity existing at that point in time (say, December 31, 2004), which may have accumulated in the past. A flow variable is measured over an interval of time. Therefore, a flow would be measured per unit of time (say a year). Flow is roughly analogous to rate or speed in this sense.

For example, U.S. nominal gross domestic product refers to a total number of dollars spent over a time period, such as a year. Therefore, it is a flow variable, and has units of dollars/year. In contrast, the U.S. nominal capital stock is the total value, in dollars, of equipment, buildings, inventories, and other real assets in the U.S. economy, and has units of dollars. The diagram provides an intuitive illustration of how the stock of capital currently available is increased by the flow of new investment and depleted by the flow of depreciation.

Wikipedia. *Stock and Flow*. [online]

< [https://en.wikipedia.org/wiki/Stock\\_and\\_flow](https://en.wikipedia.org/wiki/Stock_and_flow) > [accessed at 18 June 2016]

## Design Knowledge

There is a large body of knowledge that designers call upon and use during the design process to match the ever-increasing complexity of design problems. Design knowledge can be classified into two categories: product knowledge and design process knowledge.

Wikipedia. *Design Knowledge*. [online]

< [https://en.wikipedia.org/wiki/Design\\_knowledge](https://en.wikipedia.org/wiki/Design_knowledge) > [accessed at 01 Sep. 16]