Tema 6: Ciudades Sostenibles

Alexander Street. (n.d.). The sustainable city 2 [Video]. Alexander Street. https://video.alexanderstreet.com/watch/the-sustainable-city-2

In the last 50 years, cities have been relentlessly eating away at the expanses of countryside.

In the face of this widespread urbanization, it is imperative that we rethink the way we design our cities and construct our buildings.

Spewing masses of waste and carbon dioxide, consuming alarming quantities of water and energy, our cities are a heavy burden on our ecosystem.

Our dwellings themselves have a tremendous impact on the environment.

Their construction and daily consumption are responsible for half of the greenhouse gases released into the atmosphere today.

In architecture, the question of taking ecological considerations into account arose in the early '70s.

And what were the answers at that time?
A drastic move back to nature, or the high-tech city enclosed in a glass bubble, a symbol of a protected, controlled environment?

As early as it must have been 1967, we did a project.
And in that project, we were looking at ways to use wind turbines to harvest energy, to work with the forces of nature.
We were collecting rainwater, moving it along small canals that were part of the architecture of the planning, reusing the stepslopes, the olive groves, for traditional forms of housing.
And so that's a very early interest, which has developed, gathered momentum over time, and benefited from engaging with a German culture that is genuinely green—not just in fashionable terms, but with a very keen debate and a real commitment to the environment.

Since the '70s, the way ecology has been incorporated into building practices has evolved considerably.
Moving beyond slightly naive or radical ecology, the concept of sustainable ecology has been embraced.
The Mio viaduct, which for some people has come to define the valley, is nevertheless an example of sustainable architecture.
In fact, it has allowed the people of Mio to take back their city, which for too long had been paralyzed by holiday traffic.

Motorists willing to pay the price can also save two hours of driving time and enjoy more comfortable road conditions.
I think that in one sense, the competition was almost a philosophical exercise, because you have the river, the river town.
And everybody thinks of it as a bridge over the river town.
And if you follow that, you would do a sort of heroic span across the river.
But really, the river is very narrow.
So you could argue that this bridge is not about spanning the river, but about spanning the 2 and 1/2 kilometers from plateau to plateau.
It's about spanning the valley.
And if you take that approach, then you have these columns that march across the countryside at the widest possible span.
And then you suspend the thinnest road, a road which is actually the highest elevated road in the world.
Just to give an idea of the scale, one column is taller than the Eiffel Tower.
The scale is really a new dimension—quite heroic.
Another aspect of the bridge is that, although not seen from this view of the model, if you imagine driving along it, you see a very graceful curve that reveals the three-dimensional form of an interesting driving experience.

While the development of national transport systems is an important issue, it is within today's asphyxiating metropolises that transport and traffic problems require urgent attention.
What can be done to fight urban pollution?

What we don't talk about is the whole concept of urban comfort.
Now, it's not bad.
The traffic flows more or less, and we're in a comfortable situation.
Even if it gets heavier, it's not a problem because we're not in a hurry.

But we wouldn't be comfortable any longer.
That's what we need to address—rather than talking about getting rid of cars or insisting that everybody use the underground.
That's dogmatism.
The city of Paris has opted for developing bus and bicycle lanes at the expense of the comfort of car users.
They must pay in time and stress for choosing to get around the capital while polluting its streets.

It's obvious that transport affects the sustainability of a city, and this is major.
In terms of sustainability, this is environmental quality.
In other words, the question of pollution, noise, road safety, and energy consumption all lie at the heart of transport policies.
At the same time, it is also the sustainability of a city in terms of its acceptability.
If you're not happy in the city, you'll get into a car and leave as quickly as possible.
With Paris Beach, human activity is restored to the city center—and people are thrilled.
They really need it, and they come in throngs.
Even if it's a bit crowded, they love being in the middle of the city with some peace and quiet, easily accessible by public transport.
Paris is rediscovering its river center.

In London, some neighborhoods have regained access to the Thames and the pleasures of the waterfront.

To relieve traffic congestion in the city center, it was decided that all drivers would have to pay a toll.
The tollgate is almost invisible, yet discourages a number of vehicles.
On average, the electric barriers and cameras are enough to put off one out of every four cars.

In the cities of the future, what means of transport will be used?
What will the ideal environmentally friendly city be like?
What type of urban development plan would help control energy and water consumption?
What kinds of buildings should be favored?

I should explain to start off with that Boundsley lies in the north of England near Leeds, or between Leeds and Sheffield, the two largest cities in that area.
It has existed for eight or nine hundred years as a market town.

But then, because of the Industrial Revolution and cheap coal, it really became a coal mining town.
We know the history: in 1986, Mrs. Thatcher closed the last coal mine in Boundsley.
For 10 years, people mourned the loss of coal mining.
Then, in the mid-'90s, there was a wake-up call.
They said, "This is no good. We have to make a new future."
The Boundsley project started one and a half years ago.
I was asked in the initial phases to envision Boundsley's future, and then to plan its development in phases of 5, 10, 15, and 25 years.
Boundsley didn't have any remarkable buildings because much of its heritage is underground.
It has a beautiful town hall—the one truly good building in the town—and that was the starting point.

In the late '60s, when General de Gaulle was president of France, he commissioned an urban development plan for Paris and its surrounding departments.
Paris spread out like an oil stain, moving away from high rises.
The 1965 Urban Development Plan proposed building towns on the outskirts of Paris about 30 kilometers away—towns where you don't only find housing, but also employment and facilities.
And that's how the idea of new cities in France was born.
Five new cities were created around Paris.
There were natural surges in urbanization.
Housing was needed.
There were vast stretches of land available at Sénard with railroads.
So, of course, a new city was built—but rather than beginning with the center, three sectors were developed.
The development of the new city was essentially the development of each of these sectors.

Today, we have to start thinking about a centralized place where you can find a complete range of facilities.
The inhabitants have needs that aren't being met at a municipal level.
There are only 2,400 people living in the town center, and that has to change.
Many people live in poor housing areas on the outskirts, which are slated for demolition.
There is a requirement for these towns to build many new homes over the next 10 years.
So the important thing was to find a place to put these new homes without simply taking up more of the landscape.

Therefore, I proposed—and they accepted—that over a number of years we build a wall around the city center.

While Barnsley has opted for having the countryside outside its walls to create a dense circular city, the new city of Senard, established 30 years ago, chose a very different vision.
The area is immense.
It covers 12,000 hectares—about the size of Paris combined with Bois de Vincennes and Bois de Boulogne.
There are 100,000 inhabitants, which means a relatively low density.
People live in towns and villages organized around the church, the village square, and the municipal hall.

I wanted to mark out a place with a distinct spatial organization, one that was clearly different from the surrounding villages and towns with their traditional, rounded shapes.
I was committed to showing that this area was immense and that the scene was happening here and not elsewhere.
There had to be a clear identification of this place—this is it, right here.
You're in the square and, just beside it, you're outside the square.
You don't do the same things inside the square as outside it.
It was important that the square not be disconnected—it's not a closed or fortified shape.
It is an open square that allows for easy identification from all viewpoints, so you always know where you're going.
This simplicity in design also means that if there's an error in its use, it's less serious.
The urban network must exist as such—that's what gives the square project its character.
We try to invest in things that are well thought out so that there is some form of durability.
Yet on the other hand, we have also considered elements that could be short-lived.
For example, on a particular piece of land, rather than building a permanent structure, we might build something for a limited duration, then reclaim the land for future use when we have more information.
It's a living wall with housing, workshops, and offices.
It should be a mixed development inside the wall, which is only about a kilometer in diameter.
We discovered that the population could increase to 50,000 people in the town center, with one rule: the top of the wall must be horizontal and include a park.
In the end, you have to think about how people live.
Imagine having a Sunday lunch with the family—something you should do—even if you haven't seen your mother in a while.

After a nice lunch of roast beef and Yorkshire pudding, you might go for a walk around the wall, and then stop for a gin and tonic or a coffee while enjoying a fantastic view of the surrounding landscape.
At the same time, you increase the density of people living and working in the center while removing old houses on the outside to return that land to nature.

There is no opposition between urbanism and architecture.
They are not two distinct things—they come from the same way of thinking about cities.
Even a small building must be seen in the larger context of cities.
For us, cities are where life is; they are man's home.
Nature is not truly man's home—cities are man's nature.
This is a very important point.
All our work on buildings should be seen from the larger perspective of cities.
Cities are places of freedom—of thought, speech, action, and mobility.
You always have to consider sustainable development in relation to human beings and their aspirations.
Sometimes, these aspirations can challenge precautionary measures.
There's a lot of talk about precautionary measures, which can be dogmatic and terrifying; with such measures, you can't do anything.
Sometimes you have to adopt a risk principle.
If you applied only precautionary measures to designing buildings, we would have never evolved.
You can't rely solely on shortcuts or on the notion of common sense.
For example, if common sense means not placing buildings beside noisy motorways, then where do you put them?
Do you put them in the countryside or in the middle of a forest, cutting down trees?

The countries of the European Union have all tried to encourage new sustainable building practices.
The English and the French have their respective green labels.

With only a few buildings, their role as symbols can be very interesting and useful—a mainspring for media coverage.
But we have to reach the point where high-quality environments can be achieved at the same cost as conventional buildings.
You can't claim that a building protects the environment if it causes trauma—it should be a beautiful trauma.

I'm Peter Braithwaite, director of Overalpment Partners and head of our sustainability consulting services.
Arup are designers.
We started by designing buildings, but now we design a whole range of buildings, infrastructure, and products.
The building we are in—the Arup campus—was designed to demonstrate that by applying sustainability principles, one can produce a cost-effective building that is also very pleasant to work in.
One aspect in which we succeeded is in creating a naturally lit environment.
Daylight is brought into the center of the building through roof pods and openings in the floor.
The abundance of glass in the windows not only helps with natural lighting but also with natural ventilation.
Each window can be individually opened so that people can adjust their own comfort levels.
Additionally, the lighting system adjusts automatically to the daylight.
The open-plan office is designed so that the lighting also functions as acoustic baffles.
The adjacent wings absorb sound.

We also designed a planting system to improve air quality.
The selected plants absorb toxins from computers, carpets, and other sources while releasing oxygen to freshen the air.
Originally, we considered collecting rainwater for reuse, but this was not economical.
Instead, water from the roof is fed back into the ground by infiltration, with part of it flowing into on-site lakes.
All of these design elements are aspects we can advise our clients on.
One of the main successes is that we achieved a naturally ventilated, naturally lit building with costs comparable to a traditional air-conditioned building.

The external cladding is made of Canadian cedar—a dense wood that needs no oils, preservatives, or maintenance over the building's life.
When the building reaches the end of its life, the cedar can be completely stripped off and reused, ensuring no waste.
The design extends to the structure: all the steelwork is bolted and can later be unbolted and reused.

With a successful recycling industry and innovative materials, steel occupies an important place among environmentally friendly materials.

The fundamental idea in sustainable architecture is to view a building as an independent ecosystem integrated into the natural ecosystem.
I always wanted to live in the middle of nature—visible everywhere—with only a thin high-tech layer separating me, so I am always living outdoors, day and night.
When I wake up, go to bed, eat, or brush my teeth, it's an extraordinary feeling.
Living within transparency is very positive: after a few months, you are in perfect harmony with nature.
You notice the time of day and year, you can tell the temperature by the color of the light, and you know what time it is just by looking outside—an important experience that animals enjoy but humans have largely forgotten.

The whole house weighs 40 tons without the foundation—a normal building of these dimensions would weigh roughly 10 times as much.
This means we only use 10% of the usual building materials—a significant cost-saving factor.
For example, the glass on one facet weighs 20 tons and the structural steelwork (support and girders) weighs only 10 tons.
Besides being easily assembled and taken apart, the house is highly energy efficient and emission-free—it doesn't even need a chimney.
The house's light weight means it doesn't have much thermal storage capacity; unlike a house with thick walls that takes a long time to warm up in summer, this house reacts within minutes to weather changes.
The installed solar panels cover approximately 140 square meters and are extremely efficient—producing enough power to achieve an annual energy balance of zero.
Air is drawn from the garden, passes through a 36-meter underground conduit where it is moderated by the soil temperature, and then enters the house.
In summer, even if the outside temperature is high, the interior remains pleasantly cool.

The commerce bank was a groundbreaking building because it redefined the design of towers.
It is based on a V-shaped design where the V rises by four floors and then turns 120 degrees.
On the open side, gardens were established; on the closed side, offices were created.
This continually changing V design allows wind to move throughout the entire building, providing excellent natural ventilation.
Every person in the building benefits from real air and natural daylight.

Even in windy conditions, a double façade allows occupants to open windows all day without disturbance, reducing the need for air conditioning—a true example of efficiency and sustainability.

The Swiss Rea continues themes from earlier projects by optimizing interior volume and views.
It is carved with red slots that serve as gardens, and the floor layout is designed to optimize ventilation through diagonal garden spaces.
Having gardens on two sides ensures that, regardless of wind direction, there is always balanced pressure.

We work with the best teams possible, forming close relationships with engineers in various countries as well as in the UK—our base.
We collaborate with experts in structural engineering, energy, landscape, lighting, and acoustics.

The GLA—the headquarters of the Greater London Authority—is the result of the latest computer modeling techniques.
Its complex form maximizes interior volume while minimizing exterior surface area.
The steel and glass structure is deliberately skewed to capture sunlight, and the cooling system uses cold groundwater pumped from wells 125 meters deep.
Overall, its energy consumption is only one quarter of that of a comparably sized, well-insulated building.

Simple techniques can also be used in sustainable construction.
For example, a library features a beautiful reading terrace surrounded by water basins.

In Accordia, the atria serve as the "green lungs" of the building.
They provide the volume of air needed to naturally cool the building in summer, protect from the sun with retractable awnings, and, through luxuriant vegetation designed by biologists acting as landscape designers, help regulate temperature.
The atria create shade in summer and warmth in winter.
They are constructed with simple glass, and while the double façade forms an insulating buffer, in winter the windows can be opened.
There is an air buffer between the inside and outside, allowing air circulation while preventing drastic temperature drops.
In summer, the atria’s roof can be opened like a greenhouse to let in a breeze.

Ventilation screens hidden among shrubs connect to an underground conduit that brings in cooler air from the north side of the building.
This results in an interior air temperature about 8 degrees cooler than the atria.
Although the building is not air-conditioned, people adapt by dressing appropriately for the seasons while enjoying the freedom to open windows and access terraces at will—making them masters of their own environment.

Some believe that technology alone can solve energy consumption issues by adding more technology, but in doing so they often overlook the human aspects of sustainable construction.
It is a basic human need to establish direct relationships with both other people and nature without the interference of devices.
Even features like electric window openers can distance us from our natural environment.
This detachment is one reason why we have treated our environment so poorly over the last 100 years—we have moved further and further away from what is essential.
The aim of this building has always been to allow occupants to control their own work environment by opening windows and pushing open doors, giving them direct access to terraces created during construction.

The Altaira Institute of Wageningen in the Netherlands demonstrates that sustainable architecture is not limited to a few exceptional buildings.
Both high-tech and low-tech solutions can work together to promote ecological building practices.
The definition of sustainability often seems to focus narrowly on energy efficiency—for example, a building with a solar panel on the roof might be labeled sustainable.
But that is too narrow a view.
A truly sustainable development—whether it be a single building, a neighborhood, or an entire city—must work on a social, financial, and political level.
Density is a crucial aspect of sustainability.
While it is challenging to increase urban density in a rising population, the quality of design has the potential to improve urban life.
These are the challenges we face, and cities must always be continually balanced.
Culturally, we are beginning to accept flaws and question the myth of scientific perfection.
It is ethical to accept imperfections.
If we are dogmatic, if we forget humanity and focus only on the planet, there is a serious danger.
We must always position ourselves in relation to what is human, accepting limits and imperfections.

Sustainable development is now part of the construction discipline in Germany and has been widely accepted in society.
We are attempting to quantify sustainability, but it is more complex than simply looking at the energy consumption of buildings.
For me, sustainability means constructing buildings that serve the people working and living in them, that benefit the environment and society by disturbing them as little as possible, and that are aesthetically pleasing.
There is growing interest in sustainability around the world—even if some regions are slower to adopt these ideas—and I remain positive and optimistic that this approach will continue to spread.