Smart Cities Conference, New Delhi

Conference Track: Urban Planning

Session: Urban Design: Role of Architecture

Create Vision far beyond Architecture

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Documentation to speech available here: www.nuesch.ch

Smart City Switzerland

→ connected density

extent and amount of fibre optic connectivity in Switzerland

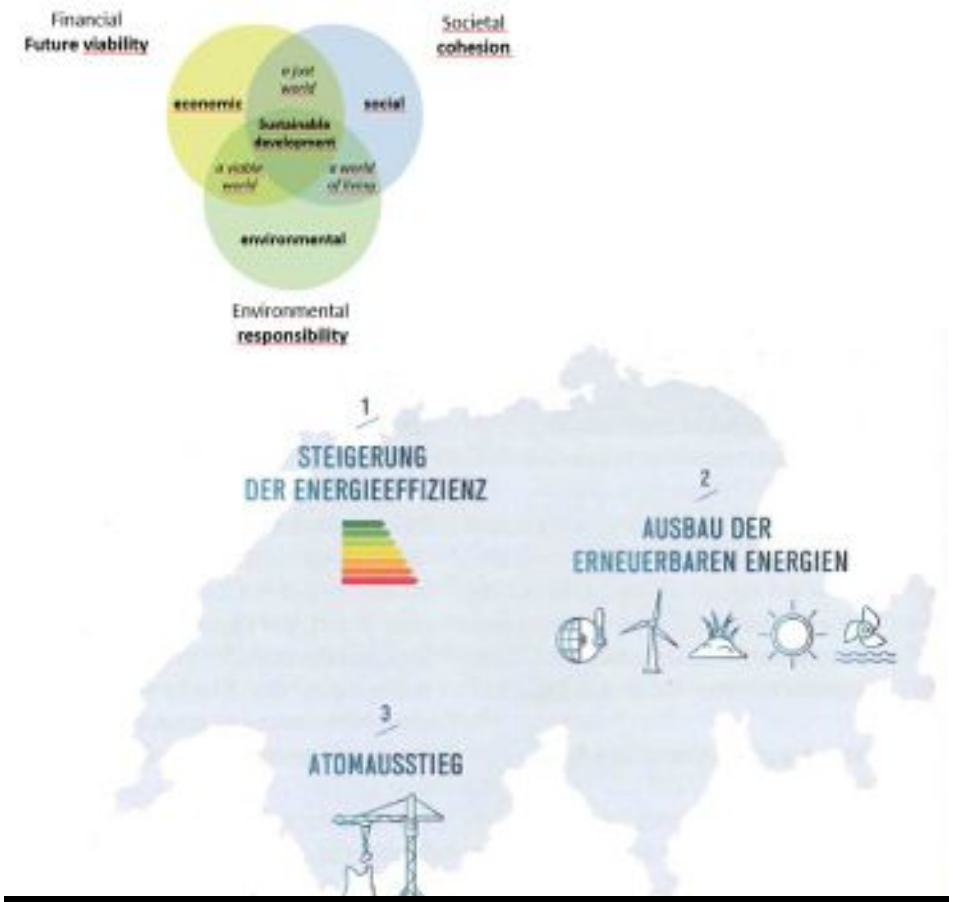
Switzerland has a high degree of urbanization because three out of four people live in cities. The cities and the service providers are confronted with major economic, technical, social and political challenges.

According to the Swiss Federal Office of Energy (SFOE), Smart City offers its residents a **maximum of quality and minimum resources consumption**. This is achieved by intelligently linking the infrastructure systems (transport, energy, communication) at different hierarchical levels (city, district, building).

Maximum of Quality is provided by new interconnected technologies 4.0

Minimum Resources consumption and CO2 Emmittance is granted by 2000 Watt Society

The legal foundations of the 2000 Watt Society



Bottom: Energy Law 2050 by Federal Government:
energy efficiency, renewable energies and the phasing-out of nuclear power

Switzerland as a country, and 55 of its cities and towns, have adopted the 2000 Watt Standard as their guideline to a sustainable future.

It is evident, from the above definition, that no single power alone can reach the goal of a sustainable lifestyle – not even the 2000 Watt Society can be achieved without the consent between all powers involved : Governments, NGOs, Industries, Citizens.

Cohesion : Politics / Education / Culture
Viability : Life Cycle Cost instead of Pay-back Period
Responsibility : building always means destroying - Luigi Snozzi

2000 Watt Society Switzerland

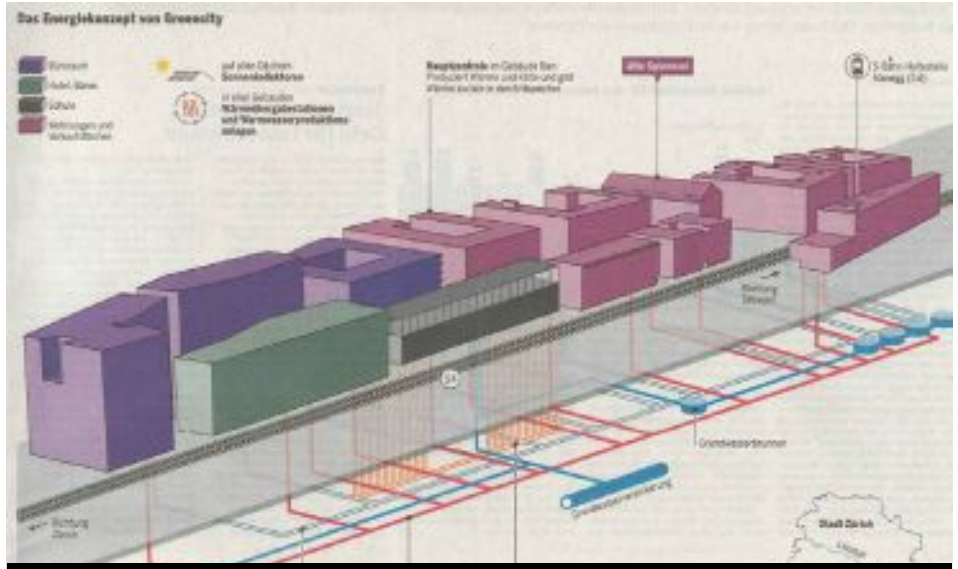
Greencity.Zurich: First 2000 Watt Precinct in Switzerland

The **2000-Watt Society** is an environmental vision, first introduced in 1998 by the Swiss Federal Institute of Technology in Zürich (ETH Zurich), which pictures the average First World citizen reducing their overall average primary energy usage to no more than 2,000 watts (48 kilowatt-hours per day) by the year 2050 – and without lowering their standard of living.

The 2000 watt society stands for a sustainable and equitable society. Every person living today and in the future shall be entitled to equal access to energy.

Source: Wikipedia

2000 Watt Sites



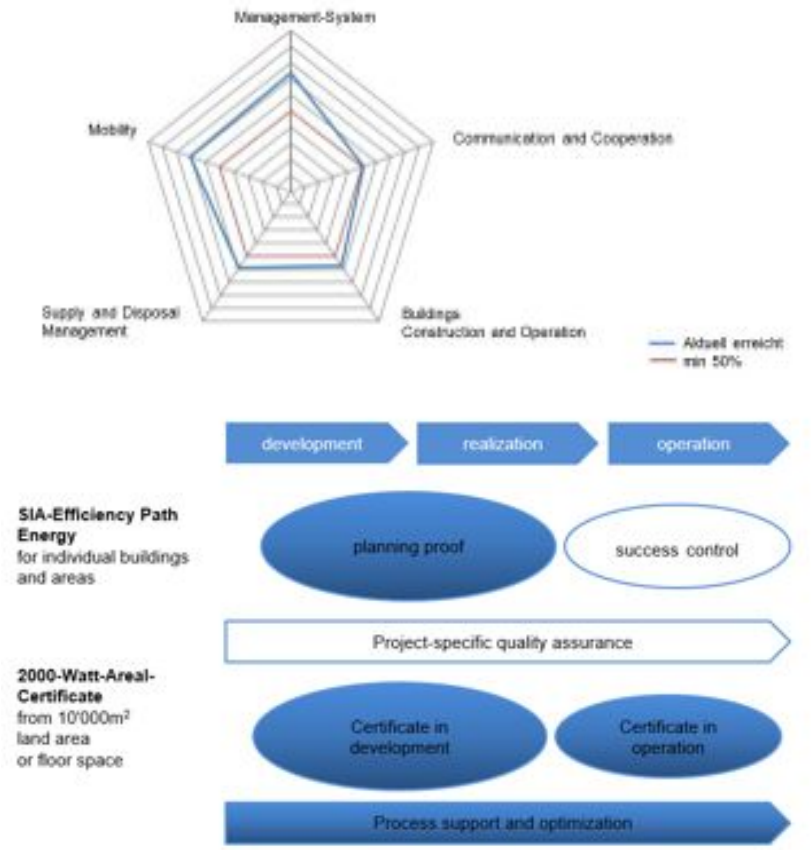
Top: Greencity Zurich, developed by Nuesch Dev. and Losinger-Marazzi

The “2000-Watt Site” is a project led by the Swiss Federal Office of Energy for the promotion of renewable energies, environmentally compatible mobility and efficient use of resources on a site or precinct level. The concept has been implemented already in 19 Swiss developments.

Greencity Zurich features:

- High density
- Minimized imbedded energy
- Zero Carbon operation
- Mixed use, including habitation, offices, shops, restaurants & bars, senior living, school, day care facilities
- Excellent mobility (Train, Bus, local streets, highway access, bike trails, pedestrian mall)

The «2000 Watt Site» Certificate



The application of SIA efficiency path energy and 2000 watt site certificate in the different phases

The **2000-watt site certificate** [2] is calculated according to the **SIA-efficiency-path** for quantitative evidence and supplemented by a qualitative assessment in five areas:

- Management system
- Communication and cooperation
- Supply and disposal
- Building
- Mobility

The "**2000 Watt area certificate**" differs from the previously applied energy standards in that after the development and realization phase, the areas are regularly checked and periodically certified during operation.

Top Down and Bottom Up: Private and Public Sector cooperate

Smart Urban Development requires a **dual approach, both top-down and bottom-up**.

Only when all stakeholders are equally involved and committed, will city planning become more than a planners' exercise.

Smart Urban Development requires an integrated design approach.

Unlike a hierarchical Top-Down-, or simply a tree-like Bottom-Up- the Integrated-Design-Approach works like a GRID. It is a multi-nodal and democratic approach.

BEEP – Building Energy Efficiency Project

BEEP to help Amaravati have energy-efficient buildings

The Bureau of Energy Efficiency (BEE) and the Swiss Agency for Development of Cooperation (SDC) of the Federal Department of Foreign Affairs of the Swiss Confederation are the implementing agencies of the project.

"Switzerland has developed stringent codes for buildings in the last 40 years. It also has the most stringent code in the world for solar protection buildings. Swiss has been No. 1 in innovation in the last five years and the expertise in buildings, practical application, and innovation that we bring can help cities like Amaravati, where there is a chance to introduce new designs and technologies,"

Pierre Jaboyedoff, Senior Engineer and Energy Consultant of the Swiss PMTU, BEEP.

Swisscom – Smart Parking

https://youtu.be/1Y29dGFC1xs
Video to Smart Parking

Smart parking sensors, which are networked via the low power network and integrated into parking spaces, enable the driver to see via the app whether there is free parking at the desired location or whether they are occupied

SwissProBlinds – Smart Facades

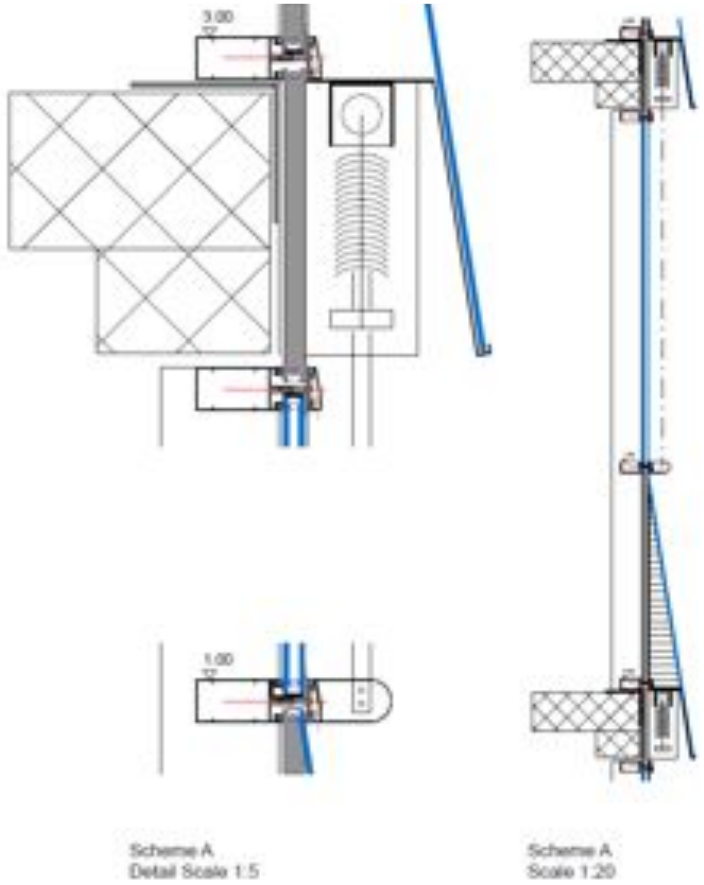
Building Management Systems (such as Siemens, Loxone or Anvil), connected to the wind- and rain-watchers can be integrated into a Smart City Network, and into the weather forcast to maintain an even temperature within the

SwissProBlinds is a start-up working towards establishing an Indian industry for solar protection products for Smart Facades. Smart Facades are an essential part of the building's envelope. They not only protect the building from the elements, but also produce light and energy for its occupants.

A Smart Facade allows sunlight in when needed, while protection the indoor spaces from any direct sun rays.

New Vaastu: Shade/Ventilate/Insulate

Smart Buildings produce energy rather than consuming it.



Smart Facade Technology from SwissProBlinds

Here are the selling arguments:

- 50% of façade collects electric energy through PV-Cells – making Blinds independent from public electricity

- 50% of the façade is shaded from direct sunlight, reducing heat load by up to 90%

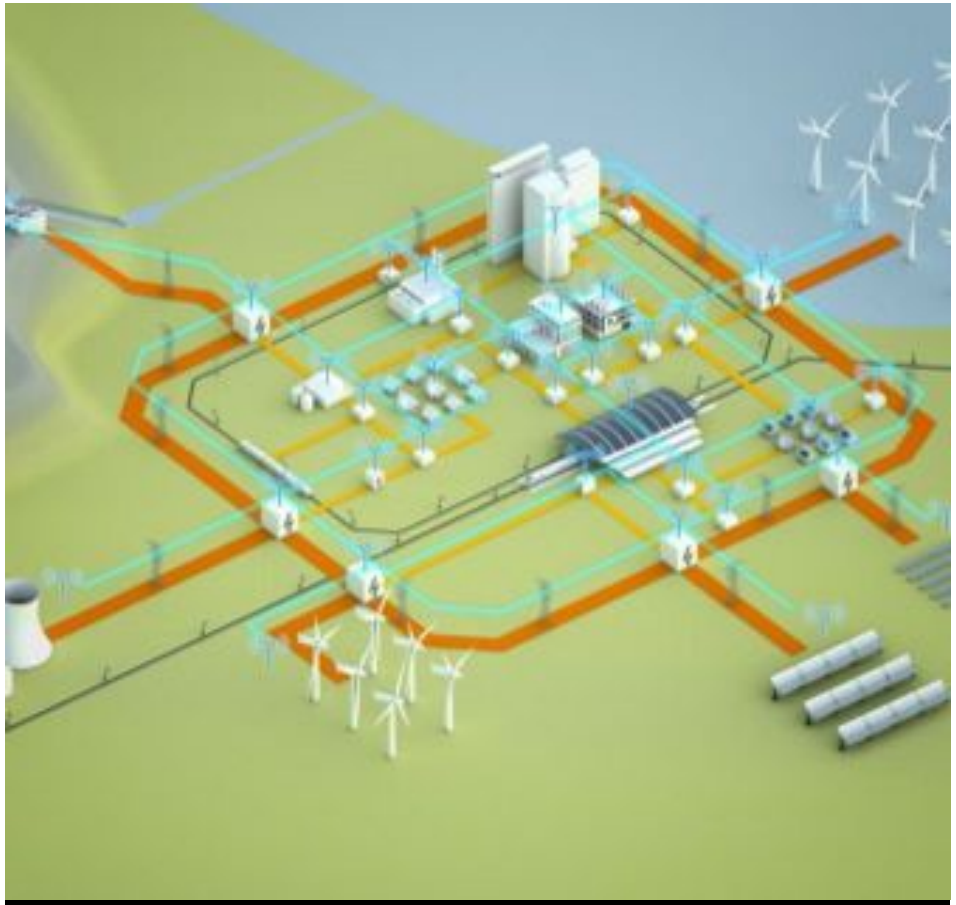
- glass can be single glazing to reduce cost, because SwissProBlinds make insulated glass avoidable

- automated positioning of SPB optimizes daylight use in the building, thus reducing artificial lighting

- insulated parapet improves energy performance of building at no extra cost compared to insulated glazing

- Swiss Smart Façade can be linked with any BMS very easily

Siemens Switzerland – Smart Grid



Smart Grid Solutions by Siemens

Siemens produces Smart Grid Solutions, DESERTEC concept, HVDC (high-voltage direct-current transmission), traffic management Systems, Automated Building Management Systems, OLEDs (organic light emitting diodes)

Swiss Traffic – Smart City Monitoring

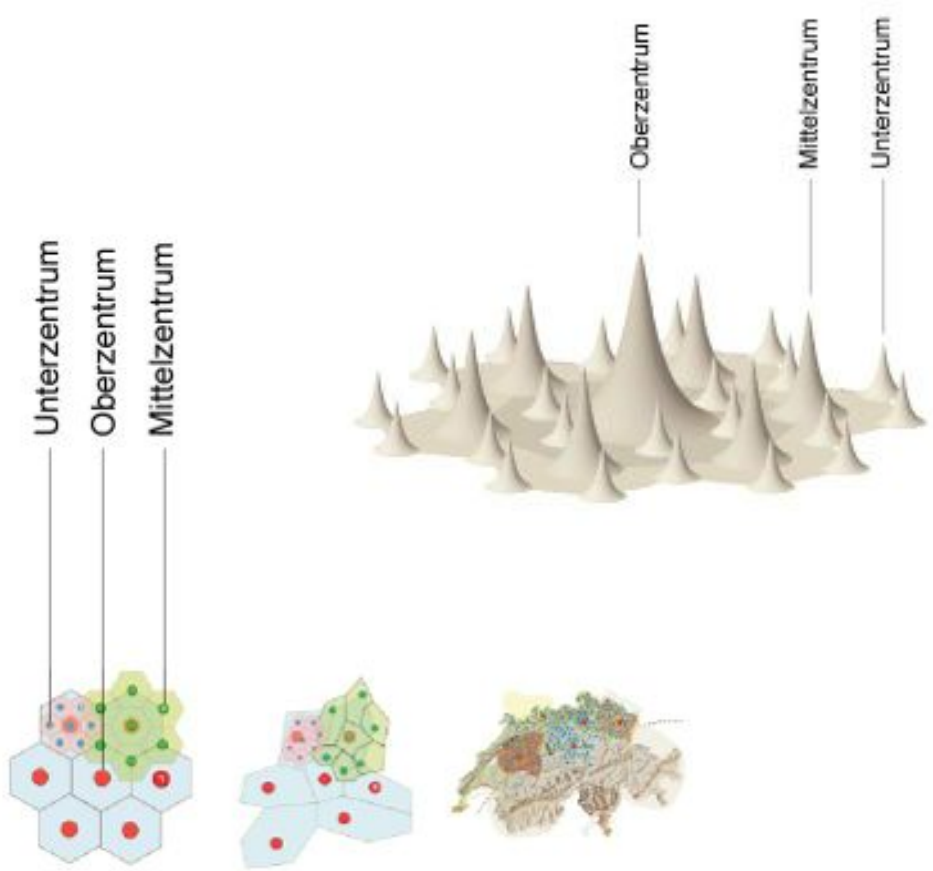
Swiss Trafic monitors the mobility flows throughout Greencity.Zurich

…

Typical on site Mobility Management measures:

- reduced amount of parking
- parking management (parking fees)
- Car Sharing
- high quality bike parking
- financial incentives to use public transport
- on site bike fleet
- bike home delivery service

Planning Foundations of Smart Cities: Densities



Individuality in High Density

Will a Smart City automatically be a dense city ? We do not believe so, but we must manage density in a smart city according to the needs of the population. We believe that a Smart City always consists of three levels of density

- High Density for state nodes (HDN)
- Medium Density for regional Nodes (MDN)
- Low Density for local Nodes (LDN)

Planning Foundations of Smart Cities: Connectivities

Top: Public Transport, Fribourg, Switzerland
Buttom: Public Transport Sion, Switzerland

In our vision of the Smart City, not only buildings must be reinvented, but also the **flow of information, of energy and of people** must be considered.

Connectivity is key for a prosperous society.

- Flow of People

Planning Foundations of Smart Cities: Connectivities

Top: Pizza delivery by EPFL-drones
Bottom: The Mall of Switzerland

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- Flow of Goods

Planning Foundations of Smart Cities: Connectivities

Curaçao Airport City

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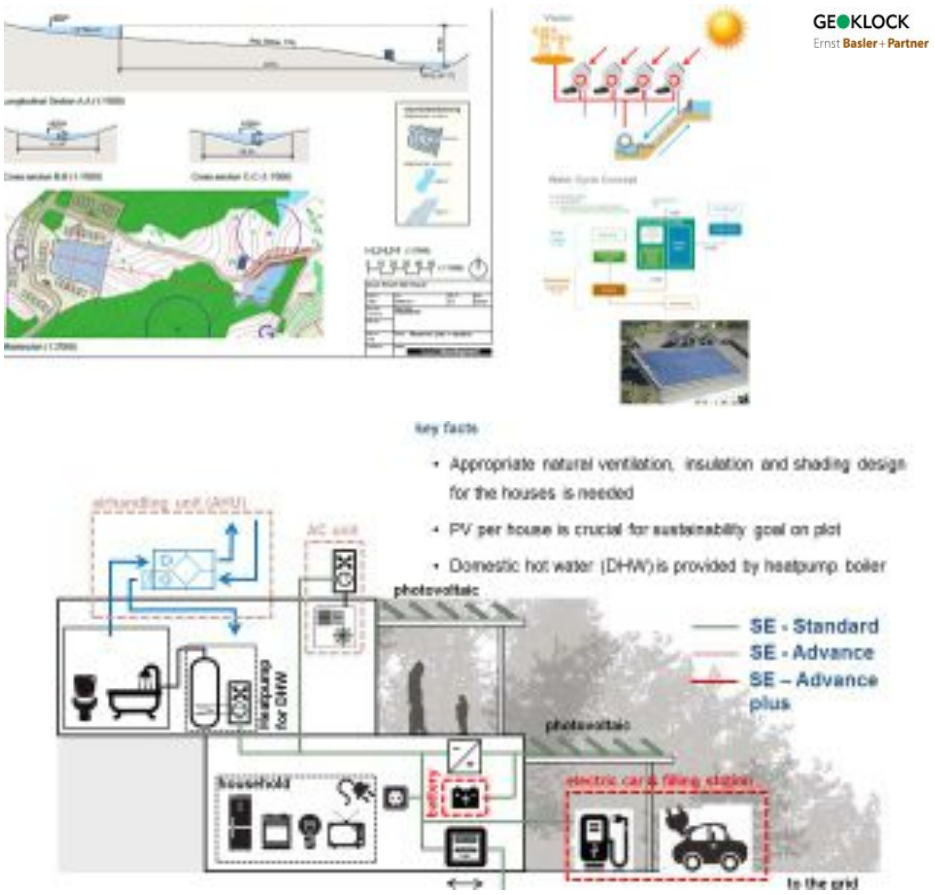
- Flow of Energy

Planning Foundations of Smart Cities: Connectivities



Top: Reservoir – Mini Pump Station

Bottom. Energy Concept – sight on house

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Connectivity is key for a prosperous society.

- Flow of People
- Flow of Goods
- Flow of Energy
- Flow of Information

NoTech / LowTech / HighTech

Swiss Valley Resort Pune, India

- Smart Cities combine different modes of technology.
- Smart Cities intelligently use technology where it is suitable and necessary
- Whenever possible, NoTech or LowTech must be applied for reasons of cost and energy consumption.

Why do few Smart Cities work?

The sustainable concept is clear and well accepted, but the financial side is often not solved.

→Financial Future Viability

Neither the governmental agencies nor the eccological engineers are experts in the field of finance.

The financial experts are not yet in tune with the Smart City concept.

Solution:

The government acts as a facilitator to bond landowners to investors.

Local community gets empowered to implement local qualities into the Smart City concept and receive returns over time from investors.

Highest and best use of local natural and cultural resources

Conclusion

Every society needs sufficient time to adapt to disruptive changes.

Smart Cities are far more than just urban development or contemporary architecture. Technology 4.0 and the legal framework controlling such technology are even grater challenges to architects and planners than the strictly city planning aspects.

Ethical questions need answering. Politicians are challenged, from the UN to the small community.

Technology 4.0 will create immense values resulting in augmented wealth for society.

Governments are challenged in finding fair ways of distributing such wealth among the population.

Thank you for your attention

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