

Learning through playing

The eco-city game



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The theory of learning through playing

- The United Nations recognizes play as a specific right for all children
- Play nourishes every aspect of children's development
 - Forms the foundation of intellectual, social, physical, and emotional skills necessary for success in school and in life
- Play paves the way for learning
 - During play, children try new things, solve problems, invent, create, test ideas and explore



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The background of the game



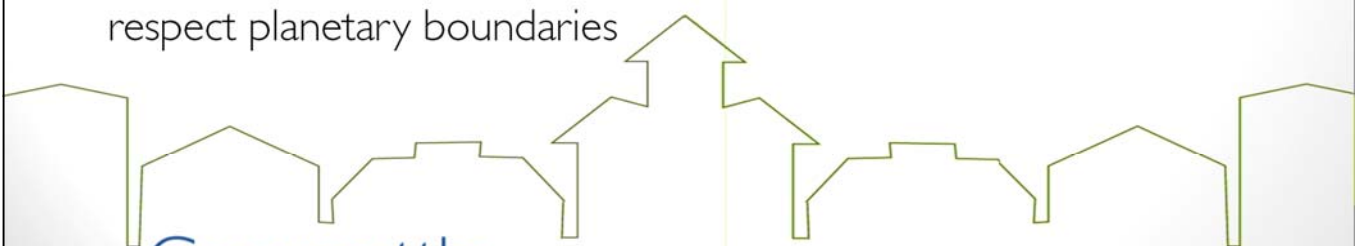
- Idea developed by Jean-Nicolas Louis and Antonio Caló, for master's students of the Barents Environmental Engineering (BEE) International Master's Degree Programme.
 - The goal was to work on existing cities in the Barents region and formulate solutions how they could be further developed.
- The game was re-designed for 11-18 year old students for the Science Day of the University of Oulu (10.9.2013)
 - Antonio and Jean was joined by all of NorTech Oulu to refine the game and describe the eco-city elements
 - The game also got its current look, designed by Heidi Pruikkonen and got the name
I'm the king of the World!



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The science behind the game

- The game uses the theory of eco-cities
 - Environmental, economic and social consideration are all considered
- The game advocates equality for all
 - All should have access to critical services, such as housing, jobs, food, energy, water services and waste management
- The city also needs to provide social services, such as education, and healthcare for all citizens
 - Also higher humans needs have to be satisfied – participation, belonging
- The ultimate idea is to build cities that aid in eradicating poverty and inequality, consume sustainably, combat climate change, and respect planetary boundaries



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The message of the game

- We hope the game makes students think and create visions of what city they would like to live in
- The game encourage to choose environmentally appropriate technologies and sustainable solutions
- However, we also want them to understand that there are trade-offs and limitations – there is a limited budget available!
 - Modern tech can be attractive but may also costs more
- The space is limited as well
 - All needs to be provided within this space
 - The city needs to have a sustainable footprint
 - Citizens also need spaces for recreation and self-realization



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The elements of the game

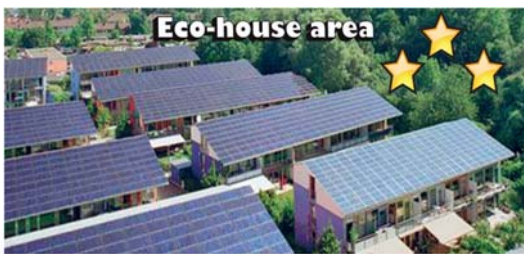
| | | |
|--|---|---|
| Building <ul style="list-style-type: none"> • Energy Efficient • Comfortable • Low density built environment • Access to services and infrastructure | Energy <ul style="list-style-type: none"> • Low emission • Local renewable sources • Carbon neutral systems • Smart solutions • Priority to district heating | Food <ul style="list-style-type: none"> • Domestic production • Ecologically clean • No genetic modifications • Fresh inexpensive products |
| Waste <ul style="list-style-type: none"> • View waste as a resource • Promote source separation of wastes • Recycling infrastructure • Waste-to-energy • Efficient collection system | Water <ul style="list-style-type: none"> • Promote water saving • Provide clean drinking water • Energy efficiency water treatment • Nutrients recovery from wastewater sludge | Services <ul style="list-style-type: none"> • Diversified • Accessible • Increase well-being of people • Diverse job opportunities • Increase local know-how |
| Transportation <ul style="list-style-type: none"> • Low emission • Priority to walking and bicycling • Efficient public transport • Electric car infra • Easily accessible | Industry <ul style="list-style-type: none"> • Provides diverse employment • Well-paid jobs • Good for economy • Accessible • Pollution-free | Recreation <ul style="list-style-type: none"> • Environment friendly • High capacity • Low resource use • Multi-purpose • Provides places to relax, exercise, walk, talk , interact |

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Building solutions

- Building design is strongly linked with energy considerations
 - Design buildings with solar access and natural ventilation
 - Insulation and thermal mass in buildings, climate responsive materials
- As the city is to be built in the North, the houses need heating
 - We encourage district heating solutions
 - We would also like to see ICT-enhanced passive smart buildings
 - We see houses as integral elements of a smart energy network
- The density of city structure is to be considered
 - Preventing urban sprawl, encourage mixed uses, access to services



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Energy

- European policies are aiming at a total decarbonization of electricity by 2050
- The application of carbon neutral solutions, wind, hydro, as well as solar and geothermal is encouraged even in the North
- Combined heat and power solutions based on locally available energy sources are ideal solutions for the North
 - Consideration should also be made to energy recovery from wastes

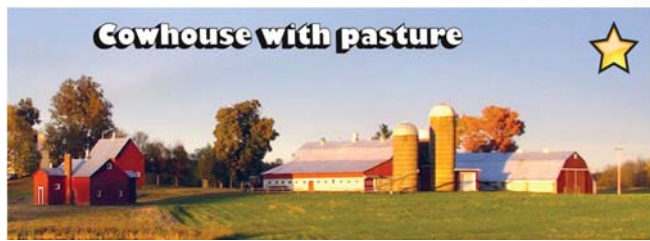


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Food

- Eco-city movements are encouraging the incorporation of food production into the city structure
 - This may not be viable for most Northern cities
- The dismal fact is that eco-cities, especially intended for hundreds of thousand of citizens, cannot supply themselves within the city walls
- A key consideration is efficiency and sufficiency
 - Both in terms of farming and delivery methods,
 - Also in the use of food and recovery of nutrients from food related wastes



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Waste management

- The purpose of waste management as a municipal activity is mainly to assigning responsibility for objects the citizens do not wish to own anymore
 - This view does not encourage reducing the amounts of wastes
 - Citizens need to take responsibility for their wastes
 - Source-separation is also key in improving waste quality
- Cities shall ideally have solutions for all waste fractions
 - bio-waste, energy waste and recyclables
 - View follows the development of waste management in Finland

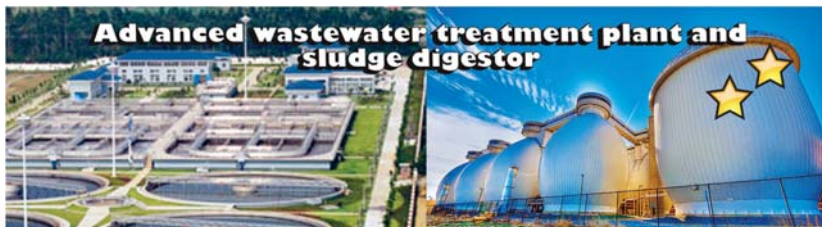


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Water and wastewater

- Providing safe drinking water to cities is one of the current challenges of the region
 - Even regions with well developed infrastructures are facing the need for water infrastructure renovation
- Groundwater and surface water are both widely used in the North
- In wastewater treatment, we would prefer mechanical and biological methods with considerations of value recovery from sludge
- Recovery of organics and energy synergies!

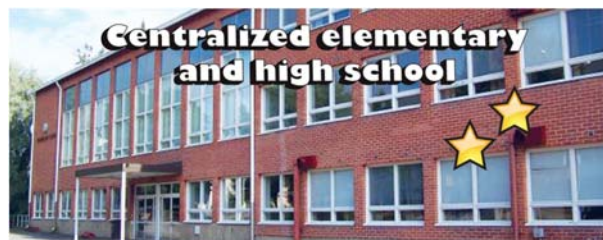


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Services

- Equal rights and access to services, facilities and information is one of the key requirements for eco-cities
- Cities often need to make a trade-off between accessible, small-scale solutions and large scale, more efficient solutions
 - Encourage the diversity of land-use: residential, commercial, recreational, educational...
- Develop culture by integrating the arts, sciences and technology
- Maximize human potential - replenish and support the processes that maintain life



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Transportation

- One of the key concepts in eco-cities is that it provides safe solutions for moving on foot or bicycle = “walkable” cities
 - Low density cities are transformed into networks of high and medium density urban settlements of limited size separated by greenspace, with most people living within walking or cycling distance of their workplace
- Public transportation is a challenge for sparsely populated areas
 - It is also instrumental in promoting well-being and equality
 - Our future vision for cities also includes an e-car infra



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Industry

- Cities are primarily the places of commerce, a spaces where goods and ideas are exchanged
 - Create work opportunities and promote economic activity
- A fundamental reason for urbanization is moving for jobs
 - Providing diverse employment opportunities is elementary for the longevity of urban communities
- Cities need to support and develop ecologically and socially responsible economic activity
 - We would like to see eco-cities that are also hubs of knowledge



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Recreation

- Cities have to provide for most daily needs within the city
 - There is room for everybody in the eco-city effort
- Identify and celebrate the spirit of place
 - Good visual relations to the public domain
 - Spaces created for self-expression
- Public use of public space is encouraged
 - Enhance the experience of urban public spaces
- Incorporating natural ecosystems into urban areas



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At last...

- We hope that, the least, the game will plant the seed of idea for eco-cities
- We intend to disseminate the game to schools in Finland and Russia and hope it can be an inspiration to students and teachers alike
- I acknowledge Jean and Tony for the game idea and all our researchers for their part in developing to the form it is now
- Very grateful for the funding of the Karelia ENPI Programme for providing us with the opportunity to further disseminate the game
- Thanks to the audience for the attention and participating the seminar
 - We will appreciate any feedback or development ideas about the game
- The Science Day encouraged to experience science
 - Now, how about you, fancy giving it a try? 😊



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