

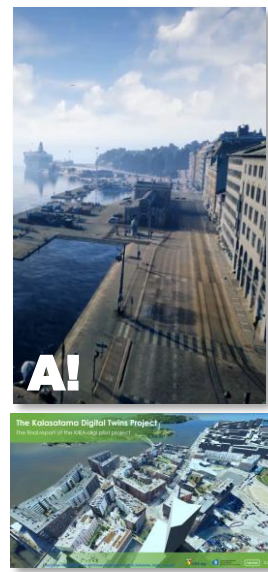
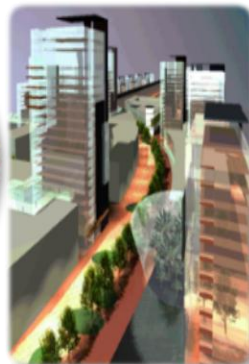
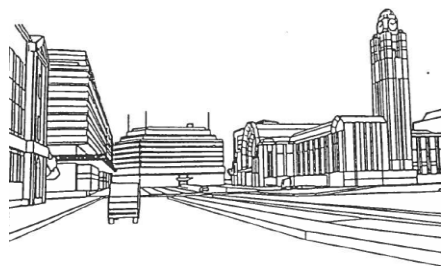
The background of the slide is a dark blue 3D city model with various building blocks. Overlaid on this are numerous thin, flowing lines in shades of green and blue, representing data flow or movement through the city space.

3D都市モデルからデジタルツインへ From 3D City Models to Digital Twins

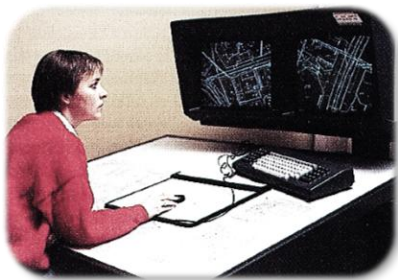
Helsinki's Experience

24.6.2026 エンニ・アイラクセネン Enni Airaksinen

40 years of 3D Helsinki



City Model Try-outs	Urban Development Models	Entire City 3D CAD	Urban Simulators	New Models	Co-Innovation & Collaboration
1980	1990	2000	2010	2020	2030
3D Workstations	Architectural Competitions	Real Time Simulator	Helsinki 3D+	Energy Atlas Digital Twins	IoT AI





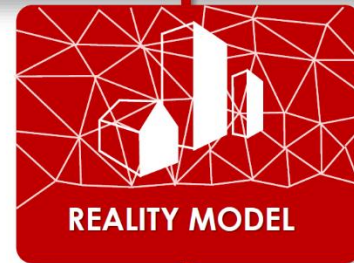
Open
Geospatial
Consortium



FME



BIG picture



REALITY MODEL



CityGML MODEL

PRODUCTION / STANDARDS / DATA MAPPING



Point Clouds



Oblique Images



GIS DataBases



Registers



IFC / BIM / Infra..



New Geodata

Two separate production lines

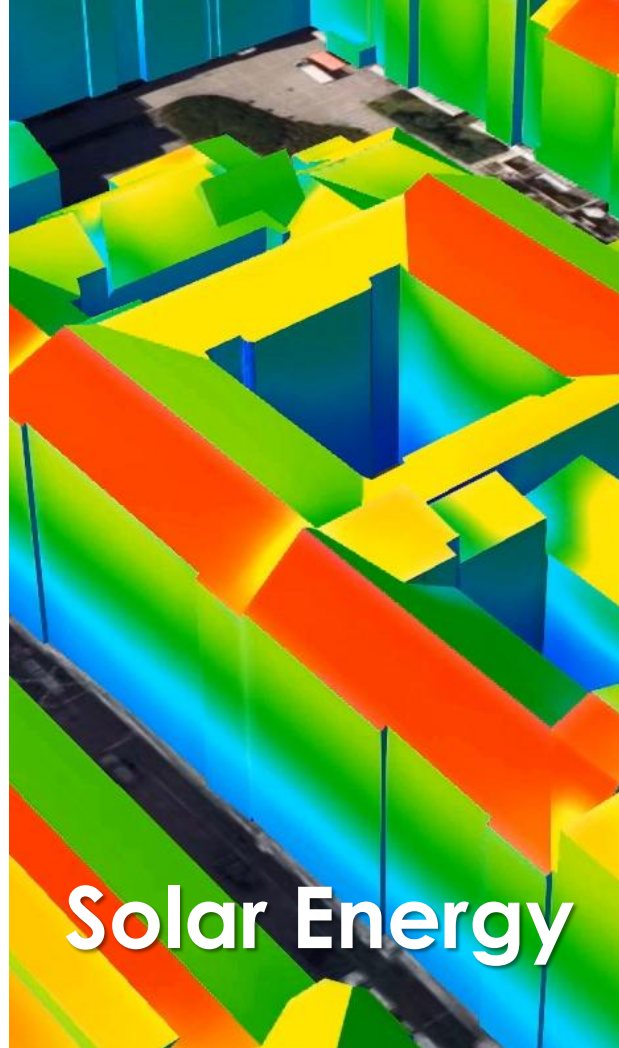
- Both - and - solution

Why are digital twins important right now?

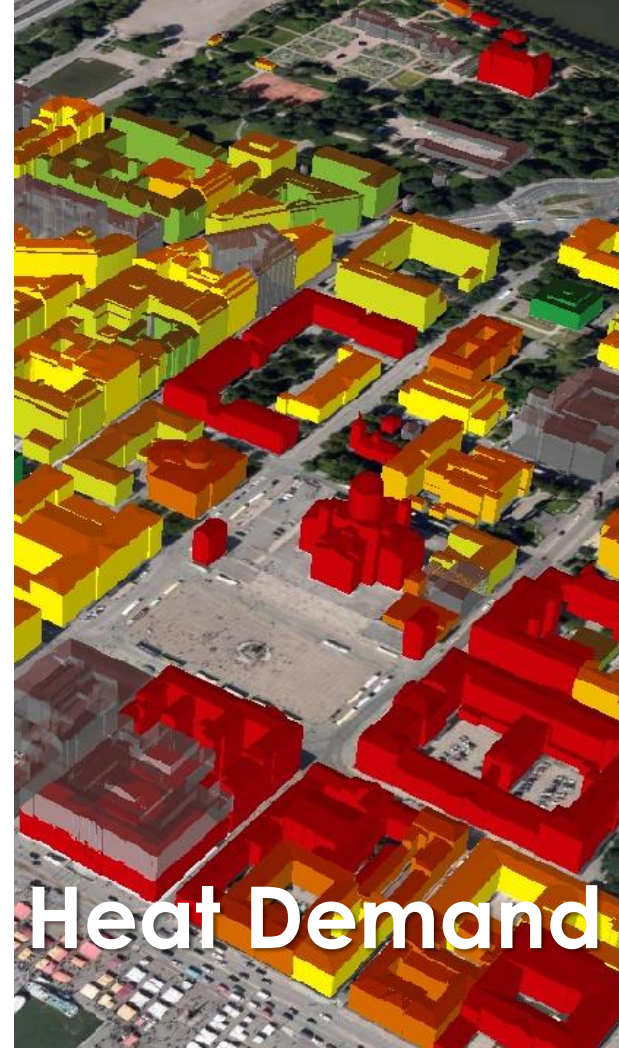
1. Cities are facing climate, energy and resilience challenges at the same time
2. Decision-making requires foresight, not just reporting on the past
3. There is a lot of data, but it is fragmented
4. 3D city models are evolving from visualisation toward a digital operating environment
5. Be at the centre of the development and gain the most



Energy Data



Solar Energy



Heat Demand



Geo Energy

Helsinki Energy and Climate Atlas hel.fi/3D

- Understand the situation now
- Alternative energy sources
- Heat demand simulations and impact of renovations

Perustietoa rakennuksesta

Katuosoite : Kalevankatu 22

RATU : 628

VTJ-PRT : 103056057X

Käyttötarkoitus : Asuinrakennus (Muut kerrostalot)

Rakennuksen korkeus : 19.47 m

Kerroksia : 5

Kerroskorkeus : n. 3.9 m

Kerrosala : 4301 m²Bruttoala : 4640 m²Tilavuus : 16650 m³

Rakennusaine : Tiili

Rakennusvuosi : 1881

Energiatietoja

Lämmitystapa : Vesikeskuslämmitys (Kauko- tai aluelämpö)

Korjaustietoja

Ikkuna-/ovi-/porttimuutos : Kaupunkikuvallinen lausunto (Rakennuslupa: 17-1571-KL 4)

Ikkunoiden uusiminen

Suojeltu rakennus

Laskennallinen kulutus (kWh/bm²/vuosi)

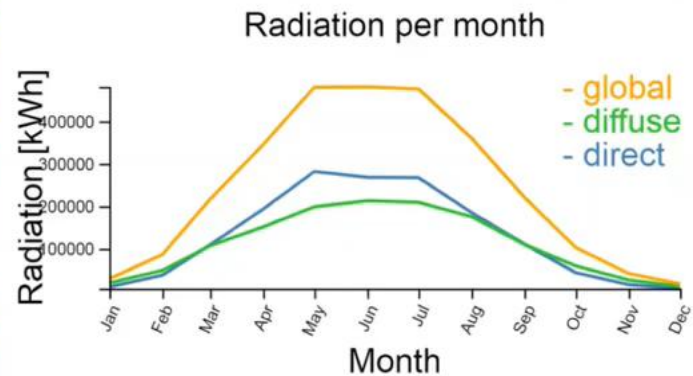
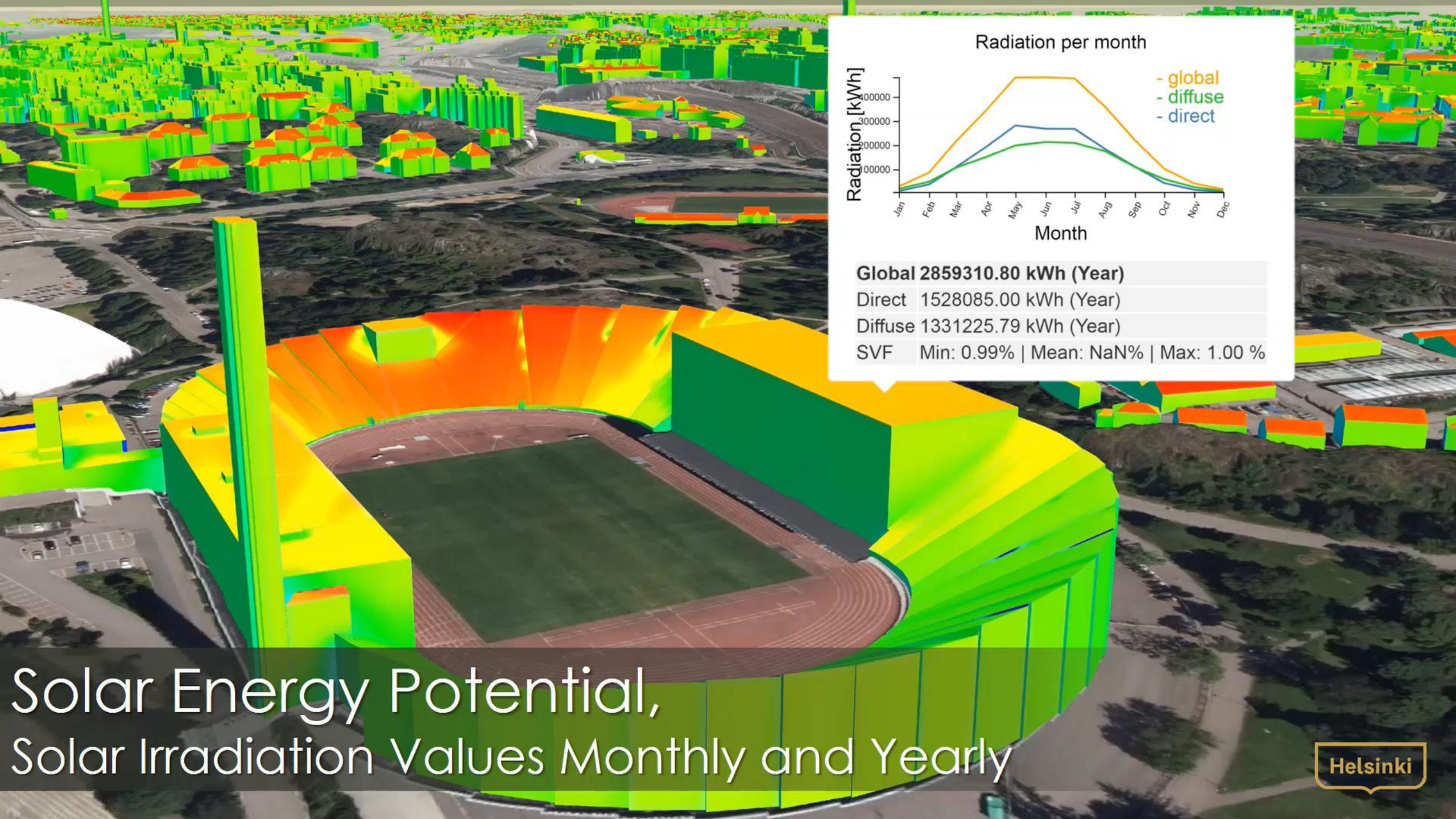
Lämmitys yhteensä : 130

(Tilojen lämmitys : 93, veden lämmitys : 37)

Kiinteistösähkö : 12

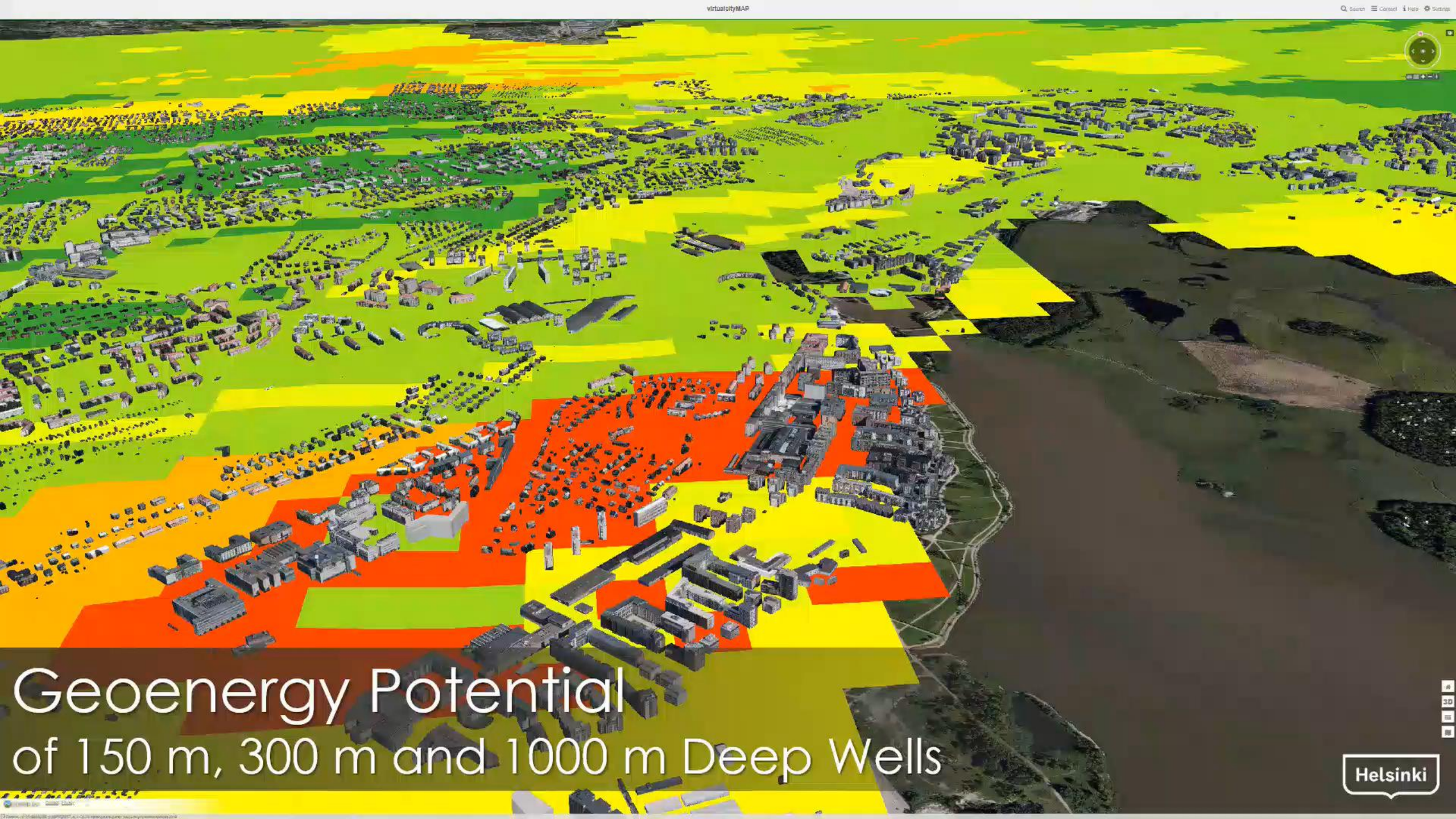
Käyttäjäsähkö : 40

Energy Data, Renovation History and Real Consumption Data



Global	2859310.80 kWh (Year)
Direct	1528085.00 kWh (Year)
Diffuse	1331225.79 kWh (Year)
SVF	Min: 0.99% Mean: NaN% Max: 1.00 %

Solar Energy Potential,
Solar Irradiation Values Monthly and Yearly



Geoenery Potential
of 150 m, 300 m and 1000 m Deep Wells



Heat Demand,
Heat Savings and also CO₂ Emissions

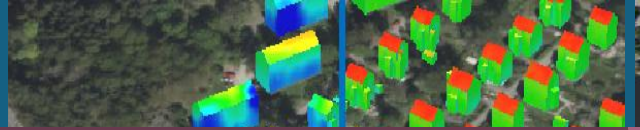


Helsinki Energy and Climate Atlas

Future Development Plans



Energy Data
up-to-date,
building-specific data



**Renewable
Energy**
continuous maintenance
and expansion

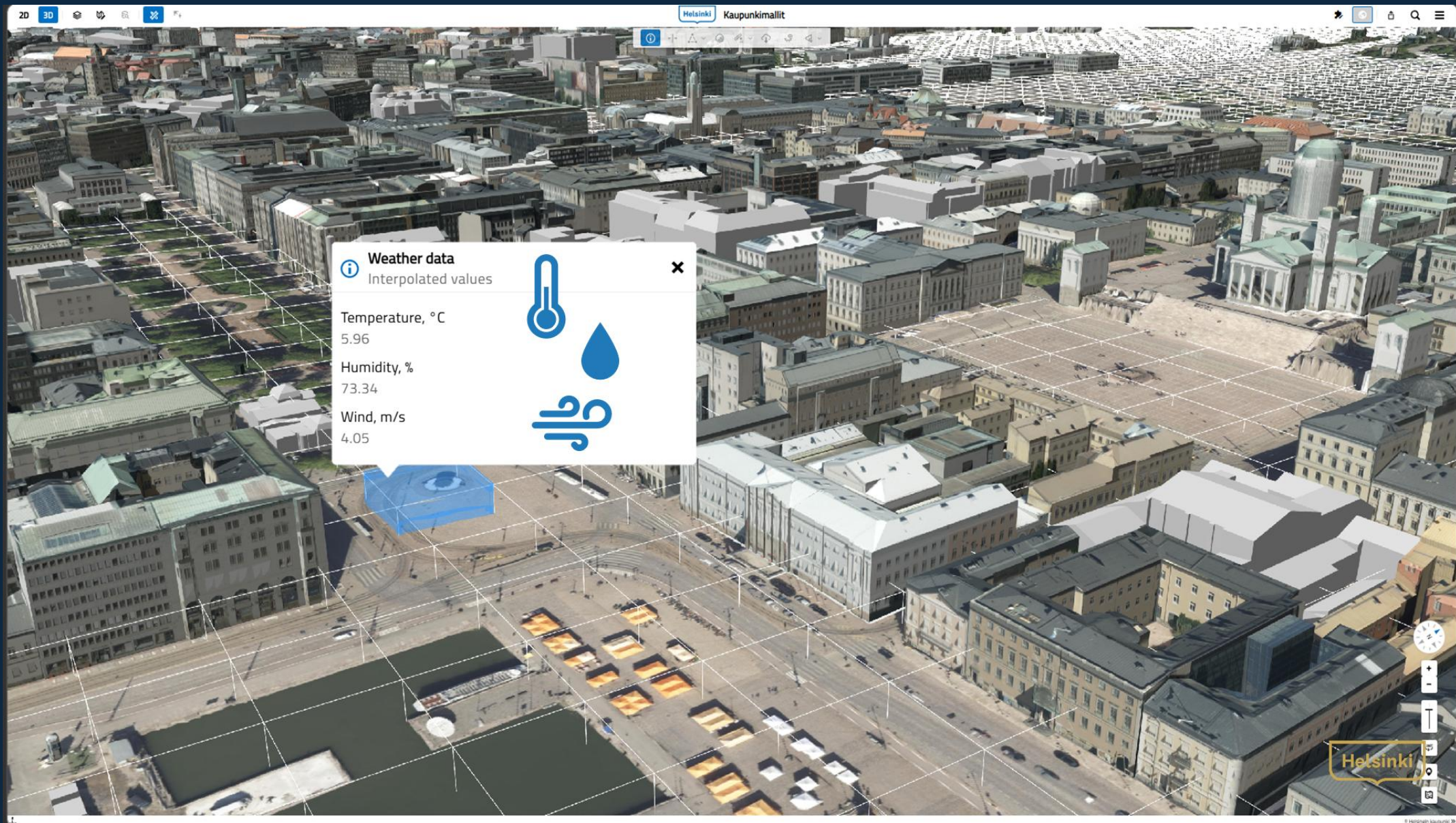


**Heat Demand and
Energy Renovations**
scenarios and forecasts

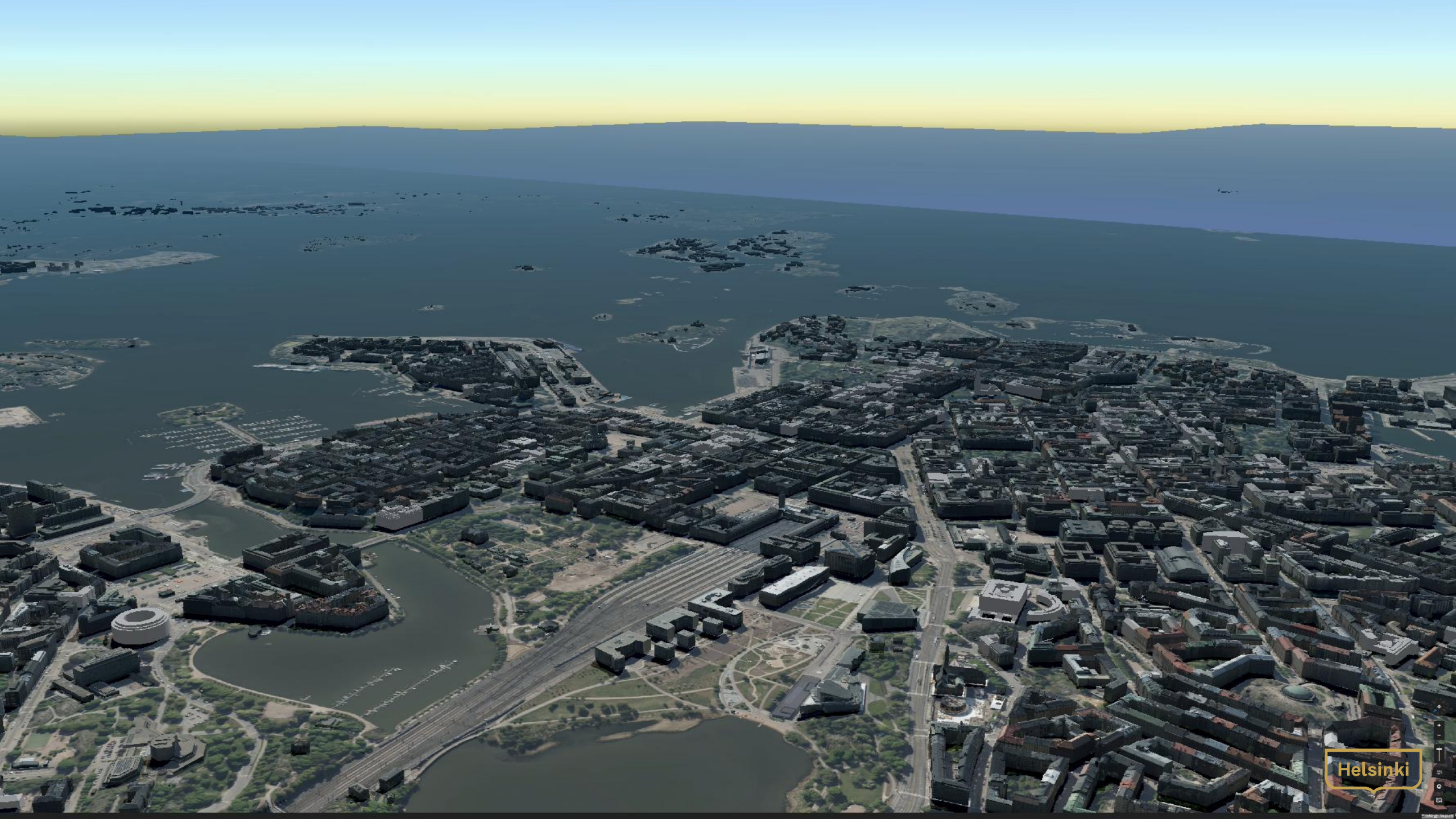
New theme
**Climate
Change
Adaptation**

stormwater and
urban heat
management

real-time
environmental
data integration



Climate Digital Twin and the Voxel Model Version 0.1



Helsinki

ありがとうございました。

Links:

- Helsinki 3D+ <https://hel.fi/3D>
- 3D City Model Platform <https://kartta.hel.fi/3d>
- Helsinki Energy and Climate Atlas <https://kartta.hel.fi/3d/atlas>
- Open Energy Atlas Data in Helsinki Region Infoshare <https://hri.fi/data/fi/dataset/helsingin-3d-kaupunkimalli>
- Helsinki 3D+ Youtube channel <https://www.youtube.com/@helsinki3d>
- Energy and Climate Atlas video clip (no audio) <https://youtu.be/Cr-M1bla7K0>
- Heat Demand Prediction of Buildings Using a 3D City Model <https://youtu.be/J6r-cCL25O0>