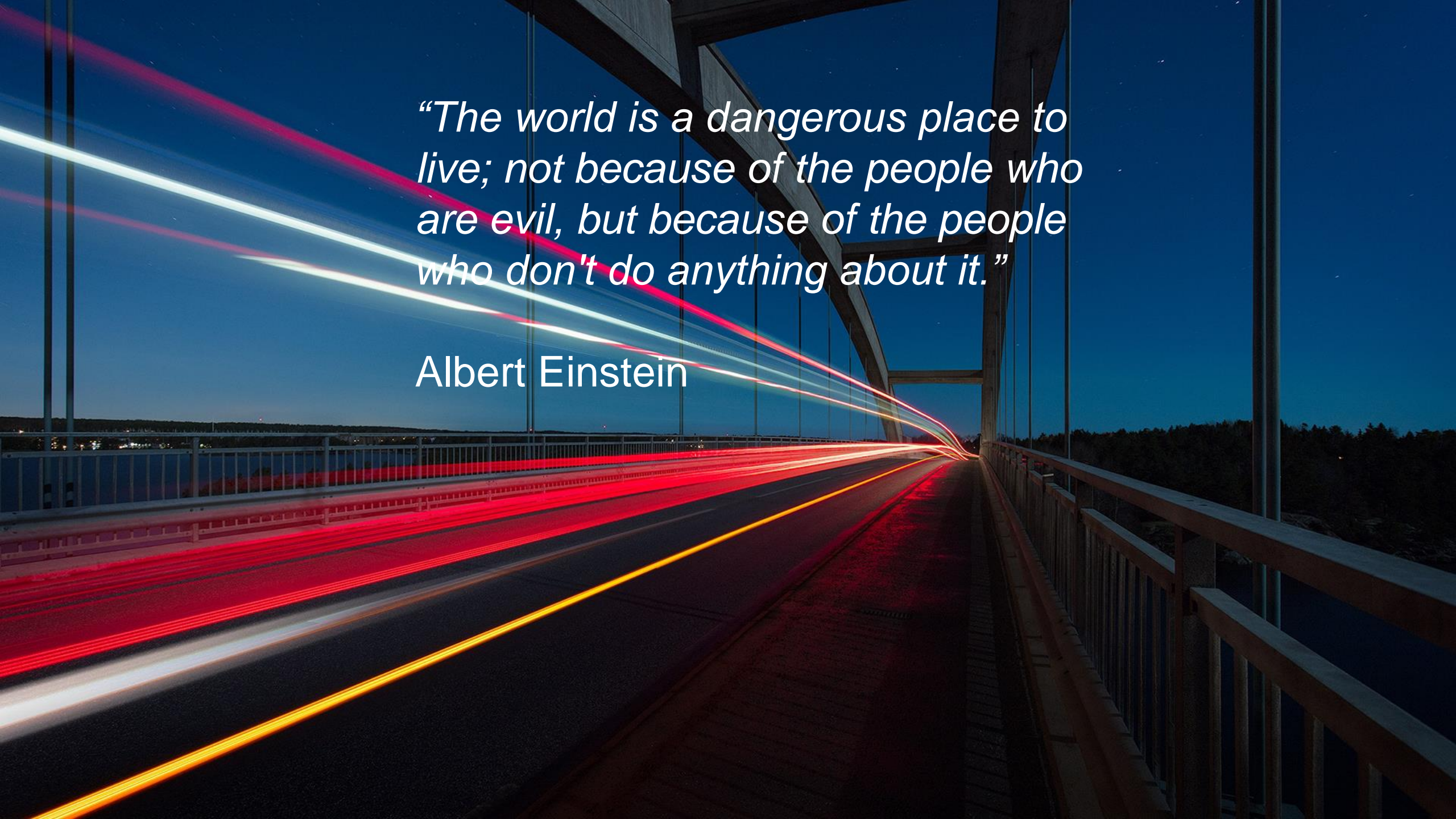


ESIMERKKEJÄ KUINKA 5G AUTTAA RAKENTAMAAN KESTÄVÄMPÄÄ TULEVAISUUTTA

Tomi Sarajisto

Development Manager

Telia Company / Division X / Architecture

A long-exposure photograph of a bridge at night. The bridge's structure, including its railings and support beams, is visible. Multiple bright, colorful light trails (red, white, and yellow) from moving vehicles stretch across the bridge deck, creating a sense of motion. The background shows a dark sky and distant city lights.

“The world is a dangerous place to live; not because of the people who are evil, but because of the people who don't do anything about it.”

Albert Einstein

TELIA'S ROAD TO ZERO



<https://youtu.be/XcGiJNiF6SA>

OUR APPROACH TO SUSTAINABILITY

BOARD AND MANAGEMENT COMMITMENT

RESPONSIBLE BUSINESS

Managing risk, minimizing negative impact and acting ethically and responsibly

SHARED VALUE CREATION

Addressing societal and environmental challenges while creating business value

EMPLOYEE ENGAGEMENT

ETHICS AND COMPLIANCE



STAKING OUT OUR ROAD TO ZERO

BY 2022 WE WILL

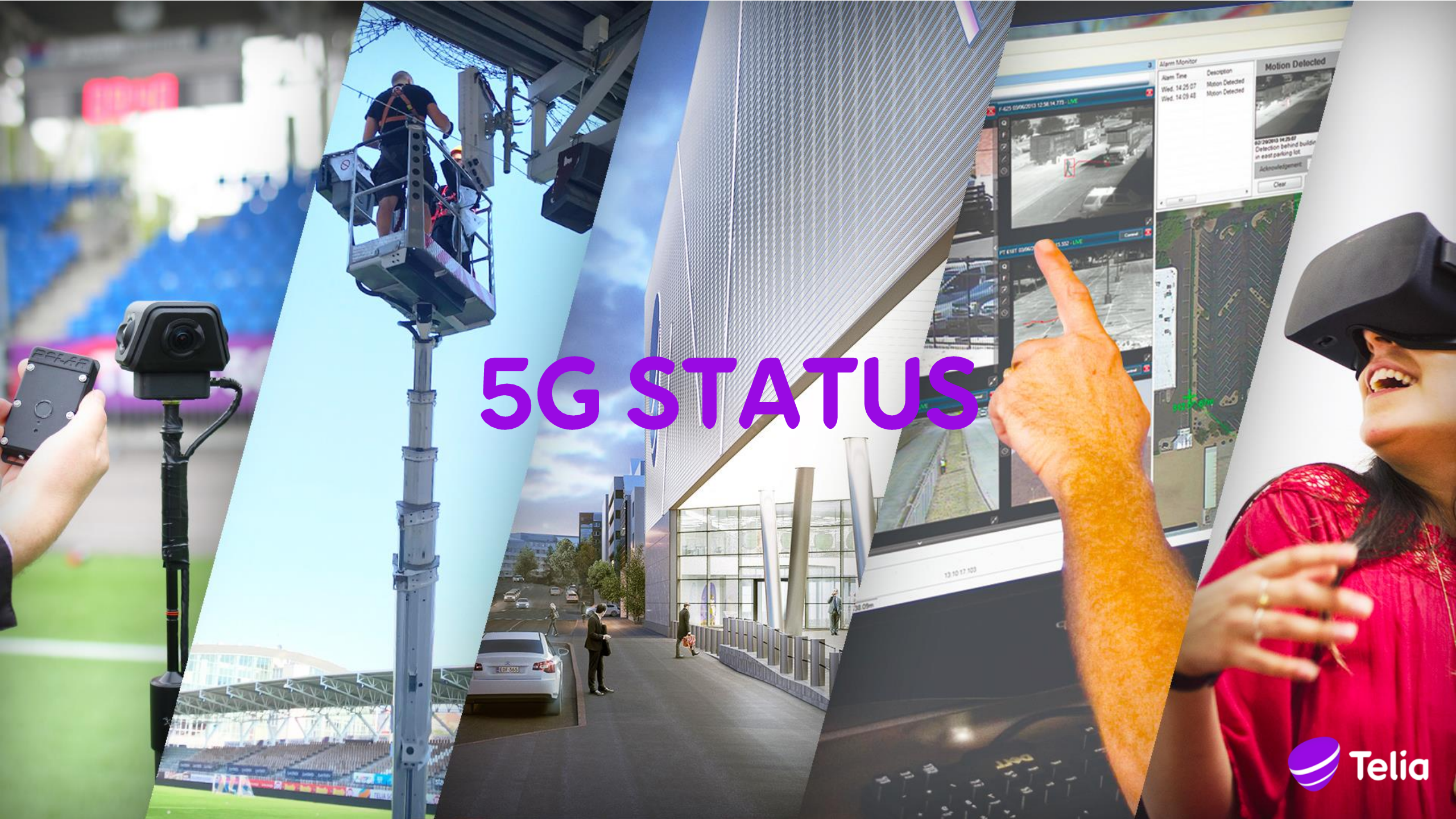
- 100 percent renewable electricity use
- 5 percent lower energy consumption per subscription equivalent (baseline 2018)
- Climate neutral within our own operations (energy and business travel)
- Engage with all suppliers to have a plan in place by 2022 to reach Zero CO₂ by 2030, including their suppliers
- Significantly increase reuse of network and B2C/B2B equipment
- Comprehensive green offerings in all markets
- Include sustainability in incentives and performance evaluation



DARING GOALS 2030



5G STATUS





5G

10-20x LATENCY
CAPACITY

+ NETWORK SLICING
+ EDGE COMPUTING

5G

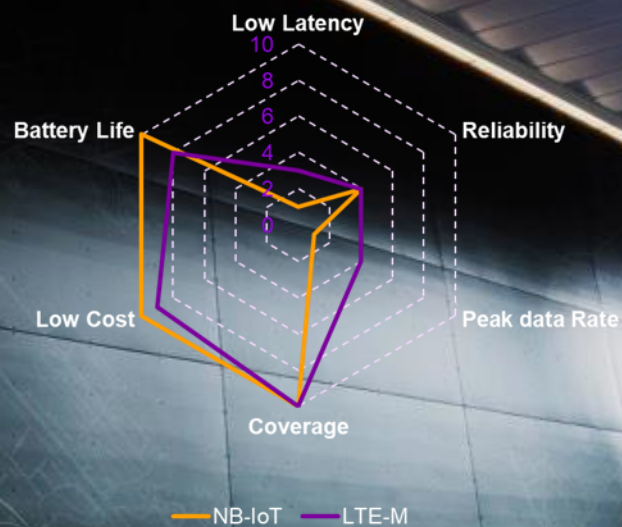
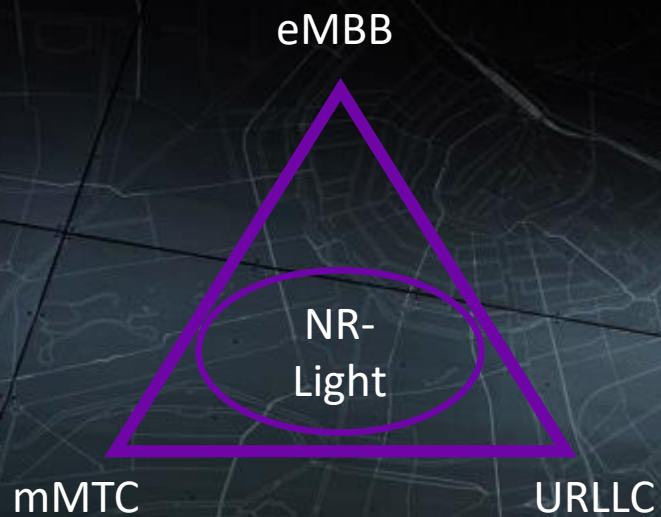
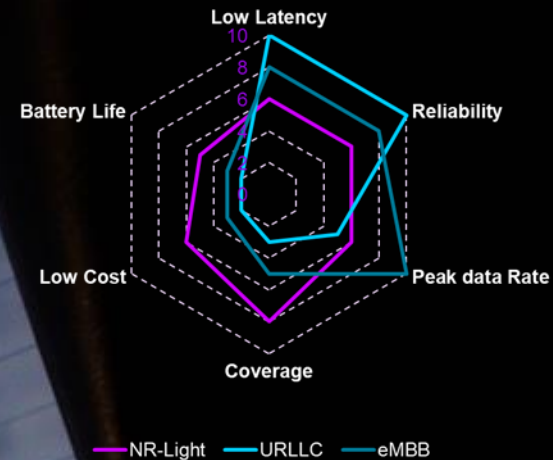
mMTC=massive Machine Type Communication

Now

eMBB= Enhanced Mobile Broadband

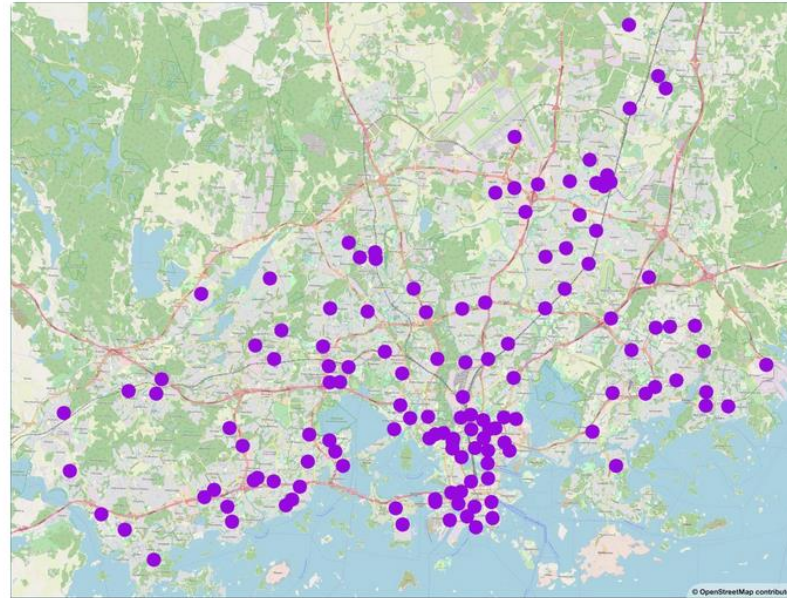
URLLC=Ultra Reliable Low Latency

NR-Light=New Radio Light



PUBLIC 5G – COVERAGE AND DEVICES

- Telia public 5G network is developing rapidly for largest cities in Finland
- Top7 cities had first 5G coverage before christmas 2019.
- On 2020 accelerated 5G network rollout.
- Both handsets and routers are available, with 5G enabled subscriptions



Pääkaupunkiseutu keväällä 2020



Oulu keväällä 2020

Currently available terminals

- Two handset models and two router models.
- Terminal portfolio will develop fast during 2020 onwards



TELIA 5G USE CASES EXAMPLES

5G VR COLLABORATION



5G & FACIAL RECOGNITION IN FAST PAYMENT



5G AI MACHINE VISION AT FACTORY



5G DRONE AND VIDEO ANALYTICS



5G PRIVATE NETWORK



5G AR FOREST INDUSTRY

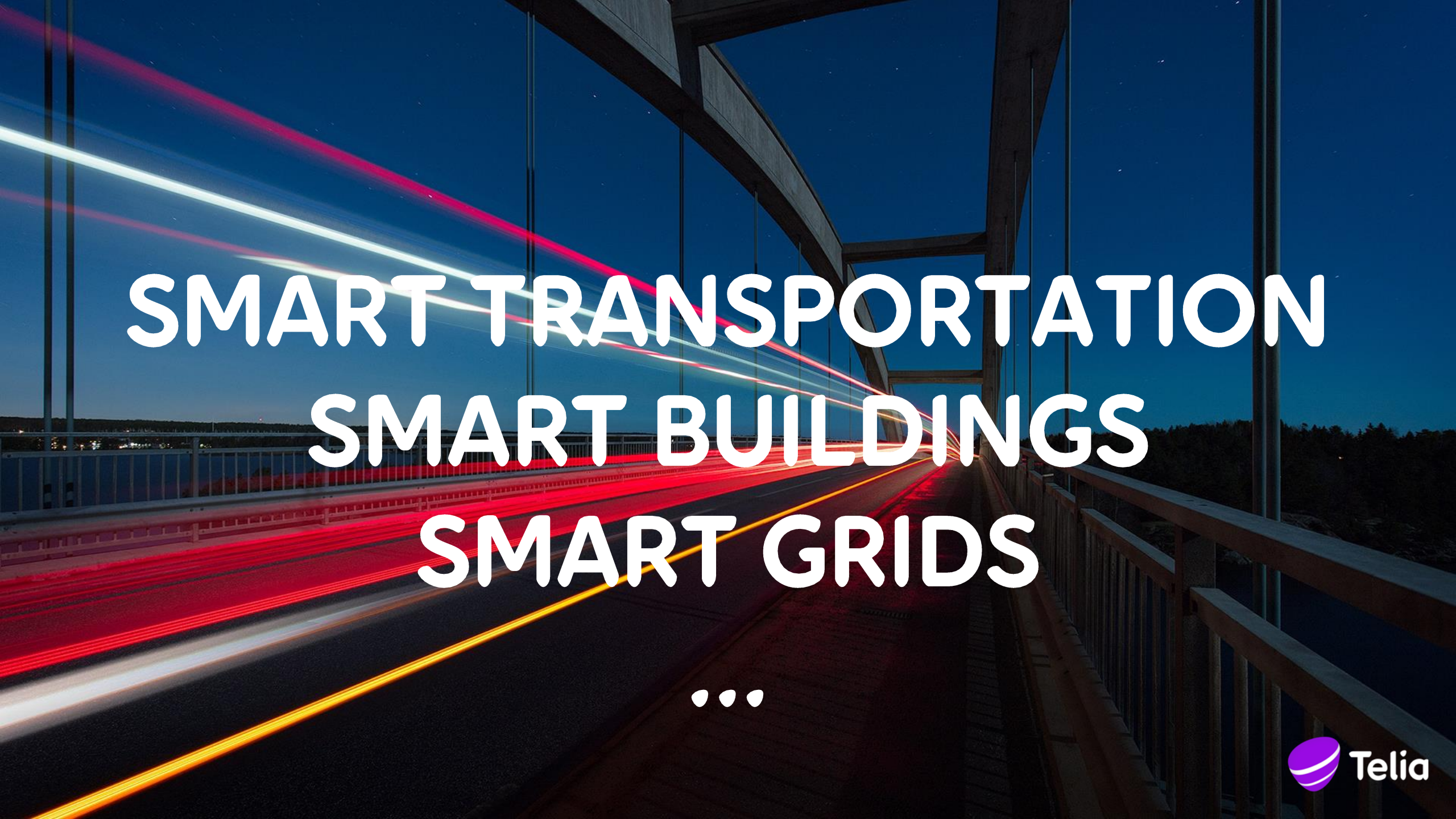


5G TELIA ESPORT



5G ROBOT AT AIRPORT





SMART TRANSPORTATION SMART BUILDINGS SMART GRIDS

...

An aerial photograph of a two-lane asphalt highway stretching into the distance. A white semi-truck is driving away from the viewer on the right lane. The road is flanked by dense forests with trees showing autumn colors of yellow and orange. To the left of the road, there is a small pond and a cleared area. The sky is overcast.


CAN IOT MAKE TRANSPORT MORE SUSTAINABLE?

The world is warming and we have to do something.

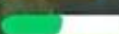
<https://youtu.be/-WpDou6nhe0>



Score: **68** / 100

Acceleration 

Braking 

Gear Changes 

So in this way using Eco-Driving you can save up to 15% fuel consumption.

A wide-angle photograph of a city waterfront. In the foreground, a body of water reflects the sky. The middle ground is filled with various modern buildings, including a prominent dark skyscraper on the left and several white and grey apartment-style buildings. The background shows more city buildings and a hillside under a heavy, grey, overcast sky. The text 'CAN IOT MAKE BUILDING HEATING SMARTER?' is overlaid in large white letters across the center of the image.

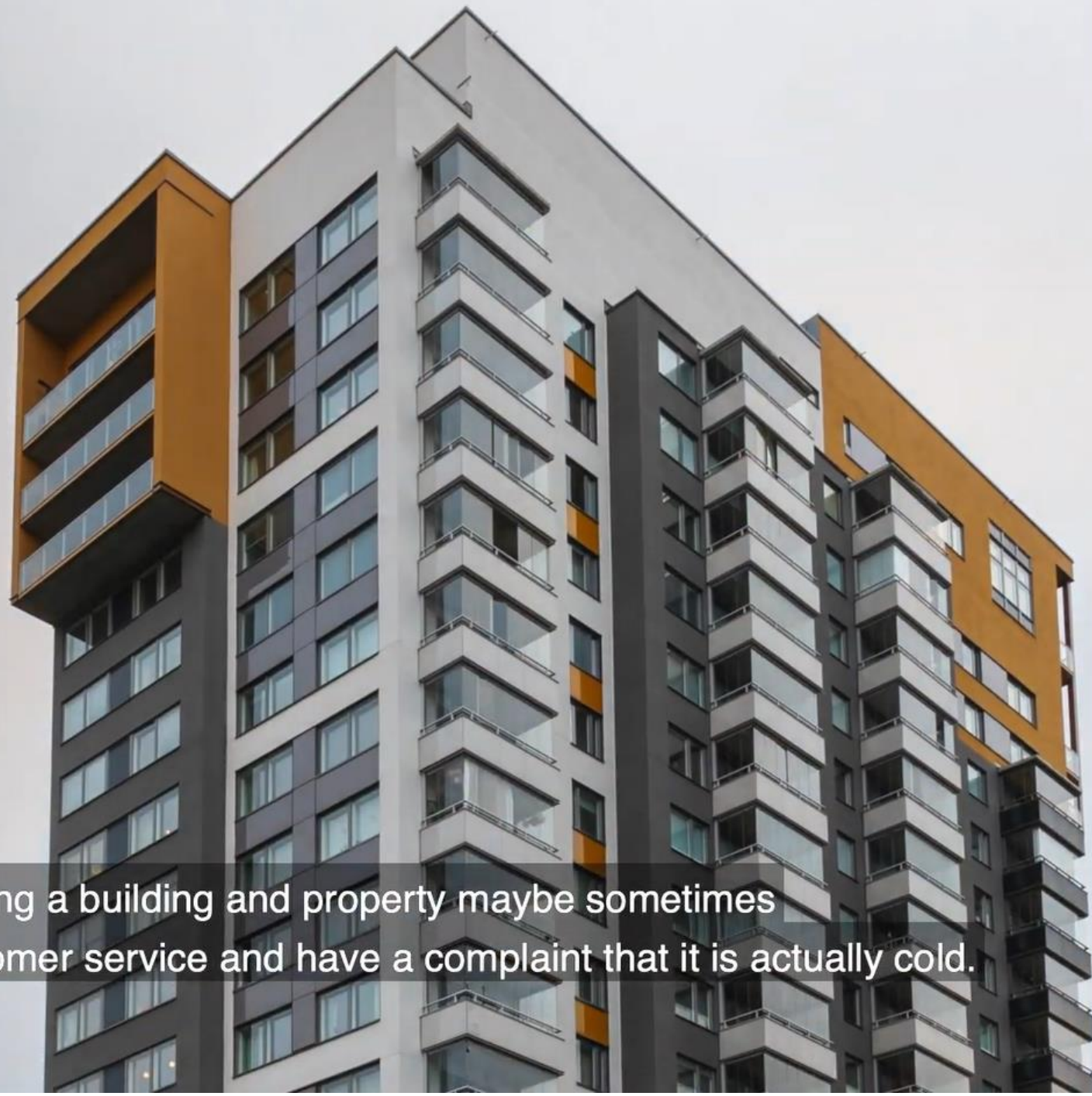
CAN IOT MAKE BUILDING HEATING SMARTER?

<https://youtu.be/8mKBCuy1EE8>

Apt 16		21.5° C
Apt 15		22.8° C
Apt 14		21.6° C
Apt 13		20.3° C
Apt 12		22.1° C
Apt 11		16.4° C
Apt 10		20.4° C
Apt 9		21.6° C




For someone owning or managing a building and property maybe sometimes you have someone is calling your customer service and have a complaint that it is actually cold.




A large, dark metal lattice tower, likely a high-voltage power line pylon, dominates the foreground. It is situated on a rocky, sparsely vegetated hillside. In the background, a deep valley with a river or lake is visible, surrounded by steep, forested mountains under a cloudy sky. The text "UNLOCKING THE GRID" is superimposed in large, white, bold letters across the middle of the image.

UNLOCKING THE GRID

<https://youtu.be/kVyc0Zwf490>

A man in a dark suit and light-colored shirt is sitting in a chair in a workshop. He is holding a white helmet with a black strap. The workshop is filled with various pieces of equipment, including two drones with green and black frames on tripods to his left, a small black robot on wheels in the foreground, and another drone on a stand to his right. In the background, there is a white door and a large white garage door. The man is looking directly at the camera with a slight smile.

You put this on the wire and then we collect the real time, real data
that the power grid owners need

An aerial photograph of a high-voltage power line tower situated in a dense, green forested mountain landscape. In the background, more forested mountains are visible under a sky with scattered white clouds. A data overlay in the top left corner shows 'Temp: 33°C', 'Amp: 442', and 'Vi: 5.2'. A thin black vertical line with a small black dot at its base extends from the data text down towards the tower.

Temp: 33°C
Amp: 442
Vi: 5.2

When the Neuron does its readings, it will check if it has an opportunity for Narrowband communication

A long-exposure photograph of a bridge at night. The bridge's structure, including its railings and support beams, is visible. Streaks of light from moving vehicles create vibrant trails of red, white, and yellow across the bridge deck. The background shows a dark sky and distant city lights.

ENVIRONMENTAL MONITORING EXAMPLE "EAGLE EYE"

ENVIRONMENTAL MONITORING

- Eagle eye trial – monitoring of the blue algae growth in the Gulf of Finland
 - Suomen Ympäristökeskus (SYKE), Nokia, Telia, Vaisala, Nordkapp
 - <https://youtu.be/KFYp8Q0JWmQ>
- AI analytics & 5G capacity for uploading the video stream
- Applicable to many other use cases as well – forestry, agriculture, bio energy production
- Long term – 5G as air traffic control solution for drones & low altitude traffic in city areas



<https://youtu.be/KFYp8Q0JWmQ>



The New Generation Telco