



IoT, Tekoäly ja wearables

**Ulkoministeriön edustajien vierailu VTT:llä
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Artificial Intelligence is a part of digitalization trend

Since 2000 we have seen many trends and buzzwords coming.



What AI is

AI is a collection of technologies and methods – not a single technology.

- Recently, deep learning neural networks have given great results e.g. for image recognition
- Other technologies and methods include machine learning, natural language processing, machine vision, robotics, as well as problem solving & searching, logic & planning & ontologies, probabilistic reasoning, fuzzy logic

AI Paradox
(odd paradox, AI effect):

”AI is whatever hasn't
been done yet.“

Douglas Hofstadter

IoT - Why is it happening now?

Affordable technology is here

People are ready for it

Computing power grows

- Smart machines
- **Intelligent analytics**, decision support systems
- **Big data**
- “Store everything” paradigm (dirty cheap GB)

Connectivity like never before

- Internet IPv6, no limit to nodes
- IoT paradigm – connected objects
- Low power communication
- Identify and track everything (QR, RFID, GPS)

Sensing everything in real time

- Extremely low cost and small
- Connected
- Advanced sensing
- Bio-mimicking

Competences

- Average person has good competences with digital services and products.

Acceptance

- People in all age groups use web, smart phones, car computers at home and on free time.
- Digital natives, Y-generation, not only accept, they expect!



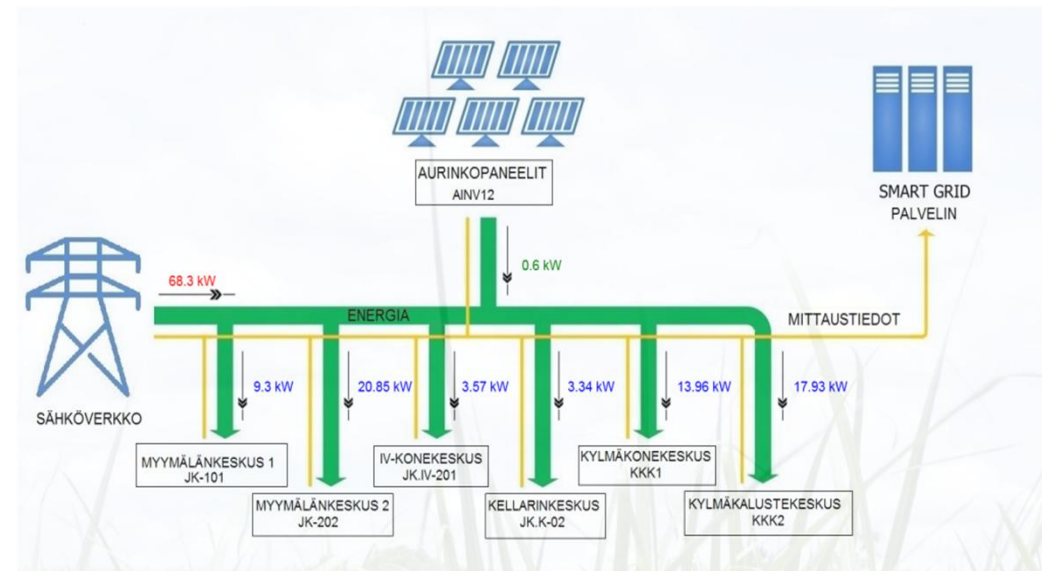
Renewing electricity delivery

“World's most energy efficient grocery store”

(1/2)

NEED

- Solutions for lower electricity consumption and more efficient use of local resources
- Flexible control of the consumption profile
- Ability to communicate with other stores in the grid



The pilot store is Tuira S Market, Oulu.
 Co-operation project supported by Tekes.
 For more information: Klaus.Kansala@vtt.fi



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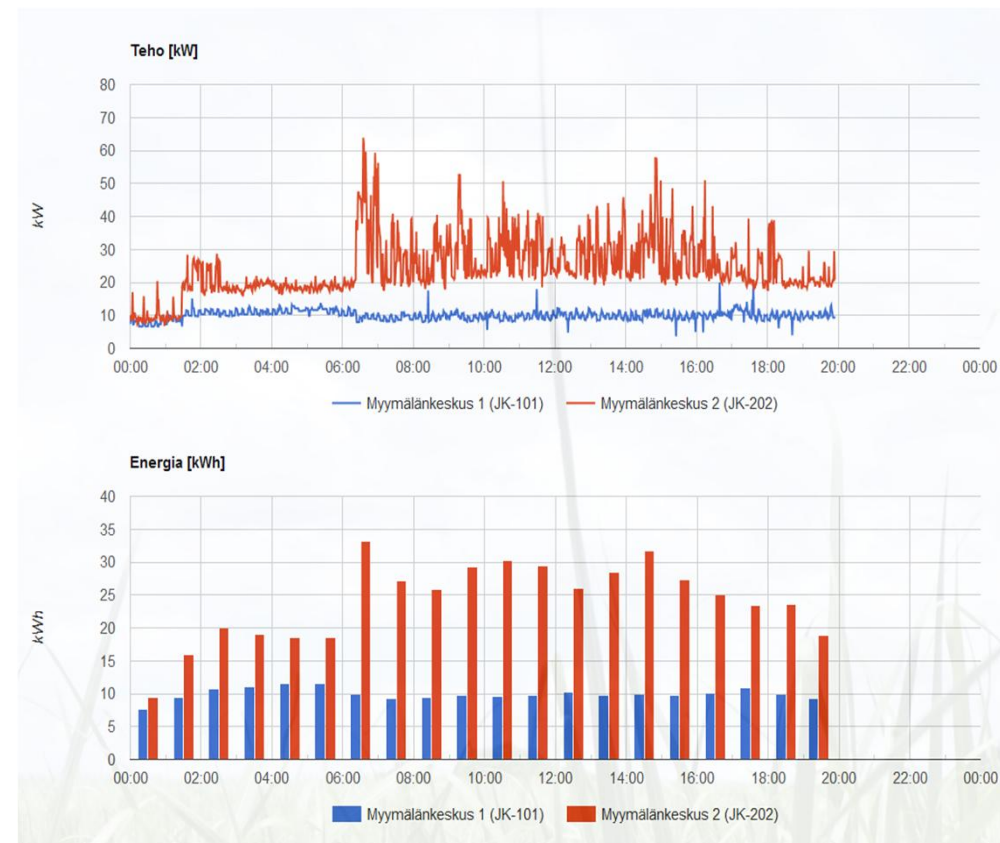
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APPROACH

- A novel combination of renewable energy supply and heat pump technology provides a flexible energy resource
- This backbone is completed by advanced control system which is able to learn from data coming from the system and from the rule base.

BENEFIT

- Smooth and peak free consumption profile reduces the energy cost for the customer – and producer.
- Energy consumption data for the following 3 hours is available for energy market operations leading to predictability
- Peak and load transfer service also possible for local balancing



Sensors in IoT Systems



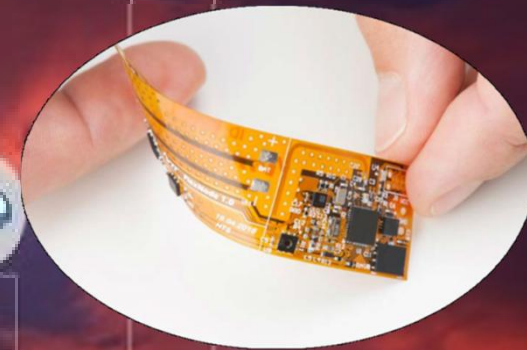
Value proposition: Cost-efficient sensor nodes for industrial environments with IoT interface. Customized sensors for specific measurement needs combined with optimal connectivity solution for a system to fit the application need.

Competitive edge: one stop shop for IoT sensor systems

Specification: Customized sensor combined with IoT connectivity: BT LE, LoRa, WLAN

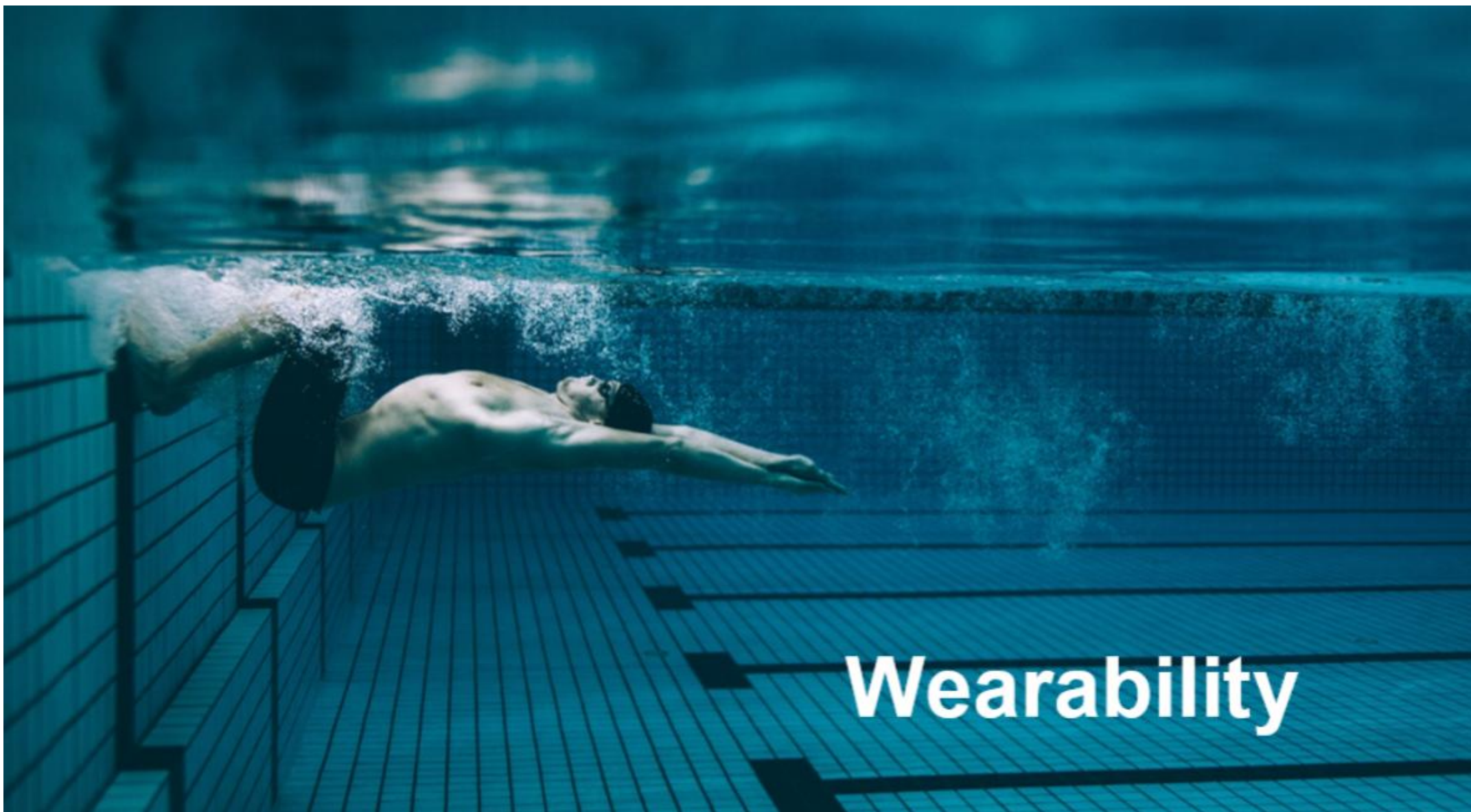
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Offering: Application demonstrators (hardware and software), prototyping, custom designs for sensor nodes and IoT cloud service for customer applications.



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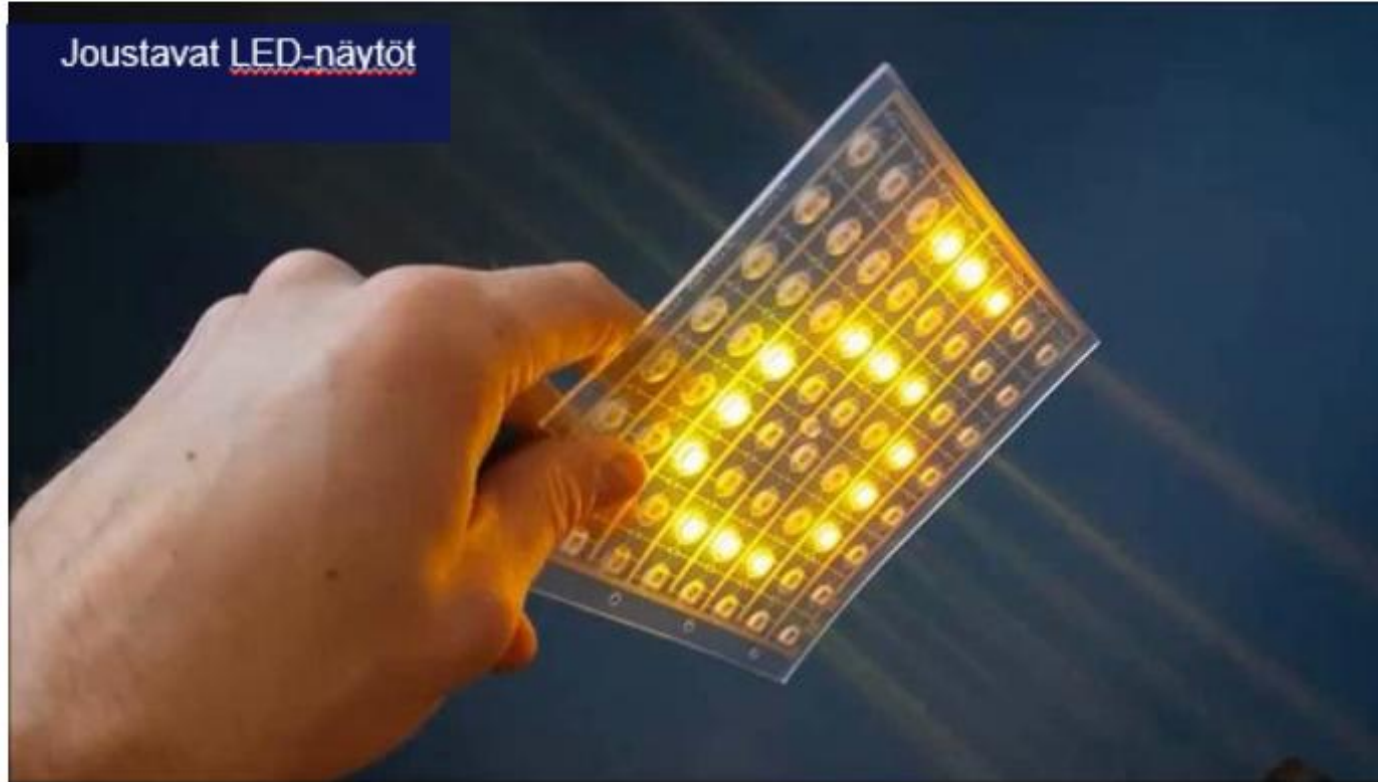
Wearability

Esimerkkejä uusista materiaaleista, jotka parantavat urheiluteknologian puettavuutta

Joustava elektroniikka



Joustavat LED-näytöt



LED-kalvosta rakennettu ranneke



VTT Flex Node

Integrated sensor set includes:

Acceleration (3-axis), Temperature,
Relative humidity, Ambient pressure

Wireless connectivity - BTLE

Online data streaming to mobile device

64 Mbit flash memory

25 mAh rechargeable LiPo battery +

Wireless charging

Size: 20 x 90 mm²

