



KIRUNA KOMMUN

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# A fantastic new city, a good example

## The model city 2.0





# Challenges and opportunities

## Technical supply systems



We will build a new city - and we must do it now!  
Kiruna in the unique situation! Seizing the potential of the process  
without considering the legacy.



To build a new city without having considered new solutions would be a  
complete failure

All possibilities or no planning conditions ?? - All systems must be renewed  
(ICT, energy and infrastructure)



# Planning for the future

## Technical supply systems



In order to achieve the goals:

We need to redesign all the supply systems...

..and we need to understand the connection between these systems



# Planning for the future

## Technical supply systems

### A recipe for a sustainable city - a "smart and sustainable city"

- Systems Perspective of - But where does the system end?
- All systems interact: E.g electricity, district heating, water, sewage waste, the buildings etc?
- Central strategy: moving and tearing system boundaries creates "smart cities"
- The unifying: Resource management



### Energy forest

- Peak load
- Business development eastern part of the municipality
- The digested residue

### Kiruna Sustainability Center

- Capture experiences
- R&D

### Cultivation

- Greenhouse that will make use of residual heat
- The light in the summer
- Food
- Substrates for anaerobic digestion

### Traveling

#### - Public transport

- Electric buses
- Cable car ?

The train male in regional travel  
(industry / regions development  
Electric vehicles (charging stations)

## THE EXAMPLE KIRUNA 2.0

The model town  
A legacy to  
The possibility of a  
blank page  
More than architecture  
the interaction systems  
THE SMART CITY

### Kiruna New energy system

- Residual heat from industries
- Storage
- Tip Load / Redundancy
- Energy tariff to be reviewed
- Individual choices based on information
- Control of the home and the system level

### Kiruna New Waste System

- Only materials, no waste
- Process industry
- Collect materials from households
- Striving towards recycling
- Biogas electric hybrid
- optical sorting

### Biogas

- Food waste grinder
- Fertilizer
- Vehicle gas / electricity

### The "smart city"

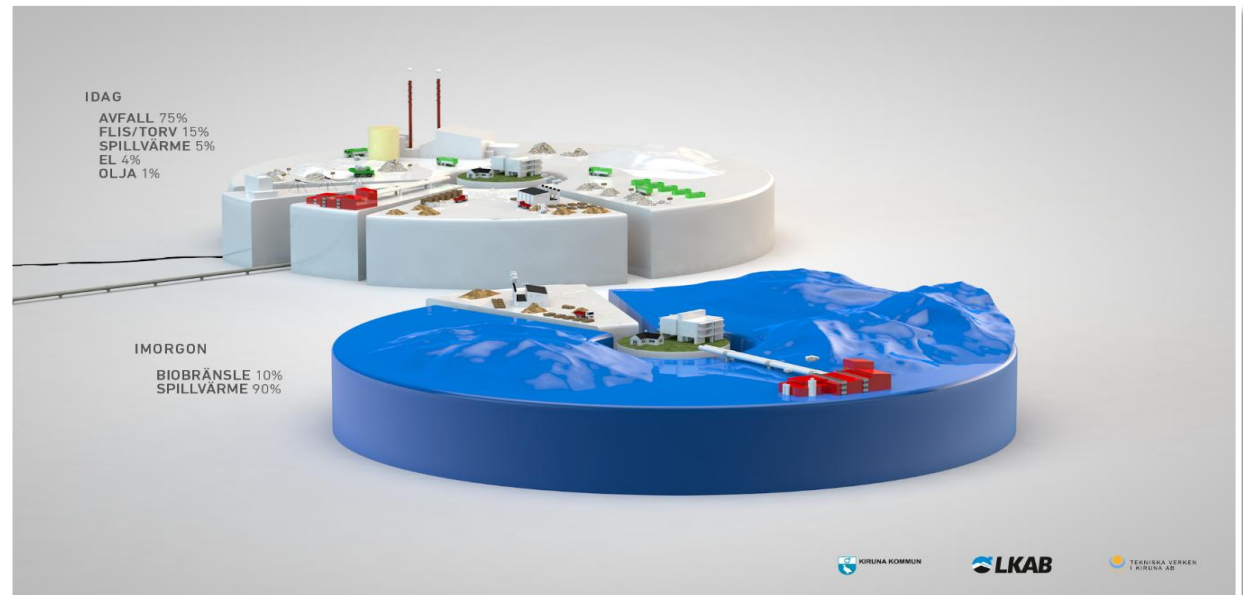
- Control, measurement, monitor impact
- Water and sewage
- Traffic
- Energy
- Democracy



# Kiruna new energy system

## Technical supply systems

- Utilize existing energies and resources
- Prioritize energies of low grade (VERY IMPORTANT!)
- Reducing electricity dependency (67% comes from fossil fuels)
- Eliminate fossil fuels
- Developing the business case
  - Financing infrastructure vs energy price vs passive houses





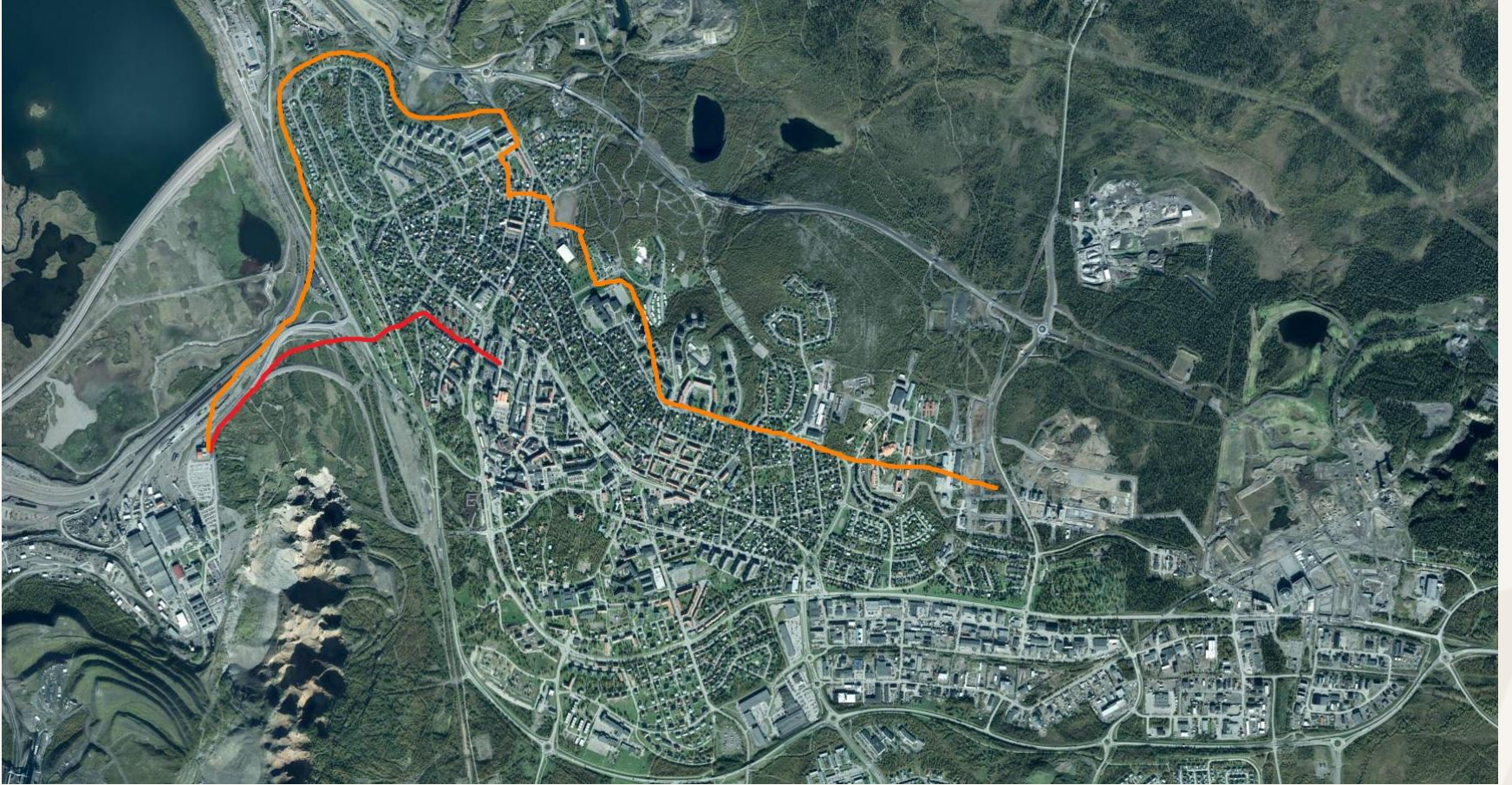
1969



2025









# Sustainable living

## Technical supply systems



### The world's first Passive House in an arctic climate

- Cooperation between Kiruna Municipality, Tekniska Verken, a construction company and Luleå Universitete
- Energy: Isolation, Home Appliances etc.
- A passive house that not only focuses on little energy but also the right energy
- District heating for passive houses
- New infrastructure
- green roofs



**Byggindustrin**

Nyheter Debatt & Opinion Karriär Blogg Lediga jobb Dina Leverantörer Fördjupning &



Huset blev dyrare än ett vanligt passivhus. Det beror bland annat på att vissa leveranser blev försenade. Foto: Nomi Melin Lundgren

### Sjunde huset visar vägen när Kiruna ändrar skepnad

Lite energi, rätt energi och ett synsätt där huset är en del av en helhet. Det har präglat utvecklingen av Sveriges nordligaste passivhus. Nu nomineras "Sjunde huset" till Årets Bygge 2015.

FÖRDJUPNING / 14 JANUARI / Av: NOMI MELIN LUNDGREN

I Kiruna, Sveriges nordligaste stad, 15 mil norr om polcirkeln, har byggbolaget NCC byggt ett passivhus anpassat för ett arktiskt klimat. Huset ligger i ett helt nytt bostadsområde i Tuolluvaara, i närheten av det område där Kirunas nya centrum ska ligga om ett antal år.



# Green Blue Cities

## Technical supply systems



Universities in Luleå, Delft and Innsbruck

Purification of surface water

Aesthetic value

Flood risk





# Kiruna new waste systems

## Technical supply systems





## Electric public transport

Transition to Sustainability

A part of the energy system

The right energy for the right purpose.





## Urban or underground greenhouses

Energy recovery  
Food production  
Sustainability  
Collaboration between  
industrial residual heat  
and society





## The Smart Cities

- The city's control rooms
- Use of ICT opportunities to create a sustainable society
- Environment: Energy, traveling, process control, traffic, lightning
- Social Security, health care, education, care
- Economy: Distance Independent, new establishment, sparsely populated areas



### ENERGY

SMART BUILDINGS  
 CONDITION BASED MAINTENANCE  
 REMOTE OUTAGE NOTIFICATION  
 SMART WASTE MANAGEMENT

### UTILITY

WATER TREATMENT  
 WATER MANAGEMENT  
 EQUIPMENT MONITORING/CONTROL  
 HAZARDOUS MATERIALS  
 EMERGENCY RESPONSE

### VEHICLE

SMART PARKING  
 PARKING ENFORCEMENT  
 VEHICLE DETECTION  
 MOBILE PAYMENTS  
 EV CHARGING

### TRANSIT

INTELLIGENT RAIL AND TRANSIT SOLUTIONS  
 FLEET MANAGEMENT  
 ASSET TRACKING  
 MOBILE PAYMENTS  
 SMART ROADS

### PUBLIC SAFETY

VIDEO SURVEILLANCE  
 REMOTE SECURITY MONITORING  
 EMERGENCY RESPONSE  
 SMART STREET LIGHTS  
 MASS NOTIFICATIONS





# Unlocking the potential the city transformation creates



## KIRUNA SUSTAINABILITY CENTER

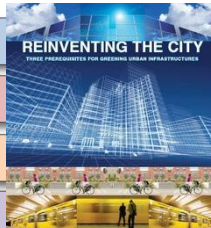
Hållbarhet  
Jämställdhet  
Mångfald

Kommun, Länsstyrelse, Landsting mfl

Näringsliv

Forskning, utveckling & utbildning

Samhället & medborgarna



Informations & kommunikations teknologi



Hållbart byggande



Hållbart resande



Hållbara Energisystem



Ekosystemtjänster  
Grön & Blå infra  
mm



Hållbar hantering  
av  
avfall & material

## Innovation platform Kiruna



## Test bed Kiruna







# A unique situation



There are no problems, only challenges and opportunities!



KIRUNA KOMMUN

Thank you for your attention!