



UiO : Department of Technology Systems
University of Oslo

Plaksha Tech Leaders Contribution, 11Jan2021

Societal Empowerment through Energy and Information



Josef Noll

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University of Oslo: <http://www.mn.uio.no/its>
Basic Internet Foundation: <http://BasicInternet.org>
Our Wiki: <http://ITS-wiki.no>

Grand Challenges

- Grand Challenges
 - ➔ Climate, CO₂
 - ➔ Resources (radio, minerals)
 - Kobald (East - DR Congo)
 - ➔ Societal Divide
- Energy
 - ➔ Transition to renewable Energy
- Digitisation
 - ➔ Mobile Networks
 - ➔ IoT, Automation
- Society

Inequality, Divide



*"Internet had the ability to
dismantle the divide.
Internet failed miserably, the
divide is bigger than ever."
Kate Gilmore, Human Rights, UNO*

Addressing Education 5.0 and Global Challenges

- Cognitive skills
 - literacy and numeracy
 - critical thinking
 - problem solving

Edu 3.0

- Social and emotional skills
 - empathy, teamwork
 - leadership, cultural awareness

Edu 4.0

- **fraternity & social friendship**

- Global challenges

- **Climate, Sustainability** (SDGs)

Edu 5.0



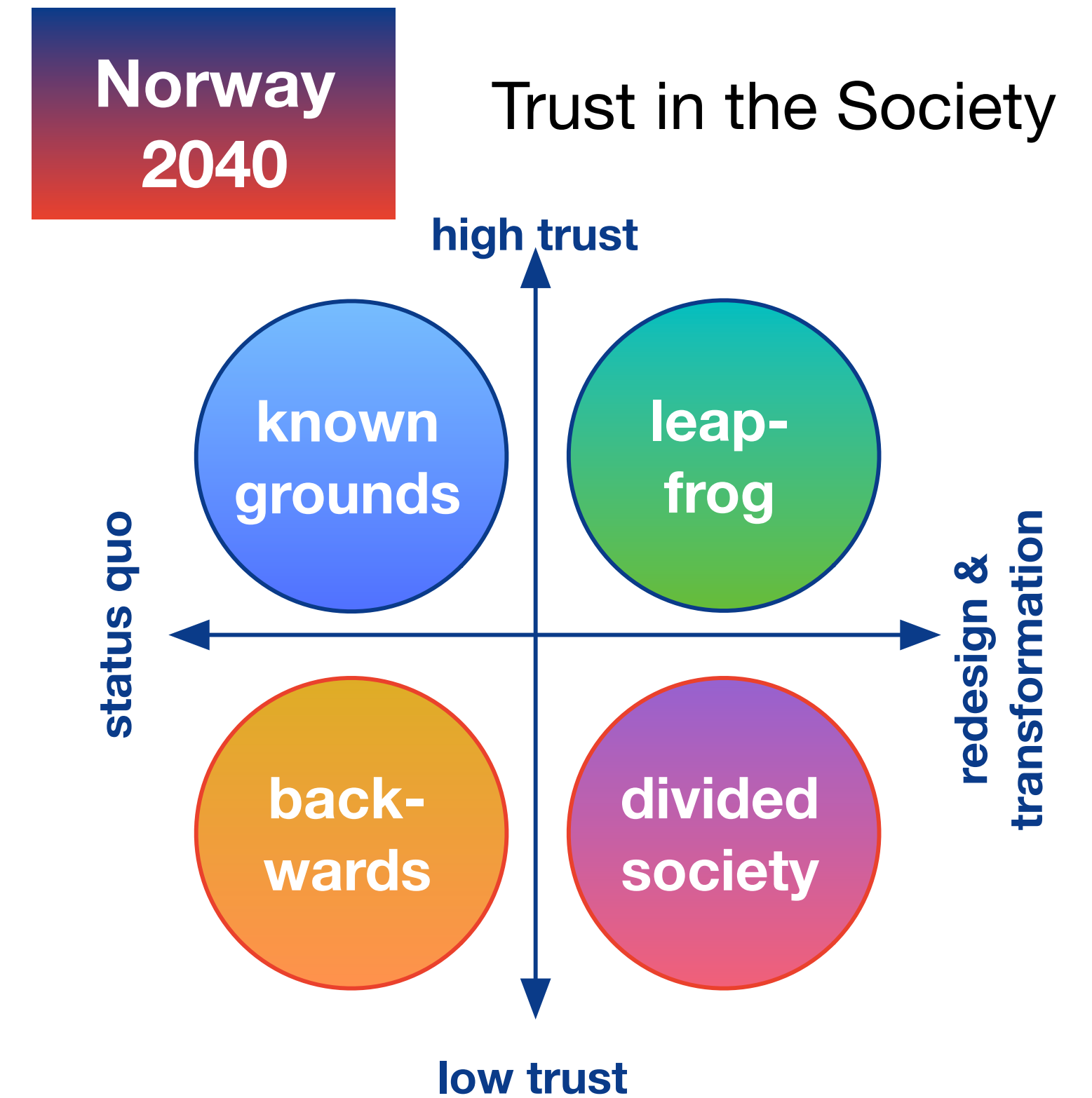
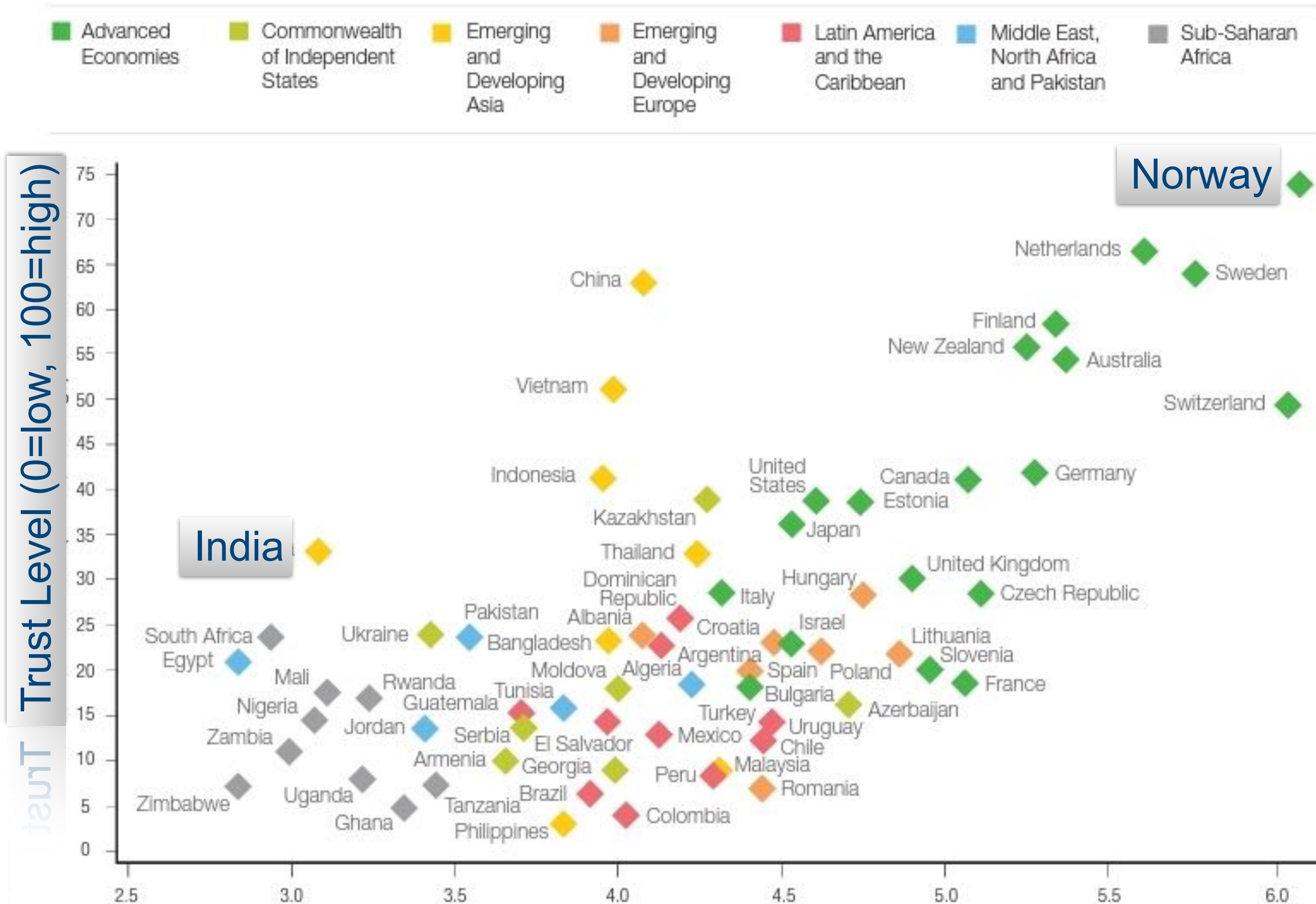
Norway - Nordics/Baltics Europe

Norway

- 95% of produced electricity is hydropower
- Sales of cars (Dec2020):
 - 📖 60% electric, 20% hybrid
 - 📖 12% petrol, 8% diesel
- ◉ almost all heating is electrical
- about 10-15% electricity export in generator/consumer balance
- Interconnections with UK, DE, NL, DK, SE, FI



Inclusive Development Performance and Interpersonal Trust



Area 1: Energy transition - climate crisis

Quick clay land slide in Gjerdrum Norway, Dec2020



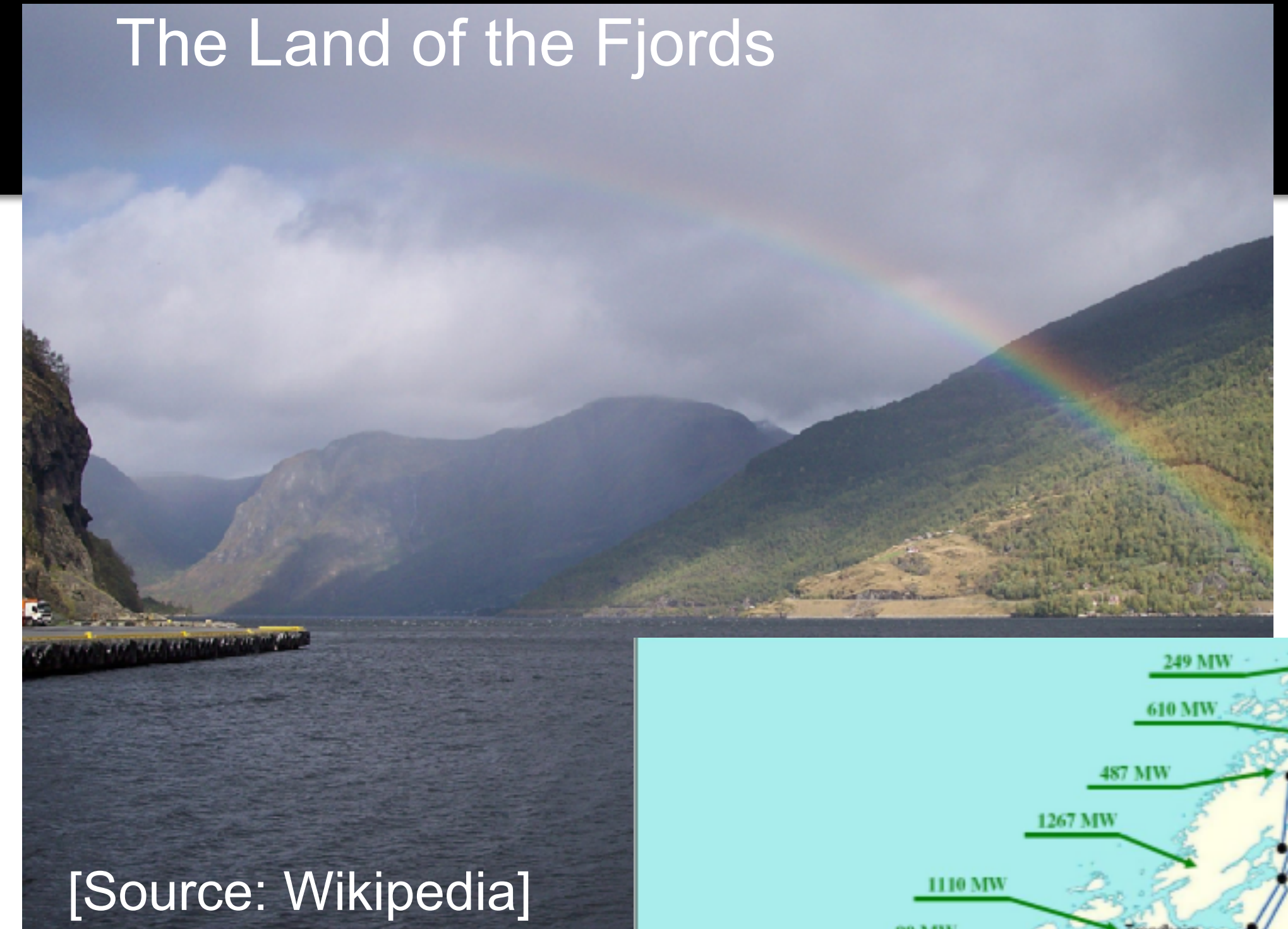
[Source: [TU.no](https://www.tu.no), Jaran]

Research Areas in Energy

- Change in generator/consumer balance
 - ➔ Prosumers
 - ➔ Electric cars as battery banks
- Lack of investments to cover consumption peaks in production
 - ➔ Flattening the power peaks in the morning & afternoon
 - ➔ Cope with seasonal changes
 - ➔ Grid stability
- Conversion of transport sector
 - ➔ “no more petrol/diesel cars by 2025”
 - ➔ all public-purchased cars are electrical by 2022
 - ➔ access to cities (Bergen, Oslo) only by zero-emission vehicles
 - ➔ electric/hydrogen ferries
 - ➔ hydrogen, NH₃ (Ammonia) trucks



The Land of the Fjords



[Source: Wikipedia]



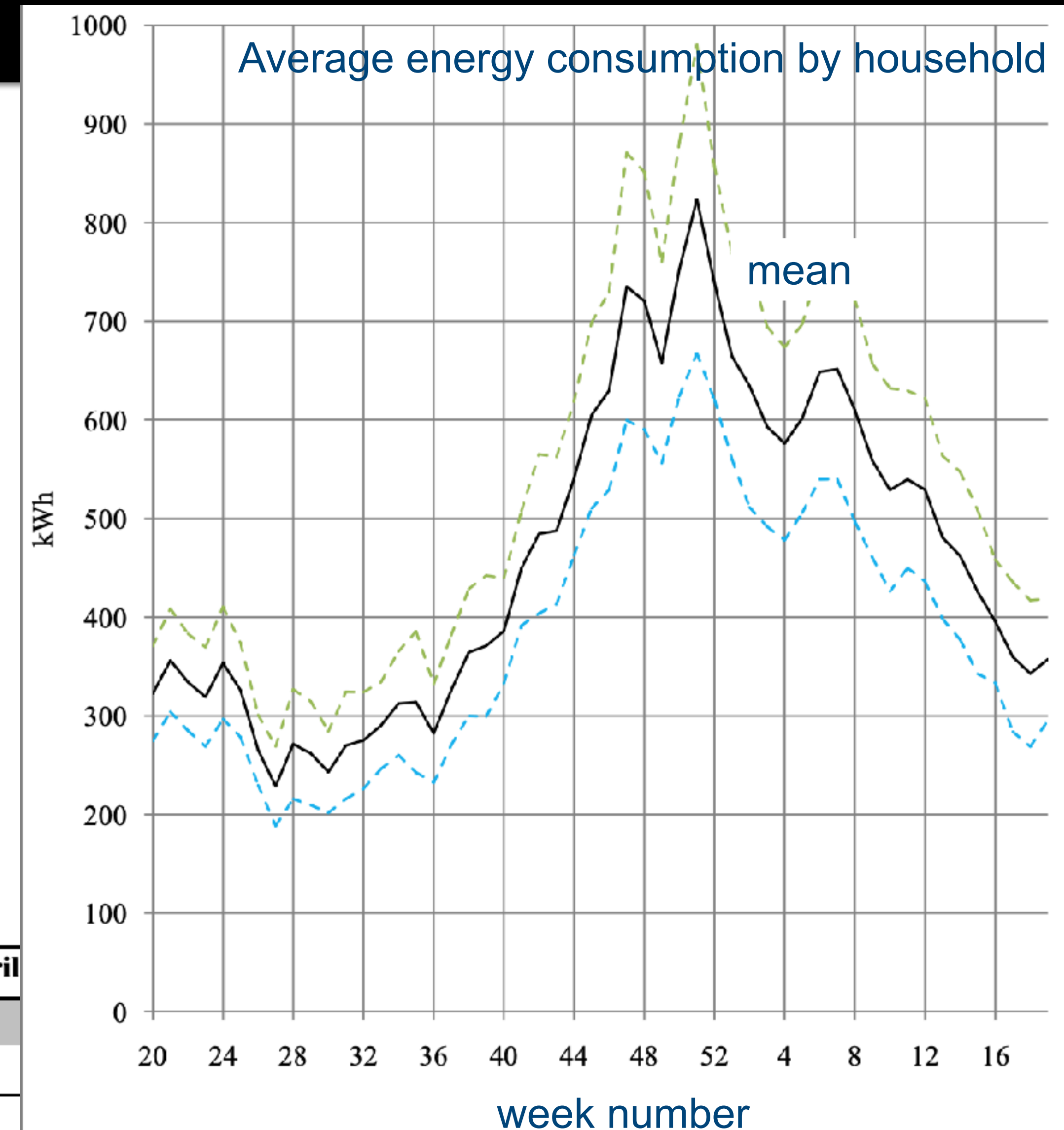
Electricity variability

- Strong variation during the year
→ heating with electricity

•

Monthly mean temperature Ørlandet

Måned	Mai	Juni	Juli	Aug	Sept	Okt	Nov	Des	Jan	Feb	Mars	April
Middel, °C	7,7	10,1	14,4	14,2	10,6	7,6	-1	-3,7	1,6	-0,5	2,1	7,2
Normalår, °C	8,7	11,4	12,7	12,9	9,9	6,9	2,6	0,5	-0,7	-0,3	1,4	4,1

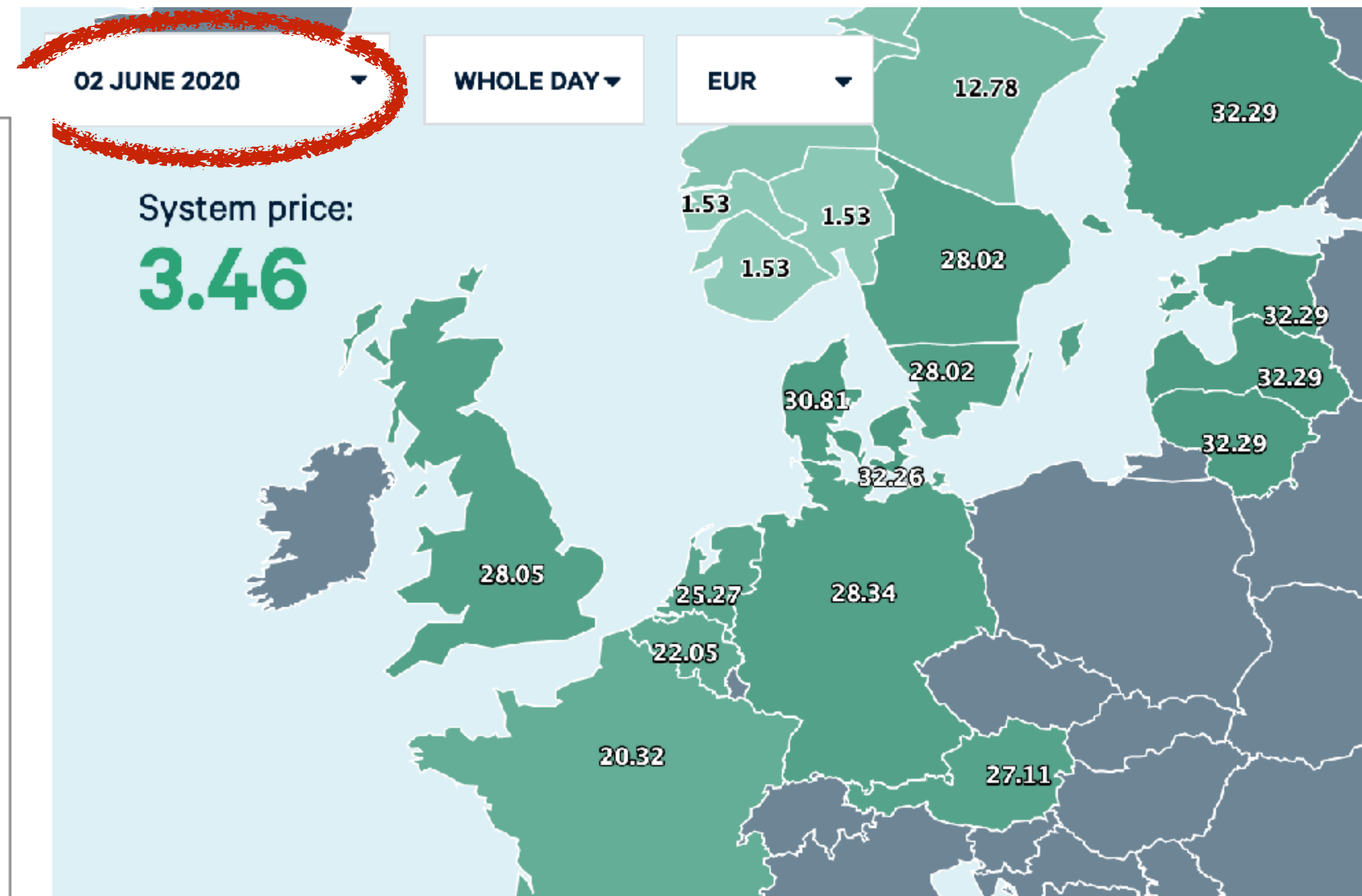
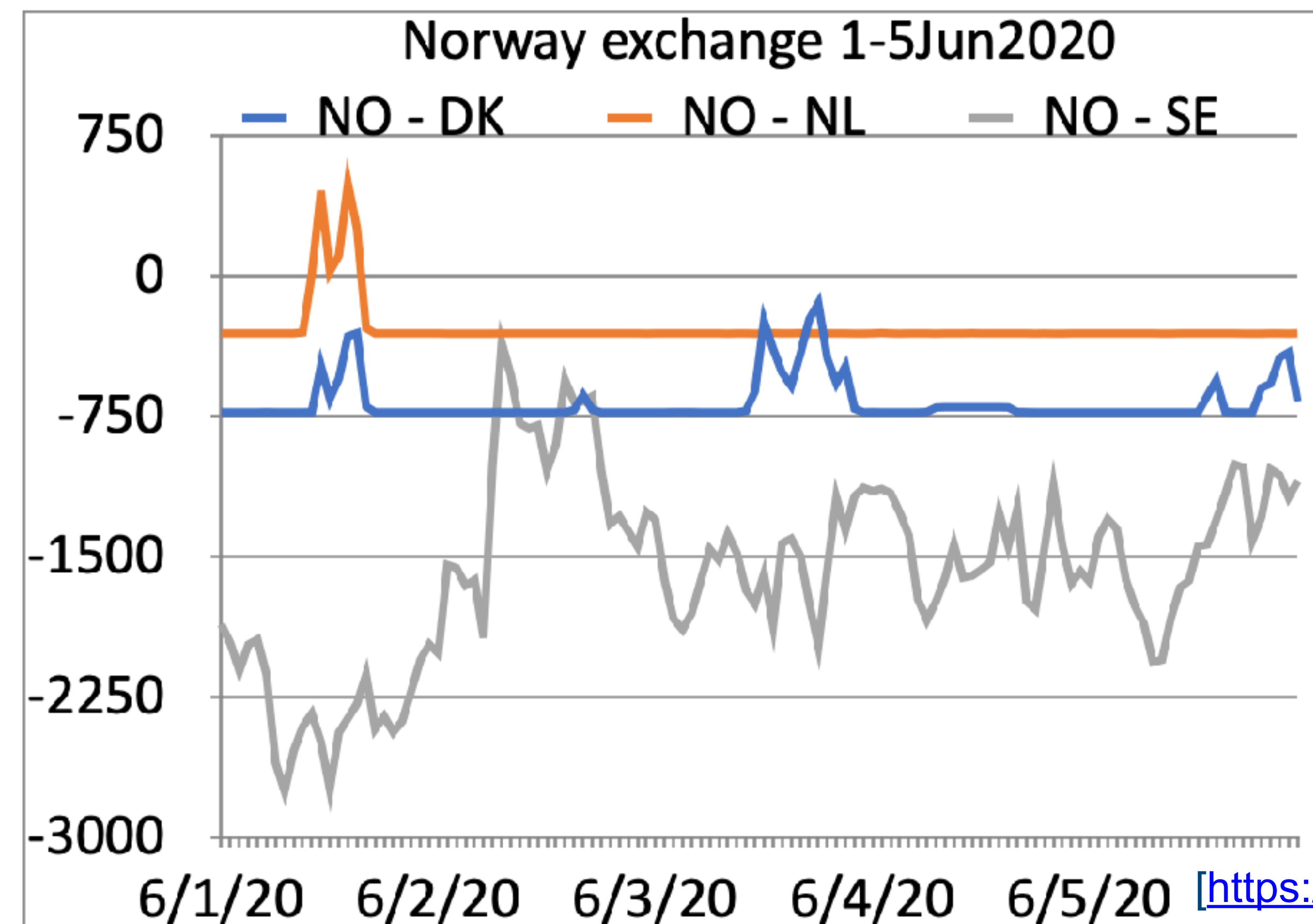


<https://www.sintef.no/globalassets/project/eldek/publisering/stromforbruk-i-norske-husholdninger.pdf>



What has happened on 3-5Jun2020?

- See: SE-NO, DK-NO

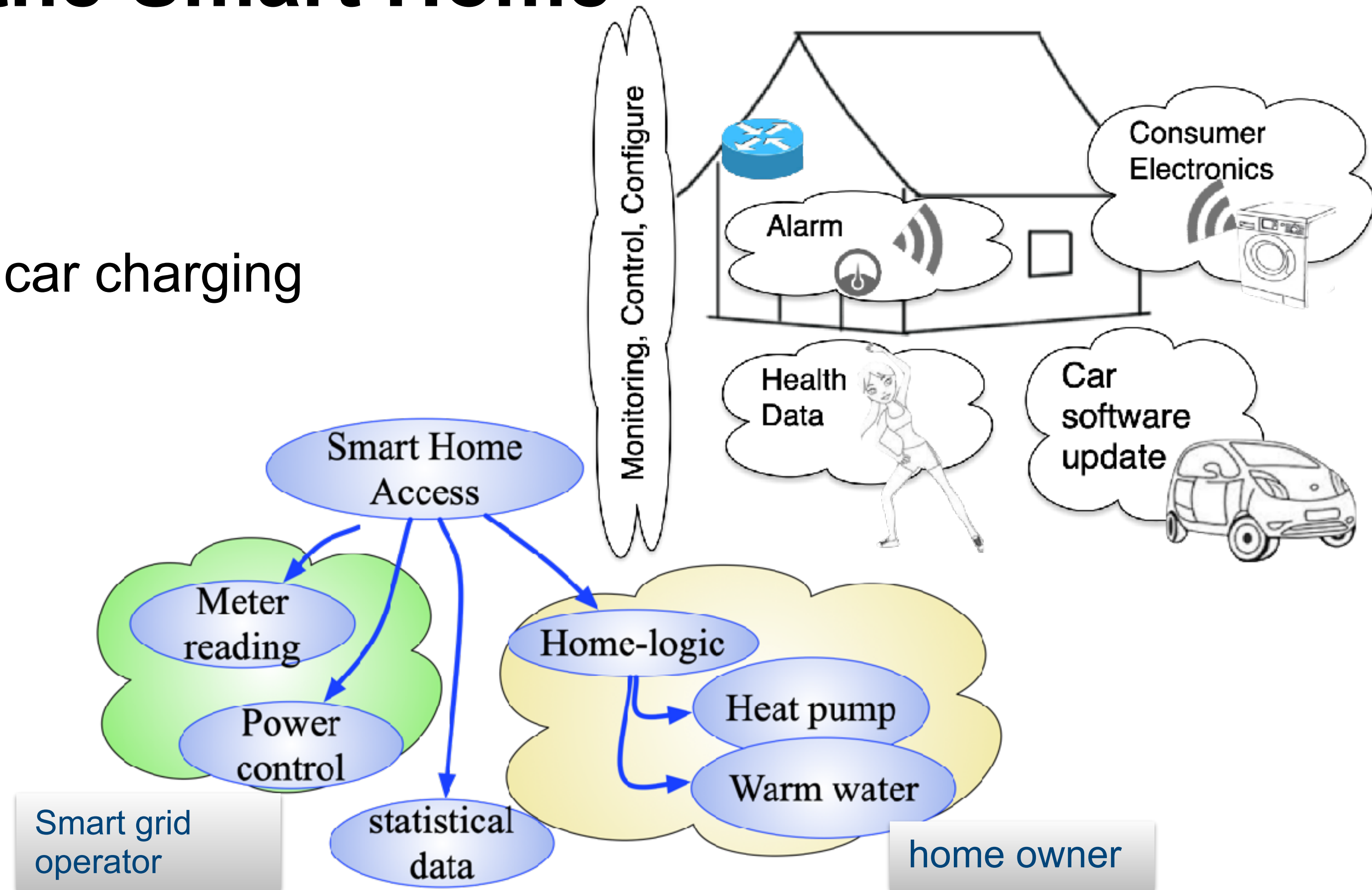


<https://www.nordpoolgroup.com/historical-market-data/> -retrieved 22Oct2020]

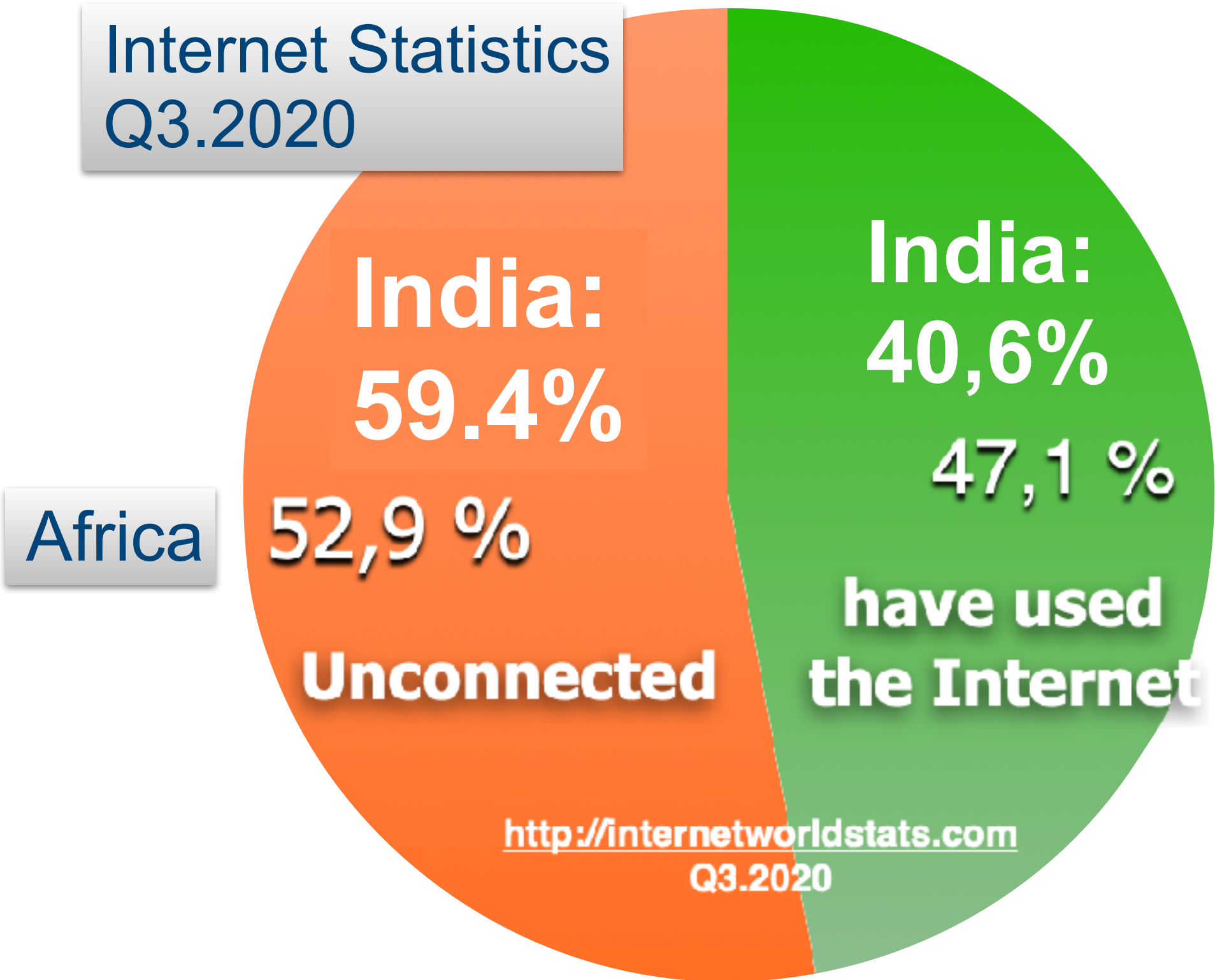
Control and access in the Smart Home

Goal: Grid stability

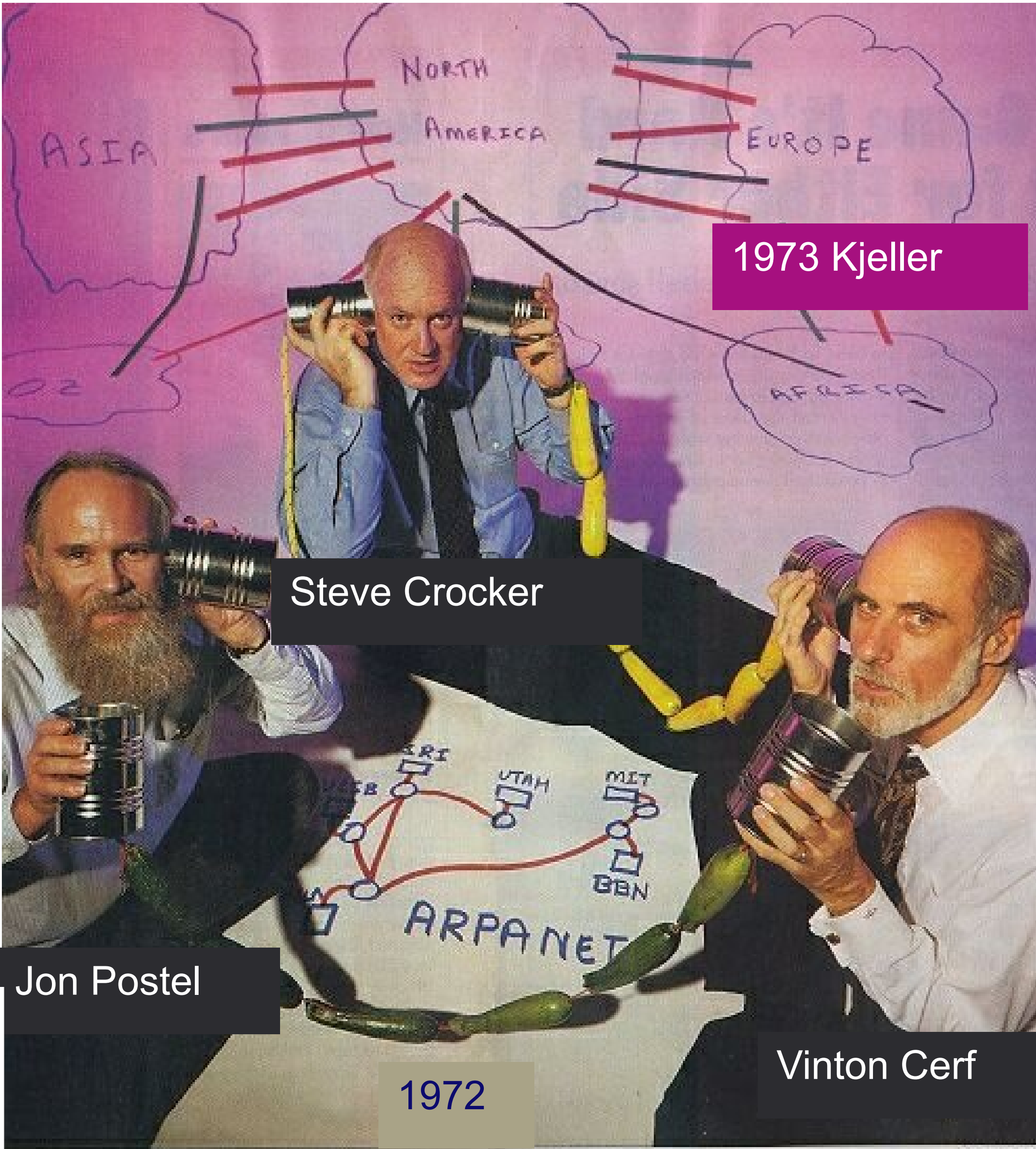
- Smart home and grid stability
 - ➔ energy devices: heating/cooling, car charging
 - ➔ “gracefull degradation”
- Access to information
 - ➔ who (sensor, person, service)
 - ➔ what kind of information
 - ➔ from where
- **Attribute**-based access
 - ➔ role (in organisation, home)
 - ➔ device, network security tokens



Area 2: Information as basis for empowerment



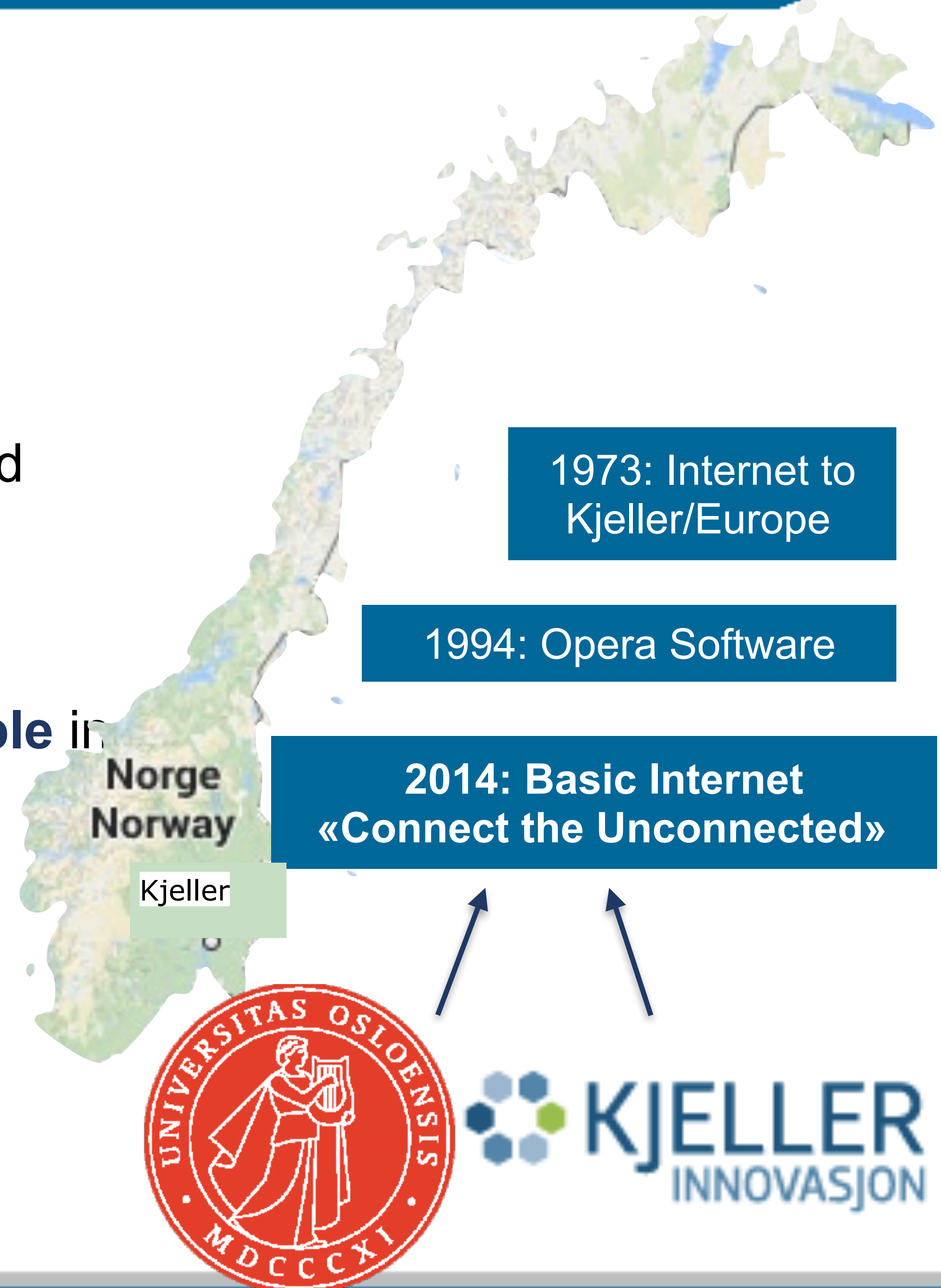
ASIA INTERNET USE, POPULATION STATISTICS DATA AND FACEBOOK DATA - JUNE 30, 2020						
ASIA	Population (2020 Est.)	Internet Users, (Year 2000)	Internet Users 31-MAY-2020	Penetration % Population	Users % Asia	Facebook 31-MAR-2020
India	1,380,004,385	5,000,000	560,000,000	40.6 %	24.3 %	251,000,000



Source: <http://www.michaelkaul.de/History/history.html>

About the Basic Internet Foundation

- **Information** is the **basis** for **education, health** and entrepreneurship
- **Digitalisation** is the engine of **economic growth** and wellbeing of people
- Sustainable development requires **digital inclusion**, which necessitates Internet for all
- **Impact** lives of the **unconnected** 3.5 billions of **people** in world
- **University of Oslo** (UiO/UNIK) and **Kjeller Innovation** co-founded the Basic Internet Foundation
 - “**Internet Lite for all**”
 - free access to information for all



United Nations Sustainable Development Goals



“Internet had the ability to dismantle the divide. Internet failed miserably, the divide is bigger than ever.”
Kate Gilmore, Human Rights, UNO



Source: Akers Avis Groruddalen, 2013

Affordable Energy & Internet Lite for All

the catalysts for the goals

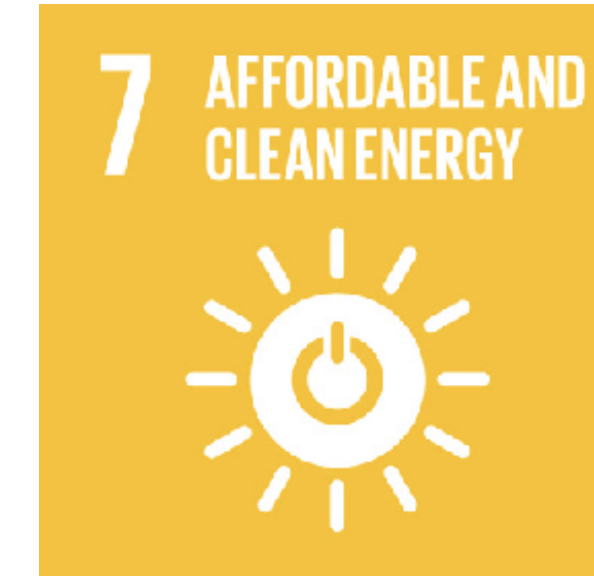
Showcase
“Non discriminating
access” project

- funded by RCN and Mfa/Norad (14.9 MNOK for 2017-2020)
- Tanzania: digital health
- Mali: energy



Energy & Internet Lite for All
Target 7.1&7.2 Target 9.C Target 16.10

SDGs addressed by B5G and 6G



- SDG 9.C:
Significantly increase access to information and communications technology and strive to **provide universal** and **affordable access** to the Internet in least developed countries **by 2020**
- SDG 16.10:
Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements with
 - 16.10.2 Number of Countries that adopt and implement constitutional, statutory and/or policy guarantees for **public access to information**.
- SDG 7.1 By 2030, ensure **universal access** to affordable, reliable, and **modern energy** services
- SDG 7.2 Increase substantially the **share of renewable energy** in the global energy mix by 2030
- 7.b By 2030, expand infrastructure and **upgrade technology** for supplying **modern and sustainable energy** services for all in developing countries, particularly LDCs and SIDS

Public Opinion on SDGs (afrobarometer.org)

- Priorities by people in Africa
- decent work
 - zero hunger
 - good health
 - ...



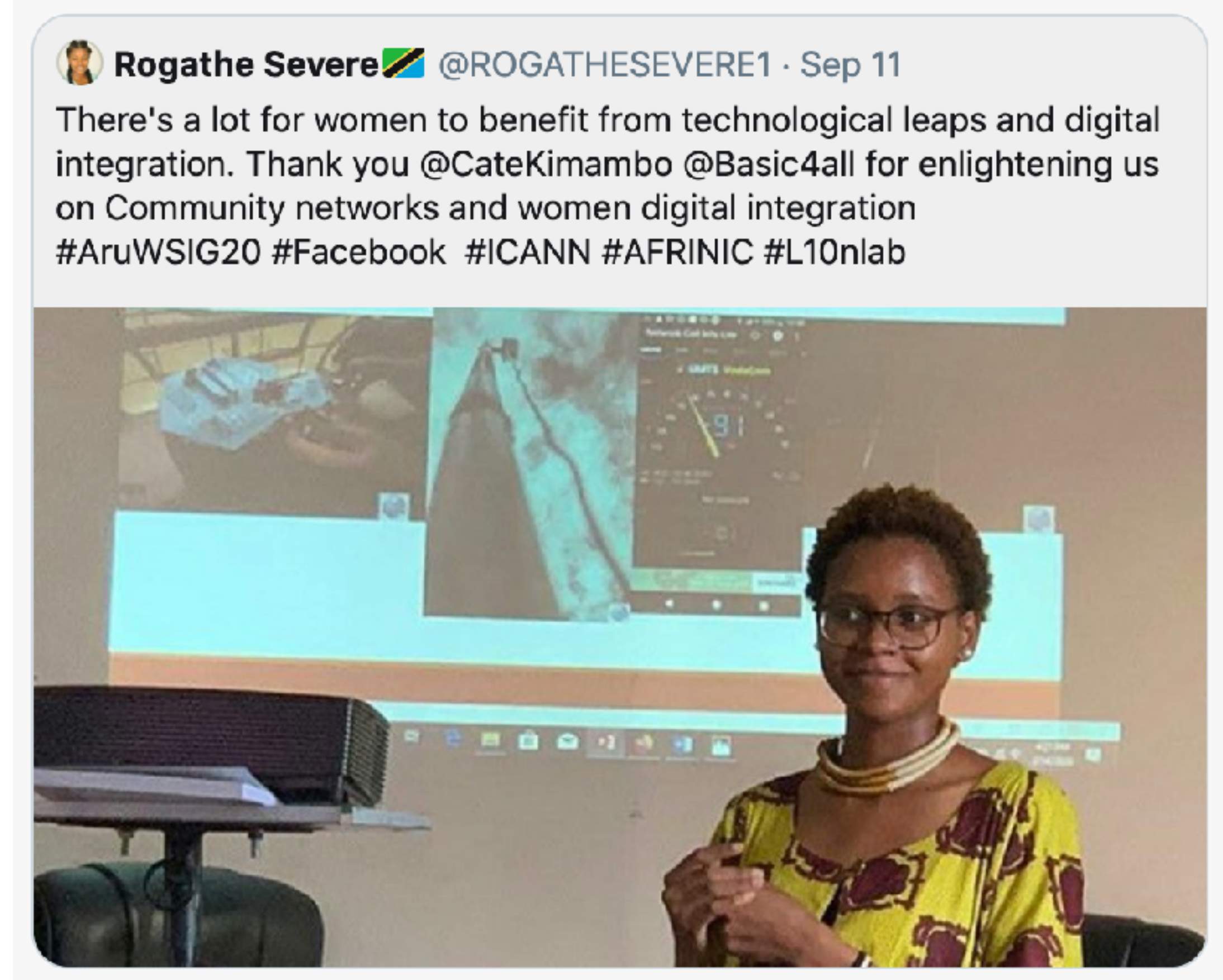


Example: Decent Work

- Centre for Monitoring the **Indian Economy**:
- 31 million people seeking actively for work
- 11 Million jobs lost in 2018
 - 9 Million in **rural areas**
 - 8.8 Million **women** lost work
- 31 Million look for work
 - most of them in RUrban area
 - from 80/20% Rural/Urban to
 - 70 / 15 / 15% Rural / RUrban / Urban
- How can we create a **sustainable future** for the young generation?
 - Rural
 - RUrban (Smart Cities)



Area 3: Research Topics in Digital Inclusion



Digital transformation and development policy

- ➔ Report to the Parliament of Norway
Meld. St. 11 (2019-2020) **Priorities**
 - Access, skills, regulations, inclusion
- ➔ Gender divide: “Boys have the toys”
 - digital divide in devices and
 - mobile broadband access
- ➔ Integrated model for digital inclusion
 - School connectivity (SDG 4.A.1)
 - Knowledge Portal as facilitator
 - Knowledge transfer
 - Community involvement



Norwegian Ministry
of Foreign Affairs

Summary

Meld. St. 11 (2019–2020) Report to the Storting (white paper)

Digital transformation and development policy

Access

Skills

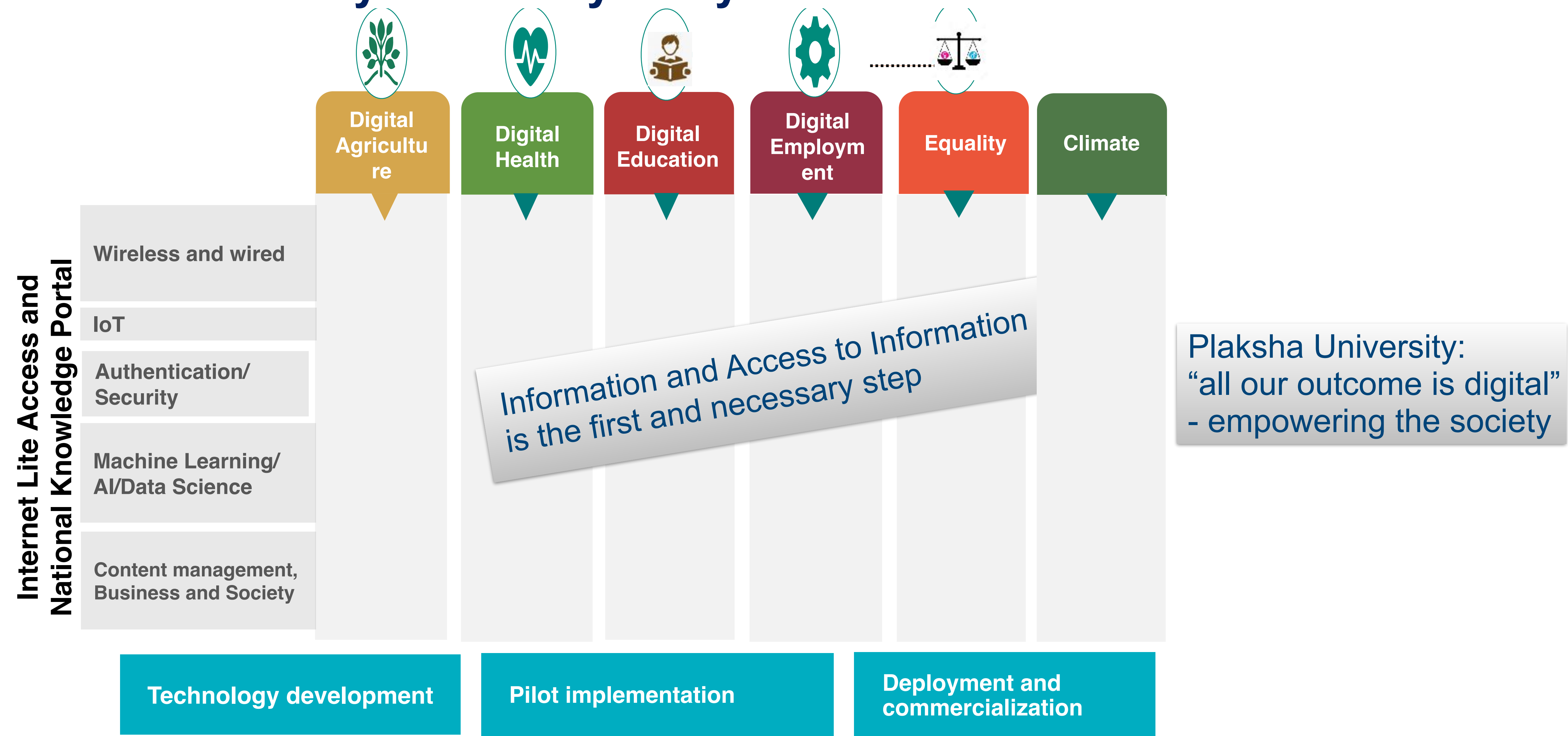
Regulations

Inclusion



https://www.regjeringen.no/no/dokumenter/meldst11_summary/id2699502/?ch=1

Examples: Address real-world challenges of connectivity and access to information for everyone and by everyone



"interdisciplinary projects with social impact with sustainable business models"

[Source: Shalini Sarin, Plaksha]

Example: Digital Health Promotion and Community Involvement

Providing the information through animations

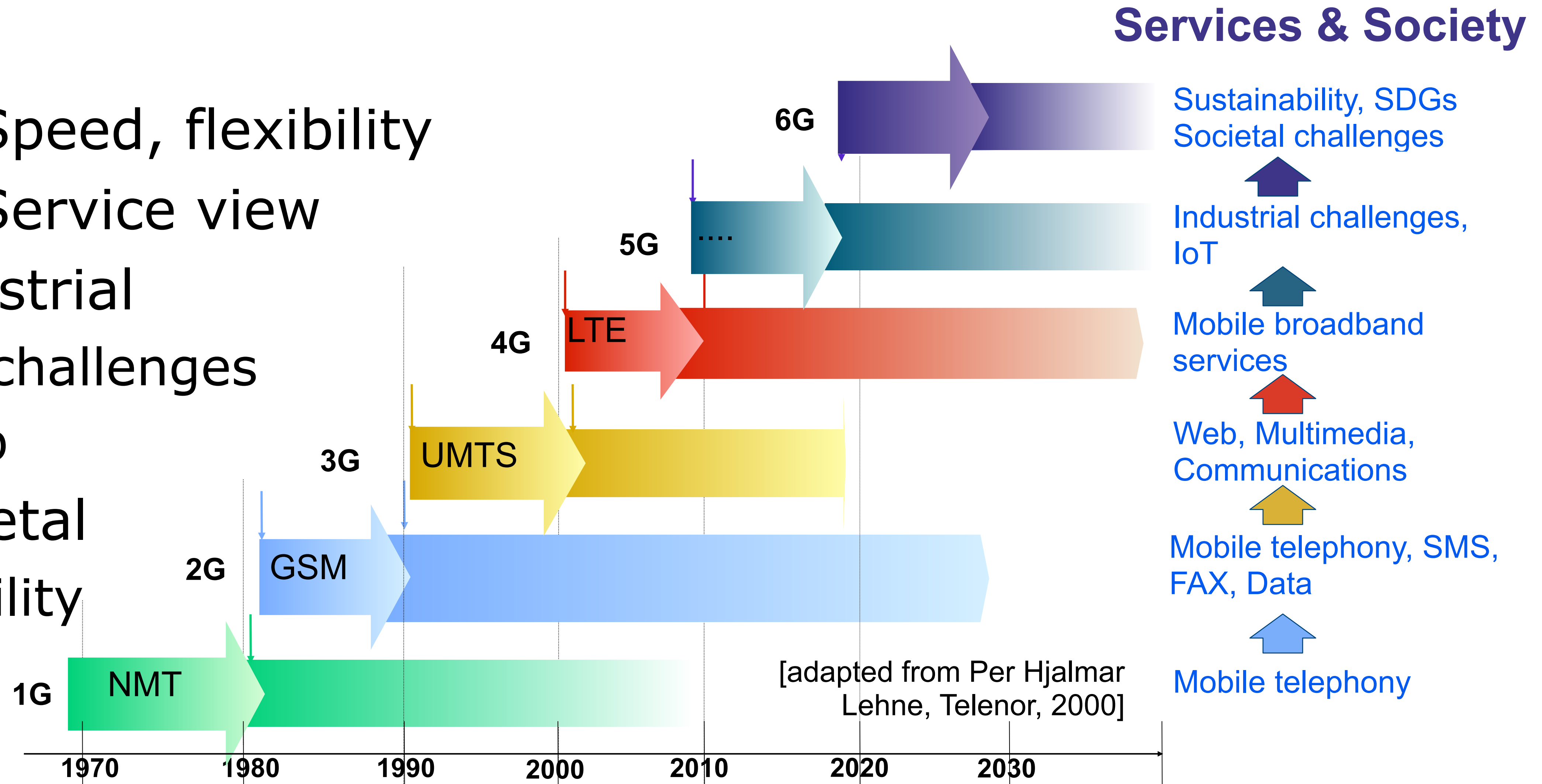


First Results: **Knowledge increase** in
Cysticercosis (TSCT) 60%
Tuberculosis 30%
HIV/AIDS 13%



(5G) and 6G: Digitisation of the Society

- 1G-3G: Speed, flexibility
- 3G-4G: Service view
- 5G: Industrial
 - Business challenges
 - ownership
- 6G: Societal
 - sustainability



Providing 6GforAll

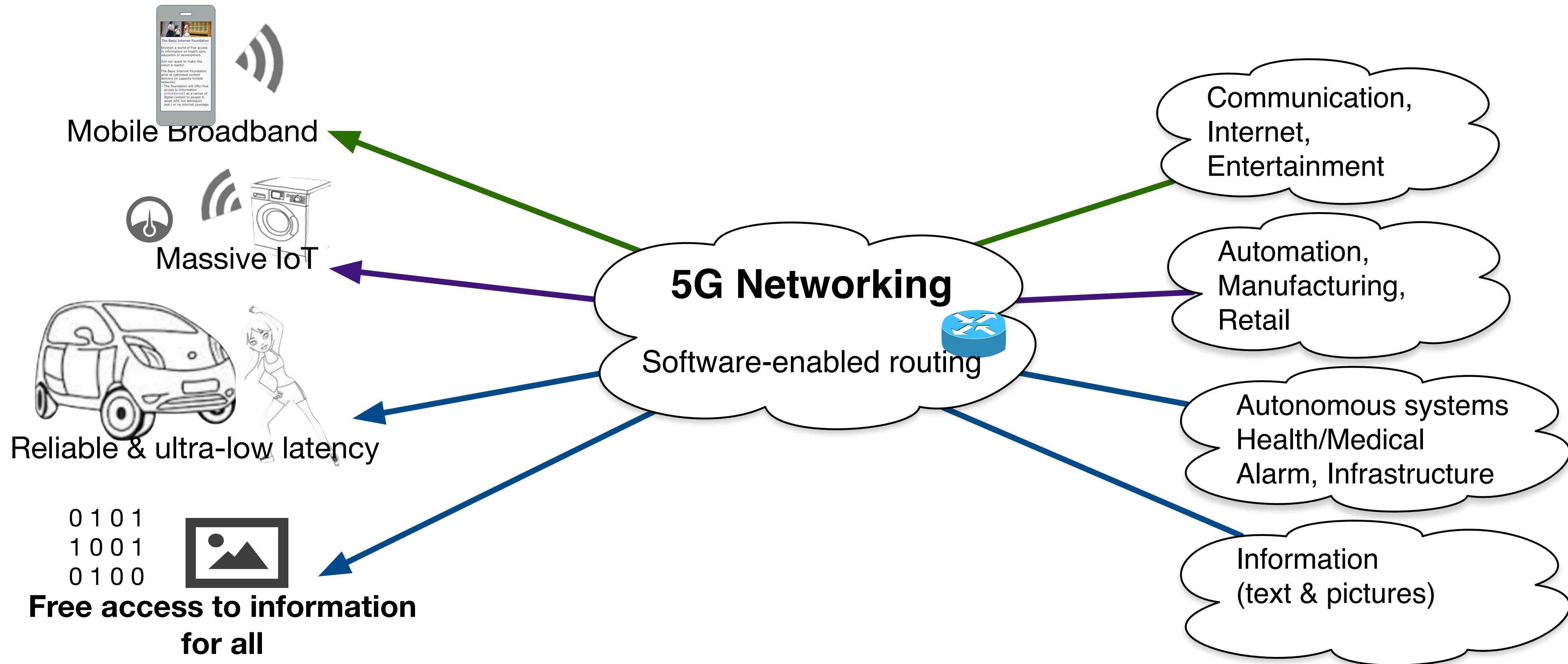
- ➔ **Free access to Information** (Internet Lite)
 - 1) Access - one **Information Spot** per village
 - 2) Skills - Health, Education, Agriculture
 - 3) Regulations - Freemium model
 - 4) Inclusion -
Free access for all #LeaveNoOneBehind
- ➔ Internet Lite & **Freemium** model for access
 - **free access to National Knowledge Portal** for all
 - **premium** access to **broadband**
 - sustainable solution

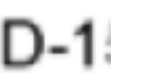
+18 dB
>20 km

“Providing Internet to the basic of the pyramid isn't a question of affordability, but rather a question of sustainability”
Internet Governance Forum, Panel, WIN

At least
one **Information Spot**
per village

5G network slicing for Free Access to Information for All





“Connect the Unconnected”



#Digital Inclusion
#Societal Empowerment
#Digital Health
#Women and Girls

Esilalei



Mto wa Mbu

Lake Manjara

Esilalei

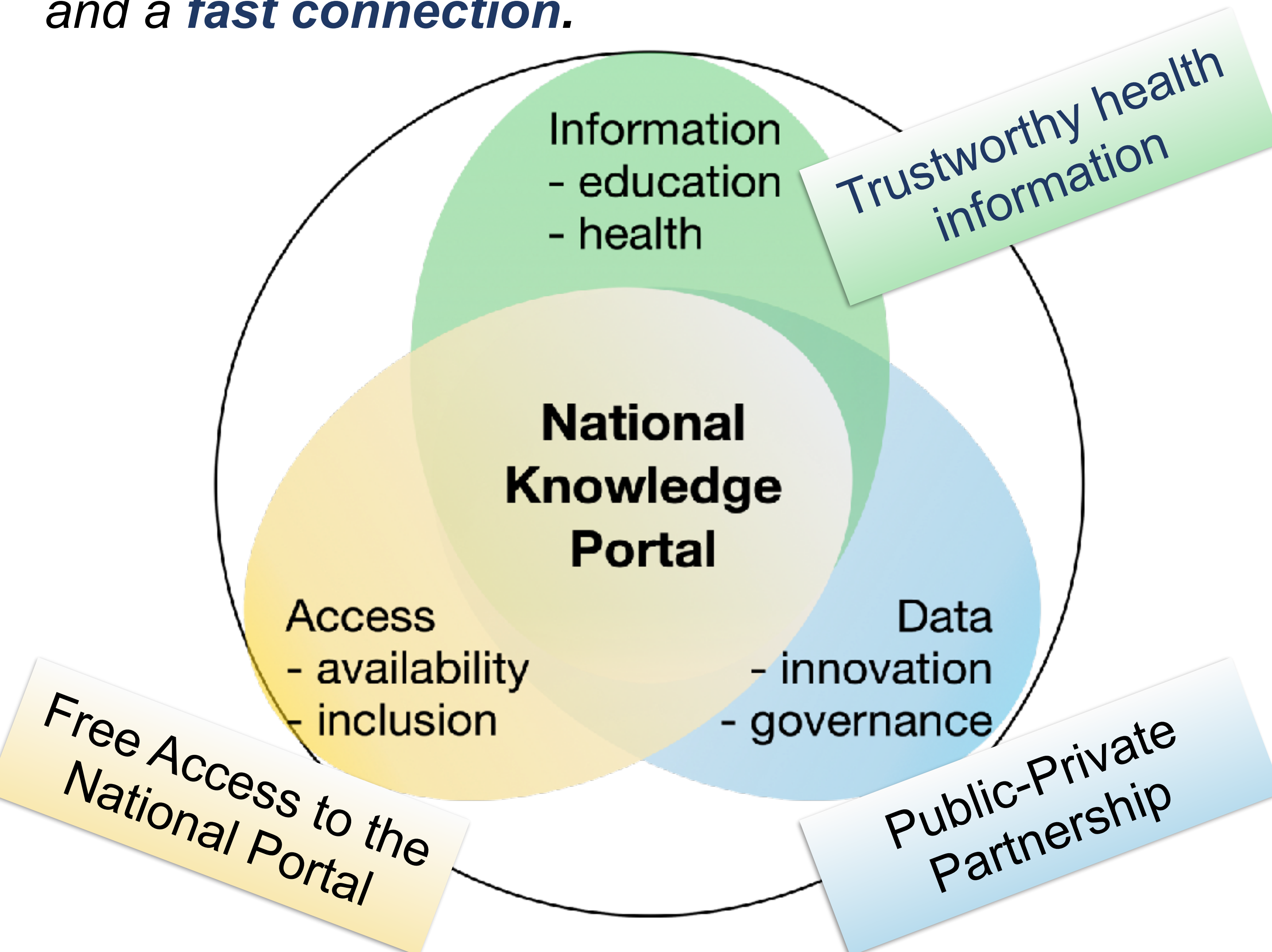
4.6 km

“Connect the Unconnected” Izazi

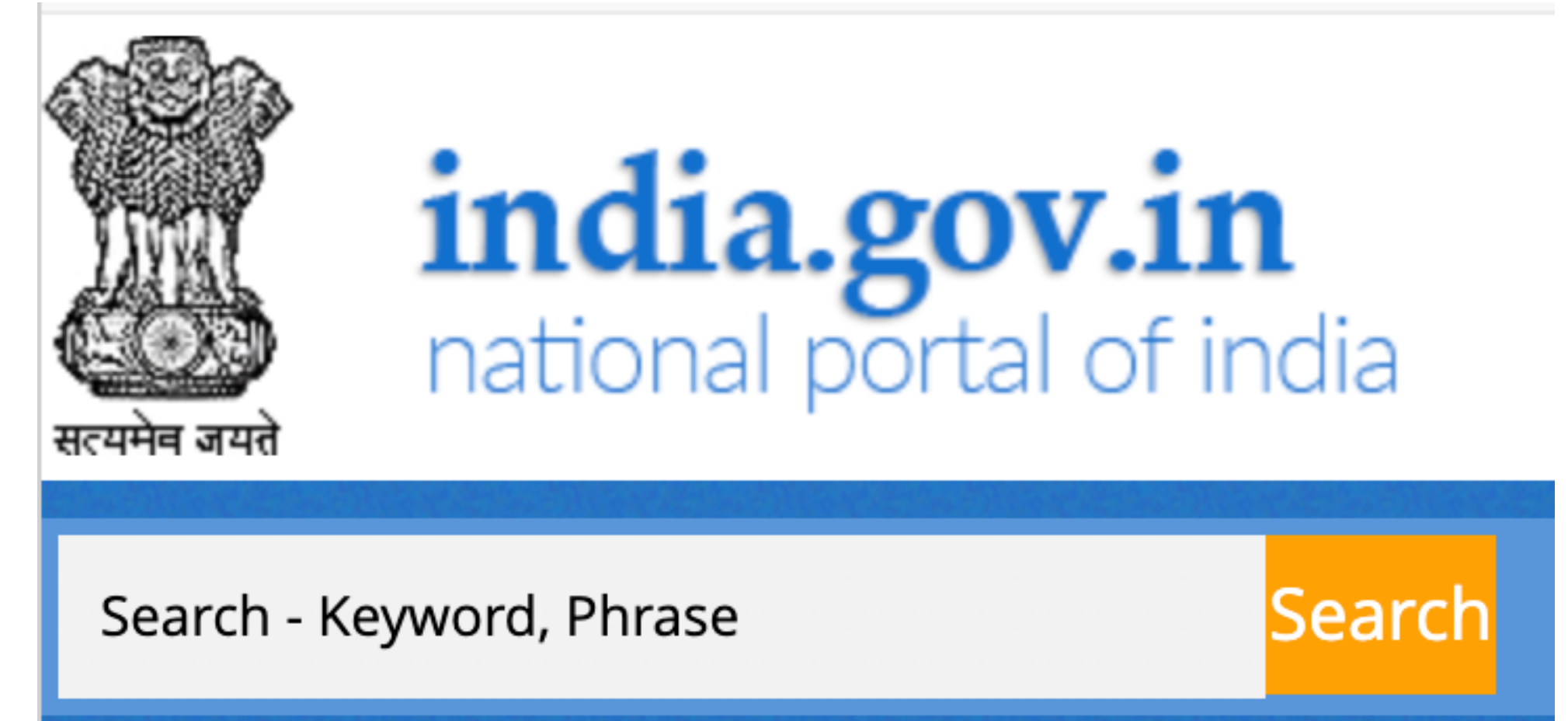


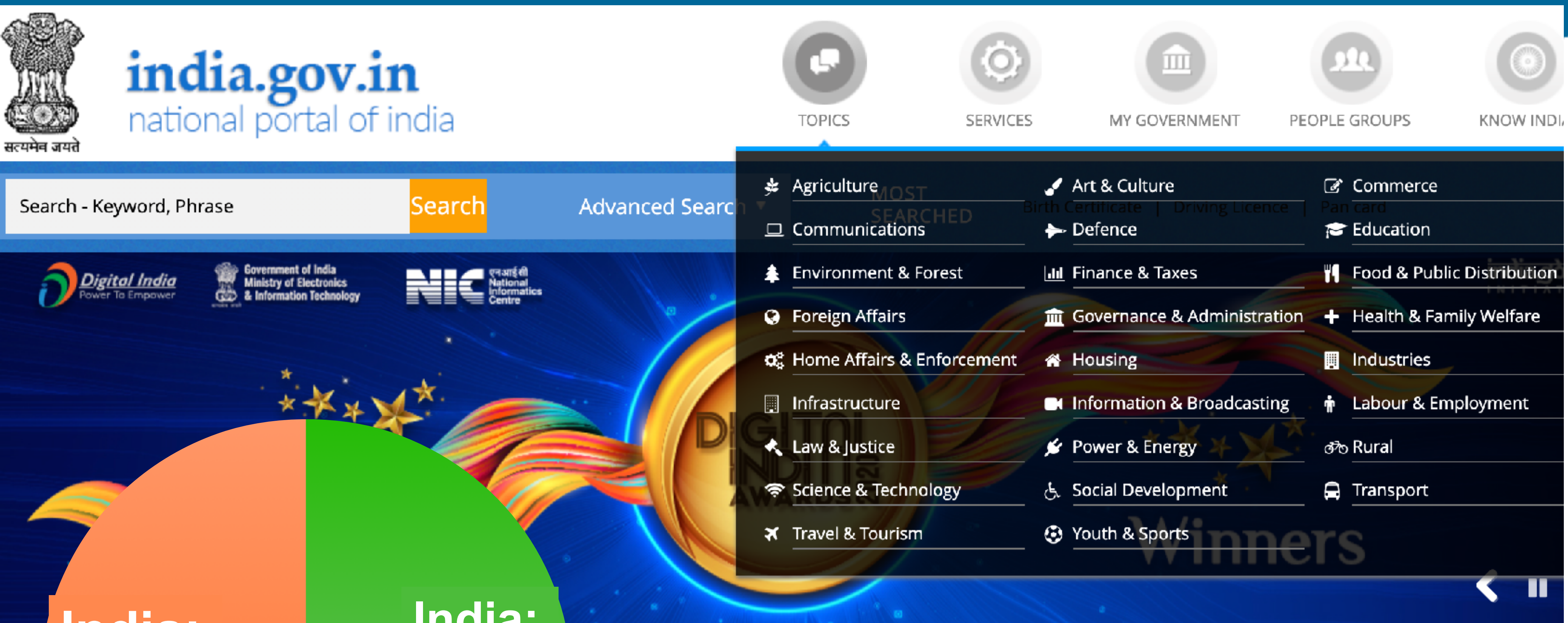
Installation time: 90 min
catching the signal from the Vodacom
tower in Migoli (~10km away)

Meaningful connectivity to the Internet and **skills** for using an **appropriate device** with **enough data** and a **fast connection**.



NationalKnowledgePortal.net





India:
59.4%
Unconnected

India:
40,6%
have used
the Internet

<http://internetworldstats.com>
Q3.2020

Internet Statistics
Q3.2020

Why are 59.4% not using the Internet?

- access: network, device
- electricity/charging
- perceived value
- focus

“Internet Lite” and the Freemium Model

free: Lightweight Protocols & premium: for broadband

<https://basicinternet.org/internet-lite-to-the-migoli-high-school/> <https://basicinternet.org/internet-lite-to-the-migoli-high-school/amp/>



MISSION PROJECTS ABOUT PARTNERS MEDIA

Full Web experience


INTERNET LITE TO THE MIGOLI HIGH SCHOOL

By josef | 4 May 2019 | Uncategorized

The Migoli High School has 1271 pupils (Apr2019) and 35 full-time teachers. The high school is located about 3 km outside of Migoli in the Iringa district in Tanzania.



Basic Internet Foundation




Internet Lite - AMP experience

Internet Lite to the Migoli High School

josef 8 months ago

The Migoli High School has 1271 pupils (Apr2019) and 35 full-time teachers. The high school is located about 3 km outside of Migoli in the Iringa district in Tanzania.



Migoli (Nyerere High School)

1271 pupils, 34 full-time teachers

Solutions for ~3.5 Billion non-digital people

- 1) Value proposition:
 - ✓ Freemium access: Free access to digital education, health, online learning and skills development,
 - ✓ Local empowerment, Relevant content (Village empowerment)
- 2) Technology and Capacity to absorb digital technologies
 - ✓ Local Info Spots connected to schools, health dispensaries, govern. buildings
 - ✓ Solar/wind, Macro and micro cells, Integrated terrestrial (TVWS)/ Satellite/ backhaul, Crowd sourcing, mesh networks, Aggressive use of cloud and virtualization
- 3) Affordability (Business/Economic)
 - ✓ Freemium model for access
 - ✓ Collaborations with governments (public-private partnership)
 - ✓ Downward price trend under \$85 (large 2nd hand market), Regulations, Push for barter and shared business models, Micro-operator eco-system mandated by the government, Replace USOF

