ITU
providing Sustainable Green & Innovative Power Solutions worldwide

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5G For Rural DEPLOYMENT

- for Remote Areas 5G Networks will be Reliable, Cost-Effective Accessible
- Opportunity for Rural Communities to be included in the Digital World
  - New Markets for Operators
  - New opportunities for vendors.
- Consider 700MHz Spectrum for Increasing Rural 4/5G Coverage
- Sub-1 GHz Frequencies suitable for Wide Area Coverage - Rural

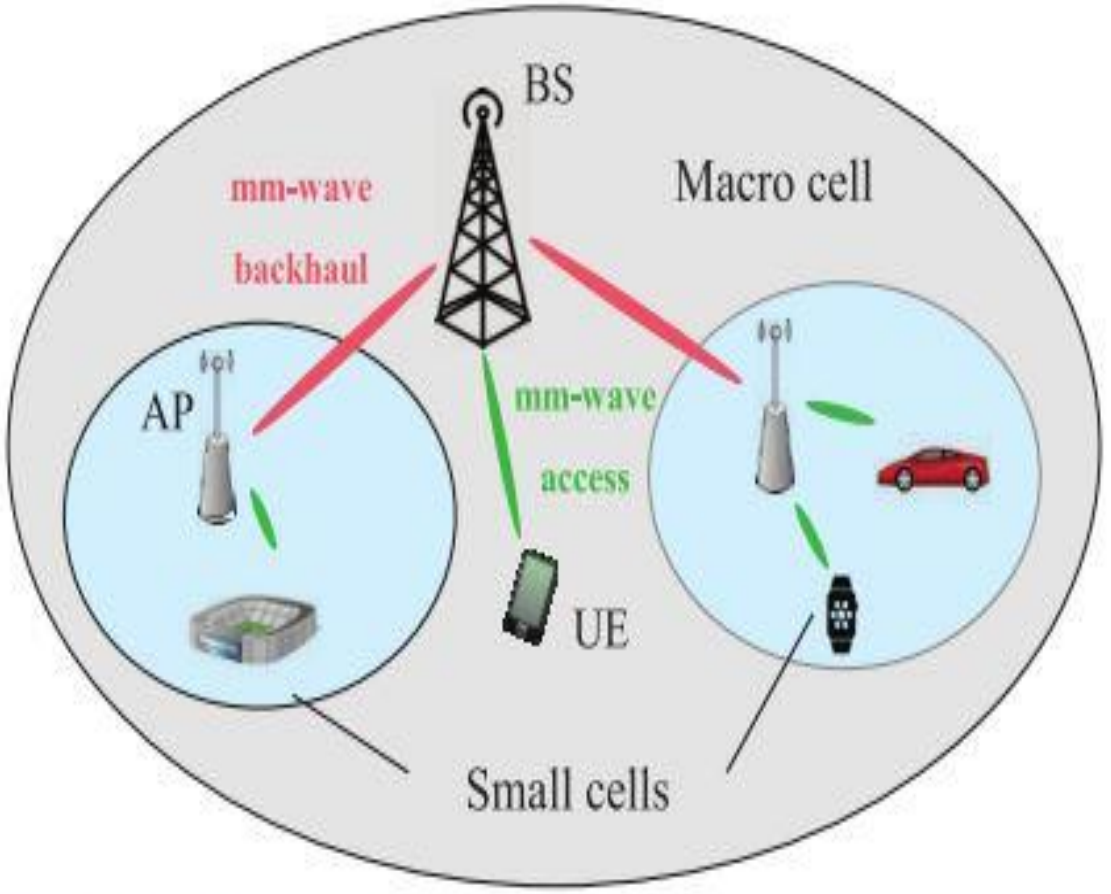


Figure 3-14: Illustration of a HetNet with mm-Wave wireless BH and access

Lack of RURAL ELECTRICITY the MAJOR CHALLENGE

- Access to Grid ELECTRICITY
  - Unavailable
  - Unreliable
  - Unaffordable
- Uneconomic Extension of Grid into Rural & Remote Areas
  - Expensive Long Grid Transmission & Distribution Networks
  - Sparse – Low Population Density, Scattered Population – Dispersed Homes,
  - Poor Population – Low Tariff
  - Poor Return On-Investment
  - Lack of Infrastructure Investments & Finance

INFRASTRUCTURE CHALLENGES For RURAL Electrification

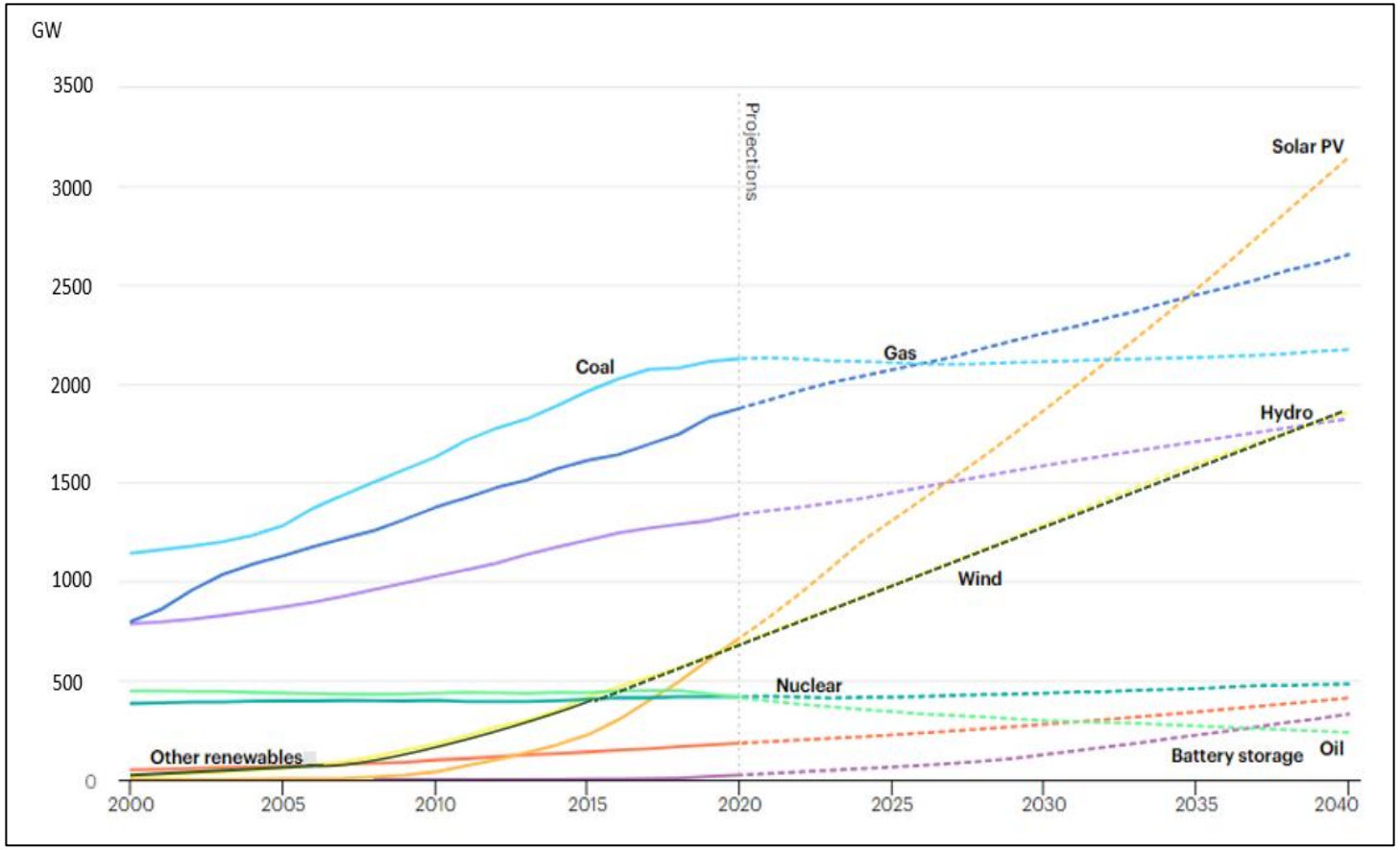
- Remoteness and challenging geography and terrain;
- Lack of reliable, affordable, secure adjacent infrastructure such as electricity grid;
- Lack of mobile internet coverage or fixed broadband wireless access networks and no means of accessing to international bandwidth;
- Lack of ICT facilities in Rural communities;
- Limited and distant power charging locations for mobile devices and Internet ICT appliances;
- Limited off-grid power solutions - irregular diesel generator supply, and intermittent renewable energy solutions.

Challenges of Extending ELECTRICITY Grid in Rural Areas

- **The extension of the national electricity grid can only be done for densely populated areas**
  - enough demand potential to justify the high investment costs
  - Transmission lines – estimated at more than 22,750 EUR per Kilometer (in Africa)
  - Distribution lines estimated cost 12,000 EUR per Kilometre (ARE, 2011)
  - Grid-based retail electricity tariffs from lower than 0.04 EUR/kWh (subsidised tariffs)
  - To over 0.23 EUR/kWh (non-subsidised tariffs) (IMF, 2008).

Grid-based retail electricity tariffs

Installed and Projected Power Generation Capacity by Source 2000-2040



Source: IEA World Energy Outlook 2019

Renewable Source Lifetime Comparison

TECHNOLOGY	ECONOMIC LIFE (YEARS)
WIND POWER	25
SOLAR PV	25
CSP	25
HYDROPOWER	30
BIOMASS FOR POWER	20
GEOTHERMAL	25

The International Telecommunication Union (ITU)

ITU:
International Telecommunication Union – the UN specialized agency for ICTs

ITU-R
ITU Radiocommunication Sector

ITU-T
ITU Standardization Sector

ITU-D
ITU Development Sector

The International Telecommunication Union (ITU)

ITU work on Environment, Climate Change and Energy

ITU-T

ITU-T Study Group 5: Environment, Climate Change and Circular Economy

ITU-R

ITU-R Study Group 7: Science Services

ITU-D

ITU-D Q6/2: ICT and climate change

Connect 2030 Agenda

Goal 1

Growth

Goal 2

Inclusiveness

Goal 3

Sustainability

Goal 4

Innovation

Goal 5

Partnership

Global initiatives

United for Smart Sustainable Cities

Connect every school to the internet

giga

gigaconnect.org

Giga: A joint ITU and UNICEF initiative to connect every school to the Internet, and every young person to information, opportunity and choice

Map

Resolving information gaps with live connectivity maps of schools

Finance

Stacking layers of public and private financing to de-risk investment and move capital "out" to the "edges"

Connect

Building new regulatory frameworks & structurin "common bids" with government partners

Empower

Partner to ensure every young person has access to information, opportunity, and choice

Considerations

- **Map electricity grids/ infrastructure together with school locations, digital infrastructure, roads, topography…**
- **Finance renewable energy solutions together with school connectivity projects**
- **Implement innovative and affordable energy solutions together with connectivity**
- **Partner on all the enablers required to bring sustainable and meaningful connectivity to schools**

unicef for every child

ITU

Coming soon

ITU Report on
"From Electricity Grid to Broadband Internet: Sustainable and innovative power solutions for rural connectivity"

Thank you!

Questions? Interested in learning more?
Let us know!

Website

ITU, Environment and climate change