Enabling the Future: Telecom and Digital Tools Powering Smart Utilities in Asia-Pacific

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GSMA Digital Utilities

Programme overview

Who we are

The GSMA represents the interests of **mobile operators worldwide**.

The GSMA Mobile for Development team drives innovation in digital technology to reduce inequalities in our world. Singularly positioned at the intersection of the mobile ecosystem and the development sector, we stimulate digital innovation to deliver both sustainable business and large-scale socio-economic impact for the underserved.

Programme mission

The Digital Utilities programme supports urban resilience in low- and middle-income countries by enabling access to essential utility services through digital solutions and innovative partnerships.

Inclusive utility services, such as **energy, water, sanitation, waste management and transport support urban resilience**, which allows cities in low-and-middle-income countries to better withstand challenges related to population growth, climate change, and inequality.

The GSMA Digital Utilities programme is funded by UK International Development from the UK government, and supported by the GSMA and its members.

UK International Development
Partnership | Progress | Prosperity

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GSMA Digital Utilities What we do

De-risking and catalysing innovative urban utility services

Provide grants to private sector innovators to test and demonstrate the role of digital urban service solutions

Partnership facilitation and convening of key ecosystem stakeholders

Drive replication and scale through convenings and leveraging our own networks (particularly mobile operators) as well as those of key partners that work to enable similar solutions.

Research and insights

Generate rigorous evidence on innovative solutions to essential service provision by gathering insights from Innovation Fund grantees, conducting research with partner organisations with deep expertise in utility service provision.

Technical advice to mobile operators, municipalities, and utility service providers

Provide advice on the role of digital innovation for improved utility service provision and insights on how to achieve multi-stakeholder partnerships.

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Why Smart Energy Utilities Matter

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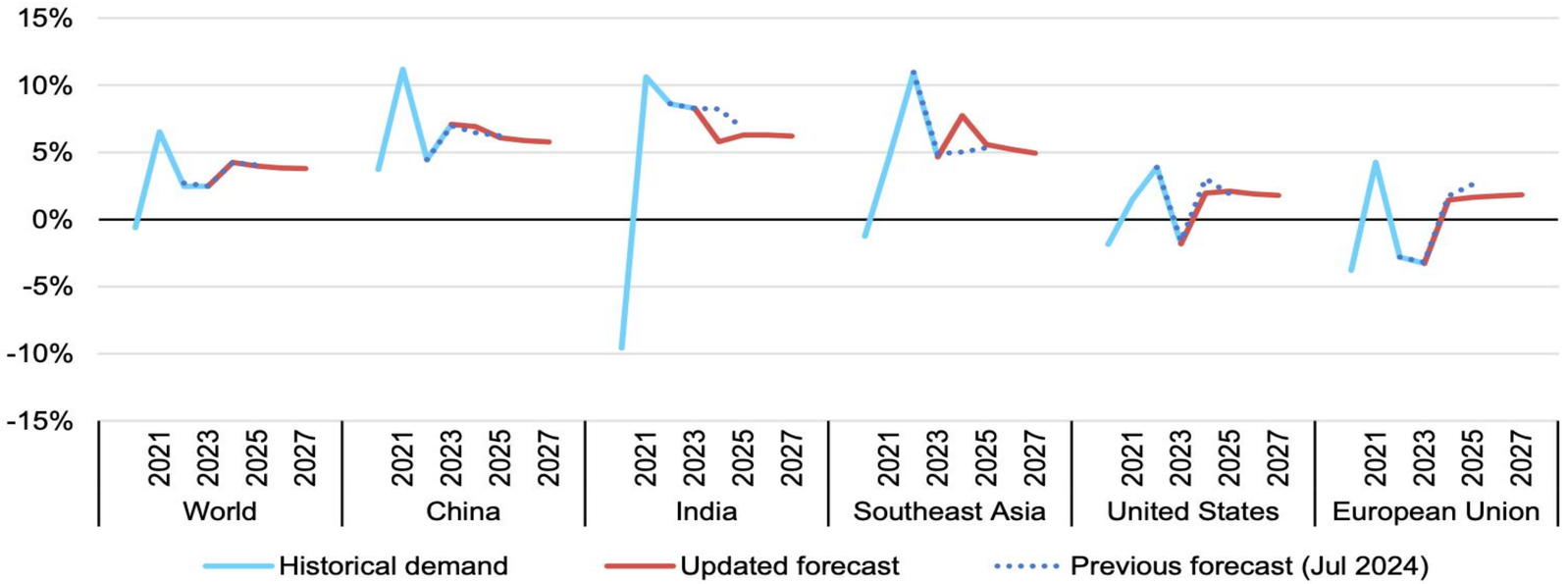
Why Smart Energy Utilities Matter

Year-on-year percentage change in electricity demand in selected regions, 2020-2027

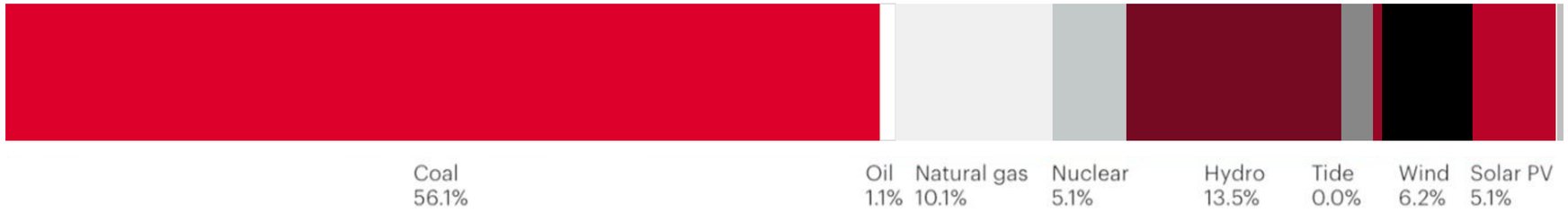


Note: Data for 2025-2027 are forecast values. The years on the x-axis start at 2020.

85%

of the additional demand for electricity through 2027 will come from emerging economies

Electricity generation sources, Asia-Pacific, 2022



IEA 2022,2025

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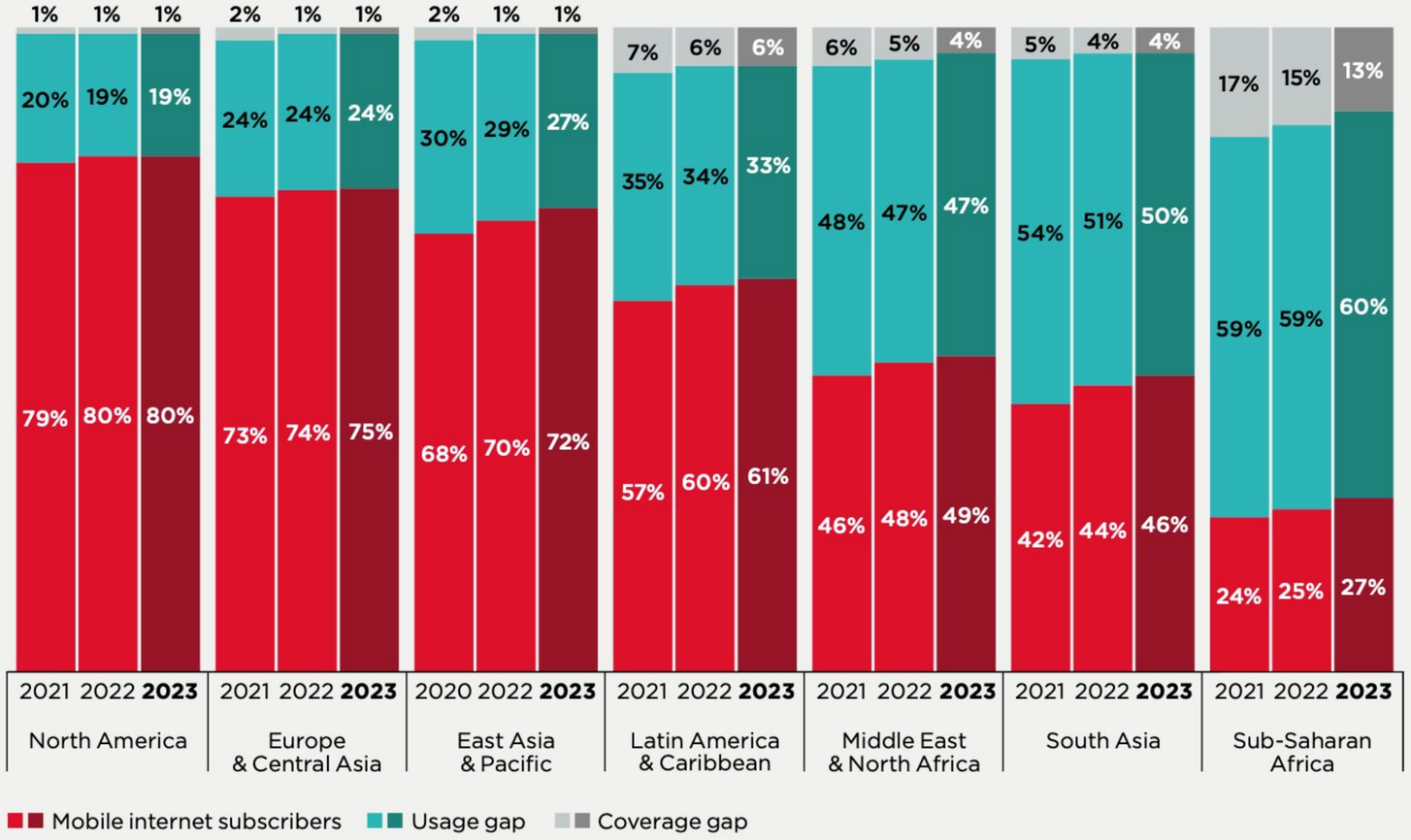
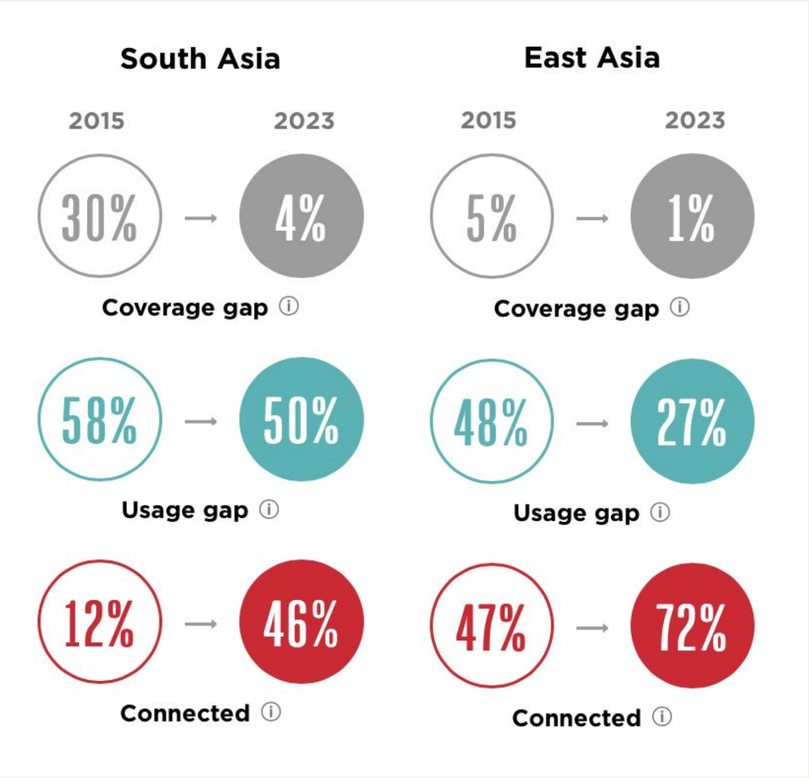
Mobile Connectivity Trends in Asia-Pacific

Mobile internet connectivity by region, 2021 - 2023





The State of Mobile Internet Connectivity, 2024

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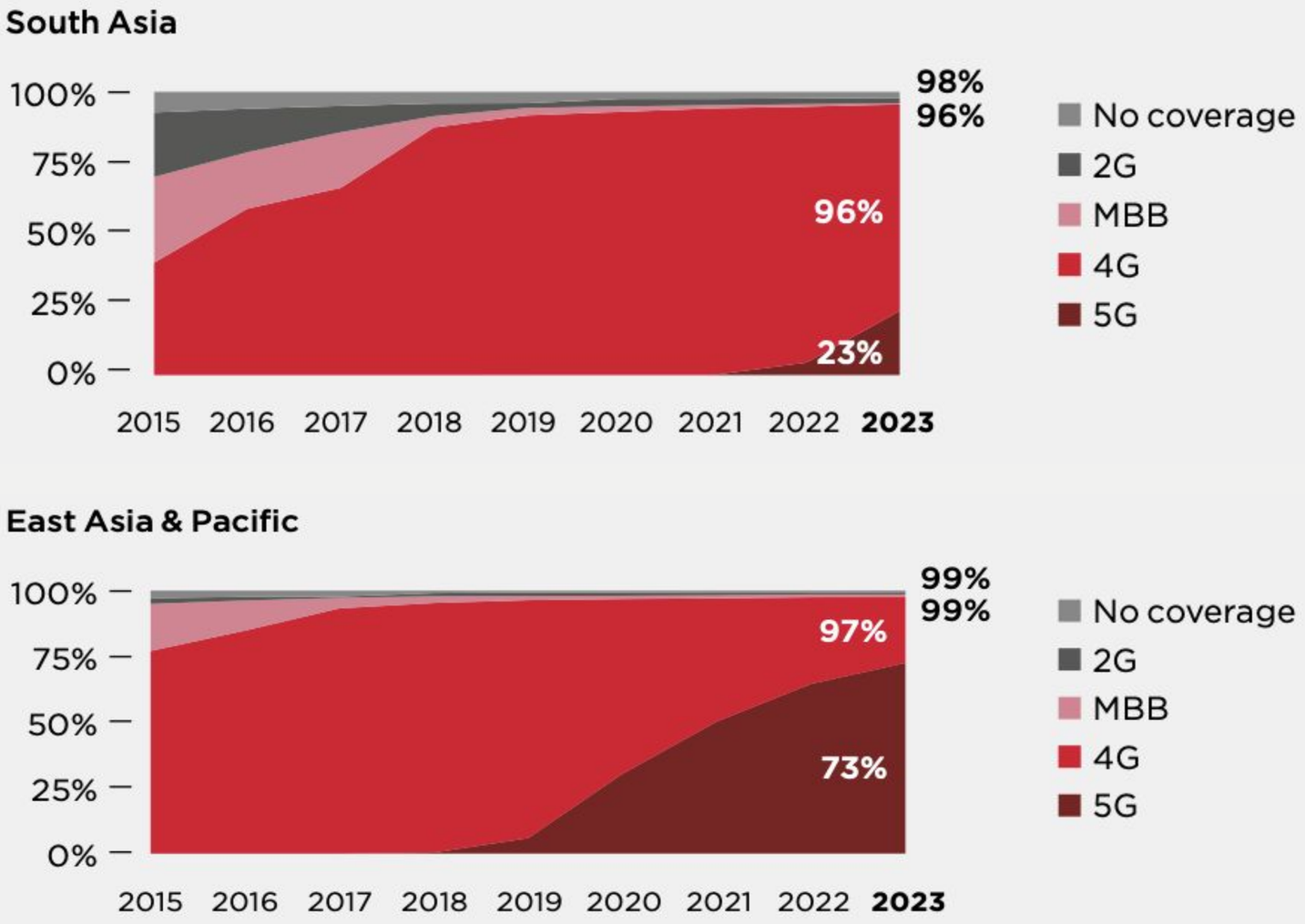
Mobile Connectivity Trends in Asia-Pacific

Population coverage by technology and region, 2015–2023



4G is now the primary coverage across both regions, but **5G** adoption is significantly more advanced in East Asia & Pacific than in South Asia

The State of Mobile Internet Connectivity, 2024

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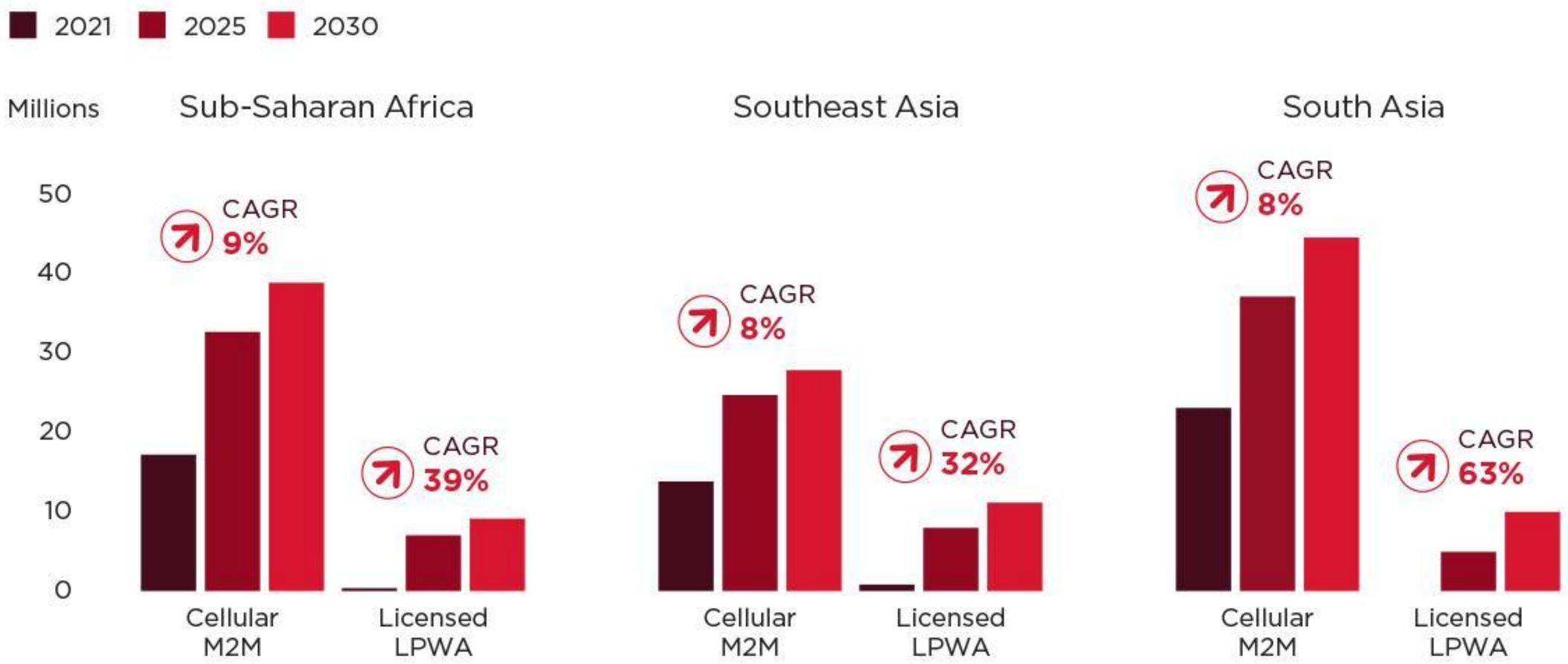
Licensed IoT Connections to 2030

Licensed cellular IoT connections to 2030



Note: Compound Annual Growth Rate (CAGR) is for the period 2021-2030

Source: GSMA Intelligence

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Digital Tech's CO_2 Reduction Potential

4.2 Gigatons of CO_2 savings are expected to be delivered over the 10-year period to 2030, by shifting to connected solar and wind grids—representing 46% of the total reductions needed in the sector.

"Low-latency connectivity and analytics support are key influencing factors behind the higher efficiency of SES that drives CO_2 reductions"

The equivalent of...

72 million
car journeys in a year

84 million
roundtrip flights from London to Los Angeles

420
coal-fired power plants taken offline over the next five years

A high-level quantification of CO2 savings in the energy and utilities sector enabled by mobile and digital technology*

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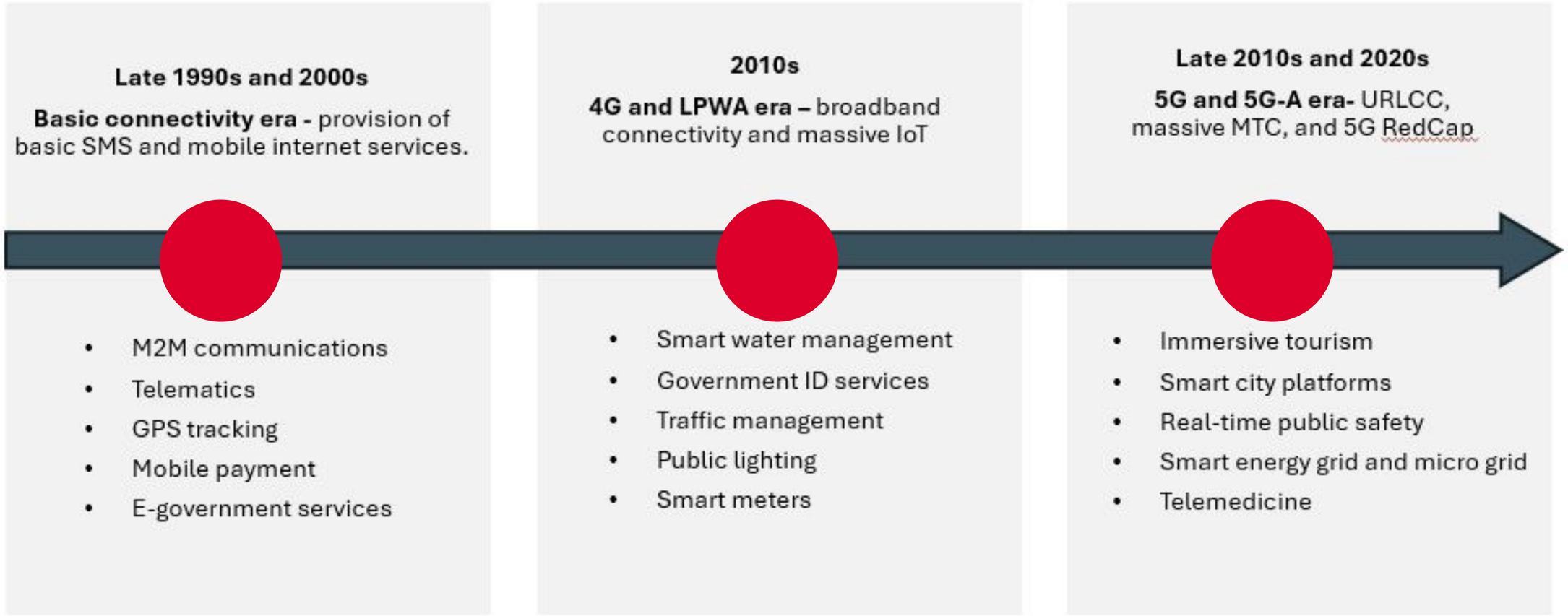
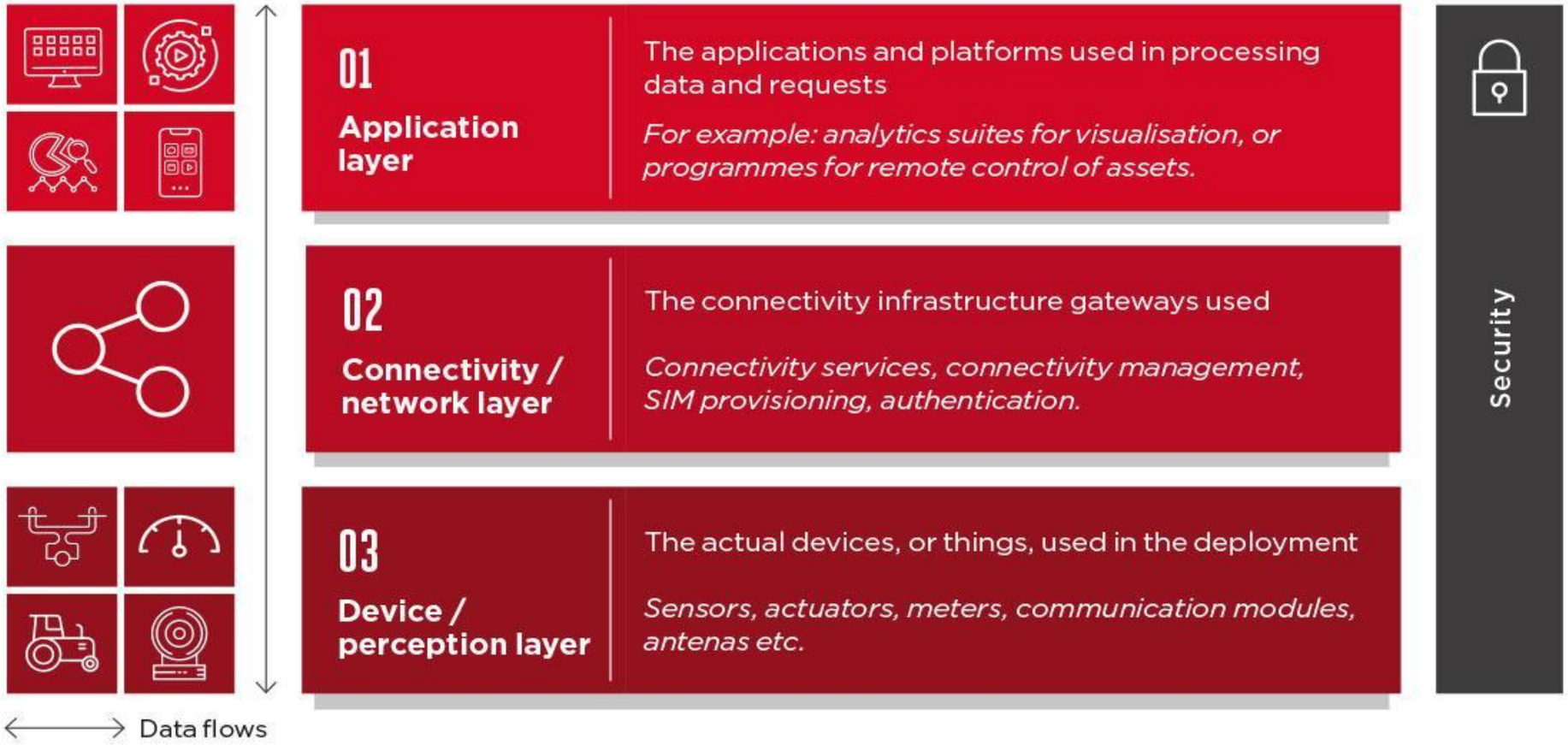
Connectivity as a Catalyst for Grid Modernisation



The IoT Stack: Architecture and Market Potential

IoT solution reference architecture



Note: This depiction of the IoT reference architecture is an adaptation of the original IoT reference architecture as published by the ITU and represents a simplified view of an IoT solution. In reality, IoT solutions are comprised of many devices, sensors, actuators and other connectivity-enabled 'things' that may receive one or more types of communication service.

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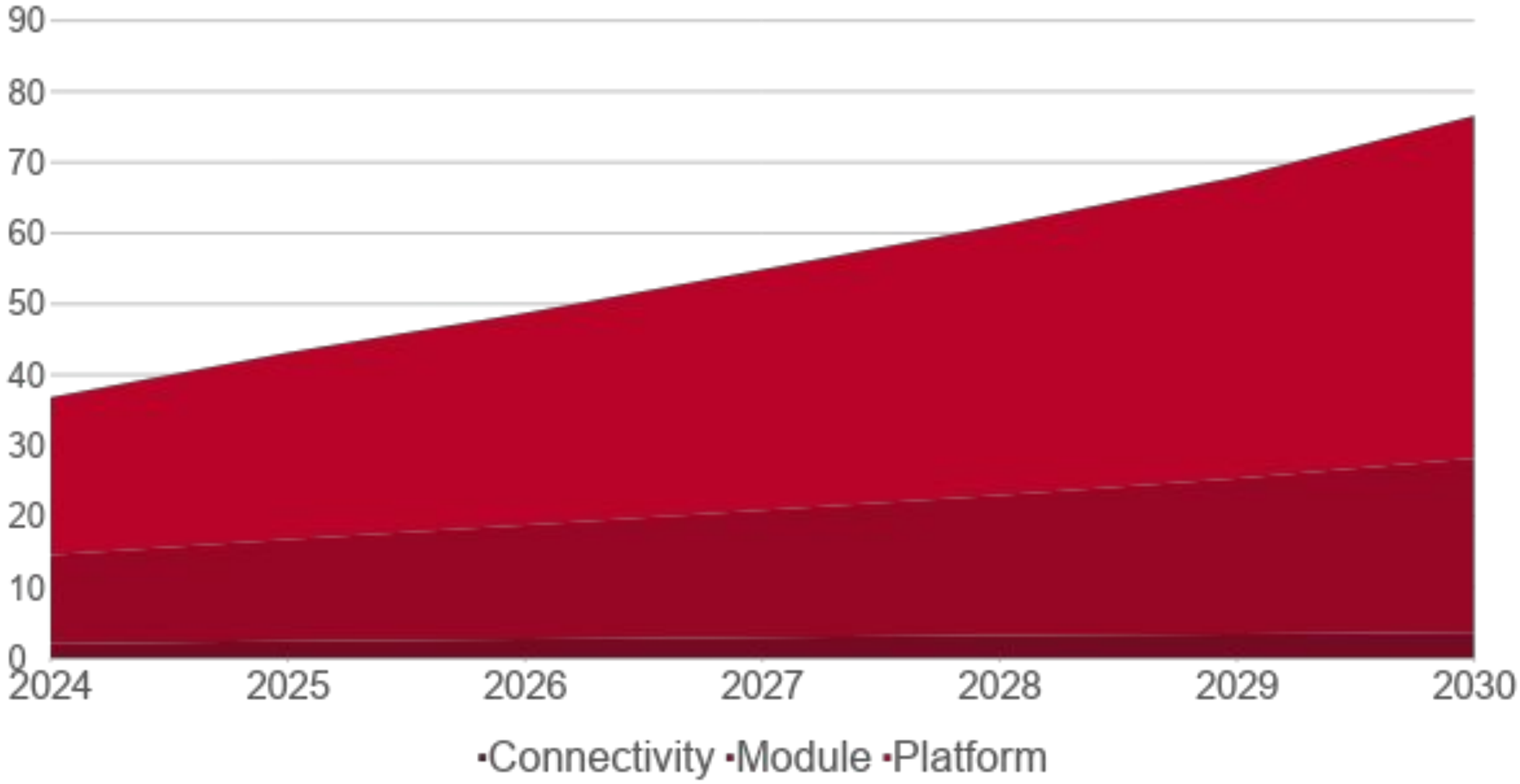
The IoT Stack: Architecture and Market Potential

TAM to 2030 by layer, $ millions



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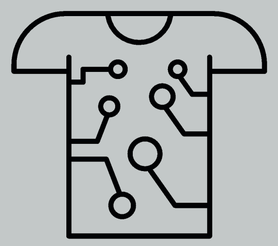
Digital Technologies Driving Grid Decarbonisation and Energy Efficiency

Technology family	Product or service	Mechanism for CO_2 reductions
IoT 	**Sensors embedded on solar photovoltaic (PV) installations (e.g., a micro grid run by a smallholder or large-scale solar farm) to monitor production and distribution**	Avoids fossil fuel-derived emissions (mostly coal) - Optimises power consumption at residential and industrial premises by using stored energy (rather than relying on the grid)
	Sensors at grid switching points (could also use LTE or 5G connectivity)	Part of broader SES in which transmission, consumption and redistribution of energy are monitored through a network of sensors and dashboards managed by the grid operator Reduces energy wastage and associated emissions in national or state-level grids through predictive analytics to pre-empt grid supply or capacity crunches
	Management of smallholder or commercial premises battery installations for energy storage and flexibility	Allows for a smoother pattern of consumption at end-user premises (reducing wastage) and the sale of excess power to the grid operator at peak periods

Industry pathways to net zero Decarbonisation in energy and utilities , 2022

Digital Technologies Driving Grid Decarbonisation and Energy Efficiency

Technology family	Product or service	Mechanism for CO_2 reductions
Cellular connectivity (LTE and 5G) 	**Private networks (or slices)**	Service solar grids (could combine with massive IoT deployments), linking back to remote terminal units (RTUs) and the main dashboard to optimise electricity loads and reduce risk of outages Automates power plant operations – Full grid network to enable distribution automation. Reduces outages and truck rolls.
	Connected drones	Used to inspect solar/wind farms and power lines to identify defective components or risk factors such as overheating (so-called ‘hotspots’ on solar panels that lead to leakage) and turbine chinks. Reduces the need for call-outs of engineering teams, often to remote locations.
	Behind-the-meter (BTM) energy management	Increasingly popular model of renewable generation, especially where national supply is low (e.g., India). LTE or 5G connectivity underpins data transfers between renewable generation assets, smart meters, and the grid to shift or store excess energy for later use on the grid.

Industry pathways to net zero Decarbonisation in energy and utilities , 2022

Digital Technologies Driving Grid Decarbonisation and Energy Efficiency

Technology family	Product or service	Mechanism for CO_2 reductions
Cloud and analytics 	**Automated grid function**	Connectivity underpins analytics to monitor electricity grid functioning and predictive maintenance on a local or national scale. - Reduces truck rolls and associated emissions.
	Forecasting and management of peak demand response	Sensor data from connected assets across a national or local grid and smart meters is processed by AI algorithms in the cloud to enable dynamic shifting of capacity to even out supply. This extends to forecasting energy production and consumption, which helps lower the risk of supply and price volatility (as seen in global wholesale gas markets in 2021, for example).
	Asset monitoring and predictive maintenance	The processing of sensor data attached to grid assets (exchange points, solar PV, wind farms) through algorithms to pre-empt repairs and outages. - Reduces truck rolls and associated emissions.

Industry pathways to net zero Decarbonisation in energy and utilities , 2022

India: Scaling Smart Metering Through Operator Partnerships

India

250 million smart meters are targeted for deployment in India by 2027

12% currently deployed, with the Power Ministry citing over 100,000 deployments daily

Airtel, Jio and Vodafone-Idea have partnered with utilities/ AMISPs across the country

Image: GSMA

Learnings

- Standardisation and certification of communication modules are critical to ensure interoperability across devices and networks
- Building data analytics capabilities will help utilities and DISCOMs unlock the full value of smart metering investments, including cost savings and efficiency improvements
- Stronger cross-government collaboration is needed—especially between power, telecom, and digital regulators—to address issues like RoW, spectrum, and cybersecurity
- Addressing end-user concerns around trust, billing accuracy, and privacy is essential to build community buy-in and support for smart meter adoption

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Pakistan: Reducing Grid Losses with Real-Time Monitoring

Pakistan

Smart monitoring deployment

Jazz (a mobile operator), CISNR (a tech startup), and PESCO (a utility) implemented ElectroCure and TransfoCure—low-cost, real-time smart grid monitoring systems—on two high-loss feeder lines

Reduced line losses

Line losses dropped by **6.7%**, saving **$19,745 annually** from just 10 smart units

Better service delivery

Load-shedding reduced by **50%**, improving reliability and billing accuracy for 262,500 users

Implementation challenges

Resistance from power thieves led to 15% of devices being damaged or stolen

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China: Scaling 5G for Secure, Smart Grids

China

China has leapfrogged into large-scale deployment of 5G-enabled smart grids. By early 2024, Chinese operators and utilities moved beyond pilot projects to full commercial rollout of 5G for critical grid operations

In Shandong province, China Unicom, State Grid and Huawei jointly built the world's largest 5G virtual private network for the power sector.

Wide Coverage: Over 2 million base stations deployed through co-construction and sharing, enabling nationwide 5G coverage for power grids

High Security: Advanced slicing (RB reservation, FlexE, UPF) ensures deterministic and isolated 5G services for critical power grid operations

Cost Effectiveness: Intelligent RAN and 5G RedCap reduce electricity device costs by up to 60%, enabling performance at scale.

Simplified Deployment: Digital Twin Systems improve provisioning accuracy, achieving a 90% success rate on first attempt.

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Telecom Energy Resilience via VPPs and Virtual Wheeling

VPPs monetise backup power: Virtual Power Plants (VPPs) use telecom tower batteries and software to act as distributed energy hubs—reducing energy costs and earning grid revenue.

Proven financial gains: Elisa (Finland) saved **€5,000/site/month** and earned **€44,000/month** through its VPP; similar models have shown **50–80% electricity cost offsets**.

Low-cost, high-impact: VPPs require minimal hardware investment, using **existing batteries, AI, and cloud platforms** to deliver fast ROI.

Scalable across markets: Telcos in **Finland, Pakistan, Indonesia, and South Africa** have achieved **56–85% savings** using VPPs and virtual wheeling—proving cross-market viability.

Virtual wheeling unlocks clean energy access: Vodacom's deal with Eskom allows **renewable energy to be virtually allocated** across 15,000+ low-voltage sites—**without physical connections**

Telcos and virtual power plants, 2024

Call to action

Smart utilities are a pillar of

resilience and **decarbonisation & economic competitiveness**

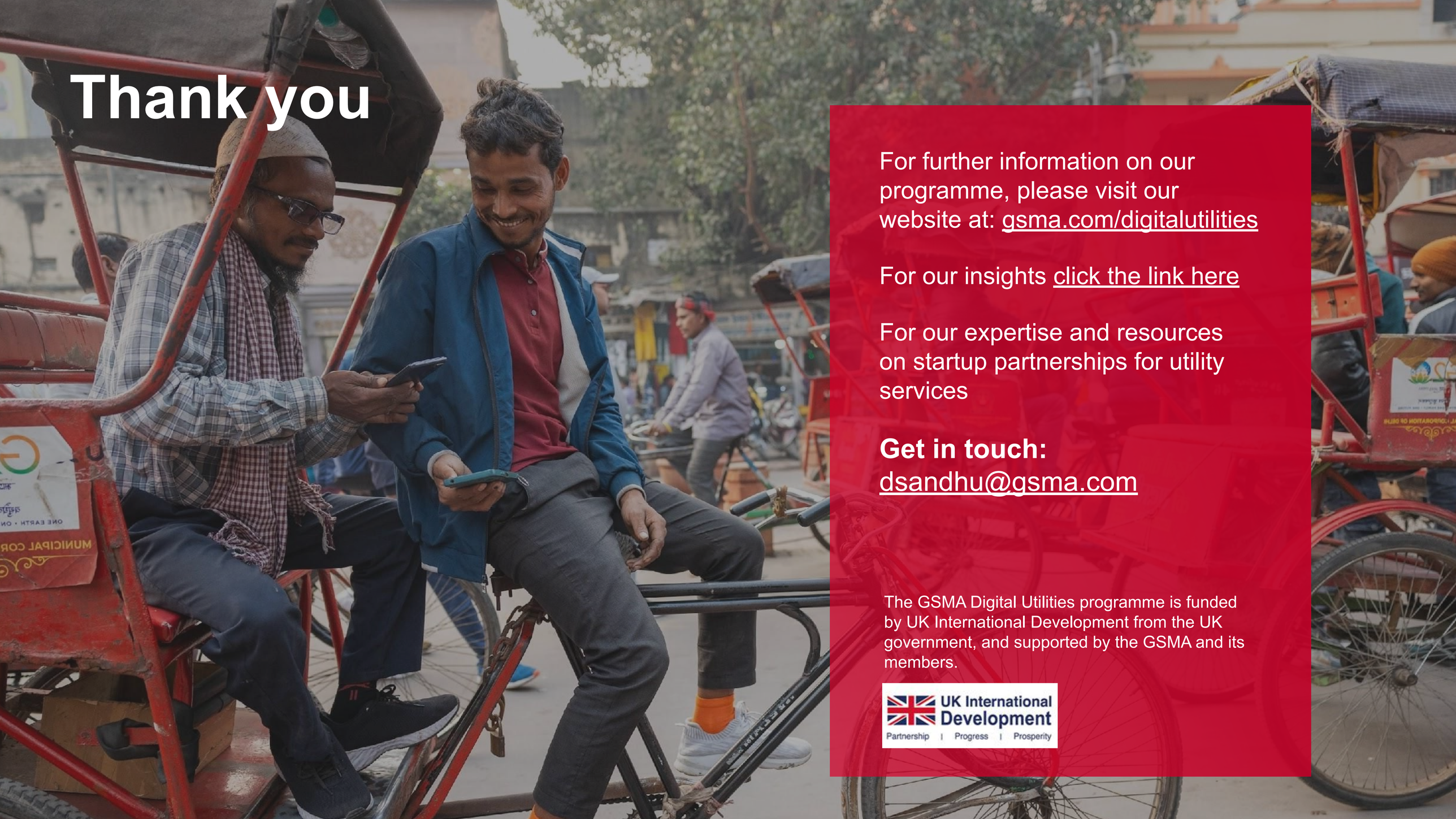
Telecoms bring the

reach, **tools** and **partnerships** to scale impact

The future of energy is

digital, **distributed** and **mobile-enabled**

Thank you



For further information on our programme, please visit our website at: gsma.com/digitalutilities

For our insights click the link here

For our expertise and resources on startup partnerships for utility services

Get in touch:
dsandhu@gsma.com

The GSMA Digital Utilities programme is funded by UK International Development from the UK government, and supported by the GSMA and its members.

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Partnership | Progress | Prosperity