

GSMA™
5G **Futures**
Community

Welcome

Mon 16 Sept 2024

LIVE WEBINAR

The Net Zero Transition

The Impact of 5G-Advanced
on Energy Efficiency in
Enterprise Markets



Session moderator:
Barbara Pareglio
Senior Technical
Director – Networks
GSMA

Agenda

- **Welcome and introduction**
- **Mobile Net Zero 2024** with GSMA External Affairs
- **The Impact of 5G-Advanced on Energy Efficiency** with GSMA Intelligence
- **5G Net Zero Strategies Panel Discussion** with Orange and Telenor

Speakers



George Kamiya
Senior Manager,
Climate Action
GSMA External Affairs



Emanuel Kolta
Lead Analyst, Network
Sustainability and
Innovation
GSMA Intelligence



Jean-Marie Chaufray
Head of RAN
Benchmark & Green
Orange Group



Johannes Bjelland
Program Director
Networks
Telenor Group
Research & Innovation

GSMA 5G Futures Community

5G Standalone 5G-Advanced

- ✓ NETWORK SLICING
- ✓ PRIVATE NETWORKS
- ✓ NTN
- ✓ ADVANCED CAPABILITIES
- ✓ GSMA OPEN GATEWAY
- ✓ COMMUNICATION AND CONNECTIVITY SERVICES



Network transformation (APIs)
AI FOR THE NETWORK



GSMA™
**Open Gateway Community &
Cloud Networks Working Groups**
TEC / OPG / OPAG



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FINTECH, IDENTITY & DATA, MOBILITY,
DIGITAL INDUSTRIES, AVIATION



GSMA™
Infrastructure Activities
OPEN RAN, SUPPLY CHAIN, T&F,
VOIP, 5G-ENABLED NTN, AI/ML

SUBSCRIBE:



Opening-up mobile network capabilities to the world

Mobile Net Zero 2024 Report



George Kamiya
Senior Manager, Climate Action
GSMA External Affairs



Mobile Net Zero 2024

5G Futures Community • 16 September 2024

GSMA Climate Action Taskforce

The Taskforce has grown rapidly and has 74 members in 150+ countries and territories representing 80% of mobile connections



Leadership



Advocacy



Best Practice

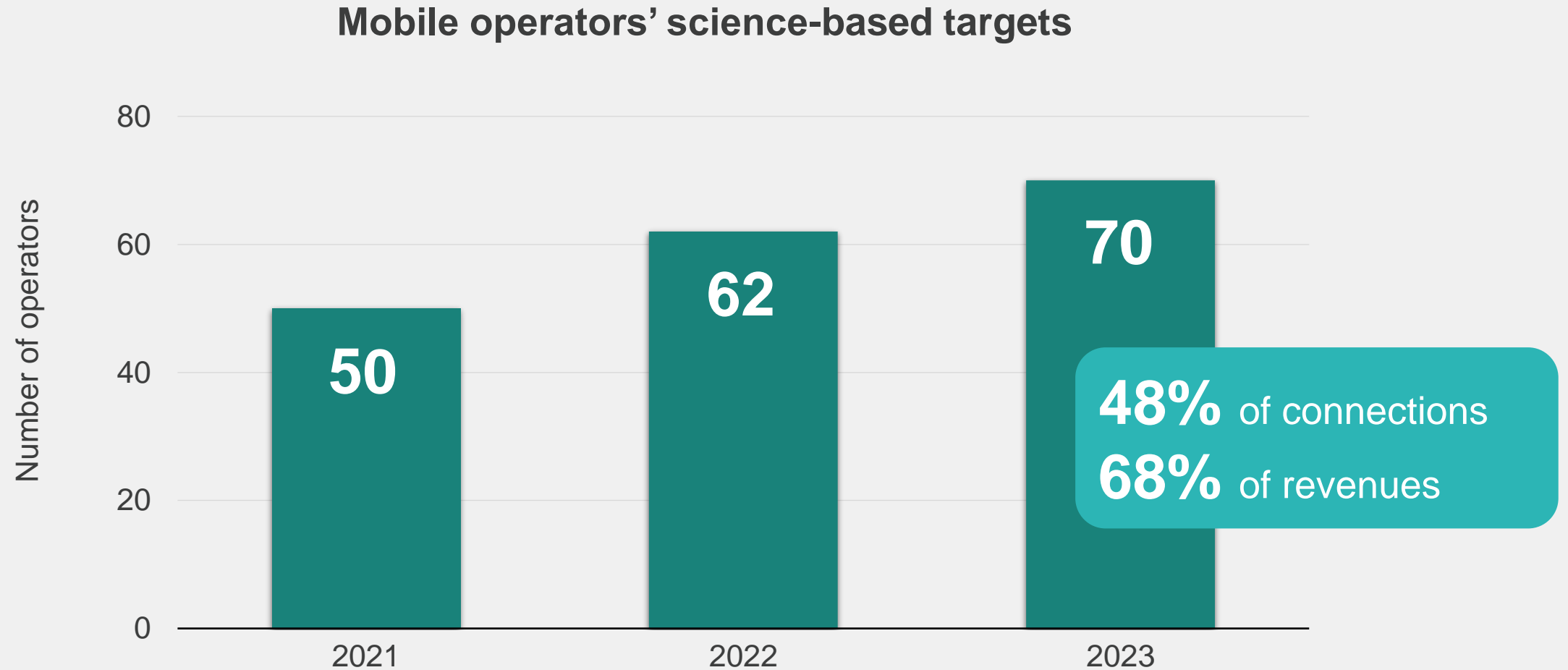


Research



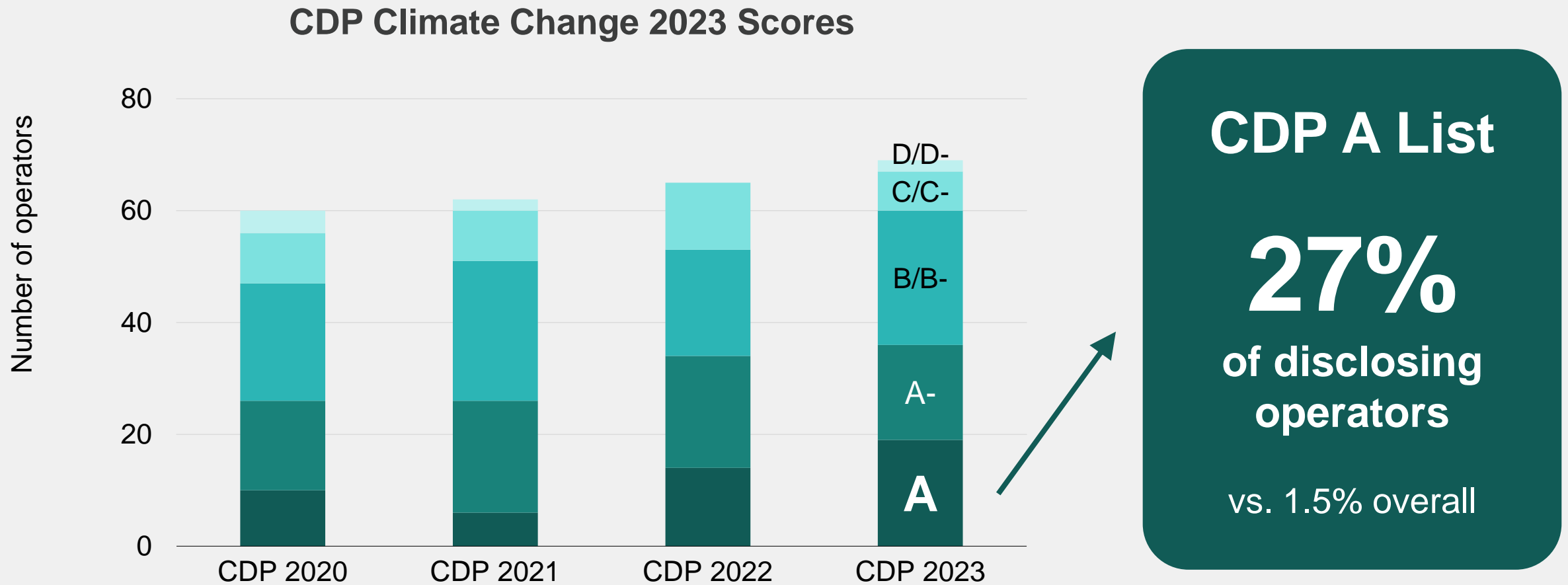
74
members

Increased commitment to voluntary climate targets



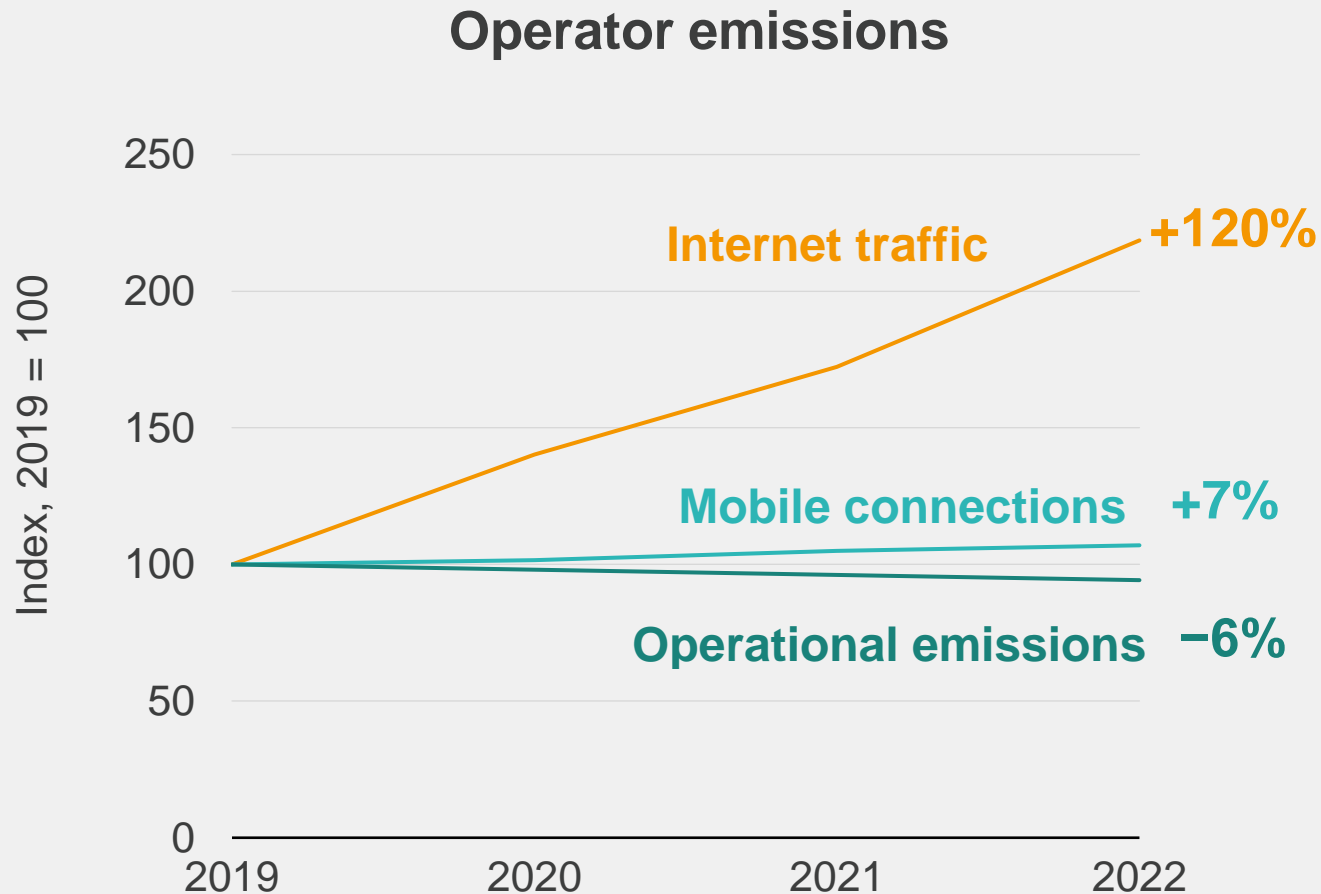
Sources: GSMA analysis based on SBTi (2023).

Number and quality of disclosures have improved



Source: GSMA analysis and CDP (2024).

Network operator emissions fell in most regions

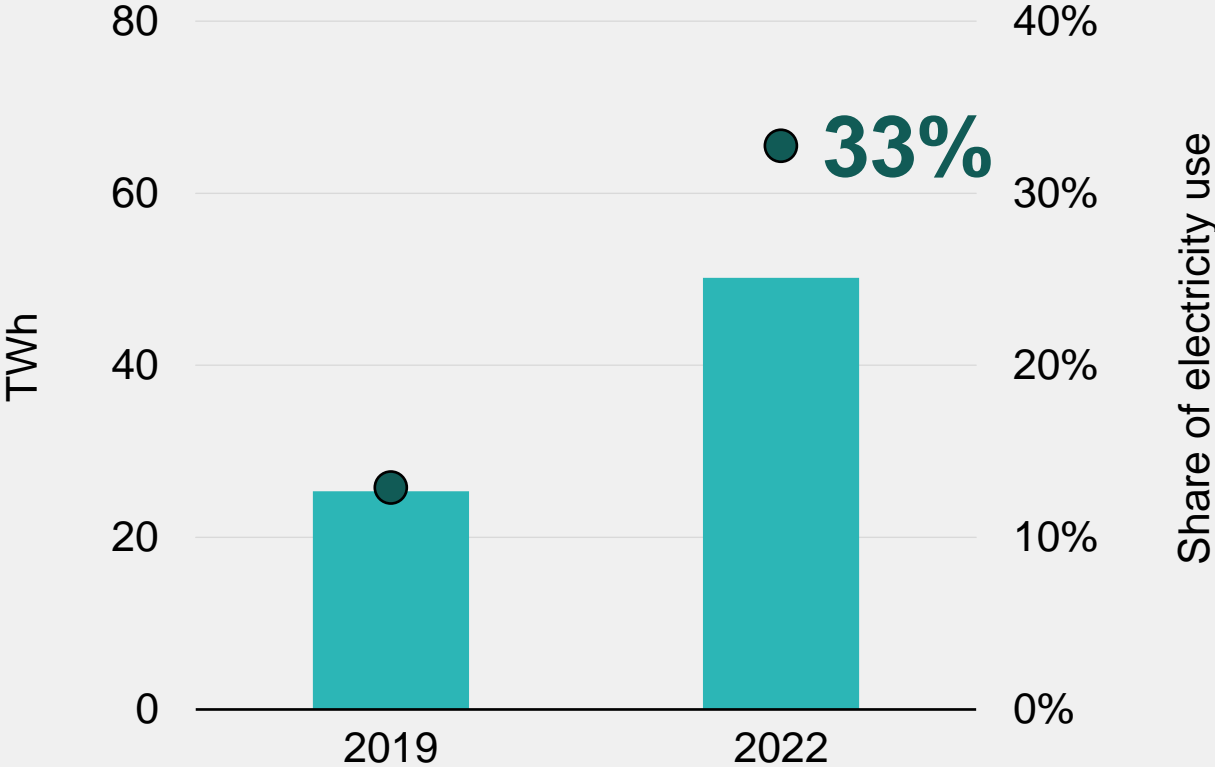


-50%
2022 vs. 2019

Sources: Operational emissions: GSMA analysis based on CDP disclosures and corporate sustainability reports. Mobile connections: GSMA Intelligence. Internet traffic: IEA (2023) based on Cisco (2015, 2019) and Telegeography (2022, 2023).

Efficiency and renewables: key drivers of progress

Purchased renewables in CDP disclosures



Operators purchasing

100% renewables

- BT Group
- Deutsche Telekom
- KPN
- Magyar Telekom
- Proximus
- Swisscom
- Tele2
- Telefónica*
- Telia
- TIM Brazil
- T-Mobile US
- Turkcell
- Vodafone

*Europe, Brazil, Chile and Peru

Source: GSMA analysis based on CDP 2023

Sources: GSMA analysis based on CDP disclosures and corporate sustainability reports.

Net zero for competitive advantage

Climate action



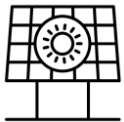
Benefits for operators



Energy efficiency



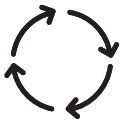
Renewable energy



On-site solar and batteries



Electric fleets



Reuse and refurb



Smart services

Cut costs & grow revenues



Reduce costs



Customer engagement



New revenue streams



Attract investment

Manage risks



Energy security and reliability



Supply chain resilience



Stay ahead of regulations

Access the report

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Mobile Net Zero 2024

State of the Industry on Climate Action

Climate action continues to be a key priority for the mobile industry. In 2019, the mobile industry set a goal to reach net zero by 2050, becoming one of the first sectors in the world to set such an ambitious target.

This report is the fourth annual assessment of the industry's progress towards this goal and provides key recommendations for how mobile network operators, suppliers, and governments can work together to accelerate progress across the sector.

Chapters in the report

Executive Summary

1. Net Zero Ambition

2. Tracking progress on climate

3. Emissions from mobile operators

4. Regional Insights

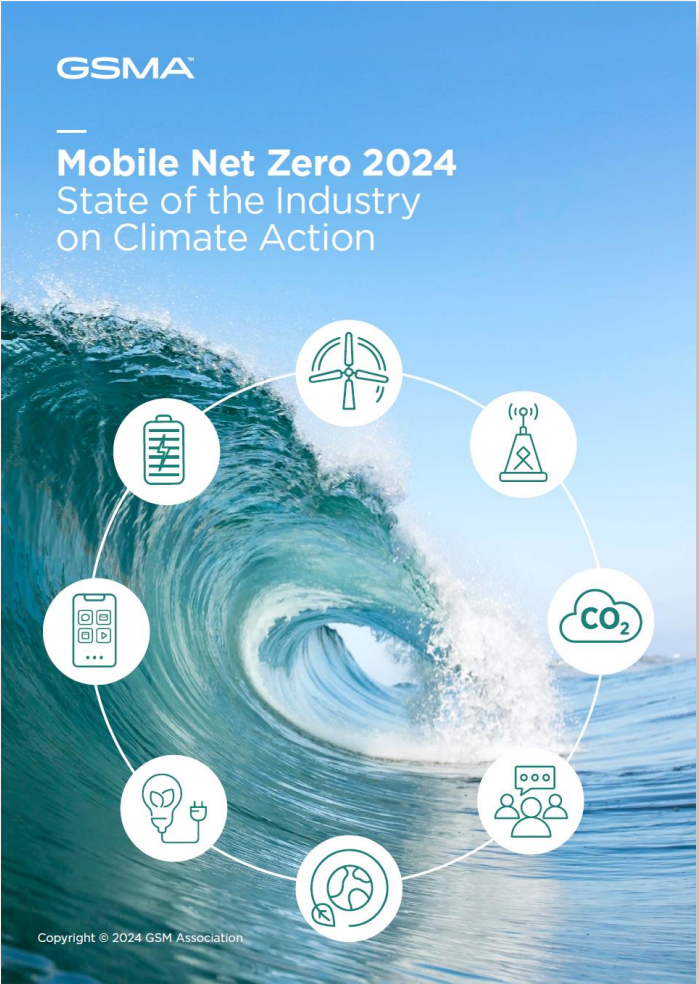
5. Emissions from supply chains & customers

6. Adaptation and resilience

7. Enabling climate action

8. Recommendations to accelerate progress

9. Annex



The Impact of 5G-Advanced on Energy Efficiency



Emanuel Kolta
Lead Analyst, Network
Sustainability and Innovation
GSMA Intelligence

GSMA 5G Futures Community

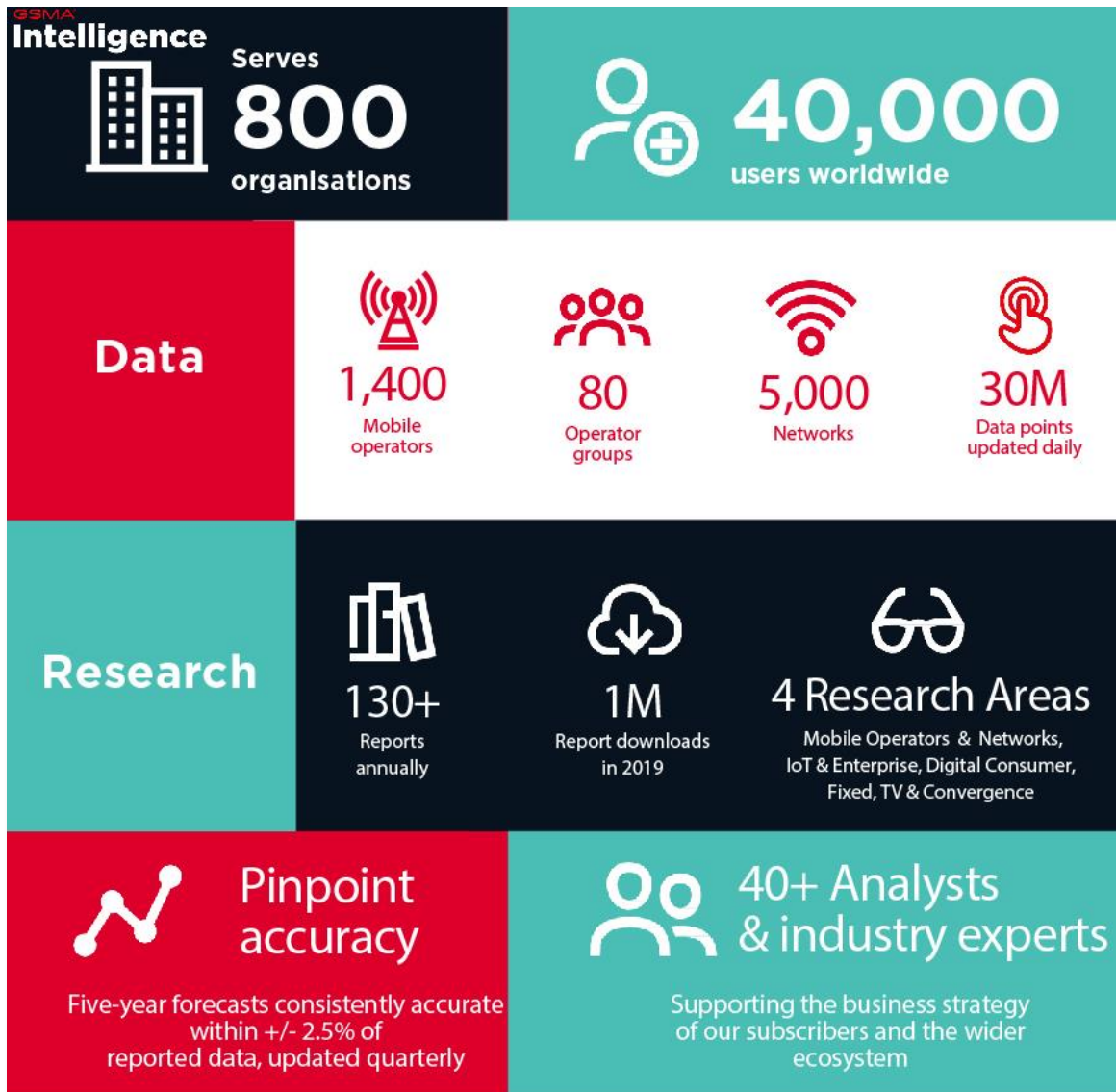
The Impact of 5G- Advanced on Energy Efficiency

DATE

16th September 2024

AUTHOR

Emanuel Kolta, Lead Analyst



THE GSMA
WAS FOUNDED IN
1987

Intelligently Connecting Everyone and Everything to a #BetterFuture



The mobile industry is the first to formally commit to the UN Sustainable Development Goals



The GSMA works to deliver a regulatory environment that creates value for consumers by engaging regularly with



14 Offices worldwide



Hosting the world's leading mobile industry events, MWC Barcelona, MWC Shanghai, MWC Los Angeles and the Mobile 360 Series attract

230,000
people from across the globe



8.7 bn+
MOBILE CONNECTIONS WORLDWIDE

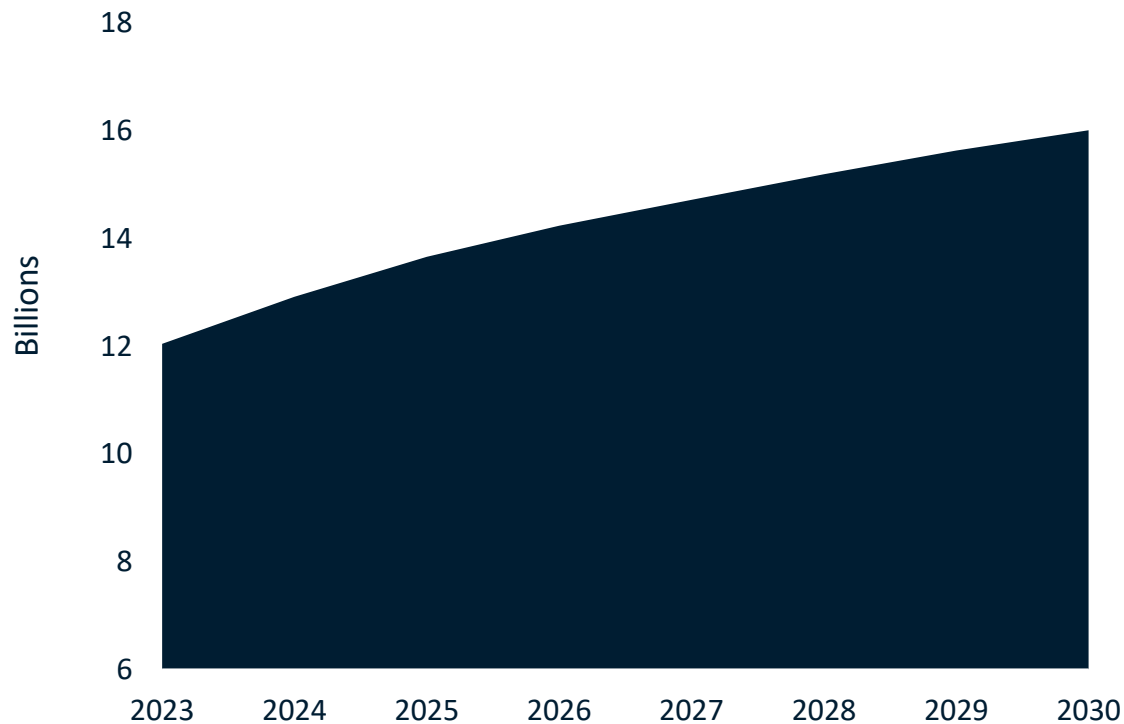


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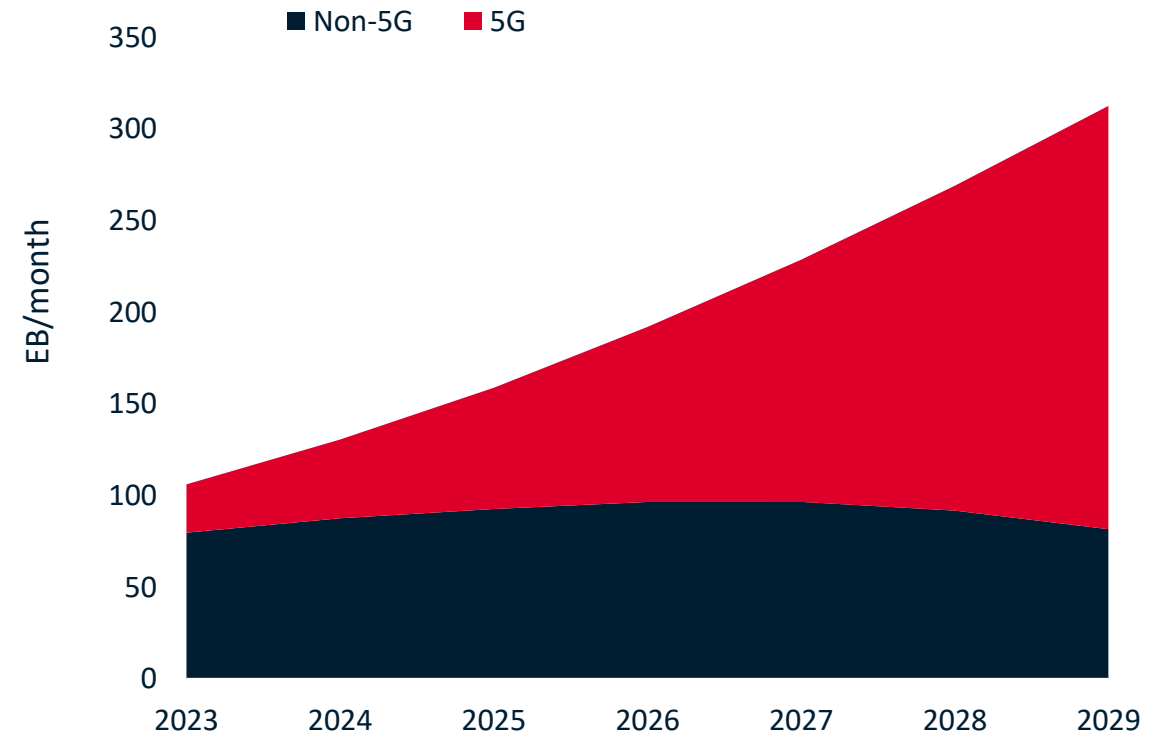
Increasing demand for connectivity

Cellular connections 2023 - 2030



Source: GSMA Intelligence

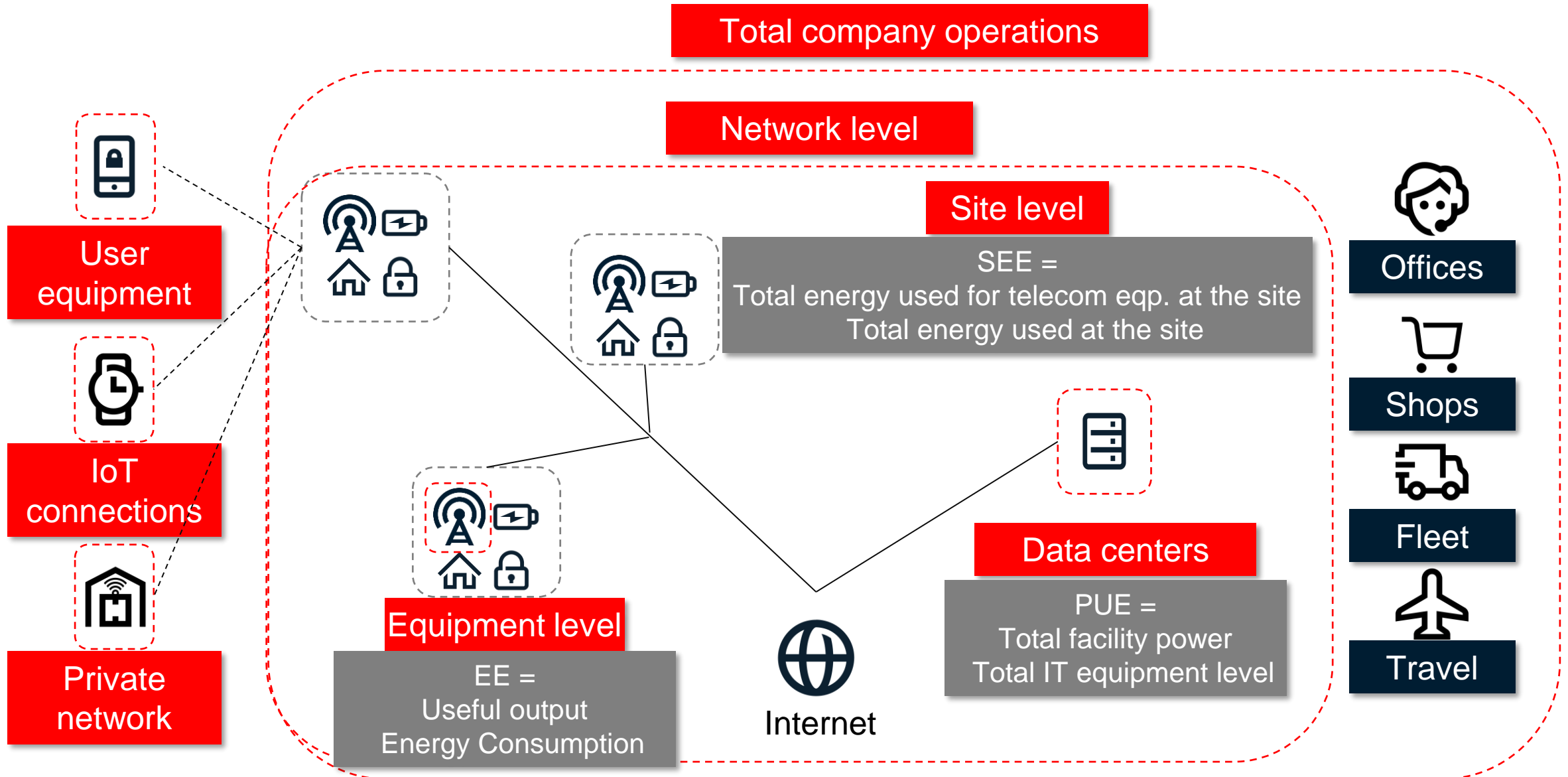
Mobile data traffic 2023 - 2029



Source: Ericsson

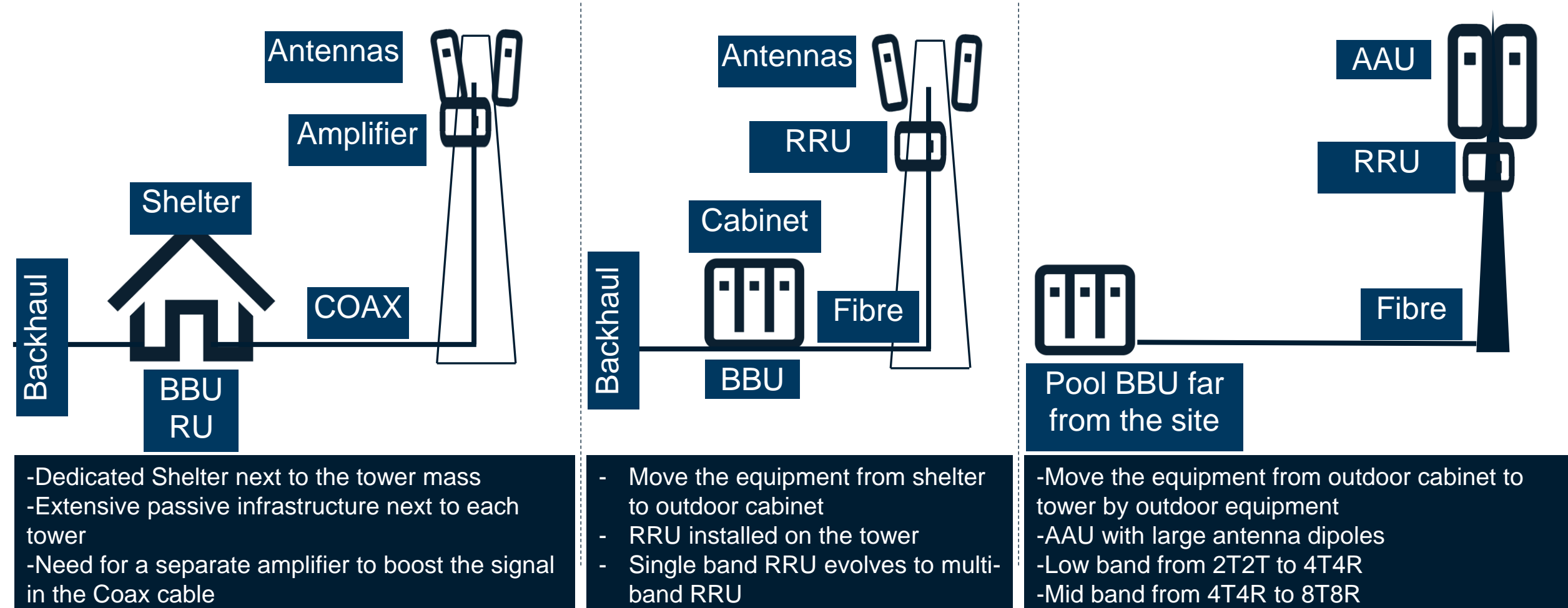
What is energy efficiency?

There is no single metric to measure energy efficiency for wireless network.



Evolution of mobile networks

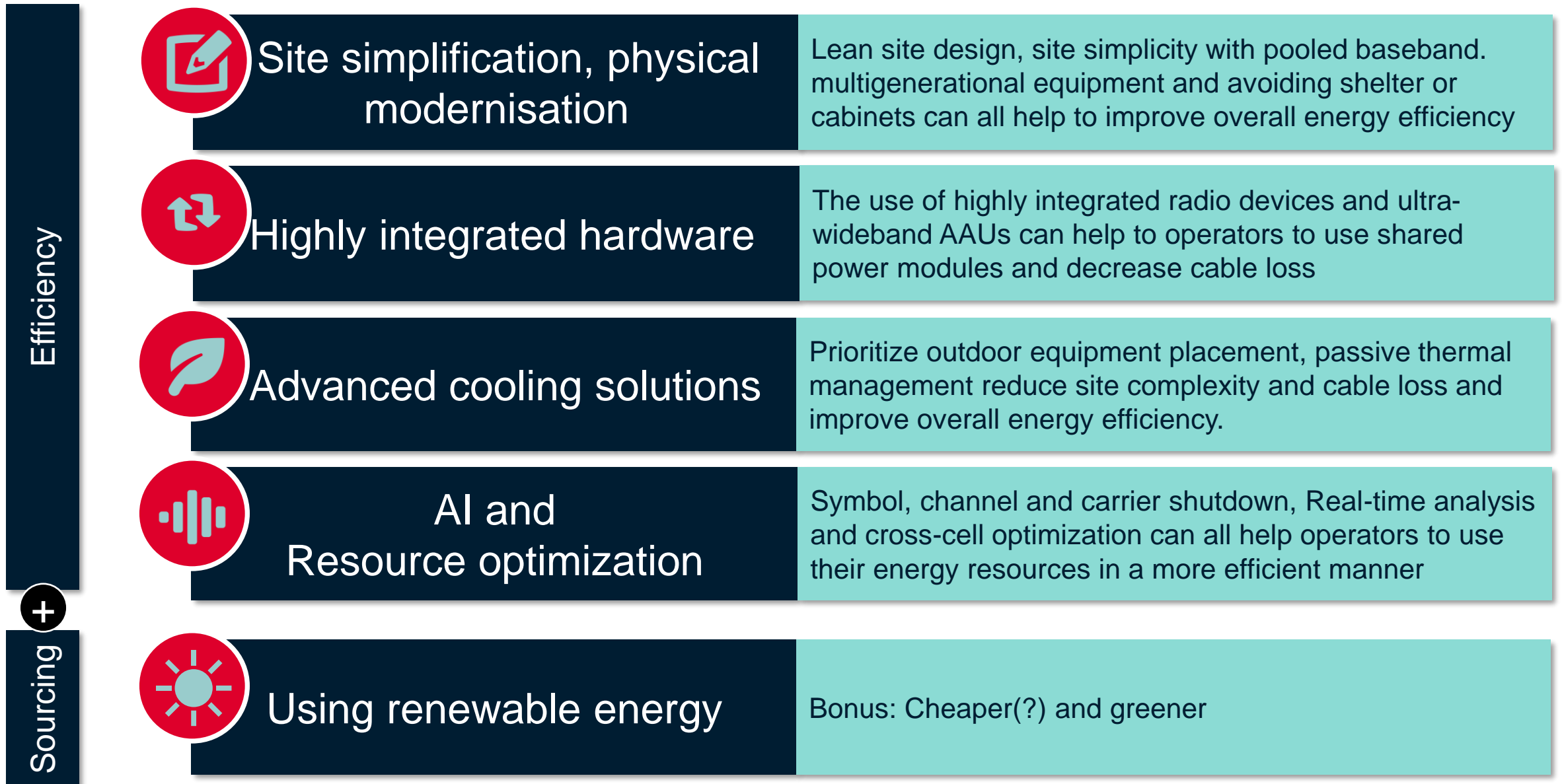
Site simplification and equipment integration



BBU - Baseband Unit, RU - Radio Unit, RRU – Remote Radio Unit, AAU – Active Antenna Unit

How: Ways to improve

The right combination of energy efficiency improvements and renewables



Equipment integration

The role of multiband equipment

Band 1

Power module

Digital
part

Transceiver
(TRX)

Power
Amplifier

Diplexer 1

Band 2

Power module

Digital
part

Transceiver
(TRX)

Power
Amplifier

Diplexer 2

Band 3

Power module

Digital
part

Transceiver
(TRX)

Power
Amplifier

Diplexer 3

Multiband Radios (Band 1+2+3)

Power module

Digital
part

Transceiver
(TRX)

Power
Amplifier

Diplexer 1

Benefits of multi-band radios:

- Less components in total
- Economy of scale
- Shared power module
- Less windload, rental cost and maintenance

Cooling solutions

Passive cooling capabilities take centre stage

Passive	New materials	<p>Using materials with advanced thermodynamic characteristic</p> <p>Aluminium was the main material used for network equipment. Recently, new composites with advanced thermodynamic features are introduced.</p>
Passive	Design	<p>Design which help to get rid of the unnecessary heat</p> <p>New equipment design methods can help operators get rid of waste heat produced and therefore reduce the amount of related cooling infrastructure needed. V-shaped bionic cooling teeth, AlSi6 outer shells, flapping wings and the butterfly design can all utilise natural conduction, convection, and radiation to cool a components.</p>
Passive	Components	<p>Advanced components</p> <p>Power amplifiers and chipsets are largely contributing to the total power consumption of the RF hardware. High efficiency power amplifiers and advanced, 5 nm chipsets are helping operators to improve overall energy efficiency.</p>
Active	Liquid cooling	<p>Liquid cooling to save the extra heat</p> <p>While air cooling systems can be noisy and require regular maintenance, liquid cooling can overcome these issues. Liquid is also much more efficient in the transmission and transfer of heat and adding liquid cooling systems can transform and save the captured waste heat produced by the base station during operation. This can then be circulated and reused for other purposes, for example, it can be redirected to a building's heating system for free, at a price, or even traded. Local climate and surroundings can limits the use of liquid cooling solution</p>

Use of AI in network optimisation

Resource optimisation when/where/on what frequency



Time domain

- Huge seasonality per day, week, month year per time
- Allocate resources when needed
- Human labour vs AI - Make decisions quickly, at scale and efficiently



Frequency domain

- Different frequencies has different attributes from the energy efficiency angle
- Adding mmWave and +5GHz
- Carrier boosting



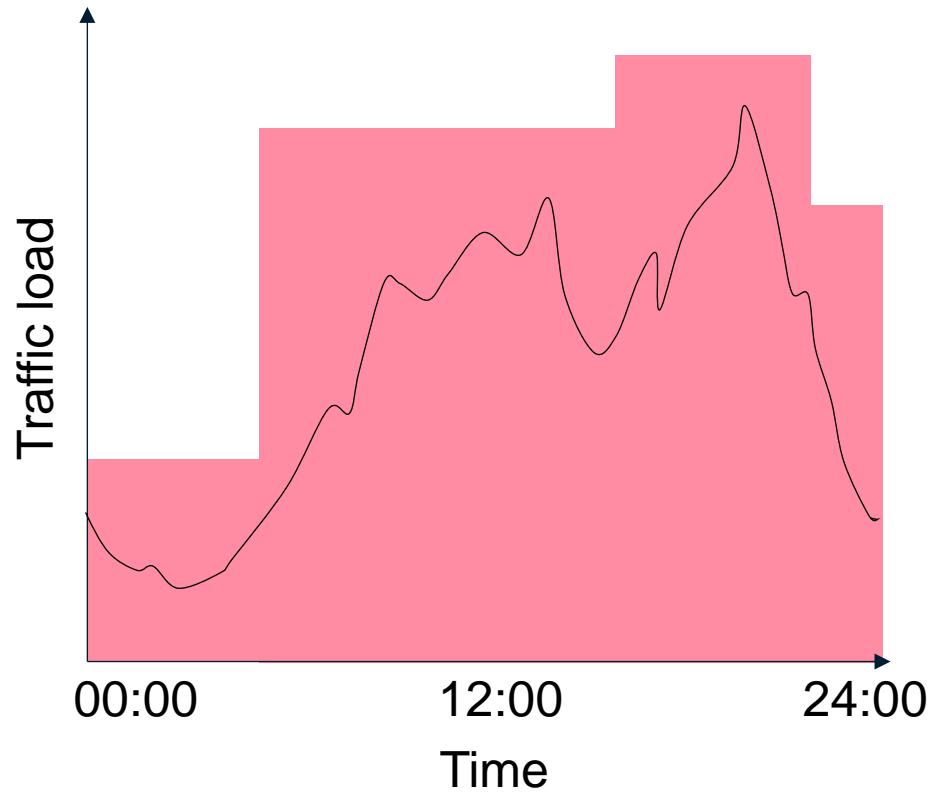
Spatial domain

- Huge seasonality – allocate where needed
- Sleep modes, shutdowns per node, per sector
- Horizontally and vertically self-optimising antenna

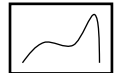
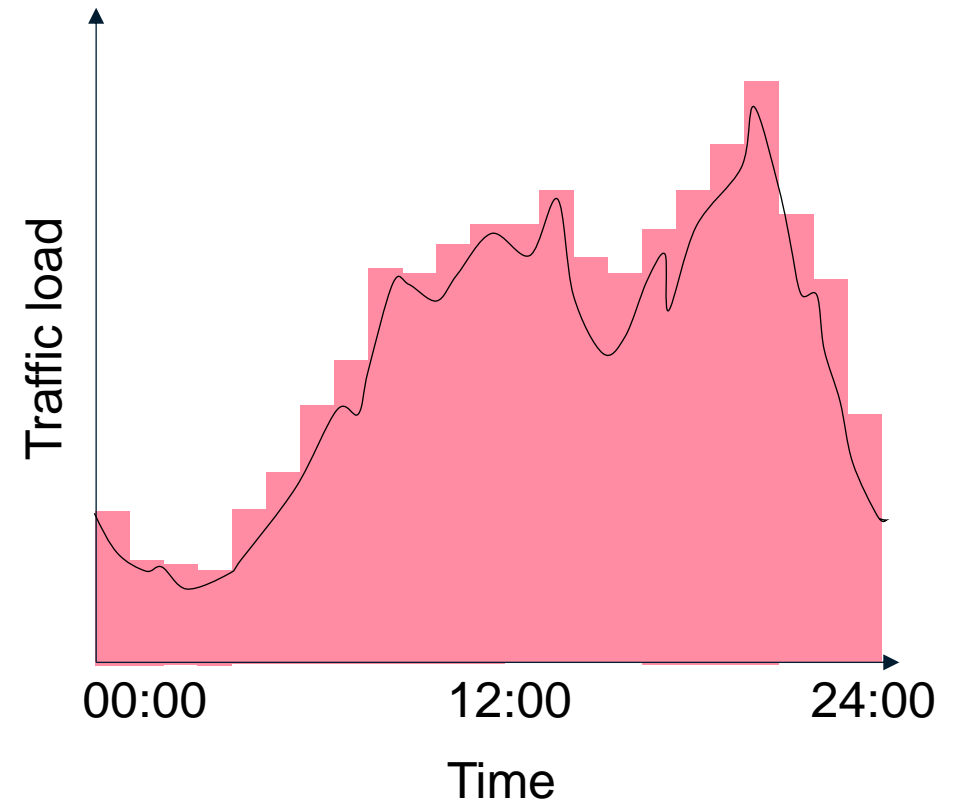
Energy efficiency in the time domain

AI solutions can help to synchronise capacity to the instantaneous traffic load

Pre-set or manual capacity optimization



Reactive, AI driven power saving



Network traffic load



Capacity/ power consumption



Thank you

Emanuel Kolta

Lead Analyst, GSMA Intelligence

 @EmanuelKolta

Panel discussion



Moderator:
Barbara Pareglio
Senior Technical
Director – Networks
GSMA



Jean-Marie Chaufray
Head of RAN
Benchmark & Green
Orange Group



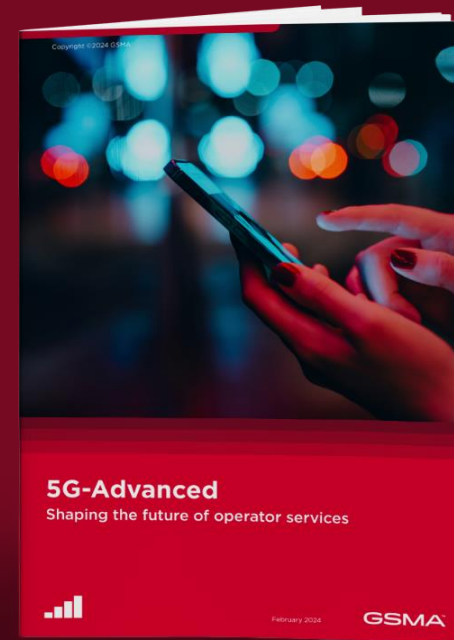
Johannes Bjelland
Program Director
Networks
Telenor Group
Research &
Innovation

Audience questions

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GSMA industry paper 5G-Advanced: Shaping the future of operator services



Business benefits of
5G-Advanced



Industry applications from
leading equipment
vendors **Ericsson**,
Huawei, **Nokia**,
Qualcomm, **ZTE**



Latest 5G-Advanced
insights and market
trends from **GSMA** and
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