Overview of the GSMA's Mobile Energy Efficiency Benchmarking Project

Jack Rowley, PhD,
Senior Director Research & Sustainability
GSM Association

Mobile Energy Efficiency

Seminar 1:
"Health and Infrastructure Development"
Wednesday 24 April 2013 - Marriott Hotel - Bogota, Colombia

© GSM Association 2013

The GSMA's Mobile Energy Efficiency (MEE) offers two services: MEE Benchmarking and MEE Optimisation

- The GSMA's **MEE Benchmarking** service is a management tool
  - helps MNOs measure and monitor the relative efficiency of their radio access networks
  - identifies under-performing networks and quantifies the potential efficiency gains available, typically around 10% to 25% across a MNO's portfolio

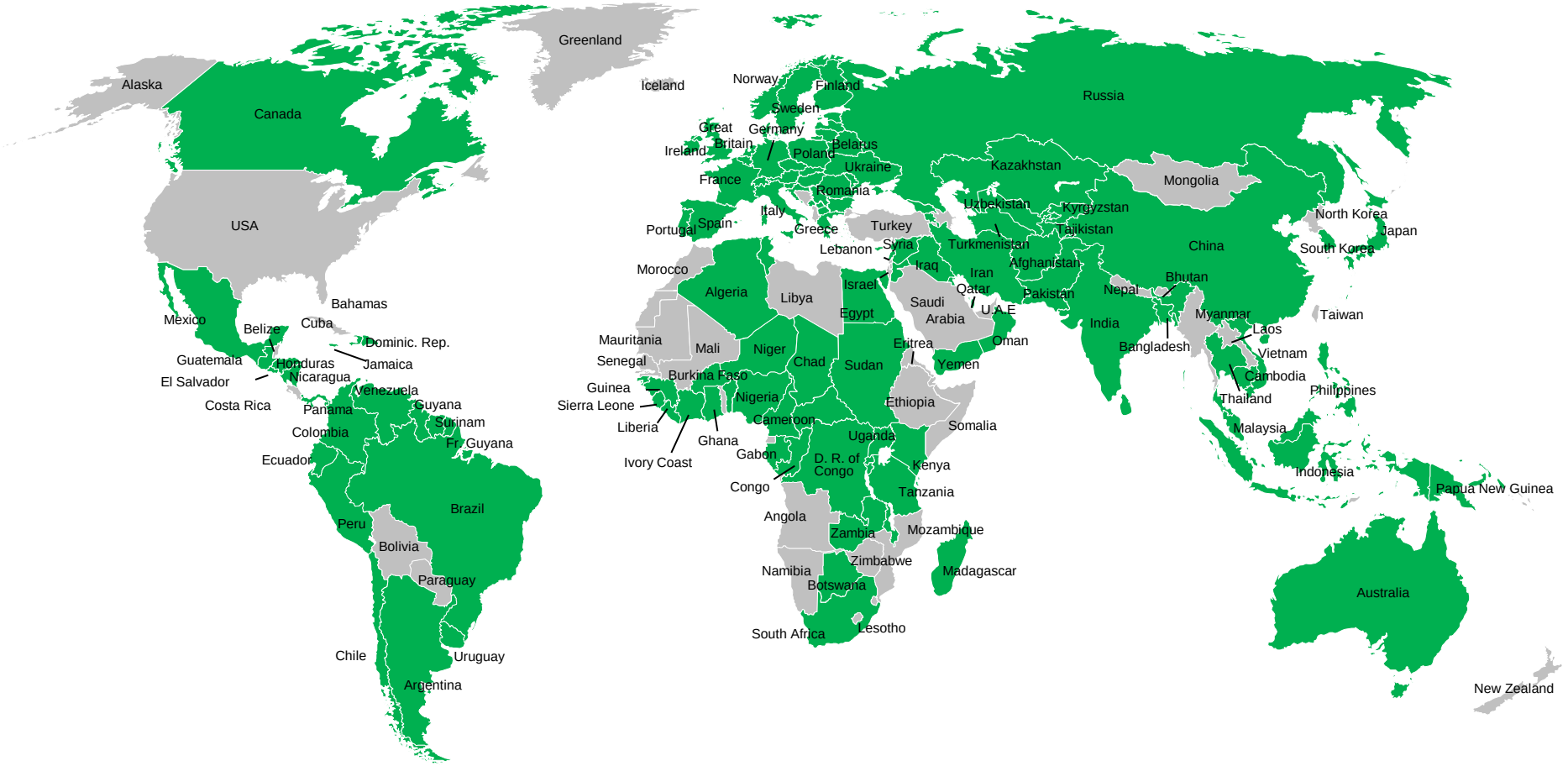
- The GSMA's **MEE Optimisation** (MEEO) is a follow-on service that uses the MEE Benchmarking results combined with site audits and equipment trials to
  - analyse the costs and benefits of specific actions to reduce energy
  - roll out the most attractive solutions

MNOs spend approximately $15bn globally on network electricity and diesel fuel consumption

MEE Benchmarking has 35 MNO participants, representing over 50% of global mobile subscribers

airtel
axiata
Bharti Infratel Limited
中国移动通信 CHINA MOBILE
China unicom中国联通
Citycell
Digicel
Globe
!dea
kpn
maxis
mobinil
MTN everywhere you go
MTS
NTT docomo
Qtel Group
SingTel
SK telecom
swisscom
TATA Access. Content. Solutions.
TELECOM ITALIA
Telefonica
TELEKOM AUSTRIA GROUP
telenor group
TeliaSonera
TELKOMSEL By Telkom Indonesia
Telstra
T
VimpelCom
vodafone
warid
zain
GSMA Mobile Energy Efficiency

MEE participants are located in 145 countries



Participant in MEE

Mobile Energy Efficiency

There are 7 key benefits of MEE Benchmarking for MNOs

1. A detailed analysis of relative network performance against a large dataset: ***potential energy cost and carbon emissions savings of 10% to 25% per annum are typical for underperforming networks***
2. Unique “normalisation” analysis enables like-for-like comparison
3. Annual participation to track improvements over time and quantify the impact of cost reduction initiatives
4. Insights to improve efficiency
5. Possible participation in energy reduction implementation projects
6. Demonstration of positive action on energy and emissions reduction to stakeholders
7. Confidentiality: external comparisons are made anonymously

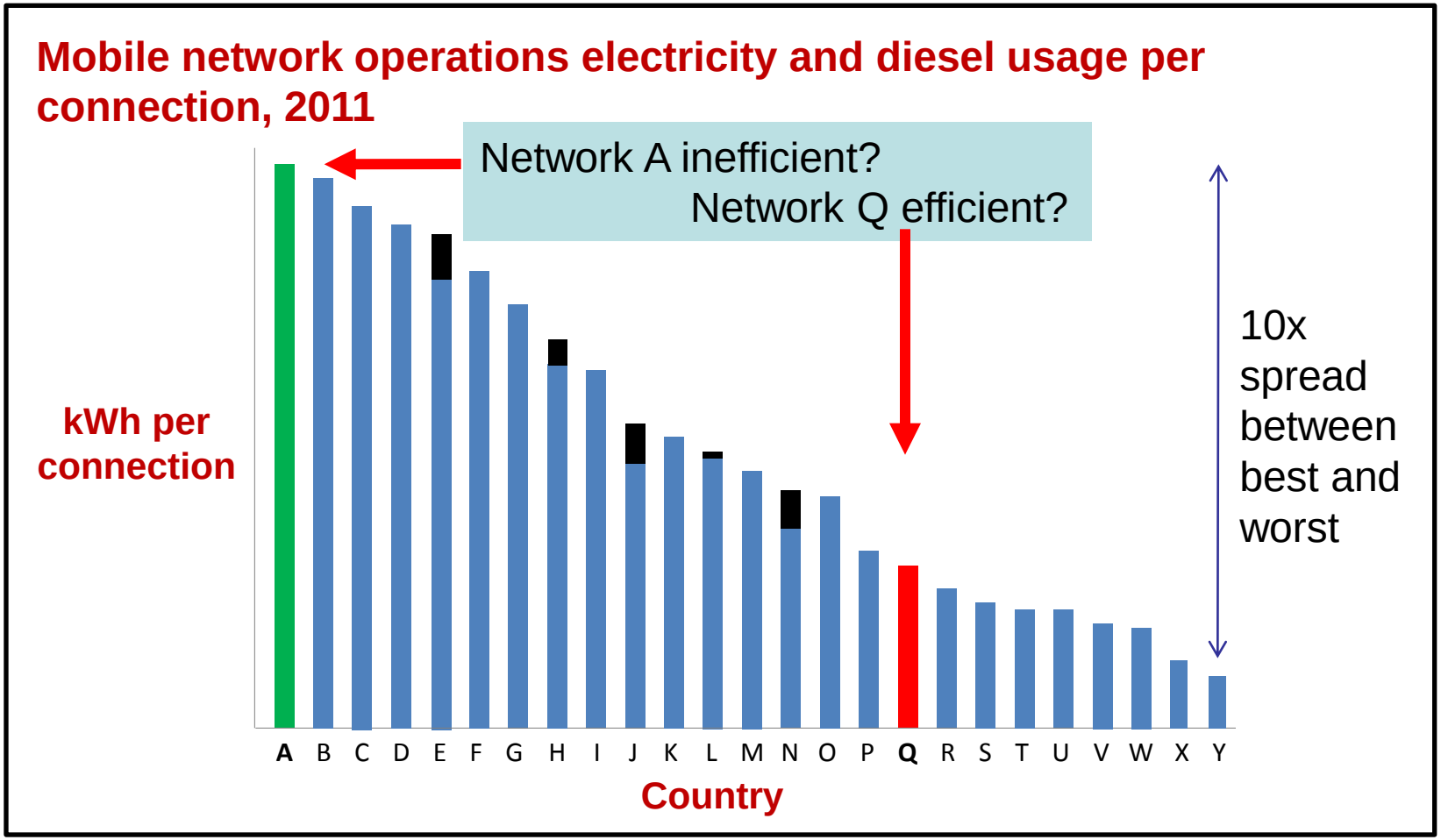
MEE Benchmarking methodology compares networks against 4 KPIs using a unique normalisation methodology

- Networks are compared against four Key Performance Indicators (KPIs)
  1. Energy consumption per mobile connection
  2. Energy consumption per unit mobile traffic
  3. Energy consumption per cell site
  4. Energy consumption per unit of mobile revenue

- Unique analytical approach allows MNOs to compare their networks against one another and against their peers on a like-for-like basis
  - Variables outside the MNO's control, e.g. population distribution and climate, are 'normalised' using regression techniques
  - Networks can then be compared like-for-like

- The potential savings are quantified financially

Prior to any "normalisation", Network A appears inefficient and Network Q efficient



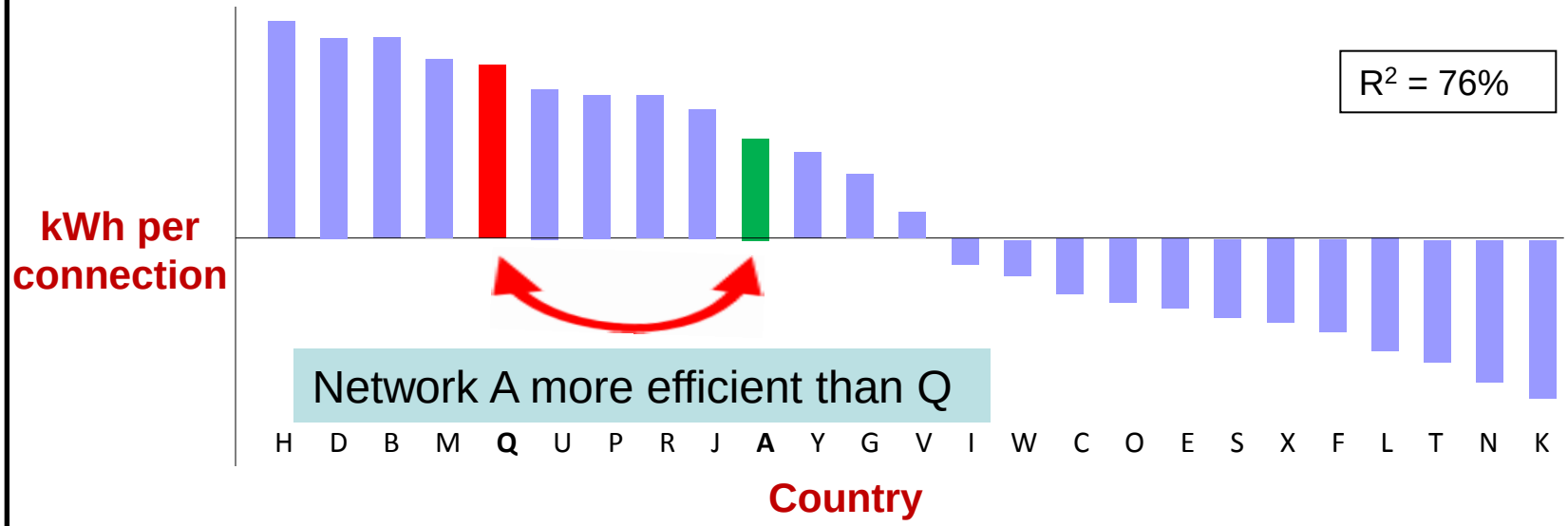
Key Electricity usage Diesel usage

Source: MNOs, UN, GSMA data and analysis

Mobile Energy Efficiency

Normalisation against four variables shows a truer picture: Network A is more efficient than Network Q

Difference between actual electrical and diesel energy usage per mobile connection and the expected value, 2011



Regression variables

Mobile operations diesel & electricity usage per connection regressed against:

- Number of cell sites per connection
- Data traffic per connection
- Number of cooling degree days per capita (population weighted)
- Voice traffic per connection

Source: MNOs, UN, GSMA data and analysis

The benchmarking results are used to quantify energy cost saving potential: here it is $89m per year

2011	RAN energy (GWh)	Elec. cost ($/kWh)	Diesel cost ($/l)	Est'd energy cost ($m)	% saving to average	% saving to top quartile	Saving to average $m	Saving to top quartile $m
Canada	424	0.09	1.18	38	3%	13%	1	5
France	289	0.11	1.37	32	0%	2%	0	0
India	3666	0.14	0.69	313	9%	21%	28	66
Etc.	…	…	…	…	…	…	…	…
Total	**5736**			**608**			**37**	**89**

It is not possible to determine how much of the circa $90m p.a. is cost-effective using the MEE Benchmarking analysis. MEE Optimisation service addresses this

It is challenging for many operators to measure and manage energy consumption and costs

- Some major operators do not manage energy centrally, although this is beginning to change
- It is difficult for many operators to gather high quality energy consumption data from their networks
- People responsible for managing energy often struggle to obtain information regarding key drivers of energy consumption for their networks
- Concern by regulators over carbon emissions is starting to impact the way some operators manage energy

The networks with the lowest energy consumption typically share several of certain characteristics

- Energy costs are managed aggressively by a person with relevant expertise, typically at group level
- High quality energy data is available
- Electricity prices are high; diesel usage is minimised
- Network equipment is relatively new
- Emerging country networks owned by a European operator are more energy efficient than their competitors

We believe many mobile networks can reduce energy consumption by 15-20% with attractive paybacks

- The benchmarking shows that after normalising for factors such as temperature, population density etc., a typical operator would have to reduce its energy consumption by 15-20% to achieve top quartile performance

- Not all operators have implemented “easy wins” such as free cooling, using latest generation of a/c equipment, reducing battery cooling, upgrading to more efficient rectifiers, using generator-battery hybrids

- Managed energy contracts can circumvent capital constraints. In some countries attractive financing of energy efficiency projects is also available

- Innovative solutions such as the dynamic matching of network radio resources with traffic demand can produce dramatic savings

MEE Optimisation was launched in 2011 to help MNOs identify and implement measures to reduce energy

Objectives	Status
■ Develop action plans for MNOs to reduce network energy costs and GHG emissions in under-performing networks. The service: – Assesses the business case for individual energy saving measures and implements attractive solutions – is run in partnership with a third party, e.g. a vendor	✓ (2011)
■ Prove it works by undertaking pilot projects	✓ (2011/12)
■ Increase participation and develop MEE Optimisation so that it becomes increasingly useful to operators	Ongoing
■ Form of a group of specialist technology providers	Ongoing

Mobile Energy Efficiency

The first MEE Optimisation projects show that considerable energy savings are achievable

- The first MEEO project, with Telefonica and NSN in Germany, identified €2m of savings and paybacks of 9-30 months, unexpected as many energy efficient measures had already been implemented

- The second MEEO project in Asia is ongoing and has involved a systems integrator installing equipment of substantial value to demonstrate the large potential for energy savings in this country

- Some energy saving implementation appears constrained by finance and lack of standardised risk-based contracts, so, should the demand exist, MEE Optimisation will additionally seek to help operators with implementation issues such as financing and contracts:
  - **Financing**, by providing introductions to sources of third party capex funding, and possibly by pooling multiple projects to access cheaper funding
  - **Contracts**, by enabling standardisation of managed energy contracts

The GSMA has formed a group of technology providers to perform MEE Optimisation projects

- These providers will be positioned as MEE Optimisation Technology Partners, and will represent a range of company sizes, geographies and specialisms
- Networks wishing to undertake a MEEO project can send invitations to tender to the group of Technology Partners, and choose their preferred partner(s). It would be expected that as part of any MEEO project, there would be an agreement to implement attractive solutions identified in the audit phase of the MEEO project
- The identity of the technology providers will be announced on our website once all contracts have been signed

A typical MEEO project should take two to three months before implementation begins

Assemble Team	Analyse cell sites	Energy Reduction Proposal	Financing	Implement-ation
Energy experts from - operator - technology provider - GSMA	Choose 20 representative cell sites Gather and analyse required data Visit some of the sites	Assess information Summarise results Recommend initiatives	Consider managed energy contract Evaluate possible financing support	Commence implementation of most attractive measures. Timescale will depend on the number and type of measures implemented.

There are several benefits to operators from MEEO projects

- Access to a group of selected Technology Partners, which by doing multiple MEEO projects over time will 'learn from doing' and become more and more expert, and provide better/cheaper technical solutions
- Receive help from the GSMA on potential financing options, by providing introductions to sources of third party capex funding, and possibly by pooling multiple projects to access cheaper funding
- Have the potential to effect real cost and environmental savings
- Receive contractual help, e.g. by enabling standardisation of managed energy contracts
- Have opportunities to undertake promotional activity

MNOs interested in MEEO projects and MEE benchmarking should contact us

Thank you – any questions?

For more information on the MEE services, please contact David Sanders, Mark Anderson or Jack Rowley

www.gsma.com/mee

mee@gsma.com

22 March 2011, Vice-President of the European Commission Neelie Kroes on the GSMA's MEE Benchmarking service:

"...it's great to see the Mobile sector's Green Manifesto getting some real teeth today with 17 new recruits signing up to the GSM Association's Mobile Energy Efficiency Network Benchmarking Service..."

Mobile Energy Efficiency