



TRAI Consultation Paper (No 3 of 2011) on Green Telecommunications

COAI Response

1. We appreciate the initiative of the Authority in its Consultation paper which has brought focus on the need for the telecom industry in India to attend to issues related to climate change which is one of the most compelling global challenges of our time. The Indian Telecommunications industry which is the second largest and the fastest growing market in the world has a vital role to play in reducing the carbon emissions as well as facilitating other Industries in going green. However combating climate change while securing energy supply and meeting ever increasing energy requirements are the main challenges our society is facing in the present times.
2. We will need to adopt new approaches for reducing the emissions of greenhouse gases (GHGs) while pursuing sustainable economic development. There will also be need to bring together funding to enable researchers to develop energy-efficient and renewable energy technologies, and policy mechanisms to transfer these technologies to the marketplace with the goal of combating climate change and promoting economic growth.
3. 'Going green' has become a necessity in a market where **margins are constantly reducing due to tariff reductions and increasing cost of inputs**. As it is well understood that the efforts to implement procedures and practices in the use of sustainable /renewable energy involve increase in initial investments. We will need facilitation for this CAPEX in the prevailing market environment. At present the energy expenses (OPEX) is nearly 25% of the total network operating costs. It is all the more imperative that incentives for encouraging efficient power management methods / mechanism should be adopted to reduce both the CAPEX and the operating costs and which will catalyse the use of green technologies.
4. Mobile operators and manufacturers are continuously upgrading to the use of "green technologies" to reduce power consumption and resort to clean energy sources where ever feasible. This is a business imperative. They also have "green power" programmes, exploring the use of a wide range of technologies, such as bio-diesel, fuel cells, pico-hydro, wind and photo-voltaic panels. Equipment vendors, tower companies and network service providers are investing heavily in bringing out "green products" and "green process" to cut operator's OPEX. However if subsidies and easy availability of renewable energy sources can be ensured it is predicted that up to 20% reduction in energy requirements can be achieved in the near future. We believe that such incentives if provided at an early stage can be integrated into the new



infrastructure rollouts that are already envisaged as a part of the National Broadband Plan. **Suitable financial outlays for “green technologies” should be integral to the National Broadband Plan.**

5. Cell sites account for most of the energy consumed by mobile networks which are highly dependent on diesel generators for sustained operations. At present India has around 3 lakh towers which cater to 4,81,333 base transceiver stations and the number is expected to increase to 4.5 lakh towers in the next three years. Taking into consideration the frequent power cuts coupled with the non-availability of electricity supply lines in more than 20% of villages each tenant consumes almost **3,000 litres of diesel** every year on a shared tower. Due to this high dependence on diesel the operational costs of these cell sites increase drastically to **about 200% more than those where grid power availability is regular.**
6. Hence, we believe that the best method would be to make steady availability of grid power in rural and remote areas by which the diesel consumption would reduce. This would result in a considerable reduction of carbon footprint to an extent of 6.3 million tons.
7. The telecom sector also faces multiple hurdles in various other policy impediments and levies that inhibit the green telecom drive. Green Telecommunications should be viewed as a national responsibility. The Government needs to give the necessary incentives to the use of renewable energy by having a policy framework in place which will **genuinely encourage the industry to adopt investment strategies and seek out innovative solutions to continuously reduce carbon emissions.**

COAI Views on the issues raised in the consultation paper are as follows:

Carbon Footprint

3.1 How should the carbon footprint of Indian telecom industry be estimated?

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3.2 What is your estimate of the carbon foot print of the fixed, mobile and broadband networks?

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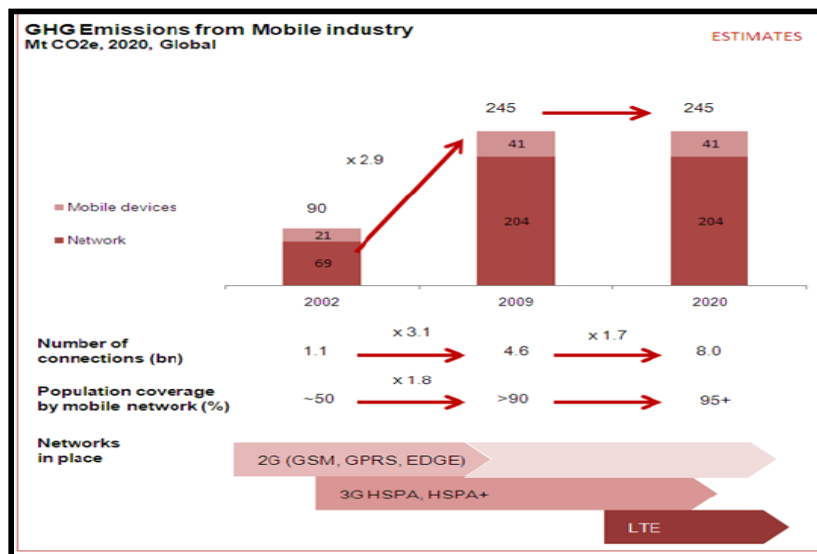
3.3 In case of mobile what would be the individual footprints of the radio access network and the core network? How are these likely to change with 3G and 4G technologies?

- a) The Carbon footprint of the Indian Telecom Industry could be estimated based on the sum total of all CO₂ emissions induced over a period of 1 year and by assessing the amount of power consumed.
 - **1 litre** of petrol is equivalent to **2.3 kgs** of CO₂
 - **1 litre of diesel** is equivalent to **2.7 kgs** of CO₂
 - **1 KWH** of grid electricity is equivalent to **0.84 kg** of CO₂



- b) In order to understand the contributory factors to the telecom carbon footprint one needs to understand the architecture of the telecom network, particularly the wireless telecom network. Compared to all other industries the ICT industry is the most proactive in attending to the concerns of the environment and only has 2% of the overall GHG emissions. Fixed and Mobile Telecommunications contribute about 24% of the total emissions from the ICT Industry
- c) We believe that in present scenario, Individual footprint of RAN and Core network is estimated to be around 70:30 ratio (Radio: Core).
- d) With regard to the 3G and 4G technologies, the carbon footprint is not dependent on the technology being used as shown in the below illustration. However with introduction of newer energy efficient equipments and use of renewable resources there would be a further reduction in carbon emissions.

GHG Emissions from the Mobile Industry



Source: GSMA

Carbon Credit Policy

3.4 How should the carbon credit policy for Indian telecom sector be evolved? What should be the timeframe for implementing such a policy?

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3.5 What should be the framework for the carbon credit policy?

- a) We are of the view that further research and analysis needs to be done before making 'carbon credit' as a standardised system. It would involve a great deal of project level experimentation over the next few years until the various systems converge on some accepted modalities.



- b) The framework of the policy should cover various aspects of the functioning of the Telecom industry and indentifying the power consumption in each of these functional domains, and measures incentives to monitor each domain to enable a steady increase in the adoption of “green” measures.
- c) If a service provider uses, say, solar energy to energize base stations, the company may be considered for certain incentives. Taking a cue from similar concepts being used internationally to reduce pollution, TRAI may **calculate the incentives based on the International Best practices.**
- d) **The “Carbon Credit Policy”** for the Telecom industry should avoid/reduce capital and energy costs, manage risks, increase revenues by deploying new technologies, and respond to new market opportunities. These should cover the following aspects :
 - I. Energy Efficiency in Telecom Equipment - Opportunities and Challenges
 - II. Examining the Market Drivers & Implementing the best practices for Green Telecom in India
 - III. Making the Most Of Renewable Energy – Exploring The Alternatives
 - IV. Determine the feasibility, cost structure, and ROI path for Renewable energy sources, including solar, wind, and others.
 - V. Examining the latest Approach to Save Money, Increase Quality and Reduce CO2 Emissions
 - VI. Immediate Strategies that network operators can utilize to reduce power and cooling costs.
 - VII. Develop a suitable frame work keeping in mind the OPEX and CAPEX savings which will entail from the deployment of alternate energy sources
 - VIII. Key development of services by equipment manufactures for the telecom industry
 - IX. Provision of steady grid power, and incentive schemes based on International Best Practices for promoting Alternate Source of Energy
 - X. Government support – subsidies, taxes & levies
 - XI. Active watch and evaluation of the carbon credit policies followed globally, amending it to suit the Indian environment and then define guidelines followed by setting up of test and certification labs for validation of Telecom equipment and Networks



XII. Network power consumption in Watts/Erlang and Watts/Mbytes could be explored as a suggested way to reward Carbon credits.

- d) A Draft Policy Framework should be made and circulated for comments by all the stakeholders prior to its implementation.

3.6 What should be the metric to ensure success of the carbon credit policy in reducing the carbon footprint of the telecom industry?

- a) One of the defining metrics to ensure the success of carbon credit policy for the telecom industry could be the CO₂ emissions as well as power consumed. However we are of the view that there would be a need to consider these metrics in terms of capacity and coverage provided while framing the carbon credit policy.

Availability of Power

3.7 What proportion of tower infrastructure is in rural areas? Please comment on the grid/electricity board power availability to these towers.

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3.8 To what extent can active sharing reduce the carbon footprint and Operational expenses?

- a) Active infrastructure sharing (such as Antennae systems, Backhaul transmissions systems, Base Station, BSC, RNC, e-NodeB) would allow operators to save an additional 40% on top of available savings from passive infrastructure and should be promoted.
- b) We are of the view that certain percentage of towers must be supported with 100% subsidy under various schemes for using non - conventional energy. The support should increase over the years so that all towers are setup for non - conventional energy in areas where grid power is not available or it is not very reliable.

Domestic Efforts for reduction of Carbon Footprint

3.9 What proportion of non-grid power supply to towers in rural areas can be anticipated to be through renewable sources of energy in India in the next 5 years?

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3.10 How much saving accrues per tower if supply is through a renewable source instead of diesel for towers that do not get grid power for 12 hours or more?

- a) Due to the precarious power situation, about 40% of the telecom towers have grid/electricity board power availability of less than 12 hours. In the absence of reliable grid power, Telecom Infrastructure service providers are forced to extend the power to the sites through Diesel Generator Sets for most of the time. Also taken into



considerations the frequent power cuts, each tenant consumes almost 3,000 litres of diesel every year on a shared tower

- b) The savings accrued on account of renewable energy should be mapped against the CAPEX that is required in the deployment of alternate energy equipment and innovative technologies adopted.

3.11 How can migration to renewable sources be expedited?

- a) In a bid to promote environment-friendly telecom infrastructure, we suggest that TRAI may propose to give carbon credits to operators for using eco-friendly fuels to power their exchanges and mobile base stations.
- b) The Government support is required to ensure that the USO-F devises a scheme to provide **Viability Gap funding (VGF)** to service providers who deploy alternative energy sources in their mobile networks.
- c) Implementation of flexible, market-based emissions trading mechanisms to reduce green-house gas emissions from existing power plants and Individual facilities.
- d) Provisioning of single-window services in terms of necessary guidelines for implementing renewable energy sources effectively.
- e) Charge lower rates of interest for funds invested in creating green telecom infrastructure in the rural areas.

3.12 If you are a service provider what steps has your company taken towards use of renewable sources of energy? Have the gains from this move been quantified?

- a) We would like to submit that our members are investing in a host of telecom products that are increasingly contributing both towards building a greener tomorrow and helping the country's economy. The energy solutions companies are innovating on technologies that can reduce Green House Gas emissions drastically, in the process making the unit or the project eligible for carbon credits in large volumes.
- b) Some of the operators have rolled out "Green Shelters" leading to major savings in energy consumption. They have also deployed solar and bio-fuels resources on trial basis for their base stations.
- c) Service providers along with players across the value chain have implemented infrastructure sharing thereby creating energy efficient networks.
- d) Platforms are also being created for green jobs, products, process and steps are being taken to develop ICT adoptions and more emphasis is being given to research and development in this regard. For example ,the green VAS initiatives of the operators is a milestone in educating subscribers on the use of mobile applications that can help



subscribers cut down their carbon footprint and is an encouraging step towards the long journey.

- e) Regular efforts are made in the reduction of use of paper in the billing systems. We recommend that TRAI allows a provision for only electronic billing for all customers who have an e-mail ID instead of a paper bill being given to such subscribers. With the projections in the growth of new broadband services, since many subscribers are going to be taking on broadband connections all such customers should be given electronic bills only and no paper bills.

Methods for Reducing Carbon Footprint

Metrics for certification of Product and Services

3.13 What should be the metric for certifying a product green?

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3.14 Who should be the metric for certifying a network or service as green?

- a) One of the defining metrics can be the CO₂ emissions, but there may be a need to take other aspects into consideration.
- b) We are of the view that the model guidelines, methodologies and metrics that are used for certifying a product green should be in line with those being practiced by other industry sectors internationally and should be carefully examined. Further discussions should be held to arrive at a monitoring mechanism which is best suited for the Indian environment.

Adoption of Energy Efficient Technologies

3.15 As a manufacturer/service provider have you started producing/using energy efficient telecom equipment? How is energy efficiency achieved? Please explain.

- a) Operators are exploring the possibilities of introduction of advanced technologies and have taken several initiatives for using energy efficient telecom equipment such as solar grid, green switches. Operators have also been deploying low energy base stations and those being powered by renewable energy.
- b) Alternating mode technology such as the alternating diesel battery hybrid mode that helps to reduce the diesel consumption by using batteries managed by smart controllers at the main power source is increasingly being utilized by some of the operators.
- c) Some of our member operators have been using energy efficient cooling solutions such as free cooling that uses fresh air to cool equipment. They have also deployed



equipment that has higher operational temperature. Both these methods have reduced the need for air-conditioning and have resulted in huge savings in terms of power consumed.

- d) With regard to mobile handsets, manufacturers have developed low cost handsets with longer battery life requiring less frequent charging and save power thus indirectly contributing to reduction of carbon footprint.
- e) As companies have become more global and decentralised, the need for business travel has increased exponentially. Operators and equipment manufacturers have constantly been exploring and introducing technologies to replace high-carbon activities such as air, road travel (which collectively is expected to account 1370 MMT of CO₂ emission in 2020) – with virtual meetings, flexible working arrangements and other solutions.
- f) Service providers/ manufacturer have taken various other innovative steps that would result in energy efficient goods with introduction of facilities like video on demand, m-services such as m-health, m-banking, m-payments etc.
- g) It is evident that the ICT sector has contributed to the emission reductions in many areas of society through their services and will play a significant part to help reduce the remaining 98% of global CO₂ emissions. We should aim towards the “greening” of other industries with green ICT.

3.16 How does the cost of energy efficient and the normal equipment compare?

- a) The capex of green products could be much higher than normal products. This is due to the extra R&D efforts, manufacture control, supply chain control and management.
- b) The initial high capex is offset in the subsequent years because of lower operational expenses.

Use of Renewable Energy Technologies

3.17 What are the most promising renewable energy sources for powering telecom network in India? How can their production and use be encouraged?

- a) We are of the view that the first step towards limiting and reducing emissions would be to increase the use of certified renewable energy sources already available.
- b) We believe that the most promising renewable and clean energy sources considering a developing country as ours would be :
 - **Hydro-Electric Power**
 - **Wind Turbines**
 - **Photo-Voltaic Panels**



- **Bio-Gas**
 - **Fuel Cells**
- c) We also feel that there is potential for more advanced alternative energy sources such as Fuel Cells, Liquid Flow Batteries, Blue batteries, Hybrid fuels and Bio - Diesel that would come to the forefront and can be seen as a means of powering Telecom sites.
- d) However the CAPEX required for using such technologies based on Solar, Wind and fuel cell etc is prohibitively expensive and the payback period for such investment would be ranging from 6 to 10 years. The policy framework should be such that additional incentives must be granted for the use of these alternate sources.

Infrastructure Sharing

3.18 What is the potential of infrastructure sharing in reduction of energy consumption?

As already stated in our response to **Q 3.7 & Q 3.8** active infrastructure sharing should be encouraged that would allow operators in reduction of energy consumption as well as save on opex and capex.

Waste Management

3.19 What is the current procedure for storing, disposing and recycling telecom waste by the service providers and manufacturers?

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3.20 How can waste management be made more green?

- a) Mobile Phone recycling mechanisms which will not only reduce the CO2 emissions but also limit the release of toxic elements into the environment.
- b) End-of-life batteries and any associated circuit boards or electronic assemblies containing lead-based solders could be managed in an environmentally sound manner.
- c) Financial incentives should be in place to encourage recycling and waste management. These incentives could be in the form of tax benefits
- d) GSMA has already taken up the initiative to have all mobile phones to use USB chargers to reduce the types of chargers in the market. The same could be introduced in the Indian market for all new handsets.

Better Network Planning



3.21 What steps can be taken by the service providers in planning green networks?

- a) It is comparatively much simpler and cost effective to implement energy efficient solutions during the green field project planning phase as compared to the same task in a live operational network because there arises several difficulties along with additional CAPEX in retrofitting existing network with more recent, environment friendly mechanisms.
- b) As noted by TRAI in the consultation paper properly planned systems could save operators from 15% to 35% on energy costs. However considering the dynamism of the industry and the ever changing technological requirement it may be difficult for operators to plan deployment of such systems well in advance.

Standardisation of equipment

3.22 What standards do you propose to be followed in Indian telecom network for reducing the carbon footprint?

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3.23 Who should handle the testing and certification of green equipment and networks?

- a) International bodies such as GSMA are working towards investigating the possibility of a standardised, global methodology for measuring energy consumption and carbon emissions. At present there is no universally accepted rating standard for the telecom sector. Hence we are of the view that it would be imperative to take into consideration the same while adopting or framing guidelines on the standards to be used as well as selecting a body for certifying a product green and to monitor carbon emissions.
- b) With regard to certification and testing of equipment and networks we suggest adoption of guidelines should be based on the global benchmarks. We believe there needs to be harmonization with ongoing international/other standardizations such as EARTH, GeSI, NIST, ETSI etc.as it would be imperative to take into consideration the same while adopting or framing guidelines on the standards.

Manufacturing Process

3.24 How can manufacturers help in reducing GHG across the complete product life-cycle?

- a) Manufacturers could be involved through voluntary agreements that encourage reducing the amount of packaging, packaging take-back schemes and greater recyclability of packaging.
- b) There needs to be a holistic assessment of raw materials used during production, manufacturing and distribution. Assessment is required during the use and disposal,



including all intervening transportation steps necessary or caused by the product's existence.

Monitoring and Reporting

3.25 What should be the rating standards for measuring the energy efficiency in telecom sector?

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3.26 Please give suggestions on feasibility of having energy audit in the telecom sector on the lines of energy audit of buildings.

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3.27 What should the monitoring mechanism for implementation of green telecom?

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3.28 Who should be the monitoring agency?

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3.29 What type of reports can be mandated and what should be the frequency of such reports?

- a) It is essential for all industries to evaluate their performance on their own and be able to show that they are making **cost effective** and proportionate contributions to the reductions in the emissions of Green House Gases (GHGs). Some metrics such as declining energy costs, improved remote collaboration, regulatory compliance, improved resource utilization can be some of the factors to be considered when measuring success.
- b) There would be a need to consider the usage of voice and data services while measuring the efficiency in the telecom sector such as Watts/Erlang and Watts/Mbytes rating.
- c) We are of the view that telecom companies may follow a **self-certification process** and have internal audit mechanisms in place. We suggest that the Government should work with and support initiatives such as EARTH, GeSI, NIST, ETSI to finalize the guidelines first and then only work towards setting up independent agency to audit.
- d) Keeping in mind that there are various elements that form a part of the network that contributes to the overall carbon footprint within a particular industry and also considering that there needs to be a fairly high level of expertise in this regard, we believe that there needs to be a **independent agency** specialized for monitoring and conducting external audits on carbon footprint.

Incentives for Green Telecom



3.30 What financial and non-financial incentives can be useful in supporting the manufacturers and service providers in reducing the carbon footprint?

Financial

- a) The Government support is required to ensure that the USO-F devises a scheme to provide **Viability Gap funding (VGF)** to service providers who deploy alternate energy sources in their mobile networks.
- b) We also believe that to begin with the Capital subsidy should be **at least 75% of the capital cost** involved in setting up of any renewable energy solution.
- c) The USO fund should be actively used which would further encourage the deployment of alternate energy sources
- d) **Tax Holiday** for
 - i. Setting up units in backward and specified areas
 - ii. Grid Power projects
- e) Zero Customs and excise duties on renewable energy components such as solar cells, fuel cells, modules and many raw materials.
- f) Government should also introduce **fuel subsidies** for operators and infrastructure providers either through USO funds or any other alternative mechanism as may be deemed appropriate e.g. differential tax structure/tax relief etc to the Telecom Infrastructure service provider to provide Telecom services to such areas, till the Electricity Board connections become available at Industrial Tariffs.
- g) **GBIs (Generation Based Incentives)** and **RPOs (Renewable Purchase Obligation)**, encourage independent power producers and private investors to establish large-scale, commercial wind plants that enable wind to be a more significant part of the power mix. **State-level GBIs** can be used in conjunction with the central level incentives (either accelerated depreciation or GBIs) to make projects more financially attractive to developers.
- h) The Government should introduce **incentives** and **subsidy schemes** that provide benefits to the Service Providers / Independent Infrastructure providers in order to power BTS through a renewable energy source. Further incentives may be granted to operators who roll out deployment of green infrastructure faster than the specified timeline.
- i) Charge lower rates of interest for funds invested in creating green telecom infrastructure in the rural areas.



- j) Indian government shall consider incentivizing research in the area of Green Telecom, Green Energy on similar lines as adopted by European “EARTH” project, which is largely government funded and is studying trends in energy usage.
- k) Support should be provided for setting up local R&D & manufacturing plant and Soft Loan should be made available for these initiatives.

Non financial

- a) Establish co-operation mechanisms for the development and implementation of energy efficient and renewable energy telecom equipment and guide the transitional process.
- b) Make ICT a central part of National and City Strategies.
 - In order to move beyond incremental CO2 improvements to transformative savings, the positive potential of ICT services should be acknowledged in all key policy documents, e.g. transport policies should include the use of Intelligent Transport Systems and telework, not just focus on improved transport. Energy policies should include smart grids, not only focus on energy supply.
 - Encourage universal access to ICT for all citizens. Mobile broadband can enable a multitude of low carbon services, including an inclusive and collaborative approach to travel substitution that allow for connectivity of rural areas. Support for solutions that enable synergies between rural and urban development are crucial.

Promoting R&D for Green Telecom

3.31 What R&D efforts are currently underway for energy efficient and renewable energy telecom equipment?

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3.32 How can domestic R&D and IPR generation be promoted?

- a) For the majority of vendors this is a matter of competitive necessity that drives R&D in all product areas. Work is being done in the following areas:
 - Natural cooling solutions
 - Spectrum efficient techniques
 - Enhance efficiency of solar PV module
- b) We believe that the Government should give financial incentives on investment made towards R&D so as to boost the research & development. Also initiatives on investments towards R&D in close cooperation with universities would result in more intellectual property rights.



- c) We are of the view that Institutions such as the CDoT, IIT's, BEL, Telecom Centres of Excellence (TCOEs) should be tasked to undertake R&D activities to come up with new methods particularly for use in the Indian environment.

CSR and Community Service

3.33 Would it be a good idea for TRAI to evolve a best practices document through a process of consultation with the stakeholders?

- a) It is essential for the identification of best practice and for the presentation of data to consumers to allow them to make informed decisions. In the medium term, with consistent methodologies and a range of data, it will be possible to identify benchmarks for global best practice. **We believe that it will be a good idea for TRAI to evolve a best practices document through a process of consultation with the stakeholders.**
- b) We also recommend that the TRAI should bring out a '**Green Telecom Network Planning Manual**' for evolving network architectures to be used to facilitate the planning of network architectures and the transition to green NGN networks.
