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Telecom Regulatory Authority of India
Mahanagar Doorsanchar Bhawan
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New Delhi 110002

Subject: Consultation Paper on "Approach towards Sustainable Telecommunications"

Dear Sir,

This is with reference to the above referred TRAI consultation paper no. 02/2017 dated 16.01.2017.

In this regard, please find enclosed our response to the consultation paper as an annexure to this letter. We would like to reiterate that while Telenor India is endorsing the objective of green telecom policy as envisaged by the Government for reduction in overall carbon emission and diesel consumption but there should only be a single carbon emission reduction target where the choice for means to achieve the target should be left to the TSPs.

We hope that the TRAI will find our response useful and consider our inputs while finalising the recommendations on this subject.

Thanking you,

Yours sincerely,
For **Telenor (India) Communications Pvt. Limited**
(Erstwhile Telewings Communications Services Private Limited)

(Pankaj Sharma)
Chief Corporate Affairs Officer

Encl: a.a

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Energy efficiency is the fifth fuel after wood, oil, nuclear and green source

A.P.J. Abdul Kalam,
Former President of India

TRAI vide this consultation has highlighted the significance of **Energy Efficiency in Telecom networks** and suggested a consumption based formula for calculation of carbon emissions.

Before responding to the specific issues under consultation, it is important to highlight the various factors that are of relevance to Energy efficiency and the steps that are being taken to meet the **end objective of reduction in carbon emissions**. Telecom networks are inherently designed for Grid power and in the absence or deficiency of Grid power, Telecom Service Providers (TSPs) have to perform use alternate methods of power including DG sets. This dependence would also wane away as the Government has embarked on the mission of providing 24x7 grid supply to the citizen. Hence, any prescriptive approach towards adoption of a particular methodology (RET etc.) for ultimate objective of reduction in carbon emissions should be left to TSPs.

The thrust of the sector should be to improve **energy efficiency** (grid supply in our case) and supplement the mission of the Government.

Preamble

Telenor (India) is actively participating in various activities towards achieving higher energy efficiency by adopting several measures and green initiatives with the ultimate objective of reduction in carbon emissions. We have been able to reduce our CO2 consumption per customer by over 45% from 2011 to 2015 through sustained efforts.

Since 2010, globally Telenor has shown a strong drive to reach its strategic climate priorities based on a broad range of initiatives. Significant progress has been realized, both on reducing its own footprint, developing enabling services, and promoting responsible supplier policies. Emissions per customer have been reduced by 29%¹ between 2011 and 2015.

In the following sections we explain that the telecom networks are inherently not designed to consume fossil fuel and the carbon footprint is majorly a supply side/ power generation phenomenon.

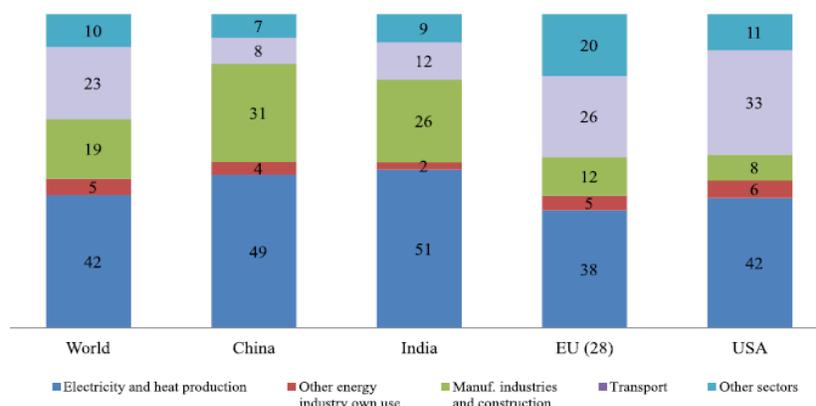
¹ Telenor Group Internal Report, published in October 2016

TSPs to ensure 24x7 network availability for QoS - TSPs are mandated to maintain quality of service as per the defined parameters under licensing obligations by ensuring that their networks are up and running at all times. This entails availability of 24x7 power (from Grid and/or other alternate sources) for powering the telecom networks.

Present Situation of Grid Power availability – The grid power availability has improved due to the progressive actions undertaken by the Government in the past few years. But the grid power availability is still not up to the mark especially in rural & remote areas and compels TSPs to use alternate sources of energy including diesel powered generator sets. The non-availability of uninterrupted grid power is a key reason for carbon emission from the telecom networks. However, as per the Green Mission statement of the Government, this will be a thing of the past. The Government aims to achieve 40% cumulative Electric power capacity² from non-fossil fuel based energy resources by 2030 in line with the commitment given in United Nations Frame Work Convention on Climate Change on Intended Nationally Determined Contribution (INDC). It is worth noting that captive power plants and power plants having capacity < 25M Watt are excluded from these calculations from FY 2011-12. The power consumption of telecom sector shall majorly fall in this category.

Telecom networks are inherently not designed for fossil fuel – Telecom equipment is distributed across the geography of the country and typically consumes 8 - 15 KW per location. These radio equipment locations have installed battery backup and self-sustain for a grid power availability of 18 to 20 hours in a day, provided the power cuts are inter spread and not continuous, thus giving sufficient time for the batteries to recharge. In contrast to the low power distributed load of radio equipments. There are other sectors which contribute majorly to fossil fuel based emissions. The below chart depicts across the major countries, Electricity & heat production, Construction and Transport sectors are the largest contributors in Carbon Emissions from fuel combustion. In India, **these three sectors put together are responsible for ~90 percent of carbon emission.**

Chart 1 - CO2 Emission from Fuel Combustion from Different Sectors



Source: Based on data from IEA CO2 Emissions from Fuel Combustion, OECD/IEA, Paris, 2015.

² <http://pib.nic.in/newsite/PrintRelease.aspx>

The United States Environmental Protection Agency (EPA) has provided specific regulations³ and compliance requirements for various sectors responsible for majority of carbon emission. Further, EPA has many voluntary and partnership programs to help businesses and organizations to prevent pollution and protect the environment. It is to be noted that **EPA has not considered telecom sector as a contributor like other identified sectors for carbon emission.** The Government should put more focus towards reduction in carbon footprints in these sectors by setting the time bound carbon footprint reduction targets. The ultimate purpose of overall carbon reduction will be defeated if all the sectors fails to take action(s) together then initiatives taken by telecom sector alone will be insignificant and unable to make any difference.

Government Mission - Affordable 24x7 Power for all by 2019 - The Government of India has set the target to provide affordable and environment friendly 24x7 Power for all by the year 2019⁴. Till now, the work of village electrification⁵ has been completed in the States/UTs of Chandigarh, Delhi, Haryana, Punjab, Daman & Diu, Dadra & Nagar Haveli, Goa, Gujarat, Maharashtra, Andhra Pradesh, Kerala, Lakshadweep, Pondicherry, Tamil Nadu, Telangana, Andaman & Nicobar Islands and Sikkim. Therefore, in view of such progressive developments towards 24x7 power availability in next 2-3 years, mandating to adopt alternative source of power such as renewable energy by adopting solar / wind power will be an additional avoidable cost for the telecom sector. The solar power generation has recently achieved the 10GW milestone and Green power tariff are at record low. **TSPs should not be mandated to implement the Renewable Energy technologies as these small capacity deployments have far less efficiency** as compared to the mega deployments being undertaken by the Government through mega solar / wind farms.

Network modernization and energy efficiency – The semi-conductor industry and consequently the telecom equipments are constantly reducing footprint, higher speed, efficient radio design and distributed architecture. This advancement in electronics result in lower power consumption and in certain cases doing away with the need for air-conditioning (outdoor BTS).

We at Telenor (India) have modernized ~65% of our network, thus bringing 20% additional coverage with the same number of sites and achieved 25% efficiency in power consumption due to smaller footprint of the core and radio nodes. The outdoor unit coupled with the transmitter in the radio access network (RAN) has been moved nearer to the antennae, thus minimizing RF cable losses and increasing power efficiency. The new equipments deployed are the state of art and environment friendly which consumes 30% less power, provides better quality of coverage with higher spectral efficiency. This shows that Telenor (India) being a responsible corporate citizen has taken **significant steps towards sustainable telecommunication networks.**

³ <https://www.epa.gov/regulatory-information-sector>

⁴ http://powermin.nic.in/sites/default/files/uploads/Ujwal_Bharat_Brochure_English.pdf

⁵ <http://164.100.47.190/loksabhaquestions/annex/10/AU4704.pdf>

Key Submissions

- Telenor (India) is committed for achieving higher energy efficiency by green initiatives with ultimate aim of reduction in carbon emissions.
- The contribution of telecom sector in overall carbon emissions is negligible. Telecom sector is merely consumer of grid power unlike other users and not the producer.
- The non-availability of uninterrupted grid power is a key reason for carbon emission of the telecom sector. TSPs are forced to use alternate energy sources for powering their networks.
- Government is committed and taking aggressive steps towards deployment of renewable energy on large scale, thus providing 24x7 grid supply to citizen.
- RET deployment targets should be abolished in view of the progress made towards increasing share of renewable sources in power generation capacity, better availability of grid power.
- There should be only one target for overall reduction in carbon emission and the choice of technology / methodology should be left to the TSPs to achieve this goal.
- **Energy efficiency** (rather than RET) should be the mantra to achieve reduction in carbon emission.
- Telenor India is fully compliant with the carbon emission targets as per the existing formula. However, existing formula can be made more efficient by considering the suggestions given in our response.

Question wise comments

Question 1: What accuracy level may be set for collecting the data and also, what should be the basis for arriving at this threshold level? Please comment with justification.

Response:

- TRAI in para 1.6 of the consultation paper has observed that there is requirement of having a consistent and accurate common methodology for calculating carbon footprints for the telecom sector so that the results are more credible and comparable among TSPs. Further, it has been emphasised that accuracy of the measurement relies on correct base data on various aspects of the source responsible for carbon emission.
- Multiple agencies (TSPs, IPs, DG Set vendors etc) are involved in the generation and collection of the data basis which carbon footprint is calculated. The cost towards diesel consumption is billed by IPs basis load factor of DG set at a particular site to the tenant TSPs on best effort basis. As understood, some of the factors such as diesel pilferage happen during the billing period and number of hours for which DG set was operational etc was not known while doing billing basis which TSP calculates its carbon emission as these factors are beyond the control of TSP.
- Besides we are on a fixed energy model, where the actual data is not required to be revealed by the IPs except for the purpose of calculation of carbon footprint.
- Therefore, it can be concluded that in order to have higher accuracy of the base data for the calculation of carbon emission, equal responsibility should be placed on both TSP & IP as far as the accuracy of data is concerned.
- **Periodic report** - TRAI may seek LSA wise monthly/ quarterly data from all the IPs and compare this with the TSPs data to check the consistency at LSA level.

$$\Sigma \text{ All IP [Electricity Bill + Diesel Bill]} = \Sigma \text{ All TSPs [Electricity Bill + Diesel Bill]}$$

This shall bring a sanity check at an Industry level in terms of KWH of energy purchased and liters of diesel purchased in a month by IPs. This should be equal to the sum total of consumption of all TSPs in that LSA.

- Alternatively, TRAI may seek the duly certified consolidated auditable information from all the IPs and publish IP wise accuracy level on yearly basis. This information can be used by TSPs to know the accuracy level of the base data received from IPs.

Question 2: Is there a need for auditing the carbon footprint of a telecom network by a third party auditor? If yes what is the mechanism proposed? Please comment with justification.

Response:

- We are of the view that there is no need for any third party audit for this purpose.
- Since expenses towards fuel and power for powering telecom networks is a major operational cost for every TSPs hence it is one of the focus area and internal audits are being carried out periodically at various levels – Infrastructure provider is doing audit of DG set vendors and TSPs is validating the billing details provided by IPs.
- As highlighted in Q1 response, the basic flaw (if any) can be in the input data owned by the IP and which is not in the domain and beyond the control of TSP.
- The periodic reporting by TSPs and IPs of the unit of power / diesel consumed would serve the purpose of consistency checks.

Question 3: Do you agree with the given approach for calculating the carbon footprint? If not, then please comment with justification.

Response:

- Telenor (India) supports the suggestions made by TRAI in the existing formula for calculating the carbon footprints. However, it requires modifications as suggested in response to Q4 to Q 8.

Question 4: Whether the existing formulae for calculation of Carbon footprints from Grid (given in paras 1.16, 1.17 and 1.1.8) of Chapter I need to be modified? If so, please comment with justification.

Response:

- The existing formula has served the intended purpose and we have been able to achieve the carbon emission targets individually and also collectively at the Industry level.
- These targets have been achieved by increasing the **efficiency of the telecom equipment** and other associated equipments. The efficiency of air-condition has been improved and in majority of the cases it has been eliminated all together by modernizing the equipments to outdoor units.
- Improvement in the existing formula :

Grid efficiency factor – As more and more renewable energy is being deployed in the Grid, this factor keeps improving annually. We should use the latest figures published by Central Electricity Authority.

Carbon Emission from DG Set - The efficiency of DG set and the efficiency achieved by increase in tenancy should be incorporated in the formula.

Note: Telecom sector being consumer of Grid power should be insulated from any sudden change in GCV data for Fuel 1 due to change in sourcing of Indian / imported coal.

Question 5: Which emission factors as mentioned in Table 1.2 of Chapter I need to be used for the calculation (Average/OM/BM/CM)? Is there any other factor(s) needs to be considered in the calculation? Please comment with justification.

Question 6: Is the formula mentioned in para 1.22 of Chapter I suitable for calculation of Carbon footprints from Grid supply? Please comment with justification.

Response:

- Considering countries having almost 90-100% power generation using sources other than coal – Argentina, Norway Egypt, France, Canada, New Zealand, Sweden, Venezuela etc. The grid efficiency factor for these countries would be nearly equal to the hydro efficiency factor and should ideally be 0.1 or 0.
- Since, we as telecom operators do not have any control on the source of Grid power, the obligation cast on us should be limited to **achieving the power efficiency of the telecom networks**.
- Our aim should be to use Grid power as far as possible, as our network equipments are inherently designed for Grid power. Within this ambit, we should strive to achieve power efficiency on y-o-y basis.
- However, in case the Authority decides to prescribe a formula for carbon footprint from Grid power also, then the **Average** Emission factor (EF) should be used. This is the true reflection of CO2 emitted from the entire Grid of the country.
- The Operating margin (OM), Build margin (BM), average of OM & BM (CM) are basically applicable for power sector, telecom sector is **consumer of grid power** (ref Preamble).

Question 7: Which of the formula, (i) or (ii) as given in para 1.23. of Chapter I is to be used for the calculation of carbon footprints from the Diesel generator along with views on possible values of φ and η ? Please comment with justification.

Response:

- The load on DG set varies during a given day, days of the week and even more significantly by seasonal conditions, the diesel generator operates at different load at different time, hence the power output from the DG set is not always equal to the installed capacity.
- Therefore, Telenor (India) recommends that for calculating carbon emission from DG set, the consumption based formula ($C_{DGSET_A} = 0.002629 * N$, where N should be the total fuel consumed during the year per operator proportionate to the DG set load) is more appropriate and realistic and same should be considered.
- Moreover, this formula would then become independent of DG capacity or its efficiency and these factors would anyway get reflected in the total fuel consumed by the installed DG.
- Consumption data in **KWh** in case of grid power and **liter** of diesel for DG set should be audited by TRAI through the monthly reporting by IPs and TSPs. At an aggregate level the KWh and liter should be equal as reported by TSPs to that reported by IPs.

Question 8: For calculation of average carbon footprint, which of the options mentioned in para 1.25 of Chapter I is to be used? Please comment with justification.

Response:

- We recommend **Option 3 - averaging across total amount of traffic carried** for the calculation of average carbon footprint. The average carbon footprint of the telecom network should be calculated by averaging across total amount of traffic carried by the telecom network.
- This option takes into account total number of subscriber or total number of unique users. CTOTAL represents the total Carbon footprint in a year derived from total power and fuel consumed, whereas total traffic carried shall be sum total of each months traffic.

Question 9: What are the options available for renewable energy solutions which may be harnessed to their maximum potential to power the telecom sector? Please comment with justification.

Response:

- Refer Preamble to the response, Energy efficiency should be the thrust area for telecom sector as far as the potential to harness is concerned. As the sector is mere consumer of Grid fed electricity and is not the generator of power, the onus should be on the traits which are core to the sector.
- As also submitted in our response earlier we have been able to achieve the carbon emission reductions targets prescribed through **energy efficiency techniques**. We at Telenor (India) have modernized 60% of our network, thus bringing 20% additional coverage with the same number of sites and around 25% efficiency in power consumption due to smaller footprint of the core and radio nodes. The new equipments deployed are the state of the art equipments and environment friendly which consumes 30% less power, provides better quality of coverage with higher spectrum efficiency.
- Under the network transformation project, we have taken several energy efficiency steps which led to significant reduction in carbon emission across our six operational circles. Till now, 16042 sites have been upgraded with efficient low power BTSs which are approx. 30% energy efficient in compare to normal BTSs. This has significantly reduced the diesel consumption and energy requirements. We have done an overall reduction of carbon emission (in tones) approx. 55.44% and 25.20% for our networks across our six circles during the period Oct'12 to Sep'16 and Apr'14 to Sep'16 respectively.
- The Government has set upon itself the target for generation of 175 GW power by the year 2022 using renewable energy sources. To achieve the same, government has taken policy initiatives⁶ for the development and financing of renewable energy including the incentives in the forms of generation based incentives/subsidies, viability gap funding from National Clean Energy Fund (NCEF), fiscal incentives such as accelerated depreciation, concessional customs duty, excise duty exemptions, income tax holiday for 10 years and preferential tariff for renewable energy power projects, increasing the authorized capital of Indian Renewable Energy Development Agency (IREDA) and extending new lines of credit to enable it to enhance its concessional loan to RE projects, mobilizing project based concessional loans through multi-lateral and bi-lateral agencies i.e. World Bank, Asian Development Bank, KfW Development Bank- Germany; inclusion of Renewable Energy Projects in Priority Sector Lending of Banks; and approval for issuance of tax free infrastructure bonds for funding renewable energy projects.
- In view of above steps taken by us for network modernization and energy

⁶ <http://164.100.47.190/loksabhaquestions/annex/10/AU3865.pdf>

efficiency as well as progressive action(s) of the Government to achieve the set targets for renewable energy deployment, **we request Authority not to mandate TSPs for the deployment of alternative technology such as renewable energy**. Instead, choice for selection of technology / methodology to reduce carbon emission should be left to TSPs.

Question 10: If electricity generated by a RET project (funded/ maintained by TSP) is also used for community, should it be subtracted from overall carbon emission of a TSP? Please comment with justification.

Question 11: If the RET project is funded/ maintained by other agency, should that emission be counted? Please comment with justification.

Response:

- In our opinion small capacity deployment of RETs are technically / financially not viable on most of the sites. Their efficiency is much lower compared to large solar farms and ROI of small RETs is higher.
- This ROI will be severely jeopardized in view of the impending Government targets for deployment of solar/ wind farms over the next few years.
- As the Government has embarked on providing 24x7 Grid power, the RETs will become increasingly financially unviable viz. Gujarat has >22 hours power supply.
- Yes, in case a TSP decides to deploy an RET on his own volition, then, if electricity generated through RET is also used by the community and CSR purposes, same should be subtracted from the overall carbon emission of all the TSPs available on that particular telecom site.
- In case if such RET project is funded by some other agency, the deduction of carbon footprint for particular TSPs should left on mutual commercial negotiations between the agency and TSP.

Question 13: For effective implementation of RET/Energy efficient solutions in telecom sector, how can the industry be supported? Should incentives be provided to licensees (TSPs)? If yes, what should be the milestone? Please comment with justification

Response:

- At the outset, It is submitted that the deployment of RET solutions should not be mandated for powering telecom networks. Instead, it should be left to the choice of TSPs to decide the deployment of RET depending upon the technical feasibility and financially viability.

- However, it is suggested that rebate should be given in the license fee as recommended by the DoT Committee as an incentive to TSPs for the deployment of RET / energy efficient solutions.
- Existing efforts made by TSPs for modernization of the network and steps taken for making the network more energy efficient, should be duly recognized by the government towards their contribution in carbon emission reduction and considered for the rebate in license fee.
- TRAI may also recommend subsidy from USO fund for the RET deployment on the sites available in the rural areas.

Question 12: Please comment with justification on the approach suggested by the DoT committee

Question 14: What methodology can be proposed for setting new Renewable energy targets in the telecom sector? What should be the timeframe for achieving these targets? Please comment with justification.

Response:

In this regard, Telenor India would like to submit as follows:

- We fully endorse the objective of green telecom policy as envisaged by the Government for reduction in overall carbon emission and diesel consumption.
- However, the existing RET deployment targets should be abolished in line with the ground realities of grid power availability as highlighted in the preamble as well as technical feasibility and financial viability of the RET deployment.
- There will only be a single carbon emission reduction target. The choice for means to achieve the target should be left to the TSPs.
