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Principal Advisor
(Networks, Spectrum and Licensing)
Telecom Regulatory Authority of India
Mahanagar Doorsanchar Bhawan
Jawahar Lal Nehru Marg
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New Delhi – 110002

Subject: Consultation Paper on "Approach towards Sustainable Telecommunications"

Dear Sir,

This is in reference to your Consultation Paper number 02/2017 dated 16th January 2017 on "**Approach towards Sustainable Telecommunications**".

As desired, we hereby enclose our response to the questions raised in your above mentioned Consultation Paper. We hope our response will be given due consideration. We shall be obliged to address any further queries from your good office in this regard.

Thanking you and assuring you of our best attention always.

Yours sincerely,


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Addl. Vice President – Corporate Regulatory Affairs
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And
Authorized Signatory
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Encl: As above

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TTL views on TRAI Released Consultation Papers on “Approach towards Sustainable Telecommunications.”

Introduction

Tata Teleservices welcomes TRAI’s initiative on implementing “Approach towards sustainable telecommunications” and seeking views from TSPs, through this consultation paper. DoT has also laid down broad directions and goals, to achieve reduction in carbon emission, through different means, including the use of Renewable Energy Technologies and stressing upon energy efficient equipments.

Both the aspects of energy efficiency and usage of RETs are important in telecom networks. However, these have to be complemented / supplemented by various stakeholders, as each entity may have limitations in terms of direct controls and boundaries of possibilities. One such example is of the Tower Infrastructure Companies (IP1) which are recognized as different entity, controlling / consuming much significant part of the total power consumed by Telecom Service Providers, while, TSPs may have control only on their core and backbone transmission systems and customer side wire-line access part.

Even the IPs may not have the control on Grid power supply or other centrally driven RETs etc. TSPs have been managing their network infrastructure, almost for the last two decades and have made efforts to adhere to DoT directives on sustainable telecommunications, for the portion which falls under their scope and for the elements of network which are under their direct control.

TTL agrees that carbon emission is an important subject in today’s environment and it should be dealt very efficiently, keeping global initiatives in mind. To deal with this sensitive subject, we are of the view that the role and responsibilities of Infrastructure Service Providers and TSPs should be well defined to achieve better results on carbon emissions.

Defining the scope of work between TSPs, IP1 and other power generation/distribution stakeholders would lead towards arriving at correct results w.r.t. usage as well as on carbon footprint.

In one of the scenarios IP-1 (Tower Companies providing and controlling the mobile towers and MW sites) would be responsible for towers and its related activities like electricity; DG sets etc. Once the tower is installed and infra is ready, only then a TSP would be equipped to install their BTS and Transmission equipment for establishing connectivity with their MSC/BSC. In view of the above the TSPs do not, directly control the infra on tower sites. Hence, IP-1 could be made accountable for carbon emissions in such cases.



TSPs scope of work begins with their network elements under their direct control. There are multiple agencies of power generation, transmission, distribution and consumption of both grid power, alternative power sources as well as renewable sources which, are not only responsible for telecom sector alone but also for other multiple use sectors. Such, issues may need to be dealt by larger expert groups (Inter-departmental and inter-industry forums).

Our comments and inputs therefore deal with some steps which are mentioned only as technical and generic suggestions as many of these are beyond our control as a TSP, for the kind consideration of the Authority.

Other important issues for consultation are covered in our detailed response for consideration.

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.**

TTL Response:

Telecom networks has following blocks mainly consist of Access Networks, Core Networks (which includes edge/core/routers/NGN/softswitches/IP core/all core items /data centers/all centralized sub systems peripherals), Aggregators (or Backhauls) and Transmission networks, which is also indicated in Table 1 of the Consultation Paper (page-14).

In our opinion and Consultation Paper also depicts the mobile network elements and passive infrastructure of supporting the elements are owned and controlled by IP-1 Infrastructure Service Provider (IP-1) for Access network (C_{AN}), Aggregators (C_A), and Transmission Network (C_{TN}) and Telecom Operator (TSP) for CORE and centralised elements (C_{CN}). The energy consumption and resultant carbon footprint under "SCOPE 1 & 2" associated with IP-1 is much major part and that related to TSP is comparatively much smaller out of the total Telecom Network

The IP-1 industry is a registered independent entity, and should be made responsible for the carbon footprint accounting of their SCOPE 1 & 2.

The process and work flow, of the Infrastructure Service Provider (IP-1) is as follows:

The IP1 acquires the Grid Power connection and purchase Grid power and Diesel for the operation of the radio access (wireless) network site (C_{AN}), part of Aggregators (C_A), and towers of the Transmission Network (C_{TN}).



The electrical equipments associated with controlling power availability, quality and monitoring of power like Automatic Failure (AMF) Panel, Stabiliser/Power Interface Unit (PIU), AC and DC Distribution Panels, Diesel Generation Sets, AC-DC rectifiers, Backup battery sets, Air-conditioner are owned and controlled solely in terms of capacity, quality, efficiencies, operations, maintenance and security by the IP-1. All site operation and consumption related measurement systems like energy meters (AC and DC), DG fuel gauges, DG run hour meters, site temperature setting and sensors, power source selectors and changeover systems/logic is also owned and controlled by IP-1. Thus the carbon footprint of Access network elements (C_{AN}), Aggregators (C_A) and Transmission Network (C_{TN}) at IP-1 sites shall be considered in SCOPE 1&2 for IP and SCOPE 3 for TSP.

The relationship between the TSP and the IP-1 for Access Network sites (C_{AN}) is of a lessee and lessor respectively and therefore supports the above contention.

For example: The Data Centre (DC) industry which is well matured in carbon footprint accounting world-over follow a similar approach, the DC service provider accounts the energy consumption of the Data Centre in SCOPE 1 & 2, while the co-location customer account the carbon footprint of their energy consumption as SCOPE 3.

C_{AN} , C_A & C_{TN} - SCOPE 1 & 2 owner, IP-1 could be asked to submit the accurate consumption data of grid power and Diesel consumption to TRAI with carbon footprint attributable to respective TSP (and also to authorities). Where-after the C_{CN} - SCOPE 1&2 owner TSP shall submit the consumption data of grid power and Diesel consumption to TRAI and separately validate and submit SCOPE 3 carbon footprint derived from IP-1 submitted data.

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.**

TTL Response:

The IP-1 and TSPs are responsible entities and can submit all required data as per TRAI requirement with self certification. Similarly, carbon footprint also can be submitted with self certification. Both IP-1 and TSP can be encouraged to report carbon footprint to international organisations like CDP, WRI etc., which also accept self certified reports. Hence, we believe that, there is no need for third party audit.



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

TTL Response:

The Consultation Paper relates/refers to a detailed methodology for defining the areas of Telecom Network, Carbon Footprint, SCOPE definitions and the boundaries. This is in line with International Standards and in sync with International guidelines for carbon foot print namely, (GHG-WRI, CDP and ITU L.1420).

TRAI Consultation Paper has been prepared after a detailed research and study. We appreciate the same on most of its technical content. However, international practices assign the responsibility on the controlling stakeholders, to report their part of carbon footprint, falling under their respective Scope. TRAI methodology seems to point out that Telecom Operators (TSP) themselves to declare the carbon footprint of their SCOPE 3 emissions as SCOPE 1 & 2. This needs to be reconsidered or further corrected.

As already mentioned in response of Question 2, the international best practice, be followed for such management and reporting.

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.

TTL Response:

The existing formula for Carbon Footprint from Grid mentioned in the consultation paper is as follows:

$CGRIDPOWER = 0.365(0.84 * P * X)$ in tones per year

P = Power consumption in kWh

X = Average hrs with grid supply per day

However, the "P" mentioned does not denote energy consumption from Grid but average Power in KW (not kWh as mentioned in the formula) and which is a derived quantity. In actual, the formula should have captured energy consumption for the whole period as a summation of monthly energy consumption data from Grid Power.

Moreover, factor "0.84" is taken as static while as per the International practice, the latest emission factor has to be considered and in India, Central Electricity Authority



(CEA) declares the carbon emission factor every year which should be taken for the relevant year.

The existing formula for Carbon Footprint from DG Set/Diesel mentioned in the consultation paper is as follows:

$CDGSET = 0.365 [(0.528 * Y * Z) / \eta]$ in tonnes per year

Z = Power capacity of DG set in kVA

Y = Running time of the DG set in hours per day

η = efficiency of the generator

The Standard International practice for carbon footprint from Diesel is basis consumption, while this formula is based on Capacity of DG set which gives wrong results. This formula also does not take into account actual loading on DG set (which drives consumption) and passive infra sharing of access network sites.

It may be noted that the Infrastructure Provider (IP-1) as an Industry has evolved with the purpose of unleashing the value of sharing of passive infrastructure with lower CAPEX, O&M costs, achieving synergy of operations while operating in better efficiency zones and thus lowering energy consumption and costs.

i.e. Formula is based on 15 KVA DG set consumes flat 3 Litre diesel per hour which is at a particular load and not based on actual loading of DG set (which will be determined by active electronics load, sharing tenancy and air-conditioning operations).

Hence, we believe that both the formulas (CGRIDPOWER and CDGSET) need to be revised with consumption based formulas in line with International Standards.

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.

TTL Response:

As per industry norms and technical innovations it is suggested that weighted Average Emission factor (Average) may be considered for calculations, since it includes emission of all stations in the Grid. This is also supported by the GHG protocol and CDP (referenced below).



Reference:

GHG Protocol: Scope 2 Guidance – Page 4 - “using mostly grid-average emission factor data” and CDP technical note on accounting of Scope-2 Emissions 2016 – Page 29 - “As per GHG protocol’s Scope 2 guidance, the weighted average grid emission factors can be used for the calculation of scope 2 emissions”.

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.**

TTL Response:

Yes, the formula for calculation of Carbon footprints from Grid supply is OK; however the latest emission factor (released by Central Electricity Authority's emission factors published on yearly basis) should be taken into consideration.

$CGRIDPOWER = (\text{Emission factor} * \text{Power consumed by TSP through Grid in MW hr})$
tonnes of CO₂e per year.

Reference:

Point 1.2.2 in Consultation Paper “Emissions from the use of purchased electricity for operation of telecom equipments fall under this category. Such emissions are also called as ‘Scope 2’ emissions”.

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? Please comment with justification.**

TTL Response:

As highlighted in earlier responses, Diesel consumption should be considered for calculation of Carbon Footprint. In this regard the suggested formula (i) can be used with suggested changes w.r.t. actual quantity of diesel consumption. It may be used in-line with International practices and put in SCOPE 1 of the respective owners of the passive infrastructure. i.e. $C_{\text{AccessNetworks_DGsets}}$, $C_{\text{Aggregators_DGsets}}$ & $C_{\text{Transmission Network_DGsets}}$ from IP-1 and $C_{\text{CoreNetwork_DGsets}}$ from TSP.

The Standard International practice for carbon footprint from Diesel is basis consumption, and not based on Capacity as suggested in formula (ii); formula based on Capacity of DG set gives wrong results. This formula also does not take into account actual loading on DG set (which drives consumption) and passive infra sharing of access network sites.



Reference:

Point 1.2.1 in Consultation Paper "SCOPE 1 emissions include those from the combustion of fossil fuels (e.g. gasoline, diesel)" which indicates it to be based on consumption.

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.**

TTL Response:

Average Carbon Footprint per active subscriber (VLR) is most suitable option because the usage of base station for voice calls and data usage is based on active subscribers and thus will be a better indicator of carbon footprint intensity. It is expected that majority users / subscribers would have similar patterns of usage in the coming future as mentioned in below paragraphs also.

Other two options following are reason as per our view is not suitable for calculating carbon footprints:

Using the number of unique users will be not correct as multiple connections in one household may be in the name of the head of the family, while if same household has multiple connections in different operators it will be counted as multiple unique users, hence it is not the preferred option.

As technology and its usages are progressing across the geography it is assumed that average usage of all type of subscribers, have similar pattern, hence active user count can be taken. It is difficult to segregate voice and data usage separately. Only data traffic will be properly accounted for while voice traffic may not, hence it is not the most preferred option.

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.**

TTL Response:

Telecom operators (TSP) and IP-1 do not have the necessary expertise and core competencies to handle energy generation.



Presently, only solar energy has been deployed as a renewable energy source at some Access Network sites, because of its better viability on CAPEX recovery compared to other renewable sources, but due to the huge techno-commercial constraints like space feasibility, shadow free area availability etc. the number of existing deployment has not picked up to substantially impact.

The experience with regard to setting of RE sites / projects for no. of BTS sites has clearly shown there are several issues which relating to site sections theft and security of equipments. More importantly the site load would not justify investment by Telecommunications Companies. The present approach has not been successful.

We feel that the generation and supply is best handle by developers who may be encourage to setup small / medium project with suitable evacuation facilities. In the policy framework for promotion of RE by the MNRE, programme for wind and solar would need suitable changes whereby small and medium developer can be incentivize.

The more viable option available for better adoption of renewable energy is adopt wheeling of third party power through Open Access (OA). Govt of India, Ministry of Power and CERC (Central Electricity Regulation) also encourage to go for wheeling of third party energy Open Access. Open Access for RE from independent IPPs / developers is a model which is worth considering by removing present constrains. Present constrains of contract demand of 1 MW at one location a several charges such as, cross subsidy charges, wheeling charges etc. have come in the way of promoting RE. In this connection, Karnataka govt has introduce a policy for encouraging OP from solar projects by giving incentives by removing cross subsidy charges, wheeling charges, etc.

We strongly believe that renewable energy solution is a much larger issue and it needs detailed study. We would recommend set-up of an Inter-Ministerial study committee on this subject which can evaluate and give their recommendations on creation of eco system to support renewable energy solutions for telecom sector.

Reference:

PWC - Technical & Financial feasibility report for review of RET and carbon footprint Project Report (dated 20th May 2014) – on feasibility of sites for renewable energy deployment talks of only 59000 towers being technically feasible out of the 5,85,000 towers in India (page 8 of the report).



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.

TTL Response:

This question is pertinent for RET solutions, deployed in rural areas for community projects at Access Network sites. These sites are being owned and controlled by IP-1, hence should form part of their Scope 1 & 2. TSPs have no role in funding and maintaining these RET projects. However, as per our opinion, the overall carbon emission can be subtracted from the energy generated and used by the community.

The portion of electricity consumed for community purpose can also be shown as carbon offset and be subtracted from total emission as well.

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

TTL Response:

Our suggestion is that Renewable Energy generation should be done through specialized power producers like RECs and IPPs. Carbon emission savings from such deployment contracted for Telecom Network should be counted towards the overall carbon footprint emission reduction of the respective SCOPE 1 owners.

The overall objective of a green telecom policy aims at reducing the diesel consumption of the Telecom networks and achieving the overall carbon reduction targets which will be aided by promoting such installations.

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

TTL Response:

The approach suggested by the RET committee for incorporating RET in telecom networks include the following key points:

S.N.	Approach suggested of DOT committee	TTL Comments
1)	Approach: it is recommended that following approached may be considered:	
a)	In new mobile tower installations the backup	Though it comes under IP1 however



	power to grid shall be based on energy efficient solutions/RET power to the extent feasible such as to make the site diesel free.	we feel. Unpredictability of the grid power availability is an impediment to DG free site.
b)	In urban areas, the Outdoor BTS installations should be made diesel free to the extent feasible with required capacity of efficient storage battery backup and RET system.	RET deployment is good practice however unpredictability of the grid power availability is an impediment to DG free site.
c)	In 1st phase, the Non-EB sites & the sites having grid power available up to 8 hrs and DG set more than 5 years old may be converted to RET by 2015-16.	In India the Grid power availability is still unpredictable it is difficult to remove DG from sites.
d)	The diesel free sites that contribute to the overall objective of reducing diesel consumption in telecom networks may be recognized as contributing towards the overall objective of the policy	Yes! We agree, however the objective of free diesel sites can be achieved, when IP1 can get uninterrupted power supply (24x7) through various sources such as RET solutions. We further suggest that the target of having diesel free sites can be done in phased manner once the alternate sources of power supply is made available.
2)	Energy Efficiency :	
a)	TSP's and ISP's to optimize the power requirement by adopting more energy efficient strategies in the BTSs and to ensure that the total power consumption of each BTS will not exceed 500 W by the year 2020 for 2+2+2 configuration of BTS	In the present scenario the technology and equipment available do not support the targeted power consumption of less than 500 W. Hence we request the concern authority to engage the equipment manufactures to produce equipments that supports the targeted consumption of energy.
b)	In line with the objective of National Telecom Policy 2012, use of outdoor DAS (Distributed Antenna Systems) in uncovered, isolated, scattered and small locations including buildings is recommended.	This is already being considered as peruse cases like in Stadium, College Campus etc.
c)	Active sharing of network infrastructure, which involves the sharing of antennae systems, backhaul transmission systems and base station equipment, is recommended as this will allow operators to save an additional 40% beyond	We are fine with sharing of active infrastructure of sites where surplus capacity is available that can be used by sharer.



	available savings from passive infrastructure sharing.	
3)	All projects being implemented with funding from USOF should be powered by Grid/RET only	This needs to be discussed with USOF Admin / DoT on the complete implications.
4)	MONITORING: In order to ensure robust planning & monitoring, the creation of a database and monitoring system is necessary. To this end :	The IP and TSP are mature and responsible entities and submits all data as per TRAI requirement with self certification.
a)	The industry to compile the location of all tower sites with Lat./Long., other details such as electrification status of the site, broad data of the cluster i.e. diesel consumption, RET power generated if any, etc. and provide this information to the extent possible to DoT TERM for creating a database within 6 months.	Similarly carbon footprint also can be submitted with self certification. Both IP and TSP should be encouraged to report carbon footprint to international organisations like CDP, WRI etc., which also accepts self certified reports.
b)	Industry shall develop a monitoring & Management system for efficiently monitoring, controlling and optimizing the use of power consumption in to the network.	There is no need of an all operator centralised energy monitoring system in DoT as monitoring of individual networks, energy consumption and other such data points be best left to the owners of the respective assets.
c)	A web based centralized energy monitoring system to be developed in DoT for monitoring of various parameters and generation of reports	As already pointed out respective SCOPE 1 and 2 owners to self-certify and report data in prescribed TRAI formats in line with International Standards and practices.
d)	Terms cells to monitor compliance of objectives of DoT.	
e)	The committee is however of the view that the penalty should not be linked to achievement of RET target at present.	Although we as TSP feel that It is not desirable to have specific Renewable Energy deployment targets as the flexibility to achieve the carbon footprint targets should be with the TSP / IP-1. As mentioned in the earlier part of the clarification, Power generation/ distribution is a specialised area and IPP/REC should come forward to take up the energy generation part and Government shall enable the



		RET adoption through favourable policies to expedite the adoption.
5)	In order to ensure that RET adoption in telecom networks is viable and sustainable, the service providers may adopt cluster based, long term agreements indexed to Total Cost Operations (TCO) where ever implementation of RET is through Renewable Energy Service Companies (RESCOs) or power management companies.	As already stated it is appropriate that policy instruments should encourage small & medium size project developers who would be under take to supply RE to the tower sites on PPA (Power Purchase Agreement) model.

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.**

TTL Response:

As pointed out in earlier responses, the generation of renewable energy power in our opinion is more economical in bigger size projects than mini projects suitable for Access Network sites. Also, the technical feasibility like availability of suitable space, power infrastructure will be much better handled at bigger sized/mega projects compared to distribute multiple mini projects due to availability of expertise and economics of scale. Moreover, Telecom operators and IP-1 do not have the necessary expertise and core competencies to handle energy generation and should be best left to Renewable Energy Companies (REC) and Independent Power Producers (IPP). A more viable option available for better adoption of renewable energy is adopt wheeling of third party power through Open Access (OA).

Having said this, the adoption of Renewable Energy Technologies by tie-ups with RECs, IPPs or through OA, can be incentivized to the respective owners of SCOPE 1&2 (C_{AN} , C_A & C_{TN} - IP and C_{CN} - TSP) with the following measures:

The targets should be set for carbon footprint reduction alone and not for RET deployment so that flexibility of measures for carbon footprint reduction should be with the respective owners of Scope 1 & 2. The targets should be in terms of reduction in carbon intensity and not absolute values, as Telecom is a growing industry.

The Methodologies for measuring carbon emission and footprint should be aligned with international practices as pointed out earlier.

It is a laudable initiative that Energy efficiency improvement is being targeted. We would welcome DOT and concern authorities engaging with the equipment



manufacturers to create a roadmap for producing energy efficient equipments like BTS, Transmission, Mux, Wireline, DSLAM, AC-DC rectifiers, Air-conditioning, DG sets etc.

The incentives to Industry should be aligned with CAPEX being spent for migrating to renewable/more efficient energy through viability gap funding and not linked to license fee (which is revenue related).

Telecommunication being a critical infrastructure contributing to economic growth and playing an important role in achievement of enshrined objectives of National Telecom Policy, Digital India, Smart Cities and Ease of Doing Business, the Ministry of Power may be requested by DOT to provide "Un-interrupted Power Supply" status through priority electricity feeders (Dedicated Feeders to Telecom Networks) and treating telecom industry as integral part of ITeS industry which is getting the benefit of industrial tariff.

Thus, it's necessary that TRAI to consider that solar/wind would become viable options for the grid supply in the long run. In so far as Telecom industry in India is concerned the approach has to be integrated with the existing programmes of the government by suitably tweaking the needs of the telecom industry.

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.**

TTL Response:

It is suggested that Targets be set for Carbon Footprint reduction in the Telecom sector for respective SCOPE 1 & 2 owners. It is not recommended to have specific Renewable Energy deployment targets as the flexibility to achieve the carbon footprint targets should be with the TSP / IP-1.

The carbon emissions and the declaration of footprint should be in the scope of the respective owners (C_{AN} , C_A & C_{TN} – IP-1 and C_{CN} – TSP) and this is in line with the International Practices as defined by the GHG-WRI, CDP and ITU.