Dated: 7th March 2011

To,
**Telecom Regulatory Authority of India**
Mahanagar Doorsanchar Bhawan
Jawahar Lal Nehru Marg
New Delhi-110002

**Kind Attn: Mr. Lav Gupta, Principal Advisor (TD)**

**Sub: GTL Infrastructure Limited's response to TRAI consultation paper 3/2011 on "Green Telecommunications'**

Dear Sir,

With reference to the consultation paper on **'Green Telecommunications'** we acknowledge the authority's initiative which will not only bring environmental awareness of telecom sector stakeholders but will also lead to formation sustainable carbon policy for the country.

GTL Infrastructure Limited 's comments are attached herewith. We request the Authority to kindly take these views in consideration for the consultation process.

Thanking you,

Yours sincerely,

For GTL Infrastructure Limited

Tushar Kapadia

(Vice President - Strategic Initiatives)

**GTL Infrastructure Limited's response to TRAI Consultation Paper No 3/2011 on 'Green Telecommunications'**

## Contents

## 1. Response Summary

GTL Infrastructure Limited (GIL) is a leading telecom infrastructure company with over 32,000 tower sites and is operational in all the telecom circles of India. GIL has put in pioneering efforts in the passive infrastructure provisioning and energy management initiatives for tower sites. GIL is a member of Tower and Infrastructure Provider Association (TAIPA).

GIL congratulates the Telecom Regulatory Authority of India (TRAI) for coming out with a consultation paper on 'Green Telecommunications'.

While telecom networks' energy consumption and environmental impact is an important issue for the telecom industry and community at large, there are some key issues which are required to be considered in perspective. Telecom growth paired with its contribution to economic growth of the country should be weighed while quantifying environmental impact.

The telecom infrastructure is a significant and critical segment of the telecom sector today comprising of approximately 400,000 towers. Availability of uninterrupted electrical energy is essential for telecom network operations. In the process of deploying Renewable energy solutions through efforts of telecom industry and support of the GoI the mission of Green telecommunications can be achieved. As rightly mentioned in the consultation paper, reduction of energy opex cost, active promotion of sharing and avoiding duplication of telecom resources and infrastructure will substantially help in minimizing the environmental impact.

We strongly believe that for achieving Green telecommunications, the **following are the top priorities for the Telecom Infrastructure industry**, and any new policy formulation must carefully and comprehensively address these priorities. We are happy to state that even TRAI's consultation paper refers to many of these priorities, and we wish to reiterate these before we attempt to address the specific issues raised in the consultation paper.

I. **Highest priority for Electricity Board (EB) connections:** Non-availability of electricity or lack of it is one of the biggest challenges adversely affecting the environment and sustained telecom growth, especially in rural areas. There are approximately 20% villages in India today, which have no electricity supply. It is often also difficult to get state electricity boards to give electric connection to the Base Transceiver Stations (BTS) as state governments do not recognize this as a priority sector. This results in high dependence on diesel, which is not only more expensive but also, has an environmental impact. The use of diesel generators in such remote inaccessible rural areas increases the cost of operations, making the service economically unviable and expensive. It is imperative that this critical industry is provided power by the State Electricity Board's (SEB's) on priority basis

by ensuring preference for new electric connections, priority for continuous supply at par with emergency services, and the lowest applicable rates.

II. **Fiscal incentives deployment of Renewable energy solutions for passive infrastructure sector :** In India, presently over 400,000 tower sites are critical part of telecom infrastructure provisioning passive infrastructure and ensuring uninterrupted power is the responsibility of tower companies. Renewable energy solutions are capital intensive and have long recovery periods. As of now, Renewable energy solutions are not mandated and therefore, companies deploying Renewable energy solutions need be encouraged through suitable incentives and subsidies:

- **Tax holiday:** Infrastructure is the backbone of an economy. Given the substantial capital investment required, it is imperative to invite private sector participation in infrastructure development. Tax incentives play a significant role in attracting these private sector investments. The GoI provides a tax holiday under section 80IA of the Income Tax Act, 1961 to infrastructure companies such as in the power sector, ports, natural gas distribution etc. A similar tax holiday should be extended to tower companies, which are seen as a critical infrastructure. Such a step is expected to encourage the overall development of the Renewable energy solutions in telecom sector, and help in green and clean environment in the country. In order to incentivize private sector participation in infrastructure projects, State Governments need to extend the exemption from state levies like VAT, Entry Tax and Stamp Duty etc. for these projects.

- **Accelerated depreciation:** Renewable energy solutions for telecom infrastructure being highly capital intensive, benefits of accelerated depreciation would encourage further investments in expanding Renewable energy solutions in rural areas. As an incentive to the industry to adopt such newer technologies, the Government needs to provide accelerated depreciation of equipment to tower companies. The accelerated depreciation of Renewable energy equipment scheme could address the current infrastructure deficiency such as low rural tele-density and adoption of newer technology.

- **Subsidies :** Subsidies can have a major impact in augmenting the growth of the telecom sector, especially to promote rural coverage through use of green energy. They are expected to significantly boost the overall growth of the sector, and provide an impetus to the GDP growth. As such, for electricity starved tower sites in rural India, the telecom industry, which requires energy on 24x7 basis, is compelled to rely on diesel generator sets. The dependence on diesel must be reduced by promoting use of renewable

sources of energy such as solar, fuel-cells, wind, etc. Besides the environmental objectives, if the government wishes to save on long-term subsidy burden on diesel, it must think of an innovative approach towards use of alternative energy for telecom infrastructure, by inducing various incentives under the National Action Plan on Climate Change (NACC). Such initiatives would establish sustainable business models, beneficial to all in line with the GoI's stated policy objective of the Ministry of New Renewable Energy (MNRE).

III. **Carbon Policy framework for telecom sector:** India has committed to reducing carbon footprint with aggressive target of achieving over 20% reduction with respect to base year (2005)'s GHG emissions levels by the year 2020. Several bodies working under various ministries (MoP, MNRE, MoEF etc.) need to integrate for common objective of Green energy. This needs a comprehensive carbon policy quickly in place, which should essentially encompass:

- Identification of major sectors of industries contributing to GHG emissions
- Recording and compiling sector-wise baseline GHG emissions on priority
- Identification of growing sectors (eg Telecom) and assessing YoY growth %
- Setting up sector-wise targets of GHG emission for short term and long term after factoring anticipated growth
- Formulation of processes for registration and periodic certification of carbon credits

## 2. Issues for deliberation:

While the consultation paper highlights major issues pertaining to environmental impact by telecom industry, it may also require to deliberate some of the topics for a balanced perspective:

- **India's GHG footprint vis-à-vis global :** Although India is ranked 5$^{th}$ highest on GHG emissions, its cabon footprint per capita is 1/11$^{th}$ that of USA. Thus, India's commitment to GHG reduction is proactive step rather than obligation. Such proactive measure can be effectively implemented through suitable incentives.

- **Emission reduction plan for Developing vs. Established industrial sectors :** In order for India to achieve GHG reduction, baseline reference needs to be separately prepared for each sector of industries based on:

  i. growth projection of that sector
  ii. sector's impact on GDP
  iii. leveraging (sector's growth benefitting reduction of GHG for other sectors

- **Cost benefit analysis:** Renewable solutions are highly capital intensive; it is therefore essential to evaluate merits of solutions depend on initial investment Capex, energy generation capacity, recurring Opex, reliability of solution and lifespan etc.

- **On-grid vs. off-grid solutions:** Various Renewable energy solutions are technically available for telecom sector. Some of these are on-grid (ie. RET energy is fed to electricity grid, e.g. Wind-farm) and others are off-grid (e.g. SPV at non-EB site ). The commercial viability of each such solution depends on technical merits and scale of deployment.

- **Challenge of becoming Carbon-neutral :** In the consultation paper chapter-2, it is mentioned that the ultimate goal all stakeholders in telecom industry would be to achieve carbon neutrality. This needs to be carefully analyzed. Conceptually it is feasible, however, the goal involves roles and responsibilities of each stakeholder in synergetic manner, with time-bound commitments. The policy framework therefore will require humongous efforts of all the stakeholders including telecom service providers, towercos, manufacturers, ministries (MoP, MNRE, MoEF) and the consulting organizations.

**3. Issue-wise Submissions**

**CHAPTER: 1 Carbon Footprint of Telecommunication Industry**

Carbon Footprint

**1. How Should the Carbon footprint of Indian Telecom Industry be Estimated?**

Telecom networks comprise of the following key elements :

**a. Wireless networks**

i. Core Network

ii. BSS network

iii. Backhaul network

iv. Subscriber terminals / handsets/PDA/PC

**b. Wireline networks**

i. Core Network / Exchange switch

ii. Backhaul network

iii. Subscriber terminals / handsets/PDA/PC

For each category of elements, their energy consumption, peripheral equipment (eg aircon)'s energy consumption, source of power, emission of Green House Gases, quantity of installations etc. are required to be captured for estimating carbon footprint.

For wireless networks, apart from these parameters, those elements' RF power output, TRX configurations, telecom traffic handling capacity are also important.

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

This requires elaborate data compilation for all important parameters affecting carbon footprint of various categories of networks.

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?**

For mobile networks Radio Access Network / BSS are geographically spread out with mix of urban, semi-urban, rural and highway sites. Source of power in the given geography, BTS frequency of operation, RF power output and TRX configurations are important for carbon footprints. Whereas core networks are strategically installed at locations of reliable power (eg district HQ or major cities).

3G , 4G BSS are operating in 2.1 or 2.3 GHz which have higher free space loss (attenuation) compared to 900 MHz. Therefore 3G and 4G BTS draw higher energy for RF propagation. This is likely to increase share of BSS footprint compared to core network's footprint.

Carbon Credit Policy

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

India has committed to reducing carbon footprint with aggressive target of achieving over 20% reduction with respect to base year (2005)'s GHG emissions levels by the year 2020. Several bodies working under various ministries (MoP, MNRE, MoEF etc.) need to integrate for common objective of Green energy. This needs a comprehensive carbon policy quickly in place, which should essentially encompass:

a. Identification of major sectors of industries contributing to GHG emissions
**b.** Recording and compiling sector-wise baseline GHG emissions on priority
**c.** Identification of growing sectors (eg Telecom) and assessing YoY growth %
**d.** Setting up sector-wise targets of GHG emission for short term and long term after factoring anticipated growth
**e.** Formulation of processes for registration and periodic certification of carbon credits

5. **What should be the framework for the carbon credit policy?**

Pls refer comments to Q.4 above. Further, for benchmarking 'as-is' footprints, the following also needs to be considered:

- Separate Benchmark for each geography (eg Uraban, Semi-urban, Rural etc.)

- growth
- Timelines for achieving implementation milestones

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

   As per comments to Q.4 and 5 above.

Availability of Power

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

   Telecom networks are continuously expanding and proportion of urban/rural mix is ever changing.

   Grid power availability substantially varies based of respective state's energy demand-supply scenario, local conditions, EB administration, industrialization of the state etc.

   In metro circles EB power is available for over 20 hours per day; In some of the northern states power availability is 10 to 16 hours per day. However, the EB availability pattern also changes with seasonal variations in demand.

**8. To what extent can active sharing reduce the carbon footprint & operational expenses?**

Due to various factors affecting carbon footprint, it is not possible accurately estimate reduction in carbon footprint for Active sharing. However, illustration, three scenarios are compared in the following table:

Scenario-I: Existing Passive infra shared 2T Indoor site with two BTS

Scenario-II: RAN shared common BTS – Indoor type

Scenario-II: RAN shared common BTS – Outdoor type

| Energy consuming elements | Scenario-I Passive Shared Site(2T) | Scenario-II RAN Shared BTS (Indoor) | Scenario-III RAN Shared BTS (Outdoor) |
|---|---|---|---|
| Single BTS | 1.2 KW | 1.8 KW | 1.8 KW |
| Total Energy for 2 operators' BTS | 2.4 KW | 1.8 KW | 1.8 KW |
| Shelter & AC | 3.6 KW | 3.0 KW | Nil |
| Total Site Consumption | 7 KW | 4.8 KW | 3.6 KW |
| *Approx. OPEX Reduction w.r.t. existing scenario-I | | 20-25% | 40-45% |

*These are indicative figures only; actual figures may vary based on traffic, cluster topology, number of sharers etc .

Domestic Efforts for Reduction of Carbon Footprint

**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?**

In next 5 years, 20 to 30 % of existing rural non-EB sites could be deployed with Renewable energy solutions. However, for estimation of quantity of deployment of Renewable energy solutions in rural area these are the major variables:

- Availability of Grid Power in Rural area
- New sites to be rollout out in Rural area
- Technological improvements in BTS technology, efficiency
- Technological improvements of renewable energy solutions
- Cost -benefit on Renewable Energy Equipments

**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?**

This question is very important for evolving a sustainable engagement model among stakeholders, especially telecom network operators, tower companies and Renewable energy solutions manufacturers.

Calculation of energy cost reduction is a complex function of several variables such as:

- Capital cost of Renewable energy solution
- Availability of Renewable energy at the specific tower site location (eg solar insolation for SPV, eg wind speed for wind turbine)
- Installed capacity of solution
- Total load at tower site

Typically a SPV based solution deployed at a 2T tower site can reduce Diesel generator run of 6 to 10 hours per day. Diesel cost reduction amount can be used for Capital cost repayment. Savings can accrue after recovery of Capital cost.

**11. How can migration to renewable sources be expedited?**

As described in comments toQ.10 above, Renewable energy solutions are capital intensive and telecom industry is required to evolve a sustainable engagement model among stake-holders. TRAI has an important role to integrate stakeholders and create win-win strategy which can benefit each stakeholder,

- Rural telecom network growth for rural economy growth opportunities
- Opex reduction for telecom operators
- Viable business case for tower companies and manufacturers
- Fulfillment of environmental commitments of GoI to international forum
- Cleaner planet to the society

**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?**

GTL Infrastructure Limited is a tower company of Global Group of companies. Global Group has focus on Greeen telecommunications through innovative Energy Management solutions which help to improve the energy efficiency at tower sites.

Global group has undertaken various Green Telecommunication projects:

- Energy Management Solutions (EMS) – **GloCool** Free Cooling unit, **GloMaster-Mini** Fuel optimizer for optimizing energy cost through optimum use of DG and battery backup combination., **GloPower** the Automatic Voltage Stabilizer

- SPV based **Green solutions at sites in power starved UP(E) circle.** The project is approved under the Jawaharlal Nehru National Solar Mission (JNNSM) of the Government of India. We have installed **10 KW Solar Photovoltaic system** for providing Renewable energy. The solutions helps to reduce energy costs in three ways – Reducing energy requirement, utilizing existing energy source optimally and using Renewable sources of energy to reduce excessive dependence on Non-renewable sources.

Methods for Reducing Carbon Footprint:

Metrics for Certification of Product and Services

**13. What should be the metric for certifying a product green?**

In order to assess the carbon footprint of a product, it needs to be compared with an existing, 'benchmarked' product of similar functionality . The key parameters to be considered are:

- Energy consumption, energy efficiency
- Manufacturing process' carbon footprint
- Operating temperature
- Sensitivity to input voltage variations
- Life expectancy of the Product

- Reliability of the product w.r.t. benchmarked product
- Environmental impact of waste disposal after product expiry

**14. Who should be the metric for certifying a network or service as green?**

As commented for Q.13 for products, on similar lines, network parameters can be compared with a 'benchmarked' network. An overall performance parameter 'CO2 per erlang' or some such term could be evolved for indicting 'greenness' of network.

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

Pls refer our answer to Q.12.

**16. How does the cost of energy efficient and the normal equipment compare?**

Telecom equipments's costs and and energy efficiency performance can explained by telecom service providers and Telecom Original Equipment Manufacturers.

Use of Renewable Energy Technologies

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

Solar, Wind, Biomass, Fuel cells are the presently available Renewable energy options suitable for telecom purpose. Overall, Solar Photo Voltaic and Wind turbine solutions appear technically promising. However, Solar panels require at least 100 Sq. mtr clear, space free of shadows of surrounding structures. Wind turbines for small installations may not be efficient.

Infrastructure Sharing

**18. What is the potential of infrastructure sharing in reduction of energy consumption?**

Passive infrastructure Sharing is well established concept. For a tower site which consumes a combination of EB power and DG power, typically an energy consumption per BTS may reduce by 15 – 18% on sharing with second BTS. This primarily due to shared energy cost of air-conditioning and DG efficiency (KWH per Ltr) increases at higher load.

Waste Management

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

This can be best answered by telecom manufacturers.

**20. How can waste management be made more green?**

This can be best answered by companies handling large amounts of waste or by Municipal corporations. For consumers and resident, a practice of segregating waste through separate bins of 'Recyclable' and 'food/ biodegradable' is a good practice.

Better Network Planning

**21. What steps can be taken by the service providers in planning green networks?**

No comments.

Standardization of Equipment

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

Indian telecom scenario is distinct from most other countries due to total number of telecom networks, geographical variation of energy sources, telecom network growth potential etc. Therefore, rather than straight implementation of standards of any foreign body, it would require customization for India. It can be evolved through joint efforts of BEE, MNRE, MOEF and TRAI.

**23. Who should handle the testing and certification of green equipment and networks?**

This subject requires cross-functional capability in the subject of energy, telecom and environment. Premier engineering institutes, govt. laboratories such as ERTL, TEC, BEE could be identified as certification bodies.

Manufacturing Process

**24. How can manufacturers help in reducing GHG across the complete product life-cycle?**

No comments.

Monitoring and Reporting

**25. What should be the rating standards for measuring the energy efficiency in telecom sector?**

This could be on similar lines to BEE's Star ratings. The deciding parameters could be:

- Operating temperature
- Input voltage tolerance
- Total power consumption (including peripheral equipment eg aircon)
- Conversion efficiency
- 'CO2 per erlang'

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

No comments.

**27. What should the monitoring mechanism for implementation of green telecom?**

No comments.

**28. Who should be the monitoring agency?**

No comments.

**29. What type of reports can be mandated and what should be the frequency of such reports?**

This should evolve as a part of Carbon policy framework.

Incentives for Green Telecom

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

- **Tax holiday:** Infrastructure is the backbone of an economy. Given the substantial capital investment required, it is imperative to invite private sector participation in infrastructure development. Tax incentives play a significant role in attracting these private sector investments. The GoI provides a tax

holiday under section 80IA of the Income Tax Act, 1961 to infrastructure companies such as in the power sector, ports, natural gas distribution etc. A similar tax holiday should be extended to tower companies, which are seen as a critical infrastructure. Such a step is expected to encourage the overall development of the Renewable energy solutions in telecom sector, and help in green and clean environment in the country. In order to incentivize private sector participation in infrastructure projects, State Governments need to extend the exemption from state levies like VAT, Entry Tax and Stamp Duty etc. for these projects.

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Promoting R&D for Green Telecom

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

Can be best answered by Telecom OEMs and R&D agencies.

**32. How can domestic R&D and IPR generation be promoted?**

No comments.

CSR and Community Service

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

Yes.

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