

# GREEN RADIO METHOD TOWARDS ENERGY EFFICIENT RADIO ACCESS NETWORKS FOR MOBILE COMMUNICATION

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**Abstract:-** Green radio technology prefers environment friendly approach towards the mobile communication. This project developed for modification in mobile infrastructure for energy conservation and CO2 reduction (carbon credit). The mobile towers are increasing in an extraordinary manner. The source for towers are based on the power requirement. Power requirement in developing countries are always greater than the generated. A critical mobile network consume ~40-50MW and a diesel generator consume ~1MG of diesel per day. Our objective is to reduce the energy consumption in base stations.

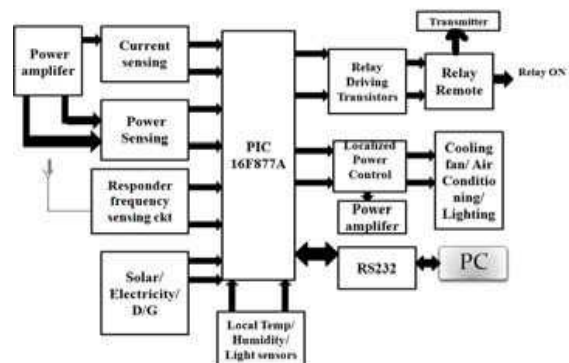
**Index Terms -** CO2 emission reduction, Green Radio Technology, Power saving in base stations.

## I INTRODUCTION

Modern analysis by manufacturers and network operatives has showing that current wireless networks are not very energy efficient, particularly the base stations by which terminals access services from the network. Green radio technology describes one of the most promising research directions in reducing the energy consumption as well as the carbon emissions of future base stations. The worldwide growth in the number of mobile subscribers, the move to higher-data-rate mobile broadband, and the increasing contribution of information technology to the overall energy consumption of the world, there is a need on environmental grounds to reduce the energy requirements of radio access networks. The Green Radio program sets the aspiration of achieving a hundredfold reduction in power consumption over current designs for wireless communication networks. This challenge is rendered nontrivial by the requirement to achieve this reduction without significantly compromising the quality of service (QoS)

experienced by the network's users. It also shows that the manufacturing or embodied energy is greater in mobile handsets when compared to base station. This is just for one single tower. The impact due to several million towers installed in a country is unimaginable. Thus our objective is to reduce the energy consumption in base stations and reduce the amount of CO2 emission. We have to keep controlling system in every base station for switching purpose. To have complete control over base station we prefer to use PC. This enables us to implement SCADA concept to monitor all the base stations and provides full control over them. Apart from this, the architectural operation of present state is not energy efficient. It does not account for user frequency (i.e. number of mobile users) in an area. All the towers in that area is turned on irrespective of the user frequency. This leads to enormous amount of fuel wastage.

*Block diagram*



## II GREEN RADIO TECHNOLOGY

Green radio technology aims at two major reductions.

- 1) To provide a novel method for establishing EnergyEfficient wireless network by reducing the total power consumption in the base stations.
- 2) To achieve Eco-Balance in nature by reducing carbon-di-oxide emission.

It explain the different concepts and techniques involved in this green radio technology and also scope & merits of this technology.

### *Technique involved*

The technique used in this project is that power used in the base stations is reduced by controlling different parameters within the station and also the network topology. Change of network topology means that for a given control area only required amount of mobile towers is switched ON, instead of all the towers present in that region. Here, all the towers are in IDLE state except those which are under operation. This technique helps in reduction of huge amount of power consumption, which in turn reduces fuel consumption and hence prevents the environment from the harmful effects of green-house gases. Secondly, the parameters which are to be controlled in base stations are the power supplied to cooling unit and lighting process. We can see that it reduces the power consumption by at least 30% (considering one single base transceiver station or BTS). So, on the whole, it Reducing carbon emissions and OPEX for wireless cellular networks are two key reasons behind the development of the Mobile Green Radio program. This technology helps in minimizing the power consumption, reduces CO<sub>2</sub> emission and prevents depletion of fossil fuel. The Green Radio project is pursuing energy reduction from two different perspectives. The first is to examine alternatives to the existing cellular network structures to reduce energy consumption. The second approach is to study novel techniques that can be used in base stations or handsets to reduce energy consumption in the network.

### *Current scenario*

- 1) The architectural operation of present scenario is not energy-efficient. It does not account for user frequency (i.e. number of mobile users) in an area.
- 2) In India more than 4 lakhs towers are present. By 2014 it is estimated to go beyond 5 lakhs.
- 3) Every tower consumes 28 litres of diesel per day.

- 4) All the towers in an area are turned ON irrespective of the user frequency. One tower delivers 85 kg of carbon per day.
- 5) During night time only 10% of the total users communicate still all the towers remain in the working state
- 6) The source for towers is based on the power requirement. A critical mobile network consumes 40-50MW approximately, even excluding the power consumed by users' handsets.
- 7) A typical diesel generator, used for supplying power for communication purpose, consumes seven million litres of diesel per day.

### *Green radiotechnology aims at two major reductions:-*

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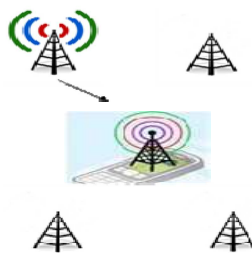
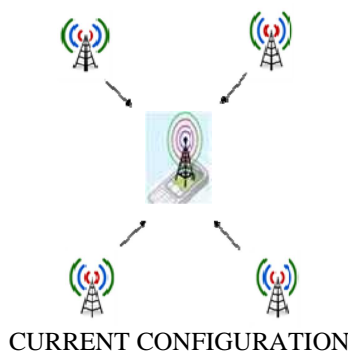
### *Technology involved :-*

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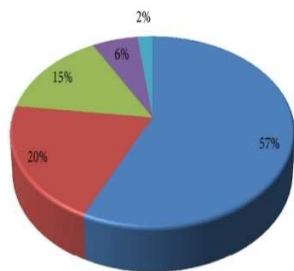
### *Basic operation :-*

Our objective is to reduce the energy consumption in base stations and reduce the amount of CO<sub>2</sub> emission. We have to keep controlling system in

every base station for switching purpose. To have complete control over base station we prefer to use PC. In this technology, the mobile communication tower in an area is turned ON, based on the frequency of users present in that area. In general, within a pre-defined control area, there will be multiple towers operating (of same network type). And each tower has predefined user-strength capacity, up to which it can operate. Thus, based on the user strength in a region, the number of towers in that particular region is turned ON and remaining towers are kept in sleep state.



**PROPOSED CONFIGURATION**



■ Base station      ■ Data center  
■ Mobile switching      ■ Retail  
■ Core network

**ENERGY CONSUMPTION COMPOSITION OF A MOBILE OPERATOR:-**

**III CONCLUSION**

- Vodafone-group: target to reduce co2 emissions by 50% by 2020, from 2006/07 levels.
- Orange: reduce greenhouse emissions per customer by 20% between 2006 and 2020.
- Ericsson: has reduced the annual direct co2 emissions per subscriber in the mobile broadband base station .

Our project proposes a comprehensive approach towards an energy efficient operation of next generation mobile communication Green Radio includes efficient hardware and software platforms and careful integration into self organizing network functions This technology is a key factor for operation expenditure reduction and endures an eco friendly

**IV REFERENCE**

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