

'Realise' Project Report



Submitted to:
blueFROG Pvt. Ltd.

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April 2010

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SECTION I

INTRODUCTION

BACKGROUND

Global Warming

Global warming is the increase in the average temperature of Earth's near-surface air and oceans since the mid-20th century and its projected continuation. Global surface temperature increased 0.74 ± 0.18 °C between the start and the end of the 20th century. The Intergovernmental Panel on Climate Change (IPCC) concludes that most of the observed temperature increase since the middle of the 20th century was very likely caused by increasing concentrations of greenhouse gases resulting from human activity. The IPCC also concludes that variations in natural phenomena such as solar radiation and volcanic eruptions had a small cooling effect after 1950. These basic conclusions have been endorsed by more than 40 scientific societies and academies of science, including all of the national academies of science of the major industrialized countries.

1.1 Introduction

The objectives of this Report are manifold. On one hand it strives to familiarise the reader with scientific concepts - defining them and putting them in context. On the other hand it also aims to stimulate discussion and encourage actions at a behavioural change level. At the same time, it details analytical and research procedures and methodologies, so that the document can stand up to scientific scrutiny. All efforts have been made to present these aspects distinctly so as to maintain clarity.

1.2 Background

1.2.1 The Arena

The reality of **Global Warming** has been accepted by the scientific community - that it IS happening and it IS the result of anthropogenic activities is no longer a matter of speculation. Results have already started appearing on the horizon*. As the warming and the melting, and the positive feedback loop connecting them gathers momentum, the uncertainty is not whether it is happening, but rather, how fast.

Meanwhile, the international community comprising the

developed countries, the newly emerging economies and the under-developed countries are locked in a stalemate over how much to commit. Our own government and industries have started taking tentative steps – tempered by political and economic exigencies.

1.2.2 The Players

blueFROG is a “revolutionary, integrated Music Project” based in Mumbai, India. It consists of the country's premiere live music performance club, four state-of-the-art music recording studios, a music production house, musicians and producers, and an independent record label & artist management service. blueFROG opened its doors in the erstwhile textile-mill area of Mumbai 3 years ago, and has, since, set new standards in entertainment, performance and hospitality.

Eliminate Carbon Emissions (ECE) and the no2co2 Project were born from the conviction that the primary responsibility for reversing the effects of Climate Change rests not with the Government, the Industry and the Policymakers, but with us – as members of the societies we live in, the businesses we are part of and as individual consumers. ECE's intervention approach follows the elegantly simple steps of REALISE MINIMISE NEUTRALISE.

'New Moore Isle is no more: expert blames warming'

TOI, March 25, 2010

<http://timesofindia.indiatimes.com/home/environment/global-warming/New-Moore-isle-no-more-expert-blames-warming/articleshow/5720685.cms>

New Moore Island, at the confluence of Ichhamati and Rai Mangal rivers near the Bay of Bengal has been swallowed by the rising sea, making it one of the earliest instances of a patch of territory ceasing to exist because of global warming. The startling fact about its submergence emerged from satellite images in 2009. These were studied by a team led by Sugato Hazra, director of Jadavpur University's school of oceanography studies. (Contd.)

Climate Change

By definition, climate change is a change in the statistical distribution of weather over periods of time that range from decades to millions of years. Accordingly, fluctuations on periods shorter than a few decades do not represent climate change.

In the current context, and in the context of environmental policy, it is used to refer specifically to climate change caused by human activity; for example, the UNFCCC defines climate change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.” In this sense climate change is synonymous with global warming.

However, what the benign terminology of “Climate Change” and “Global Warming” belie, is the fact that we are entering a period of climate uncertainty characterised by extremes and unpredictability of climatic events, rather than just a uniform “warming” or a predictable “change”.

1.2.3 The Project

Eliminate Carbon Emissions (ECE) Pvt. Ltd was contracted by blueFROG Pvt. Ltd. as the consultant in blueFROG’s journey towards achieving total environmental accountability.

blueFROG Management embarked upon this journey motivated by personal conviction about the reality of **Climate Change**, and its direct relationship with an individual’s, and small-businesses’ activities and consumption choices.

blueFROG also recognized its position as a best-practice leader in the Food, Beverage and Live Entertainment Business in India and clearly identified the immense leveraging possibilities available to it to infuse climate change consciousness into its broad customer base through its restaurant, live music and record label business activities. Thus, one of the goals of the Project is to empower blueFROG with the means to communicate its Climate Change reversal initiatives to its customers and therefore, make its customers not just passive participants, but active partners in this change process.

As part of its consulting role, ECE, also endeavors to demonstrate the fallacy of the commonly espoused perception that environmental responsibility and business profitability

are conflicting considerations. Resource conservation practices, while minimizing climate change impact and reducing costs, can go hand-in-hand with ensuring the continued delivery of excellent customer experience, and, in fact, leveraging the environmental leadership of the business for enhancing its brand value.

1.2.3.1 Step I - REALISE

The remaining portion of this report relates to the first phase of the two-phase project comprising of Carbon Footprint Calculation (‘Realise’) and Carbon Footprint Minimization (‘Minimise’).

As with any project, the details of logic and implementation are as important as the broader guiding principles and outcomes. However, in order to maintain the “readability” of the document, so that the reader does not have to continually shift focus from the “broader issue” to the “particular specific”, the Project Goals, the guiding principles of the Methodology, the Results and the Recommendations are presented in Section II of the Report while the detailed Methodology, Assumptions, Data Gaps and Uncertainties are grouped together in a separate section (Section III) of the report

(...Contd.) “There’s no trace of the island anymore. After studying satellite images, I reconfirmed this from fishermen,” Hazra said on Tuesday. Four super cyclones — Aila, Cedar, Bijli and Nargis — hit the southern parts of the Sunderbans between 2007 and 2009. According to Hazra, the islands of Ghoramara in the Hooghly estuary and Jambudeep near the Bay of Bengal, too, are slowly sinking. Ghoramara is inhabited. On islands like Bulcheri, Bhangaduani and Dalhousie facing threat from the rising sea, the tigers risk getting wiped out. Besides, there are other inhabited islands which face erosion, flooding due to storms and rising salinity of water.”

SECTION II
CONCISE REPORT

The United Nations Framework Convention on Climate Change - UNFCCC

UNFCCC is an international environmental treaty produced at the culmination of the Earth Summit, held in Rio de Janeiro in June 1992. The objective of the treaty is to “stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”. The treaty itself is legally non-binding, but it provides for updates (called “protocols”) that would set mandatory emission limits. The principal update of the UNFCCC is the Kyoto Protocol.

2.1 Project Goals

The goal of the ‘REALISE’ phase of the project was to calculate the **Carbon Footprint** of blueFROG as a business entity and to analyse it so it may be used to arrive at a blueprint for the next – MINIMISE - phase

2.2 Project Scope

Carbon Footprint Reporting for small and medium scale businesses in India is not mandated by the Indian Government, nor by the **United Nations Framework Convention for Climate Change (UNFCCC)**. blueFROG’s initiative to address its Climate Change Impacts is purely voluntary. Therefore, no set of pre-established guidelines was required to be followed for boundary definition. The globally accepted methodologies for National **Greenhouse Gas Emissions Reporting** (adopted by India as part of the Kyoto Protocol), as laid down by the **Inter-Governmental Panel on Climate Change (IPCC)** in its 2006 Guidelines were used for guidance wherever appropriate. However, given the unique nature of this project, and the niche business activity of blueFROG, the overall methodology reflects a confluence of standard protocols and business-appropriate approaches.

Defining boundaries involved two key-decision making areas:

- Activity Boundaries - activities to be included (i.e. defining a comprehensive yet manageable set of resources whose consumption was to be inventoried), and,
- Stakeholder Boundaries - stakeholders to be considered as part of the organisation’s Footprint (i.e. defining which sets of peoples/groups/functions are to be included within the Footprint boundary).

2.2.1 Activity Boundaries

2.2.1.1 Key Source Categories

In order for Carbon Footprint calculation to be considered comprehensive, it is essential to include all activities that impact it. And since every activity involves some resource or energy consumption, each has a Footprint. However analysing each minute activity that makes up a business process would render the entire exercise impossible to complete in a finite time frame. The twin goals of comprehensiveness and manageability are achieved by defining activities known as ‘Key Source Categories’ and analysing them comprehensively, while paying lesser attention to those outside that framework.

‘Key Source Categories’ are defined as those whose collective contribution account for 95% of the total Footprint. However, this means that technically speaking, ‘Key Source Categories’ can only be determined after the completion of the Carbon Footprint calculation. But this defeats its utility as a guiding principle for defining activity boundary. In practice, however, irrespective of the anthropogenic or business process being analysed, certain categories of activities can safely be presumed as being ‘Key Source Categories’. Beyond these, others need to be identified based on rational considerations of the specific nature of the business and a detailed understanding of its operations.

This process yielded the following activities as comprising the activity domain for this project:

- 1) Contributing Directly to Carbon Footprint:
 - Cooking Fuel Consumption
 - Vehicular Fuel Consumption

These are activities where an individual or business has direct control over the amount of activity, and the emission coef-

Greenhouse Effect

A classical Greenhouse for plants is a transparent glass-enclosed space. As short wavelength visible light passes through the greenhouse glass, it loses some energy and heats the air or articles inside the greenhouse and becomes longer wavelength infrared waves, or heat. The infrared waves cannot as easily pass out again through the glass. The heated air is thus trapped in the greenhouse, causing the temperature to rise.

Replace the classical greenhouse with our Earth and the glass enclosure with the “Greenhouse Gases”, and the same phenomenon occurs. As energy from the Sun passes through the atmosphere a number of things take place:

- About 26% is reflected or scattered back to space by clouds and other atmospheric particles.
- About 19% of the energy available is absorbed by clouds, gases (like ozone), and, particles in the atmosphere.
- 4% is reflected from the surface back to space.
- On average, about 51% of the Sun’s radiation reaches the surface and heats up the Earth. The heating of the ground by sunlight causes the Earth’s surface emit infrared radiations. The majority of this outgoing infrared radiation is absorbed by the blanket of gases and clouds enveloping the Earth – the Greenhouse Gases. The now warmer atmospheric greenhouse gas molecules then begin radiate heat back towards the Earth’s surface where it once again is absorbed by the surface. The heating of the ground by this radiation causes the ground surface to once again radiate, repeating the cycle described above.

The greenhouse effect is a naturally occurring process that aids in heating the Earth’s surface and atmosphere. Without the greenhouse effect life on this planet would probably not exist as the average temperature of the Earth would be a chilly -18° Celsius, rather than the present 15° Celsius.

The Greenhouse Gases

The ability of greenhouse gases to contribute to global warming is a function of their heat trapping potency, and their mean atmospheric lifetime. This ability is expressed in terms of the Global Warming Potential (GWP) of a greenhouse gas, with carbon dioxide being the standard (GWP = 1) against which the GWP of the other gases are measured.

The main gases in our atmosphere that are responsible for greenhouse effect are carbon dioxide, methane and nitrous oxide, and to a lesser extent, water vapour, ozone, halocarbons and sulfur hexafluoride

- Carbon Dioxide (CO₂) is a colorless, odorless gas and is the most prominent greenhouse gas in Earth’s atmosphere. It is also the commonly accepted standard for expressing the climate change impact of activities or entities. Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement), as also through natural processes – exhalation by plants and animals. Carbon dioxide is also removed from the atmosphere (or “sequestered”) when it is absorbed by plants as part of photosynthesis or absorbed by the oceans.
- Methane is a colorless, odorless gas. It is formed when plants decay in the absence of air. The largest natural sources of methane are wetlands, termites, and oceans (contributing approximately 30%). Anthropogenic sources are natural gas facilities, coal mines, petroleum industry, coal combustion, enteric fermentation, rice paddies, biomass burning, landfills, animal waste, domestic sewage (contribute approximately 70%). It stays in the atmosphere for only 10 years, but traps 22 times more heat than CO₂ (a GWP of 22).
- Nitrous Oxide is familiar as the “laughing gas” and is used as an anesthetic. The natural release of this gas from oceans and by bacteria in soils contributes to about 75% of the atmospheric nitrous oxide while anthropogenic emissions of N₂O associated with biomass burning, fossil fuel combustion, industrial production of adipic and nitric acids, and the use of nitrogen fertilizer contributes the rest. Over a hundred year period, Nitrous oxide has a GWP of 310.

Carbon Footprint

Imagine the environment as a vast forest floor, and your acts of consumption as a journey on foot across it. As each one of us consumes anything - electricity, fuel, food, electronics etc., we walk one step across that floor. In doing so, we impress the full weight of our existence on it; in other words, we leave a 'Footprint'. That Footprint, in effect, tramples upon the life-giving resources and life forms beneath it. Some of the trampling is, of course, unavoidable, as the very act of breathing results in a Footprint. But in effect, the more products and services we consume, the heavier the weight of our 'Footprint', the greater its size and consequently, greater is the demand that is imposed on our environment. Enough weight exerted by the collective might of all earth's inhabitants will lead to a rampant stampede that will decimate the very 'life' from underneath our feet.

There are various 'Footprints' that one can calculate by examining one's life - "What is my Water Footprint?", "What is my Wood Footprint?", "What is my Plastic Footprint?" etc. - questions such as these address different aspects of one's .

'Carbon Footprint', therefore, is just ONE of the many Footprints that can be calculated. However, it is, by far, the most critical 'Footprint' for the specific environmental circumstances we live in and have created for ourselves. This is because it is a direct indicator of a human's impact on Global Warming: the most daunting environmental issue confronting us.

'Carbon Footprint', thus, is a measure of the total quantity of gaseous emissions of Greenhouse Gases emitted by an individual or an entity in one year; directly (such as by burning fuel), or indirectly (through consumption of products and services that have resulted in such emissions in the manufacturing process).

The no2co2 Approach

While top-down interventions from the governments, industries and policy are essential, the primary responsibility for managing the effects of climatic uncertainty rests with us – as part of the societies we live in, the businesses we conduct, and, as individual consumers.

no2co2's approach to an entity's journey towards total environmental accountability can be summed up in three elegant steps of REALISE MINIMISE NEUTRALISE

REALISE –as we begin the treatment of any physical ailment with a “diagnosis” of the condition, the first step of the Carbon Mitigation journey begins with the measurement and analysis of the current resource utilization pattern. The outcome of the Realise phase lays the groundwork for the next MINIMISE phase

MINIMISE - The Minimisation journey is not an act of penance, but “Evolution” to a new way of thinking, living and doing business, that will reverse the effects of years of imbalance between our consumption and Nature's ability to sustain. It involves behavioural changes in our current consumption patterns – adapting to a more sustainable way of living and working, and adopting technologies and processes that reduce the environmental impact of our existence

NEUTRALISE – After one has examined and exhausted all avenues of MINIMISATION, it is possible to notionally reduce one's Carbon Footprint through facilitating MINIMISATION projects of another. While offsetting is not the easy route to atone for our 'climatic sins", it can be an opportunity to get involved in projects that are instrumental in not just offsetting one's own Footprint, but also in stimulating behavioural change on a wider social scale.

Inter-governmental Panel on Climate Change (IPCC)

IPCC is a scientific intergovernmental body tasked with evaluating the risk of climate change caused by human activity. The panel was established in 1988 by the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP). Its main objective was to assess scientific, technical and socio-economic information relevant to the understanding of human induced climate change, potential impacts of climate change and options for mitigation and adaptation. The IPCC has completed four assessment reports, developed methodology guidelines for national greenhouse gas inventories and published special reports and technical papers. National and international responses to climate change generally regard the UN climate panel as authoritative

efficient through technological choices. e.g. in the case of vehicular fuel, it is assumed that an individual has direct control both over how much they travel in a private vehicle, and the fuel efficiency of the vehicle.

2) Contributing Indirectly to Carbon Footprint (Primary Importance):

- Electricity Consumption
- Water Consumption

These are activities where an individual or business has direct control over the amount of activity but not the emission coefficient through technological choices

e.g. in the case of electricity, an individual may control how long they keep a certain appliance switched 'ON', but they have to draw electricity from the grid available to them and cannot control the process that generates the electricity

3) Contributing Indirectly to Carbon Footprint (Secondary Importance):

- Public Transportation (Rail, Road, and Air Travel)
- Food & Beverage comprising of Meat, Seafood, Dairy, Rice,
- Alcoholic and Bottled Water/Soft Drink Beverage Consumption
- Waste Generation
- Plastic, paper and other Consumables

These are activities where an individual or business can be considered to not have direct control either over the amount of activity or the emission coefficient through technological choices

e.g. in the case of public transport, given that an individual has to travel a certain distance, there is no less carbon-Footprint intensive activity than taking public transport and the individual cannot control the mode of public transport that has been made available to them.

2.2.1.2 Exclusions

Glass, cloth and other consumables such as cleaning detergents were excluded from the overall analysis following an initial survey of all resource consumption. It was estimated that these would fall outside the 95-percentile cut-off for 'Key Source Categories'.

Architectural and Construction related Footprints created as a result of blueFROG's inception have been excluded at this stage of the project. This is a one-time Footprint exertion that cannot be minimised operationally but rather must be neutralized through Footprint offsetting. Future phases of the Carbon Footprint Control project will address this aspect of Footprint.

2.2.2 Stakeholder Boundaries

2.2.2.1 Stakeholders

Stakeholders in this context are defined as those groups of persons, service providers, beneficiaries, customers etc. that directly or indirectly participate in Carbon Footprint creation activities of an organisation. As in the case of activity boundaries, this list too is technically nearly infinite since the 'indirect' contributors to an organisation's Footprint is an unbounded set of groups engaged in enterprise all across the globe. E.g., in the case of blueFROG which uses several different kinds of cheese, not only the Footprint of the cheese manufacturing unit, but also, the Footprint of the enterprises who provide raw material and packaging material for the manufacturing and packaging of the cheese, as also the Footprint of the manufacture of the vehicles that are involved in the transportation of the cheeses from the manufacturing facility to blueFROG premises may be included within the scope of

Emission Factors (EF)

EF is the average emission rate of GHG from a given source relative to one unit of a specific activity; for example an EF of 1 kgCO₂e per kWh of electricity indicates that generation/consumption of 1 unit of electricity (i.e. 1 kWh) causes the emissions of 1 kg of Carbon Dioxide Equivalents.

Carbon Footprint is essentially the product of multiplying activity data (i.e., the quantity or volume of the activity) with GHG Emissions Factors.

Emission (of GHG) = Activity * Emission Factor

the stakeholders.

Since voluntary Carbon Footprint calculation and emission inventorying falls outside the domain of any internationally binding IPCC guidelines, 'Stakeholder Boundary' is determined through consultation with the 'Realiser' or client. Accountability for those entities that are directly part of its own operations is the cornerstone of this exercise. At the same time, organisations are at liberty to select some operations that are outside its direct control, but are logically connected to, or are a natural extensions of, its direct operations.

Following discussions with blueFROG, Stakeholder Boundary was defined as follows:

- 1) blueFROG Internal Functions:
 - Club & Bar (including F&B Controls, Kitchen and Food Supplies)
 - Studio
 - Office (Human Resources, Admin, Accounts)
 - Marketing
 - Programming
 - Label
- 2) blueFROG Supplies Manufacturers:
 - Embedded Footprint of manufactured products related to 'Key Source Categories' activities (defined earlier) purchased by blueFROG
- 3) blueFROG Supply Logistics:
 - Footprint of the final transportation activity from Vendor to blueFROG.
- 4) blueFROG Entertainment Artists:
 - Footprint of blueFROG sponsored travel activities.

2.2.2.2 Exclusions

The following groups are excluded from this boundary:

1. blueFROG Customers: Indirect contributors to Footprint owing to their travel activities to blueFROG.
2. blueFROG Vendors: Processing, storage and internal transportation activities resulting in Carbon Footprint creation.
3. blueFROG Studio Artists: Indirect contributors to Footprint owing to their travel activities to blueFROG.

2.2.3 Life-cycle Boundaries

Emissions Factors (EFs) are indicative of the quantity of GHGs emitted per unit of activity. However, it must be emphasized that these are 'indicative' since the true EF for any activity is technically unbounded; the rationale is the same as of the infinite nature of Activity and Stakeholder Impacts on Carbon Footprint. As an activity's EFs are investigated further back into its life cycle to include, beyond primary influences, secondary and tertiary impacts, the mathematical magnitude of the EF increases, albeit to a gradually diminishing degree. E.g. an electricity emission factor of 1 kgCO₂e/kWh means that 1 kg of CO₂ is generated for every kWh (i.e. every unit) of electricity generated. However, this value of 1 kgCO₂e/kWh would increase if analysis boundaries were expanded beyond the impacts of direct combustion of coal, diesel and other fossil fuels used for power generation, to include the energy expenditure to mine the fossil fuels. Its magnitude would further increase if the analysis boundary were radially extended to envelop the resource and energy consumption to create the capital goods (machinery, factories etc.) required to harness these natural resources. This expansion can be understood as 'penetrating deeper into the life cycle of a product or service. Concisely stated, EF magnitudes are a dynamic function of the extent of life-cycle impacts selected for analysis in relation to the manufacturing process involved in the cre-

Life cycle Analysis (LCA)

Life Cycle Analysis aims to assess the environmental impact of a product from its “cradle” to its “grave”. This is based on the premise that a fair, holistic assessment requires the assessment of raw material production, manufacture, distribution, use and disposal, including all intervening transportation steps necessary or caused by the product's existence.

ation of goods and services for human consumption.

Any Carbon Footprint analysis, so greatly dependent on the mathematical magnitude of EFs chosen, is therefore, a subset of *Life Cycle Analysis (LCA)*; selecting only primary aspects of LCA (such as direct emissions of fossil fuels) yields lower values of EFs while a more extensive LCA magnifies the im-

pacts of the same activity and leads to a more conservative Carbon Footprint; a Footprint that tends towards the ‘true’ Carbon Footprint of an activity. The following table presents the extent of LCA incorporated into the Emission Factors selected for the blueFROG Carbon Footprint calculation.

No.	Footprint Head	EF LCA Status
1	Cooking Fuel	Direct Emissions
2	Generator Fuel	Direct Emissions
3	Vehicular Travel - 2 Wheeler	Direct Emissions
4	Vehicular Travel - 4 Wheeler	Direct Emissions
5	Electricity	Direct Emissions
6	Water	Direct Emissions
7	International Air Travel	Direct Emissions
8	Domestic Air Travel	Direct Emissions
9	Rail Travel - Local	Direct Emissions, Electricity
10	Rail Travel - Long Distance	Direct Emissions, Electricity
11	Bus Travel - Local	Direct Emissions
12	Bus Travel - Long Distance	Direct Emissions
13	Taxi Travel	Direct Emissions
14	Autorickshaw Travel	Direct Emissions
15	Meat	LCA
16	Seafood	LCA
17	Dairy	LCA
18	Alcoholic Beverages	LCA
19	Bottled Water / Drinks	Partial LCA
20	Waste Generation	Partial LCA
21	Paper	LCA
22	Plastic	LCA
23	Luxury Hotel	Direct Emissions, Electricity

Table II.1 - Emission Factor LCA Status

Food Miles

Food Miles refers to the distance food is transported from the time of its production until it reaches the consumer. Food miles are one factor used when assessing the environmental impact of food, including the impact on global warming – this is because fossil fuels are burnt to transport these food items across distances, often under refrigeration.

Energy Time Study

The power-consuming components of thermostat-based systems (e.g. refrigerators and air conditioners) perform a periodic 'on-off' oscillating cycle, and thus power consumption is not a direct function of multiplying usage per week and the rated power consumption. An energy-time study involves using a "power-meter" into which the device is "plugged in" and turned on (in actual use or simulated-use conditions) so as to measure the incremental energy consumed by a device over a broad span of time.

2.3 Project Methodology

The salient features of the Project Methodology were:

- **Functional Zones**
blueFROG's business was completely defined in terms of Functional Zones – as against 'physical zones' - since future interventions to minimise Footprint would have to be executed through the cooperation and participation of 'functional zone' decision makers and executives.
- **Building blueFROG's resource consumption profile "ground-up"**
Although dissecting the organisation's operations and disaggregating consumption of resources to understand the consumption patterns 'ground-up' was more time-consuming, as opposed to tracking all activities through a 'centralized' approach, it helped construct a detailed Footprint-map that would be invaluable as an analysis tool to prepare for the MINIMISE phase
- **Disaggregating and analysing the overall Carbon Footprint in various ways:**
 - Total business vs. functionally-differentiated resource consumption.
 - Total business vs. functionally-differentiated fixed capital (energy consuming devices) inventory.
 - Resource type-differentiated Annual Carbon Footprint
 - Stakeholder-differentiated Annual Carbon Footprint/ avoidable vs. unavoidable Footprint
 - Per-customer-served Average Carbon Footprint/ guest vs. employee Footprint
- **Explaining the aggregate and dissected Carbon Footprints in the context of easily understandable terms**
To provide perspective that serves to inspire actions towards a participative (i.e. involving all Stakeholders) mitigation of blueFROG's impact on Climate Change, the units of Climate Change were sought to be translated into terms that are more easily understandable.
- **Food Miles Tracking**
In order to study the impacts of supply-source choices on blueFROG's Footprint, the research process involved gathering data related to the supply location (not the 'vendor location', but the initial manufacturing/production source) and mode of transportation for all food supplies.
- **Packaging and waste tracking:**
 - Bulk packaging was considered for all supplies coming in. Micro packaging was considered wherever most relevant and practical
 - Waste was estimated through weighing
- **Fixed Capital (Appliance) inventory.**
Since the primary contributor to blueFROG's Footprint during the preliminary project assessment phase, special attention was given to this resource use. This involved:
 - Exhaustive inventory of appliances and collecting data related to their declared specs like Make, Model, Power Rating (Watts), Rated Capacity, Usage and Function.
 - For most thermostat-controlled systems, an **energy-time study** was conducted - usually spanned 30 to 45 minutes or till the point the power-cycles demonstrated a stable pattern. This provides an 'average' representative power consumption of the system that incorporates its internal power-regulation mechanism.

SECTION II

DEFINITION

Carbon Dioxide Equivalent (CO₂e)

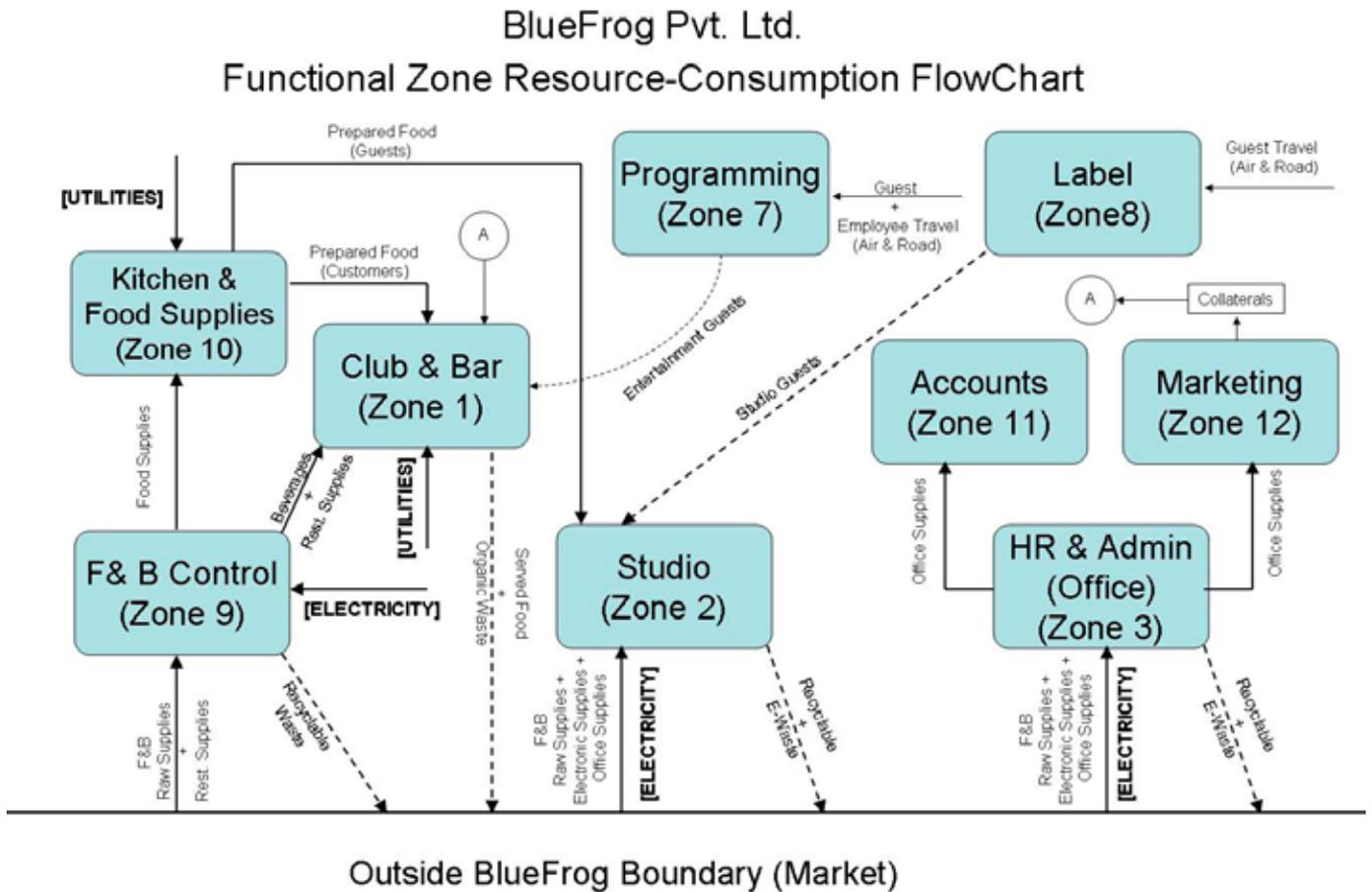
Carbon dioxide is the commonly accepted standard for expressing the climate change impact of activities or entities. Carbon dioxide equivalent (CO₂ eq) provides a measure of the impacts of releasing (or avoiding the release of) different greenhouse gases, by relating the Global Warming Potential (GWP) of the greenhouse gas to that of CO₂. The standard unit is MtCO₂e or metric tons or tons of carbon dioxide equivalent. Thus, one million tons of emitted methane, a far more potent greenhouse gas than carbon dioxide, is measured as 23 million metric tons of CO₂ equivalent, or 23 million MtCO₂e.

- Greenhouse Gas Emission Factors**

Greenhouse Gas (GHG) Emissions Factors that have been used are those specifically developed for India and in instances, specific to Maharashtra.

- Footprint Extrapolation**

The activity data gathered for this project was for 3 representative business months. The Footprint values obtained from this analysis was thus multiplied by a factor of 4 to obtain average Annual Carbon Footprint in tons of Carbon Dioxide Equivalents (CO₂e) per year.



LEGEND

[UTILITIES] = Electricity + Cooking Fuels + Water

Figure II.1 blueFROG Resource & Activity Process Flow Chart

2.4 Project Timelines

The project commenced in November 2009. The time-period of analysis was chosen to be July, August, and September 2009. blueFROG's Management concurred that analysis of these three months was a rational choice as they represented low, average and peak business months for the organisation and an average annual estimate could be rationally determined by extrapolation.

The results were presented to blueFROG in March, 2010 along with an Executive Summary (attached as Annexure I)

The REALISE phase of the Project comes to a close with the

submission of this Report

2.5 Results

2.5.1 Resource Consumption Inventory

The following table presents the extrapolated aggregated consumption inventory for blueFROG for FY 2009.

No.	Footprint Head	Qty.	Measuring
1	Scope 1		
1.1	Fuel - Cooking Fuel – LPG	13,680	kgs
1.2	Fuel - Cooking Fuel – Wood	2,880	kgs
1.3	Fuel – Cooking Fuel - Charcoal	19,526	kgs
1.4	Fuel - Vehicular Travel	14,400	v-kms
2	Scope 2		
2.1	Electricity	706,196	kWh
2.2	Water	5,979,000	liters
3	Scope 3		
3.1	Travel		
3.1.1	Domestic Air Travel	369,056	pass-km
3.1.2	International Air Travel	1,325,656	pass-km
3.1.3	Intercity Travel – Public	0	
3.1.4	City Travel – Public	1,182	pass-hrs
3.2	Food, Beverage, Waste		
3.2.1	Meat	10,380	kgs
3.2.2	Seafood	5,706	kgs
3.2.3	Dairy (Milk, Cheese, Yogurt, Butter, Misc.)	7,229	kgs
3.2.4	Rice	4,956	kgs
3.2.5	Other Groceries	25,961	kgs
3.2.6	Alcoholic Beverages - Beer	37,323	kgs
3.2.7	Alcoholic Beverages - Wine	4,408	kgs
3.2.8	Alcoholic Beverages - Spirits	15,084	kgs
3.2.9	Bottled Water / Drinks	38,103	kgs
3.2.10	Solid Waste	108,349	kgs
3.3	Paper, Plastic, Consumables		
3.3.1	Paper	4,011	kgs
3.3.2	Plastic	1,829	kgs
3.3.3	Laundry Outsourcing	6,000	pieces

Table II.2 - blueFROG Annual Resource Consumption Inventory – 2009

2.5.2 Fixed Capital Inventory

The following table presents the aggregated electrical appliance inventory for blueFROG as of February 2010.

Appliance Type	Qty. (Nos.)
Air Conditioning - Industrial	9
Air Conditioning - Split-Units	13
Air Cooling	0
Air Curtaining	1
Fan Cooling	11
Air Heating	0
Cleaning Appliances	2
Computer Systems	49
Cooking Appliances	36
Audio/Video Electronics	14
Food & Beverage Cooling - Office	1
Food & Beverage Cooling - Industrial	19
Ironing Equipment	0
Lighting Equipment	686
Office Kitchen Systems	4
Office Services Equipment	0
Pumping Equipment	5
Ventilation Systems	6
Water Heating Systems	1

Table II.3 - blueFROG Appliance Inventory - February 2010

2.5.3 Annual Carbon Footprint and 'Food-Miles'

The Annual Carbon Footprint of blueFROG during 2009, for the activities and stakeholders presented in Sections 2.2.1 and 2.2.2, is estimated to be 1,733 tons of CO₂e.

The Annual Carbon Footprint estimate of 1,733 tons CO₂e/year is created by BlueFrog's business activities to serve an annual customer base of approximately 84,000 persons. Based on this, the per-customer Carbon Footprint is estimated to be approximately 20.6 kg CO₂e. Assuming 6 days operation/week, this translates to 5,553 kg CO₂e/business-night (dividing 1733 tons of CO₂e by 313 working days).

The annual 'food miles', measured in kg-km (i.e. the total weight in kgs multiplied by the total distance traveled from source to destination), is estimated to be 355,285,717 kg-km. The contribution of these 'food-miles' to Annual Carbon Foot-

print is estimated to be 27.8 tons of CO₂e/year. This represents approximately 11% of the Food & Beverage related Footprint (184.4 tons/year) discussed later in the report.

the Annual Carbon Footprint of BlueFrog can be thought of as requiring 6,931 trees per year of operation (as of 2009) to 'neutralize' its impact on Climate Change. This equates to approximately 22 trees per business-night.

. BlueFrog's Annual Carbon Footprint thus equates to that of 274 average Indian families. Or to 137 upper-economic class families, whose Footprint is significantly higher.

2.5.3.1 Activity-Differentiated Carbon Footprint

Table 4 presents the contributions to Annual Carbon Footprint differentiated across all Footprint heads.

How is Carbon Footprint equated to number of trees?

Number of trees is a frequently used, and often misconstrued, yardstick for the Carbon Footprint impact of an entity or activity. However, the quantity of Carbon Dioxide absorbed by a tree is not an absolute number. It is a direct function of the growth stage (young, mature or old tree), the specific species of the tree, the quantity of foliage (leaves), size of tree etc., and hence it is incorrect to think of the Carbon Dioxide absorption capacity of a tree as being a simple static number that applies in all instances. For indicative purposes (to present some perspective on the relative Climate Change impacts of activities) it becomes necessary to arrive at some general consensus about the number of trees that would be required to 'offset' the Greenhouse Gas emissions from human activities. Research presented by the United Nations Environment Program (UNEP) as part of its 'Billion Tree Campaign' states that an average tree absorbs 12 kgs of CO₂ per year. Assuming an average life-span of 20 years for a tree (accounting for tree-planting mortality rates etc.), this equates to 240 kgs or approximately 0.25 tons of CO₂e as the Carbon Dioxide absorption capacity of a tree over its lifetime. Thus, a Carbon Footprint of 1 ton of CO₂e can be thought of as requiring the planting of approximately 4 trees to 'neutralise' its impact. It must be emphasized that this shouldn't be misconstrued as an endorsement of tree planting for neutralising carbon footprint.

Some indicative Carbon Footprints

- The average Annual Carbon Footprint of an Indian Citizen (based on 2004-2005 National GHG Inventory data) is estimated to be 1.6 tons of CO₂e/year.
- A family of 4 in India thus emits approximately 6.4 tons of CO₂e/year. bleFROG's Annual Carbon Footprint thus equates to that of 274 average Indian families.
- While no exact data is available for Carbon Footprints for Urban upper-economic class homes (defined by their dwelling size and travel habits), sampling in 2008-2009 conducted by no2co2 indicates averages of approximately 12 to 13 tons of CO₂e/year.

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	<i>Footprint Head</i>	<i>Footprint* (kg CO2e/year)</i>	<i>% Contribution</i>
1	Scope 1		
1.1	Fuel - Cooking Fuel	85,193	4.9%
1.2	Fuel - Generator Fuel	0	0%
1.3	Fuel - Vehicular Travel	3,253	0.2%
	Sub-Total	88,446	5.1%
2	Scope 2		
2.1	Electricity	1,206,527	69.6%
2.2	Water	11,958	0.7%
	Sub-Total	1,218,485	70.3%
3	Scope 3		
3.1	Travel		
3.1.1	Domestic Air Travel	33,986	2.0%
3.1.2	International Air Travel	126,490	7.3%
3.1.3	Intercity Travel - Public	0	0.00%
3.1.4	City Travel - Public	865	0.05%
	Sub-Total	161,341	9.3%
3.2	Food, Beverage, Waste		
3.2.1	Meat	63,692	3.7%
3.2.2	Seafood	23,560	1.4%
3.2.3	Dairy (Milk, Cheese, Yogurt, Butter etc.)	37,994	2.2%
3.2.4	Rice	4,610	0.3%
3.2.5	Other Groceries	2,334	0.1%
3.2.6	Alcoholic Beverages - Beer	21,014	1.2%
3.2.7	Alcoholic Beverages - Wine	2,668	0.2%
3.2.8	Alcoholic Beverages - Spirits	12,010	0.7%
3.2.9	Bottled Water / Drinks	16,159	0.9%
3.2.10	Solid Waste	62,199	3.6%
	Sub-Total	246,238	14.2%
3.3	Paper, Plastic, Consumables		
3.3.1	Paper	12,654	0.7%
3.3.2	Plastic	4,627	0.3%
3.3.3	Laundry Outsourcing	854	0.05%
	Sub-Total	18,135	1%
Totals	(tons CO₂e/year)	1,733	100%

* includes transportation wherever applicable.

Table II.4 blueFROG Activity-Differentiated Annual Carbon Footprint

BlueFrog Pvt. Ltd. Preliminary Carbon Footprint Summary - 2009-10 - Activity-wise

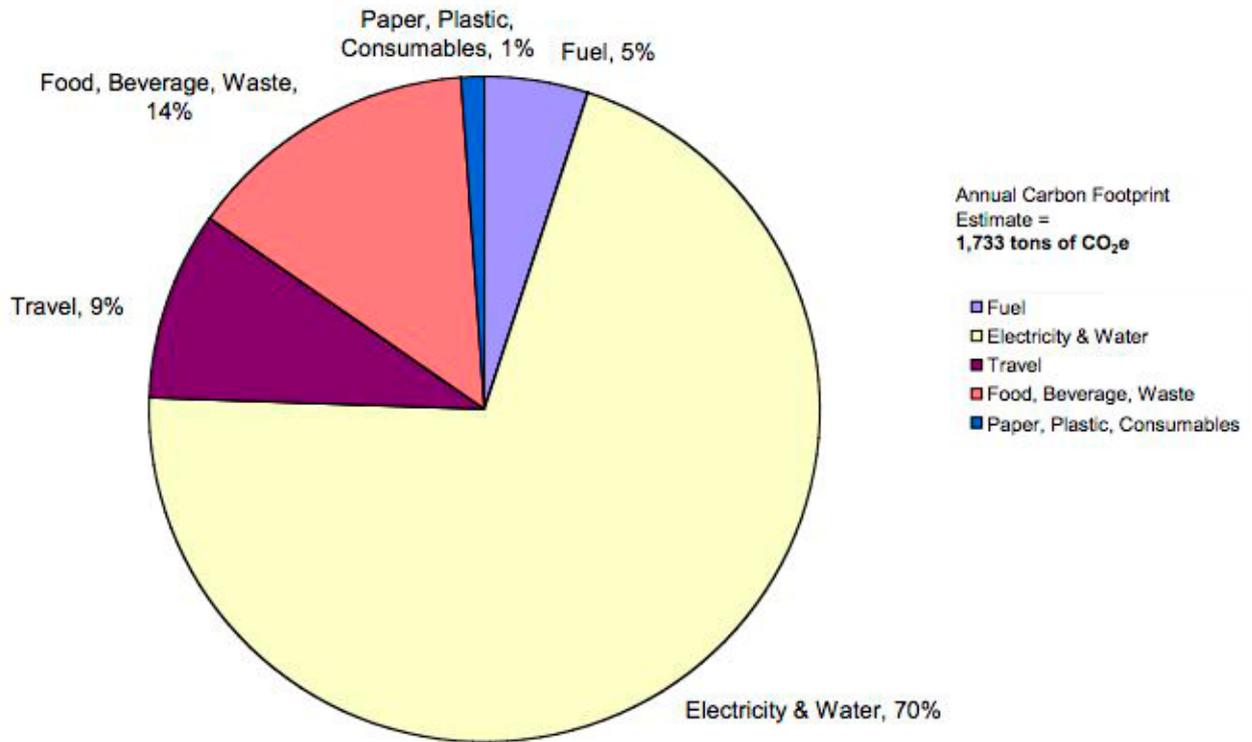


Figure II.2 Percent (%) Contributions to Annual Carbon Footprint (Activity-wise)

Figure 2 presents the collective contributions of the Footprint-heads grouped into their parent categories.

2.5.3.2 Functional-Zone Differentiated Carbon Footprint

Footprint contribution of all blueFROG's functional zones was assessed through two independent methods:

- 1) Footprint contribution through 'purchasing' of resources, and,
- 2) Footprint contribution through consumption and/or selling of resources.

While the former method provided assurance of 'completeness' of data gathering (i.e. if all resources 'purchased' are tracked, then by extension the total Footprint is tracked;

excluding the Footprint due to waste-generation). It would however, distort the relative contributions so that departments that are responsible for purchasing would emerge as the largest contributors whereas it is the consumers of those resources within the organisations that need to be identified for Footprint mitigation interventions in the future. For instance, the Zone responsible for purchasing office stationary supplies a pre-determined percentage of supplies to other functional zones. Thus, each zone that receives these supplies must be allocated the appropriately calculated percentage of Footprint for the given resource.

Summing the Footprint calculated through both methods should lead to identical results. This was verified and provided added assurance of the precision of the analysis.

Table 5 presents the contributions to Annual Carbon Foot-

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2.5.3.2 Functional-Zone Differentiated Carbon Footprint

Footprint contribution of all blueFROG’s functional zones was assessed through two independent methods:

- 1) Footprint contribution through ‘purchasing’ of resources, and,
- 2) Footprint contribution through consumption and/or selling of resources.

While the former method provided assurance of ‘completeness’ of data gathering (i.e. if all resources ‘purchased’ are tracked, then by extension the total Footprint is tracked; excluding the Footprint due to waste-generation). It would however, distort the relative contributions so that departments that are responsible for purchasing would emerge as the largest contributors whereas it is the consumers of those resources within the organisations that need to be identified

for Footprint mitigation interventions in the future. For instance, the Zone responsible for purchasing office stationary supplies a pre-determined percentage of supplies to other functional zones. Thus, each zone that receives these supplies must be allocated the appropriately calculated percentage of Footprint for the given resource.

Summing the Footprint calculated through both methods should lead to identical results. This was verified and provided added assurance of the precision of the analysis.

Table 5 presents the contributions to Annual Carbon Footprint differentiated across all of blueFROG’s functional zones based on their internal consumption and revenue generation activities (i.e. sum of Footprint from resources consumed and sold).

Functional Zone	Carbon Footprint	% Contribution
Club & Bar	1,198,292	69%
Studio	274,935	16%
Office	73,748	4%
Marketing	11,213	0.6%
Programming	72,251	4%
Label	90,248	5%
Overall*	11,958	0.7%
Totals (tons CO2e/year)	1,733	100%

*Relates to common consumption across the organisation that cannot be allocated distinctly amongst function zones e.g. water consumption related Footprint.

Table II.5 Functional-Zone Differentiated Carbon Footprint

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Figure 3 presents the percentage contributions of the various functional zones pictorially.

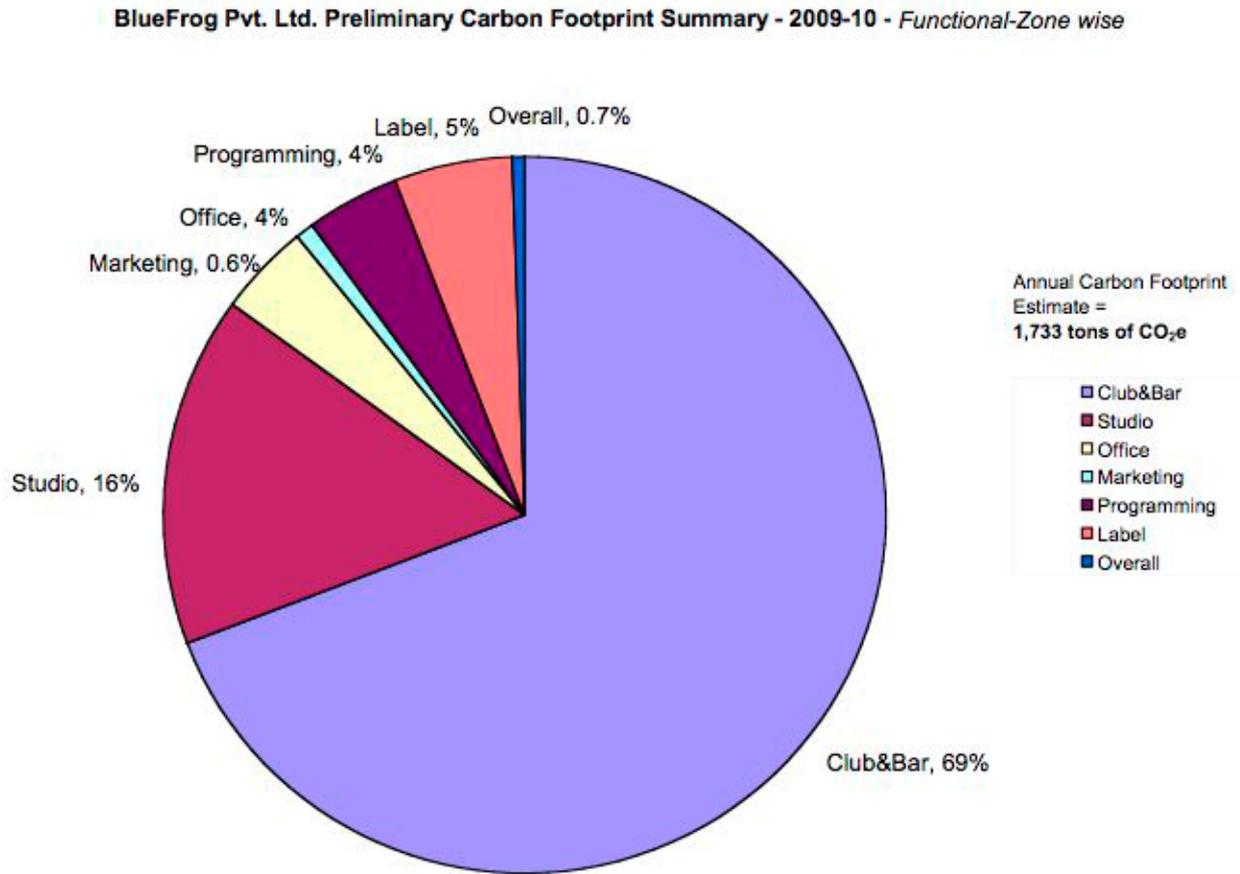


Figure II.3 - Percent (%) Contribution to Annual Carbon Footprint (Functional Zone-wise)

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2.5.3.3 Stakeholder Differentiated Carbon Footprint

The Annual Carbon Footprint of blueFROG, allocated to the stakeholders identified earlier is:

- 1) blueFrog Internal Functions: 1,668 tons CO₂e/year (96 % of Total Carbon Footprint).
- 2) Entertainment Artists: 65 tons CO₂e/year (4 % of Total Carbon Footprint).

As noted in the earlier sections of the report, the prominent groups that are excluded from this are blueFROG Customers,

blueFROG Vendor's processing, storage and internal transportation activities, and blueFROG Studio Artists. Inclusion of these stakeholders in the project boundary would increase the annual Carbon Footprint significantly.

2.5.4 Electrical Systems Differentiated Carbon Footprint

The Electrical Systems Energy Consumption Inventory process yielded the following results presented in Table 6 and Figure 4.

Stakeholder (Consumption + Sold)	Carbon Footprint	% Contribution
Air Conditioning - Industrial	487,966	35%
Ventilation Systems	356,055	25%
Lighting Equipment	175,510	13%
Cooking Appliances	98,103	7%
Air Conditioning - Split-Units	125,469	9%
Food & Beverage Cooling - Industrial	71,122	5%
Audio/Video Electronics	26,715	2%
Other	58,556	4%

Table II.6 Electrical Systems Differentiated Carbon Footprint

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BlueFrog Pvt. Ltd. Preliminary Carbon Footprint Summary - 2009-10 - Electricity Footprint

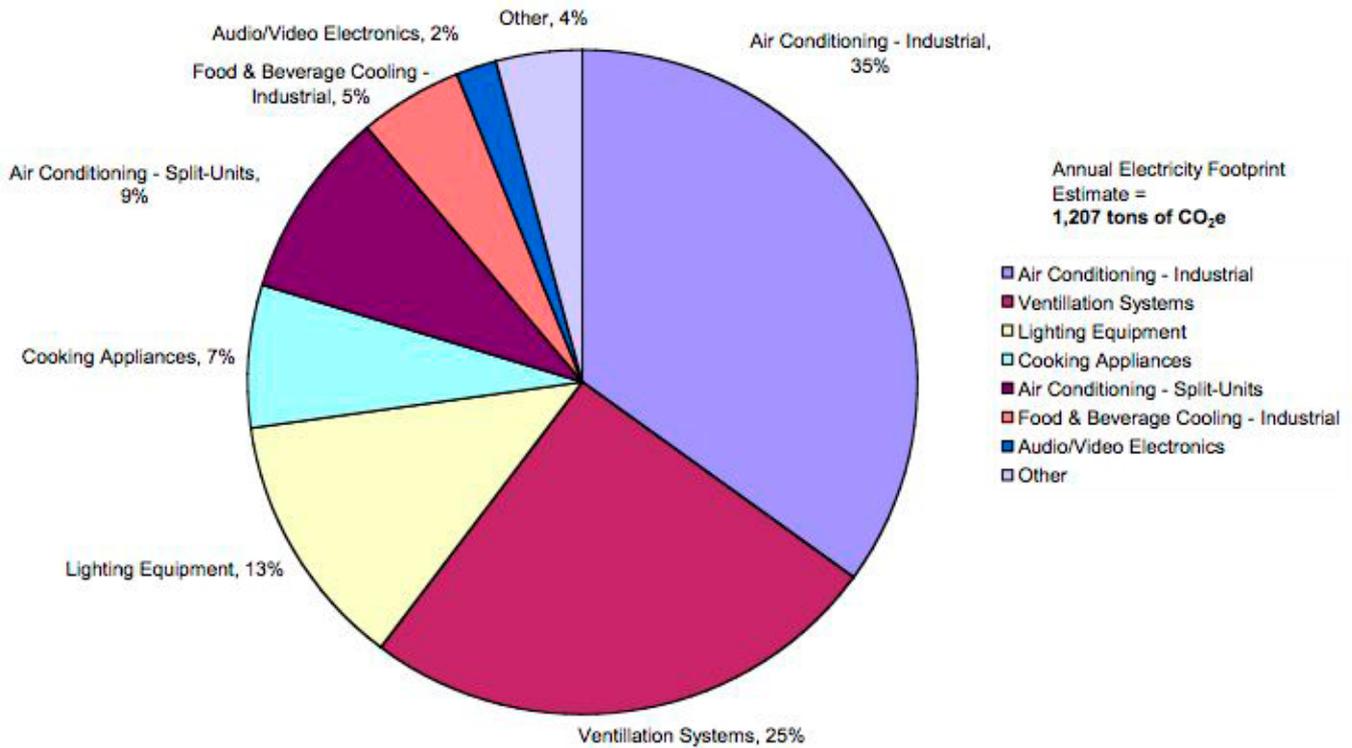


Figure II.4 - Percent (%) Contributions to Electricity Carbon Footprint

2.5.5 Annual Water Footprint

The Annual Water Footprint of blueFROG during 2009, for the activities and stakeholders presented in Sections 2.2.1 and 2.2.2, is estimated to be 59,79,000 liters of water. Water Footprint is estimated to be approximately 71 liters per customer- and 19,163 liters/business-night (assuming 6 days operation/week). This is approximately 32% of the total daily Water Footprint of the customer based on average per capita water supply for Mumbai in 2009. It must be emphasized that this does not include the 'embedded' Water Footprint implicit in the resources purchased and consumed themselves. Including this quantity would possibly exponentially increase the Total Water Footprint of BlueFrog. However, state-of-art prevents such an exhaustive assessment to be conducted at this point in time.

2.6 Conclusions and Recommendations

The Total Annual Carbon Footprint of blueFROG is comprised of the following activity-related Footprints, in order of decreasing magnitude:

Electricity (71%), Food, Beverage and Waste (14%), Travel (9%), Fuel (5%), Paper, Plastic & Consumables (1%)

This may also be translated into the following functional zone related Footprint:

Club & Bar (70%), Studio (16%), Label (5%), Programming (4%), Office (3%), Marketing (1%).

The Footprint analysis leads to the following pertinent conclusions:

- 1) Electricity consumption of approximately 7 Lac Units per year is excessive in the context of the electricity consumption of other businesses in the hospitality arena. 5-Star hotel electricity data analyzed by ECE reveals that blueFROG's electricity consumption is approximately 10% of a 24-hour operational 240 room 5-star hotel in India. Considering blueFROG's business operations are only conducted for a partial portion of a 24-hour period, the electricity consumption is disproportionately high.
- 2) Air Conditioning and Ventilation collectively contribute 69% of the total Electricity Footprint of 1,207 tons/year. The other primary contributors to Electricity Footprint are Lighting Equipment (13%), Cooking Appliances (7%) and Food & Beverage Cooling (refrigerators etc.).
- 3) Conspicuously, the 'unavoidable' component of blueFROG's Electricity Footprint (taken to be F&B and Audio/Video Electronics related electricity consumption) contributed only 14% to the overall electricity consumption.

4) F&B and Waste related Footprint of 246 tons CO₂e/year (14% of total Footprint) is comprised of the following primary contributors: Meat (3.7%), Waste (3.6%), Dairy (2.2%), Seafood (1.4%), and Beer (1.2%).

5) The annual 'food-miles', estimated to be 355,285,717 kg-km, contributes approximately 28 tons of CO₂e/year to Total Annual Footprint. This represents approximately 11% of the Food & Beverage related Footprint (184 tons/year). This is largely the result of long-distance international transportation of 3 categories of beverages: Bottled Water/Soft Drinks (32% of Transportation Footprint), Beer (31%), and Spirits (17%).

6) Travel Footprint (152 tons CO₂e/year, 9% of total) is largely the consequence of International Air Travel (121 tons CO₂e/year) undertaken by 'Label' Employees (80 tons CO₂e/year) and to a lesser degree by blueFROG sponsored Guest travel facilitated by 'Programming' (37 tons CO₂e/year).

7) The Annual Carbon Footprint of blueFROG would require approximately 6,855 trees per year of operation (as of 2009) to 'neutralize' its impact on Climate Change. This equates to the Annual Carbon Footprint of 271 average Indian families.

8) blueFROG's Annual Water Footprint estimate is 59,79,000 liters/year. A large percentage of this water (36 Lac liters/year, 60%) is resource-intensive tanker water transported to blueFROG using Diesel-fuelled vehicles.

2.7 End Notes

The results presented are based on a finite set of assumptions and influenced by known data gaps discussed in Section III of the report. Furthermore, for the Carbon Footprint estimation to be transformed to an auditable GHG Emissions Inventory, all consumption related data would need to be corroborated and substantiated by rigorous documentation. It is recommended that the required data be provided to eliminate some of the data gaps and substantiating documentation for all possible resource consumption for July, August, and September 2009 (including, but not limited to, electricity bills, fuel purchase, water purchase, and key F&B supplies) be made available to enable preparation of a auditable Carbon Footprint Report.

Finally, based on the above conclusions, it is recommended that blueFROG commission a comprehensive Footprint minimization analysis to identify means and alternatives for reducing its Electricity, Fuel, Water, F&B Resource and Transportation, Travel, and Consumables related Footprints.

SECTION III

- **DETAILED METHODOLOGY**
 - **BACKGROUND**
 - **ASSUMPTIONS**
 - **DATA GAPS**
 - **UNCERTAINTIES**
 - **EXECUTIVE SUMMARY**
-

3.1 Detailed Methodology

3.1.1 Research Methodology

The research methodology for the project centered around the idea of dissecting the organisation's operations and disaggregating consumption of resources to understand the consumption patterns 'ground-up'. While this approach was more time-consuming, as opposed to tracking all activities through a 'centralized' approach, it helped construct a detailed Footprint-map that would be invaluable as an analysis tool to identify stakeholder contributions to overall Footprint. The research methodology can be largely defined through the following components:

3.1.1.1 Functional Zones

The entire business process flow was dissected into distinct 'functional zones' in consultation with blueFROG management. The goal was to encapsulate all activities and define them in terms that were part of blueFROG's internal nomenclature. The 'functional zone' approach was considered to be preferable to a purely 'physical zone' approach since future interventions to minimise Footprint would have to be executed through the cooperation and participation of 'functional zone' decision makers and executives. In instances where a single 'functional zone' was physically vast, it was further dissected and sub-zones were identified and named. Again, nomenclature naturally understood by blueFROG management was retained and employed as identifiers for easy interpretation of results.

Since the above could only be achieved following a comprehensive dissection of the business process flow delineating the resource-based interactions of various functional zones within blueFROG, a formalized business process flow was also identified and pursued as an added benefit for blueFROG. It is intended that the resulting process flow chart be utilized for the optimization of blueFROG's internal operations and resource consumption by identifying key intervention areas for adopting resource conservation measures.

The 9 zones and their sub-zones are:

blueFROG's operation was thus identified as comprising the following functional zones:

1. Zone 1 – Club & Bar
- 1.1. Sub-Zone 1.1 – Reception
- 1.2. Sub-Zone 1.2 – Entrance
- 1.3. Sub-Zone 1.3 – Stage
- 1.4. Sub-Zone 1.4 – Green Room

- 1.5. Sub-Zone 1.5 – Men's Toilet
- 1.6. Sub-Zone 1.6 – Women's Toilet
- 1.7. Sub-Zone 1.7 – Service Stations
- 1.8. Sub-Zone 1.8 – Bar
- 1.9. Sub-Zone 1.9 – Show Kitchen
- 1.10. Sub-Zone 1.10 – Back-of-Bar
- 1.11. Sub-Zone 1.11 – Back Office (Chef's + F&B Stores Cabin)
- 1.12. Sub-Zone 1.12 – Bulk Kitchen
- 1.13. Sub-Zone 1.13 – General Area
2. Zone 2 – Studio
- 2.1. Sub-Zone 2.1 – Lounge Area
- 2.2. Sub-Zone 2.2 – Dubbing Room
- 2.3. Sub-Zone 2.3 – Control Room
- 2.4. Sub-Zone 2.4 – Conference Room
- 2.5. Sub-Zone 2.5 – Lobby
- 2.6. Sub-Zone 2.6 – Foyer
- 2.7. Sub-Zone 2.7 – UPS Room
- 2.8. Sub-Zone 2.8 – Store Room
- 2.9. Sub-Zone 2.9 – Entrance
- 2.10. Sub-Zone 2.10 – General Area
3. Zone 3 – Office (HR & Admin.)
4. Zone 7 – Programming
5. Zone 8 – Label
6. Zone 9 – F&B Control and Stores
7. Zone 10 – Kitchen & Food Supplies
8. Zone 11 – Accounts
9. Zone 12 – Marketing

It must be noted that Zones 4, 5, and 6 are 'missing' from the above list. These zones were earlier thought to have functional significance but were later 'absorbed' into the functioning of Zones 7 and 8 as it was understood that their functioning was not truly independent (a pre-requisite for defining 'functional zone').

3.1.1.2 Zonal Input, Processing, and Output Mapping

Each zone was studied in terms of resources purchased, resources processed (for use by another zone), and resources consumed/sold. Zonal heads were identified for each zone and their input was sought for detailing the operation of that zone. The primary device for data collection we specially designed questionnaires addressing the various types of activities.

As far as possible, the data sought was through documented records from blueFROG files. Actual monthly data was sought instead of averages for the chosen time span. This was es-

SECTION III

pecially ensured in the case of Electricity use data - this was obtained directly from billing records for all the electricity connections owned by blueFROG. As far as possible, the data sought was in terms of actual weight/volume of substances used. Items that were tracked primarily in terms of units purchased or used (for instance, toilet paper rolls) were eventually converted to weight units by conducting weight measurements of single units of these items and subsequently multiplying them by the quantities.

The questionnaires indicate that for each resource purchased by a zone, the eventual 'pathway' of the resource through the entire process flow was tracked by obtaining information related to the percentages of the input quantity that were transferred to other zones for consumption, selling, or further processing. Similarly, for each resource used by a zone, its source-zone was tracked to ascertain its interrelation with other zones. Conducting this exercise for each zone led to the emergence of the resource and activity process flow presented in Figure 1

SECTION III

BlueFROG Pvt. Ltd. Carbon Footprint Control Project

Preliminary Site Visit Questionnaire

Date: _____

Zone ID: _____ Zone Name: _____

Zone Contact Person: _____

Zone Employee Strength: _____

Consumption

Annual Electricity Consumption in Zone (kWh): _____

Annual LPG Cylinder/Piped Gas Use in Zone: _____

Annual Qty. of Other Fuels Used: _____

Annual Company/Prog. Related Travel Table: Yes/No (If Yes – fill attached table)

Annual Food & Bev. Consumption / Purchase: Yes/No (If Yes – fill attached table)

Annual Pap. / Plas. / Pack. Consump. / Purchase: Yes/No (If Yes – fill attached table)

Annual Qty. of Other Material Cons. / Purchased: Yes/No (If Yes – fill attached table)

Inventory

Electric / Gas Appliances in Zone: Yes/No (If Yes – fill attached table)

Vehicles Used by Zone: Yes/No (If Yes – fill attached table)

Other Inventory Used by Zone: Yes/No (If Yes – fill attached table)

Flowchart

Inputs into Zone (Zone IDs and Description): _____

Process/Function of Zone: _____

Outputs from Zone (Zone IDs and Description): _____

Notes (Employee's Inputs / Ideas etc): _____

Figure III.1 - Preliminary Zonal Questionnaire – General

SECTION III

BlueFROG Pvt. Ltd. Carbon Footprint Control Project

Preliminary Site Visit Questionnaire – Attachments (Travel)

Date: _____

Zone ID: _____ Zone Name: _____

Annual Company Related Travel Table:

Travel Mode	Routes	Distance	Duration	Expenditure	Fuel Quantity	Traveller Type(s)	Traveller Type % Dist.
Air - Short Haul Domestic Flight Roundtrips (< 45 min. eachway)							
Air - Medium Haul Domestic Flight Roundtrips (45 mins to 1 hr. 30 min. eachway)							
Air - Long Haul Domestic Flight Roundtrips (> 1 hr. 30 min. eachway)							
Air - Short Haul International Flight Roundtrips (< 4 hrs eachway)							
Air - Medium Haul International Flight Roundtrips (4 hrs to 8 hours eachway)							
Air - Long Haul International Flight Roundtrips (> 8 hours eachway)							
Rail Travel – Long Distance							
Rail Travel – Local							
Road Travel – Long Distance Bus							
Road Travel – Local Non AC Bus							
Road Travel – Local AC Bus							
Road Travel – Autorickshaw							
Road Travel – Non AC Taxi							
Road Travel – AC Taxi							
Road Travel – Petrol Vehicle							
Road Travel – Diesel Vehicle							
Road Travel – CNG Vehicle							
Road Travel – LPG Vehicle							

Figure III.2 - Preliminary Zonal Questionnaire – Travel

BlueFROG Pvt. Ltd. Carbon Footprint Control Project
Preliminary Site Visit Questionnaire – Attachments (Food & Bev. + Waste)

Date: _____ Zone Name: _____
 Zone ID: _____ Annual Food & Beverage Use: _____

Item	Qty. (kgs/litres)	Purchased / Processed / Consumed / Sold	Input Zone ID(₹)	% Cont. / Input Zone	Output Zone ID(₹)	% Dist. / Output Zone	Vendor (Brand)
Total Qty. of Beef							
Total Qty. of Mutton							
Total Qty. of Pork							
Total Qty. of Oysters							
Total Qty. of Other Seafood							
Total Qty. of Rice							
Total Qty. of Cheese							
Total Qty. of Milk+Yogurt							
Total Qty. of Alc. Bev. - Type 1 (Beer)							
Total Qty. of Alc. Bev. - Type 2 (Wine)							
Total Qty. of Alc. Bev. - Type 3 (Whiskey)							
Total Qty. of Alc. Bev. - Type 4 (Gin)							
Total Qty. of Alc. Bev. - Type 5 (Vodka)							
Total Qty. of Alc. Bev. - Type 6 (Champagne)							
Total Qty. of Alc. Bev. - Type 7 (Liqueurs)							
Total Qty. of Alc. Bev. - Type 8 (Rum)							
Total Qty. of Alc. Bev. - Type 9 (Others)							
Number of 20-Liter Bottled Water Jars							
Number of 250 ml Bottled Water / Drinks							
Number of 500 ml Bottled Water / Drinks							
Number of 1 Liter Bottled Water / Drinks							
Number of 1.5 Liter Bottled Water / Drinks							
Number of 2 Liter Bottled Water / Drinks							
Number of Juice Cannisters							
Total Qty. of Cooking Oil							
Total Qty. of Solid Waste Produced							
Other							
Other							
Other							
Other							
Other							
Other							
Other							
Other							
Other							

Figure III.3 - Preliminary Zonal Questionnaire – Food, Beverage & Waste

3.1.2 Gathering inputs from internal stakeholders

As is evident from the questionnaires administered, in addition to obtaining operational and consumption data related to resources, the zone's operational staff and decisions makers were solicited for their inputs related to resource conservation measures. This was done to incorporate the invaluable operational insights acquired by the management and implementation team. It was reasoned that perhaps they already had deliberated upon more efficient and less-wasteful process and means of accomplishing tasks at blueFROG but not had the opportunity to convert those ideas into interventions for the overall benefit of the organisation. The results of this 'operational-input' exercise are presented in the subsequent sections related to discussion of results of the 'Realise' phase.

3.1.3 Food-Miles Tracking

In order to study the impacts of supply-source choices on blueFROG's Footprint, the research process involved gathering data related to the supply location (not the 'vendor location', but the initial manufacturing/production source) and mode of transportation for all food and consumables (paper, plastic, cleaning agents etc.) purchased. As it emerged that most of the non-food supplies were manufactured locally, the emphasis was shifted exclusively food items - to meticulously tracking the source location (city and country of origin) and transport modes (ambient, refrigerated, or frozen; via road, rail, sea or air).

In the case of alcoholic beverages, the packaging weight was included as part of the overall food-miles measurement as the glass bottles involved represented a significant proportion of the actual product weight. Packaging weight was ignored in other instances due to the marginal impact on total product weight.

3.1.4 Packaging and Waste Tracking

For each type of supply consumed by blueFROG, the bulk packaging in which the purchased product arrived on site was investigated to ascertain the implicit paper, cardboard, plastic and glass consumption resulting from resource consumption. While the micro-packaging was accounted for quantitatively in the case of beverages (PET bottles, Glass Bottles etc.), for bulk-packaging the exercise was restricted to

qualitative assessment for this phase of the project as its contribution relative to overall direct supplies consumption was uncertain at the outset.

3.1.5 Fixed Capital (Appliance) Inventorying

Electricity-related Footprint was anticipated as being the primary contributor to blueFROG's Footprint during the preliminary project assessment phase. It was evident that the specific electricity consumption of commercial-grade (food and beverage refrigerators, custom-designed lighting etc.) and domestic-grade appliances (fans, office lighting, office air conditioning etc.) was especially relevant for the following reasons:

- to gauge the relative impacts of various functions on overall Footprint and thereby provide the basis of a prioritized intervention-roadmap for future Footprint 'MINIMISE' phase of the project.
- For estimating the energy efficiency related cost savings that could be realised following the implementation of energy management protocols and replacement with energy efficient systems.
- To determining the avoidable vs. unavoidable contributions to the organisations Carbon Footprint (discussed later).

The process for assessing electricity related Carbon Footprint involved conducting an exhaustive zone-wise (and sub-zone wise in the cases of the larger zones such as Club & Bar, Studio etc.) inventory of appliances and collecting data related to their Make, Model, Energy Star Rating (if indicated on the unit), Power Rating (Watts), Rated Capacity (for instance, refrigerator volume or AC tonnage), Usage per week (in hours) and Function. The rationale governing the collection of Power Rating as well as Rated Capacity data was to determine the energy-efficiency ratio so as to identify equipment that consumes disproportionately high energy to perform a given function.

For most thermostat-controlled systems whose power consumption could not be ascertained by merely noting their 'rated power consumption' an energy-time study was conducted. Power-meter measurements were also conducted for systems such as desktop computers and other devices whose power rating was not displayed on the unit.

3.1.6 Contextualising the Result

The aggregate and dissected Carbon Footprints were understood and explained in the context of easily understandable terms (i.e. commonly understood units of Climate Change impacts) to provide perspective that serves to inspire and define actions towards participative (i.e. involving all Stakeholders) mitigation of blueFROG's impact on Climate Change through Footprint minimisation.

3.1.7 Avoidable / Unavoidable Footprint

Consumption of resources by blueFROG, related to providing a defined customer experience or service to clients (i.e. live music, dining experience, and studio facilities for recording artists) were defined as being contributors to 'unavoidable' Footprint. These were activities where choices could not be dictated by considerations of energy efficiency or resource minimization. These activities were kept to a minimum and determined to be comprised of the following:

Studio Audio Electronic Systems, and
Club & Bar Audio/Video Electronic Systems.

The power consumption resulting from these systems was measured as a discrete component of Carbon Footprint and isolated to assess the proportion of unavoidable versus avoidable Footprint for the organisation.

3.1.8 Employee / Guest Footprint

In parallel to the avoidable/unavoidable Footprint assessment described earlier, another aspect of the research methodology that was designed to provide diagnostic information useful for establishing a prioritized intervention road map was tracking of employee versus guest-related activity Footprint. This exercise was predicated on the idea that Guest related Footprint involves great constraints on choice while

more liberties can be exercised in relation to addressing employee activity related Footprint. In the context of this project, this differentiation was particularly investigated in relation to air travel activities for Guest Artists versus blueFROG employee air travel.

3.2 Analysis Methodology

3.2.1 Spreadsheet Framework

Data was entered into custom-designed spreadsheet frameworks; each zone had 5 spreadsheets attributed to it for calculating Footprints related to specific sets of activities: Sheet 1 for Direct Fuel emissions and indirect emissions from Electricity and Water Sheet 2 for Travel related emissions, Sheet 3 for Food, Beverage and Waste, Sheet 4 for other Consumables, Sheet 5 for zonal electrical appliance inventory.

Food, Beverage and Consumables spreadsheets were linked across zones to correlate resources and their associated Footprint transferred to, or absorbed from, another functional zone.

3.2.2 Resource / Activity Tagging

Each resource/activity inventoried during research was tagged and collated under Footprint-head groups. Table 7 presents the list of Footprint-head groups used for data classification. The governing principle for the elaborate data classification was to provide intrinsic intra-zonal and cross-zonal analytic capability across any specific Footprint-head and aggregated Footprint analysis across zones to gauge relative zonal impacts.

SECTION III

Table III.1 Resource / Activity Footprint-Head Tagging

Footprint Head	Item Type	Item Sub-Type
Electricity Consumption		
Electricity	Electricity - Gross	Electricity
Water Consumption		
Water	Water	Water - Municipal
Water	Water	Water - Tanker
Fuel Consumption (Non-Travel)		
Fuel	Cooking Fuel	LPG - Commercial
Fuel	Cooking Fuel	PNG
Fuel	Cooking Fuel	Wood
Fuel	Cooking Fuel	Electricity
Fuel	Cooking Fuel	Charcoal
Fuel	Generator Fuel	Diesel
Travel		
Travel	Domestic Air Travel	Dom. Air - Short
Travel	Domestic Air Travel	Dom. Air - Medium
Travel	Domestic Air Travel	Dom. Air - Long
Travel	International Air Travel	Int. Air - Short
Travel	International Air Travel	Int. Air - Medium
Travel	International Air Travel	Int. Air - Long
Travel	Intercity Travel - Public	Long Dist. Rail
Travel	Intercity Travel - Public	Long Dist. Bus
Travel	City Travel - Public	Local Rail
Travel	City Travel - Public	Local Non AC Bus
Travel	City Travel - Public	Local AC Bus
Travel	City Travel - Private	Autorickshaw
Travel	City Travel - Private	Non AC Taxi
Travel	City Travel - Private	AC Taxi
Travel	City Travel - Private	2 Wheeler - 4ST Petrol
Travel	<i>City Travel - Private</i>	<i>Petrol 4-Door Car - City</i>
Travel	<i>Intercity Travel - Private</i>	<i>Petrol 4-Door Car - Highway</i>
Travel	<i>City Travel - Private</i>	<i>Diesel 4-Door Car - City</i>
Travel	<i>Intercity Travel - Private</i>	<i>Diesel 4-Door Car - Highway</i>
Travel	<i>City Travel - Private</i>	<i>CNG 4-Door Car - City</i>
Travel	<i>Intercity Travel - Private</i>	<i>CNG 4-Door Car - Highway</i>
Travel	<i>City Travel - Private</i>	<i>LPG 4-Door Car - City</i>
Travel	<i>Intercity Travel - Private</i>	<i>LPG 4-Door Car - Highway</i>
Travel	<i>City Travel - Private</i>	<i>Bio-Diesel 4-Door Car - City</i>
Travel	<i>Intercity Travel - Private</i>	<i>Bio-Diesel 4-Door Car - Highway</i>
Travel	<i>City Travel - Private</i>	<i>Electric 4-Door Car - City</i>
Travel	<i>Intercity Travel - Private</i>	<i>Electric 4-Door Car - Highway</i>
Food, Beverage, Waste		
Food & Beverage	Meat	Beef

SECTION III

<i>Footprint Head</i>	<i>Item Type</i>	<i>Item Sub-Type</i>
Food & Beverage	Meat	Mutton
Food & Beverage	Meat	Pork
Food & Beverage	Meat	Chicken
Food & Beverage	Seafood	Oysters
Food & Beverage	Seafood	Fish
Food & Beverage	Seafood	Scallops
Food & Beverage	Seafood	Chilean Sea Bass
Food & Beverage	Dairy	Mascarpone Cheese
Food & Beverage	Dairy	Bocconcini Cheese
Food & Beverage	Dairy	Parmesan Cheese
Food & Beverage	Dairy	Feta Cheese
Food & Beverage	Dairy	Philadelphia Cheese
Food & Beverage	Dairy	Fondue Cheese
Food & Beverage	Dairy	Tofu Cheese
Food & Beverage	Dairy	Gorgonzola Cheese
Food & Beverage	Dairy	Amul Slice Cheese
Food & Beverage	Dairy	Ricotta Cheese
Food & Beverage	Dairy	Indian Cheddar Cheese
Food & Beverage	Dairy	British Cheddar Cheese
Food & Beverage	Dairy	Camembert Cheese
Food & Beverage	Dairy	Cow Milk
Food & Beverage	Dairy	Carton Milk - Regular
Food & Beverage	Dairy	Carton Milk - Regular
Food & Beverage	Dairy	Carton Milk - Skim
Food & Beverage	Dairy	Buffalo Milk
Food & Beverage	Dairy	Yogurt
Food & Beverage	Dairy	Regular Butter
Food & Beverage	Dairy	Fresh Cream
Food & Beverage	Rice	Arborio Rice
Food & Beverage	Rice	Regular Rice
Food & Beverage	Other Groceries	Cooking Oil - Sunflower
Food & Beverage	Other Groceries	Cooking Oil - Olive
Food & Beverage	Other Groceries	Indian Vegetables
Food & Beverage	Other Groceries	International Vegetables
Food & Beverage	Other Groceries	Tea Bags
Food & Beverage	Other Groceries	Packaged Coffee
Food & Beverage	Other Groceries	Packet Sugar
Food & Beverage	Other Groceries	Packet Sugar
Food & Beverage	Other Groceries	Loose Sugar
Food & Beverage	Other Groceries	Pastas
Food & Beverage	Other Groceries	Artichokes (canned)
Food & Beverage	Other Groceries	Wine Vinegars
Food & Beverage	Other Groceries	Olives
Food & Beverage	Other Groceries	Prunes
Food & Beverage	Other Groceries	Soya Sauces
Food & Beverage	Other Groceries	French Fries
Food & Beverage	Other Groceries	Tomato Ketchup
Food & Beverage	Other Groceries	Maple Syrup
Food & Beverage	Other Groceries	Tobasco

SECTION III

Footprint Head	Item Type	Item Sub-Type
Food & Beverage	Other Groceries	Table Salt
Food & Beverage	Other Groceries	Pepper
Food & Beverage	Other Groceries	Lemon Barley
Food & Beverage	Alcoholic Beverages	Beer – Domestic
Food & Beverage	Alcoholic Beverages	Beer – Domestic
Food & Beverage	Alcoholic Beverages	Beer – International
Food & Beverage	Alcoholic Beverages	Wine – Domestic
Food & Beverage	Alcoholic Beverages	Wine – International
Food & Beverage	Alcoholic Beverages	Spirits – Domestic
Food & Beverage	Alcoholic Beverages	Spirits – International
Food & Beverage	Bottled Water / Drinks	Water - 20 Liter Jars
Food & Beverage	Bottled Water / Drinks	Water - 250 ml PET Bottles
Food & Beverage	Bottled Water / Drinks	Water - 500 ml PET Bottles
Food & Beverage	Bottled Water / Drinks	Water - 1 Liter PET Bottles
Food & Beverage	Bottled Water / Drinks	Water - 1.5 Liter PET Bottles
Food & Beverage	Bottled Water / Drinks	Water - 2.0 Liter PET Bottles
Food & Beverage	Bottled Water / Drinks	Avg. Bottled Water - PET Bottle
Food & Beverage	Bottled Water / Drinks	Soft Drink - 250 ml Can
Food & Beverage	Bottled Water / Drinks	Soft Drink - 330 ml Can
Food & Beverage	Bottled Water / Drinks	Soft Drink - 500 ml PET Bottle
Food & Beverage	Bottled Water / Drinks	Soft Drink - 200 ml Glass Bottle
Food & Beverage	Bottled Water / Drinks	Soft Drink - 330 ml Glass Bottle
Food & Beverage	Bottled Water / Drinks	Soft Drink - 500 ml Glass Bottle
Food & Beverage	Bottled Water / Drinks	Soft Drink - 18 Liter Cannister
Food & Beverage	Bottled Water / Drinks	Avg. Soft Drink
Food & Beverage	Bottled Water / Drinks	Fruit Juice - 1 L Tetrapak
Waste	Waste Production	Organic Waste – Landfilled
Waste	Waste Production	Recyclable Waste – Landfilled
Waste	Waste Production	Organic Waste – Composted
Waste	Waste Production	Recyclable Waste – Recycled
Paper, Plastic & Consumables		
Paper, Plastic & Consum.	Cleaning Products	Cleaner - Air Freshener
Paper, Plastic & Consum.	Cleaning Products	Cleaner – Disinfectant
Paper, Plastic & Consum.	Cleaning Products	Cleaner - Caustic Soda
Paper, Plastic & Consum.	Cleaning Products	Cleaner – Phenyl
Paper, Plastic & Consum.	Cleaning Products	Cleaner – General
Paper, Plastic & Consum.	Cleaning Products	Cleaner – Glass

SECTION III

<i>Footprint Head</i>	<i>Item Type</i>	<i>Item Sub-Type</i>
Paper, Plastic & Consum.	Cleaning Products	Cleaner - Industrial Appliance
Paper, Plastic & Consum.	Cleaning Products	Cleaner – Sanitiser
Paper, Plastic & Consum.	Cleaning Products	Cleaner – Sink
Paper, Plastic & Consum.	Cleaning Products	Cleaner – Toilet
Paper, Plastic & Consum.	Cleaning Products	Detergent – Dishwashing
Paper, Plastic & Consum.	Cleaning Products	Detergent – Dishwashing
Paper, Plastic & Consum.	Cleaning Products	Detergent – Laundry
Paper, Plastic & Consum.	Cleaning Products	Essential Oil - Nilgiri Oil
Paper, Plastic & Consum.	Cleaning Products	Soap – Liquid
Paper, Plastic & Consum.	Cleaning Products	Cleaner – Turpentine
Paper, Plastic & Consum.	Cloth	Dinner Napkin
Paper, Plastic & Consum.	Cloth	Cocktail Napkin
Paper, Plastic & Consum.	Cloth	Manager's Shirt
Paper, Plastic & Consum.	Cloth	Manager's Pant
Paper, Plastic & Consum.	Cloth	Captain Shirt
Paper, Plastic & Consum.	Cloth	Captain Pant
Paper, Plastic & Consum.	Cloth	Hostess Dress
Paper, Plastic & Consum.	Cloth	Hostess White Top
Paper, Plastic & Consum.	Cloth	Hostess Black Skirt
Paper, Plastic & Consum.	Cloth	Bouncer Shirt
Paper, Plastic & Consum.	Cloth	Bouncer Pant

SECTION III

Footprint Head	Item Type	Item Sub-Type
Paper, Plastic & Consum.	Cloth	Valet Shirt
Paper, Plastic & Consum.	Cloth	Valet Pant
Paper, Plastic & Consum.	Cloth	Steward T-Shirt
Paper, Plastic & Consum.	Cloth	Steward Jeans
Paper, Plastic & Consum.	Cloth	Black Tie
Paper, Plastic & Consum.	Cloth	Blue Tie
Paper, Plastic & Consum.	Cloth	Sky Blue Shirt
Paper, Plastic & Consum.	Cloth	White Shirt (Captain)
Paper, Plastic & Consum.	Cloth	White T- Shirt (Stewards)
Paper, Plastic & Consum.	Cloth	Black Aprons
Paper, Plastic & Consum.	Cloth	White Aprons (Service)
Paper, Plastic & Consum.	Cloth	Chef Coat
Paper, Plastic & Consum.	Cloth	Chef Pant
Paper, Plastic & Consum.	Cloth	Mrigank Chef Coat (White)
Paper, Plastic & Consum.	Cloth	Mrigank Chef Pant (White)
Paper, Plastic & Consum.	Cloth	Mrigank Chef Coat (Black)
Paper, Plastic & Consum.	Cloth	Mrigank Chef Pant (Black)
Paper, Plastic & Consum.	Cloth	Nilesh Chef Coat
Paper, Plastic & Consum.	Cloth	Nilesh Chef Pant
Paper, Plastic & Consum.	Cloth	Rahul Chef Coat
Paper, Plastic & Consum.	Cloth	JD Chef Coat

SECTION III

Footprint Head	Item Type	Item Sub-Type
Paper, Plastic & Consum.	Cloth	Jd Chef Pant
Paper, Plastic & Consum.	Cloth	JD Chef Black Coat
Paper, Plastic & Consum.	Cloth	JD Chef Black Pant
Paper, Plastic & Consum.	Cloth	Bala Chef Pant
Paper, Plastic & Consum.	Cloth	Apron White (Chef)
Paper, Plastic & Consum.	Cloth	Chef Cap (White)
Paper, Plastic & Consum.	Cloth	Chef Cap (Black)
Paper, Plastic & Consum.	Cloth	Grey Shirt Maint/Store
Paper, Plastic & Consum.	Cloth	Grey Pant Maint/Store
Paper, Plastic & Consum.	Cloth	Maintainance Black Pant
Paper, Plastic & Consum.	Cloth	HK/Stewarding Shirt
Paper, Plastic & Consum.	Cloth	HK/Stewarding Pant
Paper, Plastic & Consum.	Cloth	Black Dinner Napkin
Paper, Plastic & Consum.	Cloth	Turkish Towel (Lg)
Paper, Plastic & Consum.	Cloth	Turkish Towel (Sml)
Paper, Plastic & Consum.	Cloth	Satin Cloth
Paper, Plastic & Consum.	Cloth	Manager Blazer
Paper, Plastic & Consum.	Cloth	Chef Amit Bajaj Chef Coat
Paper, Plastic & Consum.	Cloth	Chef Vikram White Coat
Paper, Plastic & Consum.	Cloth	Chef Vikram Black Coat
Paper, Plastic & Consum.	Cloth	Chef Vishnu White Coat

SECTION III

Footprint Head	Item Type	Item Sub-Type
Paper, Plastic & Consum.	Cloth	Bedsheets (Double)
Paper, Plastic & Consum.	Cloth	Pillow Covers
Paper, Plastic & Consum.	Cloth	Staff Towels
Paper, Plastic & Consum.	Cloth	Beds
Paper, Plastic & Consum.	Glass	Beer Goblet
Paper, Plastic & Consum.	Glass	Brandy Balloon
Paper, Plastic & Consum.	Glass	Champagne Tulip
Paper, Plastic & Consum.	Glass	Cocktail Pitchers
Paper, Plastic & Consum.	Glass	Decanters - 200 MI
Paper, Plastic & Consum.	Glass	Decanters - 500 MI
Paper, Plastic & Consum.	Glass	Hurricane Glass/Zombie
Paper, Plastic & Consum.	Glass	Marguerita
Paper, Plastic & Consum.	Glass	Martini Glass
Paper, Plastic & Consum.	Glass	Red Wine Glass
Paper, Plastic & Consum.	Glass	Rock Glass
Paper, Plastic & Consum.	Glass	Shot Glass
Paper, Plastic & Consum.	Glass	Tom Collins Glass
Paper, Plastic & Consum.	Glass	Water Goblet
Paper, Plastic & Consum.	Glass	White Wine Glass
Paper, Plastic & Consum.	Glass	Wine Decanters
Paper, Plastic & Consum.	Glass	Stella glasses

SECTION III

<i>Footprint Head</i>	<i>Item Type</i>	<i>Item Sub-Type</i>
Paper, Plastic & Consum.	Glass	Hoegaarden glasses
Paper, Plastic & Consum.	Glass	Water Jug
Paper, Plastic & Consum.	Ceramic	Rim Plate 29cm
Paper, Plastic & Consum.	Ceramic	Rim Plate 23.5cm
Paper, Plastic & Consum.	Ceramic	Pasta Plate 28cm
Paper, Plastic & Consum.	Ceramic	Soup Pasta Bowl 20.5cm
Paper, Plastic & Consum.	Ceramic	Sauce Boat (L) 320cc
Paper, Plastic & Consum.	Ceramic	Dish 10cm
Paper, Plastic & Consum.	Ceramic	Rectangular Tray 29cm
Paper, Plastic & Consum.	Ceramic	Demitasse Cup 100cc
Paper, Plastic & Consum.	Ceramic	Saucer Demi
Paper, Plastic & Consum.	Ceramic	Cappuccino Cup 220cc
Paper, Plastic & Consum.	Ceramic	Saucer Cappuccino
Paper, Plastic & Consum.	Ceramic	Oval Plate 26cm
Paper, Plastic & Consum.	Ceramic	Bowl 5.5cm 40cc
Paper, Plastic & Consum.	Ceramic	Rd. Divided Dish 10cm
Paper, Plastic & Consum.	Ceramic	3-Compartment Sauce Dish
Paper, Plastic & Consum.	Ceramic	Creamer (S) 80cc
Paper, Plastic & Consum.	Ceramic	Square Plate 27cm (L=270, H=30)
Paper, Plastic & Consum.	Ceramic	Towel Tray 17.5cm
Paper, Plastic & Consum.	Ceramic	Sugar Packet Holder

SECTION III

<i>Footprint Head</i>	<i>Item Type</i>	<i>Item Sub-Type</i>
Paper, Plastic & Consum.	Ceramic	Sugar Bowl Body 250cc
Paper, Plastic & Consum.	Ceramic	3 Dips
Paper, Plastic & Consum.	Ceramic	Bowl 13cm
Paper, Plastic & Consum.	Hygiene Products	Body spray
Paper, Plastic & Consum.	Hygiene Products	Conditioner
Paper, Plastic & Consum.	Hygiene Products	Shampoo
Paper, Plastic & Consum.	Hygiene Products	Soap - Bodywash
Paper, Plastic & Consum.	Hygiene Products	Soap - Handwash
Paper, Plastic & Consum.	Paper	Newspaper - Daily
Paper, Plastic & Consum.	Paper	Magazine - Monthly
Paper, Plastic & Consum.	Paper	Magazine - Bi-Weekly
Paper, Plastic & Consum.	Paper	Weekly
Paper, Plastic & Consum.	Paper	Business Cards
Paper, Plastic & Consum.	Paper	Cardboard Box
Paper, Plastic & Consum.	Paper	Coasters - 3" Dia.
Paper, Plastic & Consum.	Paper	Diary - Telephone
Paper, Plastic & Consum.	Paper	Envelope - Brown A4
Paper, Plastic & Consum.	Paper	Envelope - Brown - Check Size
Paper, Plastic & Consum.	Paper	Envelope - Brown - Check Size (Custom)
Paper, Plastic & Consum.	Paper	Envelope - Green Cloth - A4
Paper, Plastic & Consum.	Paper	Files - Box Type

SECTION III

<i>Footprint Head</i>	<i>Item Type</i>	<i>Item Sub-Type</i>
Paper, Plastic & Consum.	Paper	Misc. Paper - Coupons - 6" x 2"

Table III.1 Resource / Activity Footprint-Head Tagging

Data collation done in such a manner allowed for quantities (i.e. liters, kgs, pieces of items, kilometers of air travel etc.) of the same resources or activities across to be aggregated across zones. This would prove to be of utility as an overall organisational and cost-estimating tool for equipment overhaul (if warranted) and other administrative interventions beyond the purposes of Carbon Footprint analysis

3.3 GHG Emission Factors

Activity data collated according to the framework described earlier was multiplied by the appropriate Greenhouse Gas (GHG) Emissions Factors specifically developed for India and in instances, specific to Maharashtra. These coefficients are presented in Appendix A. The product of the resource quantities and the GHG Emission Factors yielded the Carbon Footprint for the particular activity.

Table III.2 Resource / Activity Footprint-Head Tagging

Footprint Head	EF Type	Weight EF	Units	Qty. EF	Units	Distance EF	Units
Electricity	Electricity			1.71	kg CO2/kWh		
Fuel	Charcoal	1.89	kg CO2e/kg				
Fuel	Diesel	3.19	kg CO2e/kg	2.66	kg CO2e/liter		
Fuel	LPG - Commercial	3.13	kg CO2e/kg				
Fuel	LPG - Domestic	3.13	kg CO2e/kg				
Fuel	PNG			0.00	kg CO2e/liter		
Fuel	Wood	1.89	kg CO2e/kg				
Water	Water - Municipal			0.00	kg CO2e/liter		
Water	Water - Tanker			0.00	kg CO2e/liter		
Travel	2 Wheeler - 4 ST Petrol	3.17	kg CO2e/kg	2.37	kg CO2e/liter	0.04	kg CO2e/v-km
Travel	Autotickshaw					0.08	kg CO2e/v-km
Travel	CNG 4-Door Car - City	2.48	kg CO2e/kg			0.15	kg CO2e/v-km
Travel	CNG 4-Door Car - Highway	2.48	kg CO2e/kg			0.11	kg CO2e/v-km
Travel	Diesel 4-Door Car - City	3.19	kg CO2e/kg	2.66	kg CO2e/liter	0.21	kg CO2e/v-km
Travel	Diesel 4-Door Car - Highway	3.19	kg CO2e/kg	2.66	kg CO2e/liter	0.16	kg CO2e/v-km
Travel	Dom. Air - Long - COEFF A						kg CO2e/pass/km
Travel	Dom. Air - Long - COEFF B					0.07	kg CO2e/pass/km
Travel	Dom. Air - Long - COEFF C					27.97	kg CO2e/pass/km
Travel	Dom. Air - Medium - COEFF A						kg CO2e/pass/km
Travel	Dom. Air - Medium - COEFF B					0.07	kg CO2e/pass/km
Travel	Dom. Air - Medium - COEFF C					27.97	kg CO2e/pass/km
Travel	Dom. Air - Short - COEFF A						kg CO2e/pass/km
Travel	Dom. Air - Short - COEFF B					0.07	kg CO2e/pass/km
Travel	Dom. Air - Short - COEFF C					27.97	kg CO2e/pass/km
Travel	Int. Air - Long - COEFF A					0.00	kg CO2e/pass/km
Travel	Int. Air - Long - COEFF B					0.04	kg CO2e/pass/km
Travel	Int. Air - Long - COEFF C					109.09	kg CO2e/pass/km
Travel	Int. Air - Medium - COEFF A					0.00	kg CO2e/pass/km
Travel	Int. Air - Medium - COEFF B					0.04	kg CO2e/pass/km
Travel	Int. Air - Medium - COEFF C					109.09	kg CO2e/pass/km
Travel	Int. Air - Short - COEFF A					0.00	kg CO2e/pass/km
Travel	Int. Air - Short - COEFF B					0.04	kg CO2e/pass/km

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Footprint Head	EF Type	Weight EF	Units	Qty. EF	Units	Distance EF	Units
Travel	Int. Air - Short - COEFF C					109.09	kg CO2e/pass/km
Travel	Local AC Bus					0.03	kg CO2e/pass/km
Travel	Local Non AC Bus					0.02	kg CO2e/pass/km
Travel	Local Rail					0.02	kg CO2e/pass/km
Travel	Long Dist. Bus					0.01	kg CO2e/pass/km
Travel	Long Dist. Rail					0.02	kg CO2e/pass/km
Travel	LPG 4-Door Car - City			1.50	kg CO2e/liter		
Travel	LPG 4-Door Car - Highway			1.50	kg CO2e/liter		
Travel	Non AC Taxi					0.18	kg CO2e/v-km
Travel	Petrol 4-Door Car - City	3.17	kg CO2e/kg	2.37	kg CO2e/liter	0.23	kg CO2e/v-km
Travel	Petrol 4-Door Car - Highway	3.17	kg CO2e/kg	2.37	kg CO2e/liter	0.17	kg CO2e/v-km
F&B	Beef	8.61	kg CO2e/kg				
F&B	Beer - Domestic			0.53	kg CO2e/liter		
F&B	Beer - International			0.33	kg CO2e/liter		
F&B	Butter	23.76	kg CO2e/kg				
F&B	Cheese	8.48	kg CO2e/kg				
F&B	Chicken	4.48	kg CO2e/kg				
F&B	Chilean Sea Bass	6.60	kg CO2e/kg				
F&B	Fish	3.76	kg CO2e/kg				
F&B	Fresh Cream	7.60	kg CO2e/kg				
F&B	Milk - Avg.	0.89	kg CO2e/kg	0.92	kg CO2e/liter		
F&B	Milk - Cow	0.96	kg CO2e/kg	0.99	kg CO2e/liter		
F&B	MSW - Landfilled	0.57	kg CO2e/kg				
F&B	Mutton	12.69	kg CO2e/kg				
F&B	Oysters	3.76	kg CO2e/kg				
F&B	Pork	5.53	kg CO2e/kg				
F&B	Rice	0.92	kg CO2e/kg				
F&B	Scallops	3.76	kg CO2e/kg				
F&B	Soft Drink - 500 ml PET Bottle			0.15	kg CO2e/bottle		
F&B	Spirits			0.84	kg CO2e/liter		
F&B	Water - 1 Liter PET Bottles			0.27	kg CO2e/bottle		
F&B	Water - 1.5 Liter PET Bottles			0.41	kg CO2e/bottle		
F&B	Water - 2.0 Liter PET Bottles			0.55	kg CO2e/bottle		
F&B	Water - 20 Liter Jars			0.45	kg CO2e/bottle		

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Footprint Head	EF Type	Weight EF	Units	Qty. EF	Units	Distance EF	Units
F&B	Water - 250 ml PET Bottles			0.07	kg CO2e/bottle		
F&B	Water - 500 ml PET Bottles			0.14	kg CO2e/bottle		
F&B	Wine			0.68	kg CO2e/liter		
F&B	Yogurt	1.92	kg CO2e/kg				
Consumables	Coated Freesheet (High-End Magazine Paper)-COEFF B	-0.99	kg CO2e/kg				
Consumables	Coated Freesheet (High-End Magazine Paper)-COEFF C	2.49	kg CO2e/kg	0.75	kg CO2e/magazine		
Consumables	Coated Groundwood (Standard Magazine)-COEFF B	-1.38	kg CO2e/kg				
Consumables	Coated Groundwood (Standard Magazine)-COEFF C	2.87	kg CO2e/kg				
Consumables	Corrugated (Avg.)-COEFF B	-1.32	kg CO2e/kg				
Consumables	Corrugated (Avg.)-COEFF C	2.63	kg CO2e/kg				
Consumables	Corrugated (Bleached)-COEFF B	-1.32	kg CO2e/kg				
Consumables	Corrugated (Bleached)-COEFF C	2.77	kg CO2e/kg				
Consumables	Corrugated (Semi-bleached)-COEFF B	-1.33	kg CO2e/kg				
Consumables	Corrugated (Semi-bleached)-COEFF C	2.58	kg CO2e/kg				
Consumables	Corrugated (Unbleached)-COEFF B	-1.31	kg CO2e/kg				
Consumables	Corrugated (Unbleached)-COEFF C	2.55	kg CO2e/kg				
Consumables	Paperboard (Avg.)-COEFF B	0.06	kg CO2e/kg				
Consumables	Paperboard (Avg.)-COEFF C	2.62	kg CO2e/kg				
Consumables	Paperboard (Coated Recycled Board)-COEFF B	0.00	kg CO2e/kg				

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Footprint Head	EF Type	Weight EF	Units	Qty. EF	Units	Distance EF	Units
Consumables	Paperboard (Coated Recycled Board)-COEFF C	1.44	kg CO2e/kg				
Consumables	Paperboard (Coated Unbleached Kraft)-COEFF B	1.51	kg CO2e/kg				
Consumables	Paperboard (Coated Unbleached Kraft)-COEFF C	3.11	kg CO2e/kg				
Consumables	Paperboard (Solid Bleached Sulfate)-COEFF B	-1.54	kg CO2e/kg				
Consumables	Paperboard (Solid Bleached Sulfate)-COEFF C	3.24	kg CO2e/kg				
Consumables	Paperboard (Uncoated Bleached Kraft) -COEFF B	-1.09	kg CO2e/kg				
Consumables	Paperboard (Uncoated Bleached Kraft) -COEFF C	2.76	kg CO2e/kg				
Consumables	Paperboard (Uncoated Unbleached Kraft)-COEFF B	1.42	kg CO2e/kg				
Consumables	Paperboard (Uncoated Unbleached Kraft)-COEFF C	2.56	kg CO2e/kg				
Consumables	Plastic	2.53	kg CO2e/kg				
Consumables	Supercalendered (Newspaper Inserts)-COEFF B	-1.53	kg CO2e/kg				
Consumables	Supercalendered (Newspaper Inserts)-COEFF C	3.31	kg CO2e/kg				
Consumables	Uncoated Freesheet (Copy Paper)-COEFF B	-0.95	kg CO2e/kg				
Consumables	Uncoated Freesheet (Copy Paper)-COEFF C	2.58	kg CO2e/kg	0.01	kg CO2e/ sheet		
Consumables	Uncoated Groundwood (Newsprint)-COEFF B	-1.61	kg CO2e/kg				
Consumables	Uncoated Groundwood (Newsprint)-COEFF C	3.16	kg CO2e/kg	0.35	kg CO2e/ newspaper		
Other	Ironing - Dhobi			0.14	kg CO2e/ clothing_item		

Table III.2 Resource / Activity Footprint-Head Tagging

3.4 Footprint Extrapolation

The activity data gathered for this project was for 3 representative business months. The Footprint values obtained from this analysis was thus multiplied by a factor of 4 to obtain average Annual Carbon Footprint in tons of Carbon Dioxide Equivalents (CO₂e) per year.

3.5 Assumptions

The following are the key assumptions made during the project analysis:

- Only services/products paid for by blueFROG or received in exchange of services are included in the resource consumption inventory.
- The following types of supplies were not considered for resource inventory calculation for the Club & Bar: Cutlery, Coffee Count, Non-chemical House-keeping Supplies, Bar Equipments, Electronics, Engineering Maintenance Supplies, and Furniture.
- All Office Supply consumables were inventoried but, besides products comprising of paper, cardboard and plastic, were not considered for Footprint calculations.
- Paper content assumed to contain 0% post-consumer recycled content for Footprint calculation purposes.
- Laundry Ironing Footprint allocated entirely to Zone 1 (Club & Bar) despite some clothing needs clearly due to Kitchen and Food Supplies (Zone 10) use (Chef etc.).
- All paper, plastic and consumables consumption for Label and Programming Zones attributed to 'Office' due to inaccurate percentage allocation information.
- For electrical appliance power consumption calculations: Office Kitchen Systems Use: 1) Electric Kettle: 2 minutes per cup per employee per day. 2) Coffee Maker: 1 min per cup, 2 cups per employee/guest per day. 3) Microwave: 3 minutes per employee per day. Office Employee Strength assumed to be 15, Studio Employee and Guest Strength assumed to be 15.
- Meat/Seafood waste while processing (e.g. reject chicken weight per kg), not deducted from Meat/Seafood Footprint calculation. Food processing waste generation included in zonal Footprint calculation as part of overall waste generation from business activities.
- Alcohol Emission Factors (EF) differentiated for Domestic and International Beer since electricity data for overall manufacturing available and hence possibility of making the EF more India-specific by altering the electricity related emissions. Data for Wine and Spirits was not differentiable between electricity and other resources hence Domestic - International differentiation not included for Wine and Spirits.
- All Alcoholic beverages assumed to be sold in glass bottles for Footprint calculation purposes. Impact of aluminum cans sold, if any, on Footprint excluded from this study.
- Distance of 53 kms, 15 kms and 9 kms, respectively, by Road Transport added to all ocean freight, air freight and rail freight calculations to account for travel from Nhava Sheva Port, Mumbai, Mumbai Airport and CST Rail Terminal to Lower Parel
- International Meat/Seafood assumed to be transported via ocean freight in frozen condition.
- International Perishable Items assumed to be transported via refrigerated/frozen airfreight.
- International Non-Perishable Items assumed to be transported via ocean freight in ambient conditions.
- Frozen ocean freight emission factors calculated as ratio of refrigerated ocean freight data based on road freight ratios from frozen and refrigerated transport GHG emissions research.
- All Road transport assumed to be conducted in Diesel fuelled Heavy Motor Vehicles.
- Packaging weight included for Alcoholic Beverages but not for any other F&B items for 'Food-Miles' and Transportation Footprint calculations.
- GHG Emissions coefficients for Chicken, Cheese, Cream, Butter and Yogurt based on international LCA data from 'Gemis 45' database and are not India-specific.
- All inter-city flight distances calculated using travelmath.com, road distances using mapmyindia.com, ocean distances using searates.com.
- Water GHG Emissions Factors estimated to be 2 gm/liter (for municipal and tanker water) based on IIM-A Water Carbon Footprint Research by Prof. Amit Garg and Ms.

3.6 Data Gaps

The existing resource consumption inventory and Annual Carbon Footprint magnitude is influenced by a few clearly identified data-gaps (in the context of the finite Footprint calculation boundary). However, their impact on Total Footprint and the resultant activity, zonal and stakeholder differentiations is expected to be minimal. Primary amongst these data gaps are:

- Transportation distances and vehicular fuel efficiency for 'local' F&B as well as other consumable supplies.
- Transportation distance, operational electricity and resource consumption of water vendors, and vehicular fuel efficiency of tankers transporting water to site.
- blueFROG sponsored travel activities in other nations (subsequent to air travel to those locations – which is included in the Footprint calculations).
- Accurate energy consumption of 3-phase air-conditioning and ventilation systems of Club & Bar and Studio. Their high current-draw prevents direct 'in-line' energy measurement over an adequate time-span to gage 'average' hourly energy consumption as achieved for all other electrical appliances. Project data analysis currently relies upon power consumption estimates provided by blueFROG's Maintenance and Engineering Department staff based on 'clamp-on' Ammeters providing instantaneous energy consumption estimates. An 80%-20% time-split for on-off durations respectively, has been incorporated to account for energy regulation provided by thermostat operation.
- Accurate energy consumption of Office Split-AC units not known due to concealed wiring which prevents 'in-line' measurements and hence theoretical estimates based on power rating used for analysis.
- Waste generation from Club & Bar is not differentiable amongst organic and recyclable dry-waste and hence waste generation Footprint is an estimate based on assuming a typical 'household' mix of the kind used in studies to estimate landfill GHG emissions.

3.7 Uncertainties

3.7.1 Activity-Data Uncertainty

Most activity data was obtained through meticulous survey of filed records for supply purchases and utility bills. Instances wherein activity data was obtained through estimates include:

- MunicipalWaterconsumption–estimatedthrough'height' difference in receiving tank during daily filling-cycle.
- Waste generation – estimated through daily weighing of garbage bags over 2 to 3 days in the various waste-generating functional zones.
- Approximate weights and volumes for certain paper and plastic consumables are estimated to add a limited degree uncertainty to those calculations.

3.7.2 Electrical-Appliance Energy Inventory Uncertainty

The primary uncertainty in the appliance energy consumption and resultant Footprint calculation arises from 'usage' in hours/week of the various appliances inventoried. 'Usage' data was obtained through interviews with zonal operational staff. Responses could have an uncertainty ranging from 15 to 25 %.

Uncertainty in energy consumption of the Air Conditioning units discussed earlier is a source of unquantifiable uncertainty due to measurement limitations.

Measurement of cooking-appliance energy consumption was conducted, in some instances, under non-actual food preparation conditions i.e. baking ovens without any substance being baked. This was unavoidable as measurement of energy consumption was not possible during actual food-preparation periods for certain activities. These simulated conditions could have added uncertainty to the power consumption of certain food-heating appliances that would possibly display different 'on-off' thermostat controlled cycles in actual food preparation conditions.

Ambient temperature conditions, affected by daily and seasonal variations, would also affect the performance of heating and cooling appliances. This adds an element of unquantifiable uncertainty in the Appliance Energy Inventory process.

Confidence in the Appliance Energy Inventory, despite the above mentioned sources of uncertainty, is high based on

the following observation: the total electricity consumption related Carbon Footprint based on electricity billing was calculated to be 1,206 tons CO₂e/year while individual appliance inventorying yielded a total value of 1,399 tons. This represents a %-difference of approximately 14%; within the margin of error due to human approximation of weekly appliance usage hours.

It must be noted, however, that the electrical appliance energy consumption related uncertainty does not impact the total Footprint calculations but rather the functional-differentiation of energy consumption amongst various appliances and their related Footprints.

3.7.3 Emission Factor Uncertainty

The following EF-related assumptions are known to add uncertainty to the Footprint calculations:

- All paper related items were assumed to be composed of paper with an Emission Factor equivalent to that of the commonly used A4-size computer printer paper in most offices (technically referred to as 'Uncoated Freesheet'). Ideally, unique EFs would be used for different paper products. However, unavailability of adequate research-based EFs prevented adoption of this approach.
- All plastic related items were assumed to be composed of generic plastic with an Emission Factor equivalent to that of plastics\EPS-APME-97 in Gemis 45 LCA Emission Factor database. The factor was customized for Indian conditions by altering the electricity related emissions component but does not account for differences in the type of plastics used in manufacturing different types of plastic-based products used by blueFROG, for instance the plastic contained in 'bin-liners' for waste collection is different from plastic contained in 'flex'. For the purposes of this study, however, the per-unit-weight emission factors for both plastics were assumed to be equivalent.
- Electricity EFs are based on 2004-2005 Electricity Generation Statistics reported by Central Electrical Authority (CEA). Fuel mix specific to Maharashtra were used for estimating state-specific Electricity Emission Factors. The EF thus calculated was 1.094 kgCO₂/kWh. The national T&D Loss Factor was calculated as being 35.9% (including unaccounted consumption) for 2004-2005. The effective EF was thus equal to $1.094/(1-0.359) = 1.71$ kgCO₂/kWh. While this EF value is notably higher than values used conventionally for CDM project calculations, the methodology adopted herein is rational and possibly more appropriate. The total Footprint value is greatly dependent

on the Electricity EF and hence any uncertainty in this factor also greatly influences the overall uncertainty of final calculations.

The transportation related Footprint for F&B supplies and consumables are affected by uncertainties in the fuel efficiency values assumed for the Diesel-based Heavy Motor Vehicular Transport. 'Food Miles' calculations are influenced by uncertainties related to exact transportation distances from other nations to India. Distance calculators were used assuming commonly-recognized cities as origin points (ports) for ocean freight calculations. Travel distances from supply origin point to port of origin have been excluded from these calculations and could be viewed as a source of uncertainty.

The cumulative impact of the above mentioned uncertainty elements have not been quantified. Quantification of the uncertainty and estimates of accuracy and precision of the analysis will be pursued in the future phases of the project.

3.8 Limitations

The existing project analysis is limited in the following aspects.

3.8.1 Fixed Capital Manufacturing Footprint

The current state-of-art does not allow for Life Cycle Analysis for any of the fixed capital used by blueFROG for its business activities. Depending upon the life-span of these pieces of equipment, their contribution to Annual Carbon Footprint could be significant. For instance – replacement of lighting equipment, heating elements and even periodic replacement of Air Conditioning equipment (amortized over its life-span) all exert an equivalent Annual Footprint 'embedded' in their manufacturing and disposal processes. The calculation of these Life-Cycle based Footprints are not only beyond the scope of this project but also limited by the state-of-art in terms of the sophisticated software systems required to analyze them which are expensive to procure and require specialized training to operate.

3.8.2 Architectural Modifications and Construction Impacts

This study has not taken into account the Footprint creation due to the initial construction of blueFROG and the associated infrastructural and architectural modifications to the pre-existent structures. Concrete, Cement, Steel, Brick, Wood and other construction material along with the significant quantities of electrical and fuel energy used are impacts that would

have a notable impact on the life-time Footprint of blueFROG. tion.

3.8.3 Life-Cycle Emission Factors

Besides Food and Beverage EFs, most other EFs used are based primarily on direct fuel or energy consumption. The ancillary infrastructure that is an inalienable part of these anthropogenic activities would have an augmented impact on the Footprint calculations for using those services. For instance, airport construction, operation and maintenance as well as aircraft manufacturing do impact air travel Footprint but have not been studied adequately by research communities to yield usable Emission Factors. This partial-LCA Emission Factor defines the state-of-art but is nonetheless a recognizable limitation.

3.8.4 Water Footprint

Water is a scarce resource and warrants study as a distinct entity beyond the Carbon Footprint implications involved in its processing and public supply distribution systems as well as on-site pumping. However, while this does study does quantify the total annual quantity of water used and its associated Carbon Footprint, it does not provide an estimate of the other (and possibly more significant) ecological impacts associated with high quantities of water usage.). Moreover, the study does not include the 'embedded' Water Footprint implicit in the resources purchased and consumed themselves. Including this quantity would possibly exponentially increase the Total Water Footprint of blueFROG. However, state-of-art prevents such an exhaustive assessment to be conducted at this point in time

3.9 Executive Summary

Eliminate Carbon Emissions Pvt. Ltd was contracted by blueFROG Pvt. Ltd. to calculate their Annual Carbon Footprint Calculation (i.e. an inventory of the total Greenhouse Gas Emissions (GHGs) that contribute to Climate Change, resulting from direct and indirect resource consumption through blueFROG's business activities). This represented the first phase of the two-phase project comprising of Carbon Footprint Calculation ('Realise') and Carbon Footprint Minimization ('Minimise'). Carbon Footprint Calculation processes commenced in November 2009. The time-period of analysis was chosen to be July, August, and September 2009. blueFROG Pvt. Ltd's Management concurred that analysis of these three months was a rational choice as they represented low, average and peak business months for the organization and an average annual estimate could be rationally determined by extrapolation.

Boundaries for the Carbon Footprint Calculation process were defined in consultation with blueFROG Management. Defining boundaries involved two key-decision making areas: activities to be included (i.e. defining a comprehensive yet manageable set of resources who's consumption was to be inventoried) and stakeholders to be considered as part of the organization's footprint (i.e. defining which sets of peoples/groups/functions are to be included within the footprint boundary).

Since Carbon Footprint Reporting for small and medium scale businesses in India is not mandated by the Indian Government, nor by the United Nations Framework Convention for Climate Change (UNFCCC), and blueFROG's initiative to address it's Climate Change Impacts are purely voluntary, no set of pre-established guidelines were required to be followed for boundary definition. In the absence of explicit guidelines for GHG Emission Reporting Indian Businesses, the globally accepted methodologies for National GHG Emissions Reporting (adopted by India as part of the Kyoto Protocol) laid down by the IPCC (Inter-Governmental Panel on Climate Change) as part of the 2006 Guidelines were used for guidance wherever appropriate. However, given the unique nature of this project and the niche business activity of blueFROG, the overall methodology reflected a confluence of standard protocols and business-appropriate approaches which would provide an accurate estimate of the Climate Change Impact of a unique Food, Beverage and Live-Entertainment business which blueFROG represents.

The blueFROG Carbon Footprint Boundary was defined as comprising the following activities:

1. Contributing Directly to Carbon Footprint: Cooking Fuel Consumption, Vehicular Fuel Consumption
2. Contributing Indirectly to Carbon Footprint (Primary Importance): Electricity Consumption, Water Consumption
3. Contributing Indirectly to Carbon Footprint (Secondary Importance): Transportation (Rail, Road, and Air Travel), Food & Beverage Consumption, Waste Generation, Plastic, Paper and Other Consumables.

The Stakeholders Boundary was defined as comprising the following sets of peoples/groups/function:

blueFROG Internal Functions: Club & Bar (including F&B Controls, Kitchen and Food Supplies), Studio, Office (Human Resources, Admin, Accounts), Marketing, Programming, Label.
blueFROG Entertainment Artists: blueFROG sponsored travel

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activities.

The Annual Carbon Footprint for blueFROG Pvt. Ltd., representative of financial year 2009-2010, in the context of above mentioned footprint boundaries is estimated to be 1,733 Tons of Carbon Dioxide Equivalent (Tons of CO₂e). The most significant contributor to blueFROG's Carbon Footprint is its Electricity Consumption (69.6%), followed by (in progressively lesser proportions), Food, Beverage and Waste (14.2%), Travel (9.3%), Fuel (5.1%), Paper, Plastic and Consumables (1%) and Water (0.7%). Dissecting the Carbon Footprint in terms of contributions from various Functional Zones reveals that the largest contributors are activities by Club & Bar (69%), followed by (in progressively lesser proportions), Studio (16%), Label (5%), Programming (4%), Office (4%), and Marketing (1%).

Based on an approximate annual customer base of 84,000

persons, the per-customer Carbon Footprint is estimated to be approximately 20.6 kg CO₂e. In simple terms, based on the Carbon Dioxide absorption capacity of trees (the most commonly understood unit of mitigating Climate Change) this equates to approximately 22 trees being eliminated (or alternatively, needing to be planted) per 'business night' due to the Carbon Footprint of blueFROG's activities.

The results presented are based on assumptions and influenced by known data gaps. Furthermore, for the Carbon Footprint estimation to be transformed to an auditable GHG Emissions Inventory, all consumption related data would need to be corroborated and substantiated by rigorous documentation. Following provision of the data required to eliminate data gaps and substantiating documentation, an auditable Carbon Footprint Report will be prepared and presented to conclude the 'Realise' Phase of the Project.