Smarter Dharma
Sustainability in the Hospitality & Tourism Sector
Resource Management

Impact Assessment and Management

Organisations
Policy Makers
Communities

Policy
Technology

Implementation
Stakeholder Engagement

CONSTRUCTION
HOSPITALITY
MANUFACTURING
SERVICES
GOVERNMENT & COMMUNITY
EDUCATION

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The Problem

**Energy**
- Global Limit
  - $2^\circ C$ by 2100

**Water**
- Ground Water Table
  - 5m in 10 years
  - 25m in 10 years
- In highly urbanized areas: 500m
- Dwindling Supply from Musi / Govt.

**Waste**
- In 2016 >> 530mn tons
- By 2030 >> 1.2bn tons

**Materials**
- 40% Raw material for construction
- Increasing scarcity
- Exponential increase in cost

**Economic**
- Buildings getting warmer
- Higher demand for cooling
- 4% Cost for Every degree
- 30% Annual Water & sewage board
- 7-10 times Cost from 100 to 500m

**How to deal with the heat?**

**Where will water come from?**

**What about resources?**
<table>
<thead>
<tr>
<th>Sustainability</th>
<th>Development</th>
<th>Eco-Tourism</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>meets the needs of the present</em></td>
<td>Continuous state of <em>growth</em> or <em>advancement</em></td>
<td><em>tourism directed towards</em></td>
</tr>
<tr>
<td><em>without compromising</em></td>
<td></td>
<td><em>natural environments,</em></td>
</tr>
<tr>
<td><em>future generations to meet their own needs.</em></td>
<td></td>
<td><em>intended to support conservation efforts and</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>observe wildlife</em></td>
</tr>
</tbody>
</table>

**CONTINUITY**

**GROWTH**

**CONSERVATION**

we live with finite resources
Earth Overshoot Day:

EOD is the date on which humanity’s resource consumption for the year exceeds Earth’s capacity to regenerate those resources that year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Overshoot Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>December 19</td>
</tr>
<tr>
<td>1990</td>
<td>December 7</td>
</tr>
<tr>
<td>1995</td>
<td>November 21</td>
</tr>
<tr>
<td>2000</td>
<td>November 1</td>
</tr>
<tr>
<td>2005</td>
<td>October 20</td>
</tr>
<tr>
<td>2007</td>
<td>October 26</td>
</tr>
<tr>
<td>2008</td>
<td>September 23</td>
</tr>
<tr>
<td>2009</td>
<td>September 25</td>
</tr>
<tr>
<td>2010</td>
<td>August 21</td>
</tr>
<tr>
<td>2011</td>
<td>August 27</td>
</tr>
<tr>
<td>2012</td>
<td>August 22</td>
</tr>
<tr>
<td>2013</td>
<td>August 20</td>
</tr>
<tr>
<td>2014</td>
<td>August 19</td>
</tr>
<tr>
<td>2015</td>
<td>August 13</td>
</tr>
<tr>
<td>2016</td>
<td>August 8</td>
</tr>
<tr>
<td>2017</td>
<td>August 2</td>
</tr>
</tbody>
</table>
### The Looming Reality of Our Cities

**Table: Regions in India that will likely experience the highest levels of out-migration due to sea level rise, drought/ globalisation.**

<table>
<thead>
<tr>
<th>Vulnerable Region</th>
<th>Migrant Levels in 2100</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Bengal</td>
<td>~10 million</td>
</tr>
<tr>
<td>Coastal Maharashtra (around Mumbai)</td>
<td>~10-12 million</td>
</tr>
<tr>
<td>Coastal Tamil Nadu</td>
<td>~10 million</td>
</tr>
<tr>
<td>Coastal Andhra Pradesh</td>
<td>~6 million</td>
</tr>
<tr>
<td>Gujarat</td>
<td>~5.5 million</td>
</tr>
<tr>
<td>Coastal Orissa</td>
<td>~4 million</td>
</tr>
<tr>
<td>Western Rajasthan</td>
<td>~1.4 million</td>
</tr>
<tr>
<td>Northern Karnataka</td>
<td>~1.3 million</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>~1.2 million</td>
</tr>
<tr>
<td>Interior Maharashtra</td>
<td>~1 million</td>
</tr>
<tr>
<td>Northern Andhra Pradesh</td>
<td>~1 million</td>
</tr>
<tr>
<td>Southern Bihar</td>
<td>~1 million</td>
</tr>
</tbody>
</table>

*Department of Humanities & Social Sciences, Indian Institute of Technology Madras*
Sustainability Development Goals

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace, Justice, and Strong Institutions
17. Partnerships for the Goals

Transforming Our World: The 2030 Agenda for Sustainable Development
MOVING TOWARDS A SYSTEMS VIEW
Ecological: Resource efficiency, protection of natural resources, biodiversity

Social: Social inclusiveness and employment creation

Cultural: Protection and Promotion of cultural values, Diversity and Heritage

Economic Growth: Creation of Business opportunities – enhance bottom-line
Environmental
• Physical Integrity
• Biological Diversity
• Resource Efficiency
• Original/ Native Environment Quality

Social
• Community Wellbeing
• Cultural Richness
• Social Equity
• Visitor Fulfilment
• Local Control

Economic
• Economic Viability
• Local Prosperity
• Employment Quality

Sustainability Development Goals

GOAL 8
Promote sustained, inclusive, and sustainable economic growth, full, and productive employment and decent work for all

By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products

GOAL 12
Ensure sustainable consumption and production patterns

Develop and implement tools to monitor sustainable development impacts for sustainable tourism which creates jobs, promotes local culture and products

GOAL 14
Conserve and sustainably use the oceans, seas and marine resources for sustainable development

By 2030 increase the economic benefits of SIDS and LDCs from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism
Examples on Intervention in Hospitality Sector

-Water
Water - Post Intervention Analysis with RWH and Phytorid Treatment

Water Interventions

Consumption in Kilo Litres

<table>
<thead>
<tr>
<th>Location</th>
<th>Pre Intervention</th>
<th>Post Intervention</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location 1</td>
<td>27</td>
<td>4.5</td>
<td>83%</td>
</tr>
<tr>
<td>Location 2</td>
<td>14.6</td>
<td>4.7</td>
<td>68%</td>
</tr>
<tr>
<td>Location 3</td>
<td>14.1</td>
<td>3.9</td>
<td>72%</td>
</tr>
</tbody>
</table>

Pre Intervention  Post Intervention

83% Reduction  68% Reduction  72% Reduction
Annual Water & Expense Savings

Reduction in Annual Water Consumption

INR in 6 digits Annually Saved at Utility Rates

1860 KL Annually Saved

1860 KL Annually Saved
Average Per capita Water Consumption in liters

- Best in Class: 180 liters
- BIS: 275 liters
- Hotel 1: 224 liters
- Hotel 2: 370 liters
- Hotel 3: 420 liters
- Hotel 4: 743 liters
Water Consumption compared to EnergyDeck global database

<table>
<thead>
<tr>
<th>Hotel</th>
<th>Site Consumption</th>
<th>Benchmark - Average</th>
<th>Benchmark - Best in class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel 1</td>
<td>5.68</td>
<td>5.26</td>
<td>0.56</td>
</tr>
<tr>
<td>Hotel 2</td>
<td>6.13</td>
<td>5.26</td>
<td>0.56</td>
</tr>
<tr>
<td>Hotel 3</td>
<td>6.67</td>
<td>5.26</td>
<td>0.56</td>
</tr>
<tr>
<td>Hotel 4</td>
<td>10.43</td>
<td>5.26</td>
<td>0.56</td>
</tr>
</tbody>
</table>
Examples on Intervention in Hospitality Sector

-Materials
MATERIAL MANAGEMENT

DIFFERENT CATEGORIES OF WASTE & WASTE HANDLING PROCESS

- Dry Waste
- Kitchen & Food Waste
- Bio-Sanitary Waste
- Garden Waste
- Debris & Hazardous Waste
- Medicine Waste
- E-Waste

- Recycling
- Composting
- Incineration
- Composting
- Landfill
- Incineration
- Recycling
Current Daily Waste Scenario

15-20 Kgs
Wet Waste
(Dishwash Area and Gol Ghar)

10-12 Kgs
Wet Waste
(Kitchen)

5-7 Kgs
Dry Waste
(Kitchen, Rooms, office and restrooms)
Waste Management Strategy: Wet waste

### Composting Unit

<table>
<thead>
<tr>
<th>CAPEX in INR (15 Kgs)</th>
<th>Annual OPEX in INR</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>20,000</td>
<td>5,000</td>
<td>Rich Compost used for gardening or sold to visitors in Souvenir shop</td>
</tr>
</tbody>
</table>
Waste Management Strategy: Biogas Plant for Wet Waste

<table>
<thead>
<tr>
<th>Biogas Plant</th>
<th>CAPEX in INR (20 Kgs)</th>
<th>LPG Equivalent kg/day</th>
<th>Monetary Savings on LPG/Year</th>
<th>ROI in Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>81,600</td>
<td>0.8</td>
<td>15,840</td>
<td>4</td>
</tr>
</tbody>
</table>
Waste Management Strategy: Conscious consumption and recycling

SEGREGATION OF DRY WASTE FOR PROPER RECYCLING - Glass, metal cans, paper etc

REDUCE NON-RECYCLABLES

STEER TOWARDS BECOMING A PLASTIC FREE ZONE
PROBLEM - ??

• Creating a dialogue that celebrates forests and biodiversity
• Promoting responsible ecotourism

• Towards Resource Positivity
  - Energy savings ~ 76%
  - Water savings ~ 27%
  - Waste - 100% landfill free!

• Stakeholder Engagement
  - Customer
  - Staff
  - Vendors

• Carbon Neutrality
  - Driven by SDGs
Monitoring, Assessment & Global alignment
PLATFORM TO MANAGE SUSTAINABILITY

- Comprehensive data management system
- Benchmarking resource use against industry
- Record, identify and realise saving opportunities
CONSERVE - WHAT CAN BE DONE?
Identifying Anomalies

- The graph shows the energy consumption in KWH from January 2015 to January 2018.
- The green bars represent units consumed from the grid, the red bars represent units generated from the DG set, and the blue line shows occupancy.
- Anomalies are highlighted with circles.

Source: Smarter Dharma
Pre & Post Intervention - Service Wise Monthly Energy Consumption

Monthly Energy Consumption per Energy Service

<table>
<thead>
<tr>
<th>Service</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>HVAC</td>
<td>2200</td>
<td>1800</td>
</tr>
<tr>
<td>Refrigeration</td>
<td>800</td>
<td>600</td>
</tr>
<tr>
<td>Waterheating</td>
<td>300</td>
<td>200</td>
</tr>
<tr>
<td>Plugloads</td>
<td>400</td>
<td>300</td>
</tr>
<tr>
<td>Pumping</td>
<td>1200</td>
<td>1500</td>
</tr>
</tbody>
</table>

kWh
Hotel ZZZ spends **30%** of its overall energy cost on Diesel for just **20%** of the energy!!
Energy Interventions

Energy - Post Intervention Analysis Excluding Solar

Consumption Pre & Post Interventions

- **Location 1**: 17077 KWH (23% Reduction)
- **Location 2**: 5580 KWH (35% Reduction)
- **Location 3**: 6450 KWH (36% Reduction)
Cumulative Electricity & Expenses over 10 Years

~ INR 17 Lakhs OPEX savings per annum
Evidence Based Policy Intervention
Feet on the ground

• 5000 households reached for waste segregation training and awareness programs
• Created a revenue stream for housekeeping staff in many communities
• Created a sustainable plan for medical waste management which included a revenue plan for a low-income entrepreneur
Federation of Hotels & Restaurant Association of India – Sustainability policy

**Short term guidelines**
- No/ Low cost interventions - tangible
- ROI based process & behavioural changes
- Employee and stakeholder involvement
- Increased efficiency and better bottom-lines

**Medium term guidelines**
- Structured & high impact interventions
- Carbon measurement and offset program
- Customer engagement & resource efficiency
- Software analytics for decisive management & action

**Long term guidelines**
- A long term roadmap for sustainable development
- Roadmap for expansion
- Carbon and biodiversity management
- Supplier management program

- Low cost.
- High impact.
- Resource mgt.

- Org intervention.
- Resource efficiency.
- Happy bottom-lines

- Leadership.
- Expansion.
- Supply mgt.
Sustainability Policy Guideline - Karnataka Tourism
Sustainability Hospitality Dashboard

**GREEN HOUSE GAS EMISSIONS**
Kilograms CO2-e Per Guest Night

**ENERGY CONSUMPTION**
Megajoules Per Guest Night

- The Lalit Ashok
- Taj West End
- ITC Windsor
- Park Plaza Bengaluru Hotel
- ITC Royal Gardenia
- Ritz Carlton
- The Oberoi
- Moevenpick Hotel and Spa
- The Leela Palace
- Hyatt Bangalore
- The Chancery Pavilion
- The Zuri Whitefield
- The Park Hotel
- Vivanta by Taj Whitefield

Colors:
- Benchmark
- Meets Benchmark
- Above Benchmark
- Below Benchmark
FACILITATING BEHAVIOUR CHANGE

THE SUSTAINABILITY CATALOGUE.

RESOURCE MANAGEMENT
(energy, water, materials)
Optimizing consumption & costs
Responsible sourcing
Shared economy
Resource Creation

TECHNOLOGY
Dharmameter Monitoring

OPERATIONAL IMPACT ASSESSMENT & MANAGEMENT
Emissions (carbon)
By-products (waste)

SUSTAINABILITY POLICY
Vision Mission Statement
Interviews
Focused group discussions

STAKEHOLDER ENGAGEMENT
Identification
Interviews
Drivers
Action plan
There are no passengers on Spaceship earth.

We are all crew.

Marshall McLuhan

Karthik Ponnapa
kp@smarterdharma.com
+91 9886454654

www.smarterdharma.com