Carbon Management for Tourism Destinations

Policies and Investment Strategies for Local Authorities

Advancing Sustainable Tourism in a Changing Climate

Session of the UNFCCC Conference of Parties

November 11, 2016
Tourism Growth - Impacts

UN Environment Research:
• The 4% average annual growth of the tourism economy uses key resources:
  ➢ Energy, Water, Land and Materials
  ➢ Growing Waste, Sewage and Greenhouse gas emissions
• ‘Business-as-usual’ approach will result in resource consumption that will more than double impacts of the industry by 2050.

The Climate Change Challenge:
• Developing nations will be the most vulnerable to climate change impacts many of which are already affecting their tourism offerings
• Most are unprepared to manage the carbon impacts of tourism from waste, waste-water, and growing GHG emissions
• Few are monitoring overuse of renewable and non-renewable resources

It is estimated that Bali’s major freshwater resources may run out by 2020. 60% of Bali’s watersheds now declared dry and water table in some areas has dropped over 50m in less than 10 years
Efforts to Measure Impacts on Resources

- Examples of the burden on local economies are numerous and increasingly well documented, but data is surprisingly scarce.
  - Impacts remain unreported due to a lack of capacity to monitor at the local level

**Rhodes, Greece**: a destination with high tourism seasonality
- Local population: 115,000
- Tourism arrivals: 1.8 million + domestic tourism

**Monthly average electricity demand:**
- in off-season (average): 45,000 MWh
- in high season (August): 107,000 MWh
  $\Rightarrow$ Power generation to its max. capacity during tourism peak + a saturated grid (i.e. upgrade required to accept more renewables) + no strategic planning $\Rightarrow$ fire-fighting solutions = A brand new oil-fired power plant: a 20-years lock-in on GHG emissions and highly subsidized oil imports

*Research by Sofia Fotiadou at Harvard Extension*
Private Sector Accounting

• Private sector studies show the economic impact from local and international tourism is very large, however;

  ➢ economic impacts are not reaching public authorities in charge of managing systems at the destination level
  ➢ untreated waste, waste water, and GHG emissions are escalating quickly
Tourism Destinations

- Environmental monitoring in tourism is a vital step for developing policies and strategic planning at the local level to manage tourism in a sustainable manner.
- A **bottom-up approach**, is required to guide adaptation and mitigation action.
- **Local Authorities** must be at the front of a global effort to better measure and manage the cumulative impacts of tourism.
Harmonized Data Needed

• Data gaps will remain large without public-private solutions
  • SMEs need to be engaged through simple indicators using IT solutions

• Growing and Urgent Need for Harmonized Data
  • Public management of indicators through global cooperation mechanisms will address a growing emergency
  • We need a “Moonshot” approach which engages the technical support of universities
    • Use of students, global IT systems, and GIS (geodesign) software makes this feasible for the first time in history
Working Within the NDC System

• Paris climate agreement spurs us to act.
• Conversion of NDCs into financeable investment strategies requires high quality and disaggregated data per economic sector
• Understanding destination footprints benefits corporations and destinations
  • Allowing for joint goal-setting for creating essential sustainable infrastructure to combat climate change in the next 20 years

Water resources are an indispensable asset for tourism and are top priorities of national adaptation plans for most countries as reported by their NDCs (UNFCCC, 2016)
A new framework fostered by Harvard University to:

- Monitor tourism’s climate impacts at the local level - work within the NDC system under a bottom-up approach
- Identify hot spots that require intervention
- Foster technical transfer from local/national academic institutions for a cloud based system
- Create advanced measurement systems
  - Science based metrics
  - Local field studies
  - Crowd sourcing
- Use national and regional UNWTO TSA economic data to track performance on decoupling economic growth from environmental pressure
## Carbon Reporting and Management Framework for Tourism Destinations

### Tourism Economic Contribution

<table>
<thead>
<tr>
<th>Energy</th>
<th>Water</th>
<th>Waste</th>
<th>Air Pollution</th>
<th>Land Use</th>
<th>Biodiversity</th>
<th>Vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy</strong>&lt;br&gt;a. Stationary Energy&lt;br&gt;b. Transport Energy (local)&lt;br&gt;• Consumption: absolute; intensity; relative to other sectors; and to total natural freshwater availability;&lt;br&gt;• GHG emissions</td>
<td><strong>Water</strong>&lt;br&gt;a. Solid Waste&lt;br&gt;b. Wastewater&lt;br&gt;• Quantities: attributable to tourism (absolute; intensity); treated (or disposed) by treatment type; recycled; left unmanaged; SW exports&lt;br&gt;• GHG emissions</td>
<td><strong>Waste</strong>&lt;br&gt;Contribution of: tourism’s energy consumption and local transport; cruise ship idling; aircraft idling and taxing to total concentrations of SOx, NOx, CO, PM 2.5/10, VOCs etc.&lt;br&gt;• Payments for ecosystem services to protect wetland ecosystem or dune ecosystem&lt;br&gt;• Key species within green corridors and protected areas&lt;br&gt;• Prioritised major vulnerabilities of the destination&lt;br&gt;• Area of natural land per category of land converted to developed land for tourism infrastructure; GHG emissions&lt;br&gt;• % of high biodiversity land with interrupted habitats due to land transformation for tourism infrastructure&lt;br&gt;• Connectivity of ecosystems to larger corridors&lt;br&gt;• % of destination area at risk for flooding due to storm surge</td>
<td><strong>Air Pollution</strong>&lt;br&gt;• Plug-in infrastructure at airports / Control of taxi-out emissions&lt;br&gt;• Control of emissions from cruise ships at seaports&lt;br&gt;• Local transport (as addressed in the Energy category)&lt;br&gt;• Increased % of land allocated to protection of species&lt;br&gt;• Payments for ecosystem services from tourism in high biodiversity regions</td>
<td><strong>Land Use</strong>&lt;br&gt;• Area of natural land per category of land converted to developed land for tourism infrastructure; GHG emissions&lt;br&gt;• % of high biodiversity land with interrupted habitats due to land transformation for tourism infrastructure&lt;br&gt;• Connectivity of ecosystems to larger corridors&lt;br&gt;• % of destination area at risk for flooding due to storm surge</td>
<td><strong>Biodiversity</strong>&lt;br&gt;• Key species within green corridors and protected areas&lt;br&gt;• Prioritised major vulnerabilities of the destination&lt;br&gt;• Area of natural land per category of land converted to developed land for tourism infrastructure; GHG emissions&lt;br&gt;• % of high biodiversity land with interrupted habitats due to land transformation for tourism infrastructure&lt;br&gt;• Connectivity of ecosystems to larger corridors&lt;br&gt;• % of destination area at risk for flooding due to storm surge</td>
<td><strong>Vulnerability</strong>&lt;br&gt;• Key species within green corridors and protected areas&lt;br&gt;• Prioritised major vulnerabilities of the destination&lt;br&gt;• Area of natural land per category of land converted to developed land for tourism infrastructure; GHG emissions&lt;br&gt;• % of high biodiversity land with interrupted habitats due to land transformation for tourism infrastructure&lt;br&gt;• Connectivity of ecosystems to larger corridors&lt;br&gt;• % of destination area at risk for flooding due to storm surge</td>
</tr>
</tbody>
</table>

### Measurement - Adaptation

<table>
<thead>
<tr>
<th>Energy</th>
<th>Water</th>
<th>Waste</th>
<th>Air Pollution</th>
<th>Land Use</th>
<th>Biodiversity</th>
<th>Vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Contribution to RE production; to low carbon grids&lt;br&gt;• # of Energy efficiency upgrades&lt;br&gt;• % of tourism accommodation reporting on energy and GHGs&lt;br&gt;• Infrastructure for mass transport, bicycling, walking&lt;br&gt;• Low carbon vehicles for rental</td>
<td>• Use of rainwater and recycled water&lt;br&gt;• Use of treated wastewater for aquifers’ replenishment&lt;br&gt;• Water from desalination powered by renewable energy&lt;br&gt;• Payments for services to protect watersheds</td>
<td>• Solid waste diverted from disposal; efforts to minimise bottled water; payments for advanced MSWM&lt;br&gt;• Wastewater treated on-site; application of alternative wastewater treatment methods</td>
<td>• Plug-in infrastructure at airports / Control of taxi-out emissions&lt;br&gt;• Control of emissions from cruise ships at seaports&lt;br&gt;• Local transport (as addressed in the Energy category)&lt;br&gt;• % of land returned to wetland ecosystem or dune ecosystem&lt;br&gt;• Payments for ecosystem services-protection of forested regions</td>
<td>• Area of natural land per category of land converted to developed land for tourism infrastructure; GHG emissions&lt;br&gt;• % of high biodiversity land with interrupted habitats due to land transformation for tourism infrastructure&lt;br&gt;• Connectivity of ecosystems to larger corridors&lt;br&gt;• % of destination area at risk for flooding due to storm surge</td>
<td>• Key species within green corridors and protected areas&lt;br&gt;• Prioritised major vulnerabilities of the destination&lt;br&gt;• Area of natural land per category of land converted to developed land for tourism infrastructure; GHG emissions&lt;br&gt;• % of high biodiversity land with interrupted habitats due to land transformation for tourism infrastructure&lt;br&gt;• Connectivity of ecosystems to larger corridors&lt;br&gt;• % of destination area at risk for flooding due to storm surge</td>
<td>• Area of natural land per category of land converted to developed land for tourism infrastructure; GHG emissions&lt;br&gt;• % of high biodiversity land with interrupted habitats due to land transformation for tourism infrastructure&lt;br&gt;• Connectivity of ecosystems to larger corridors&lt;br&gt;• % of destination area at risk for flooding due to storm surge</td>
</tr>
</tbody>
</table>
Focused Outcomes:
It is essential that measurements and benchmarking have clear intended outcomes for the private sector and local authorities
- Measurable progress in lowering carbon impacts
- Improved internal accounting at destination level to understand cost benefits of tourism
- Leveraged opportunities to finance clean development infrastructure

Instruments for Finance:
- Green Climate Fund (for developing countries)
- Private equity investments
- Green Bonds (issued by municipalities, national development banks or the private sector)
For More Information:

Megan Epler Wood
Director, International Sustainable Tourism Initiative
Center for Health and the Global Environment
Harvard T.H. Chan School of Public Health

http://www.chgeharvard.org/category/international-sustainable-tourism-initiative

meganeplerwood@fas.harvard.edu