

# EnergyCheck™ WORKSHEET

**ENERGY  
MANAGEMENT  
TOOL FOR**  
HOTELS & TOURISM  
INFRASTRUCTURE

*Responsible and sustainable energy management is a critical concern for the global hospitality industry. With tourism growing in the Asia Pacific region, issues of energy reliability, cost and climate change impacts cannot be ignored.*



EARTHCHECK

**ECOLAB®**

Everywhere It Matters.™



Energy consumption accounts for about 70% of global greenhouse gas (GHG) emissions. The global economy grew by 3.1 percent in 2015, but global GHG emissions have essentially remained flat, after a decade of annual average increases of 4%. Meanwhile, global surface temperatures in 2015 were the warmest on record (since 1880).<sup>1</sup>

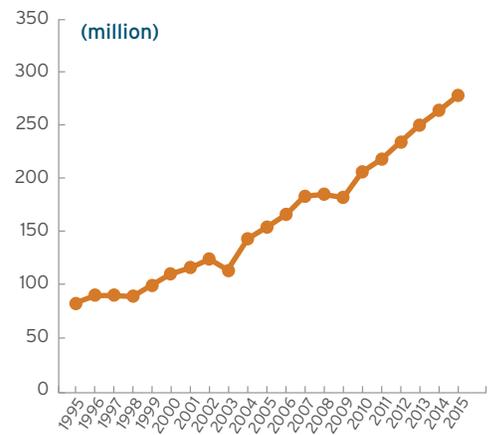
Global international tourist arrivals increased by 4.4% in 2015, with the Asia Pacific region welcoming 278 million international visitors, a 5% increase from the previous year.<sup>2</sup> The hotel sector's contribution to global GHG emissions is small (1%) but rising, with tourism related GHG emissions projected to grow 130% from 2005 to 2035.<sup>3</sup> The World Travel and Tourism Council announced an aspirational target to **reduce GHG emissions by 50%** from 2005 to 2035.<sup>4</sup> Higher growth in the Asia Pacific will result in increased climate change impacts, unless continuous improvements in efficiency and carbon intensity are achieved.

While the energy and power sectors focus on reducing carbon intensity of energy produced, Hotels can focus on improving energy efficiency. **EnergyCheck™** is designed to help identify areas for potential improvement in energy management practices. Use it to discover hands-on solutions, strategies and plans for action. This tool will help you develop energy-focused action plans and property or destination level energy efficiency goals.

<sup>1</sup>NASA and the National Oceanic and Atmospheric Administration (January 20, 2016)  
<sup>2</sup>UNWTO World Tourism Barometer (World Tourism Organization, Volume 14, March 2016)  
<sup>3</sup>Climate Change: Implications for Tourism (European Climate Foundation, 2016)  
<sup>4</sup>Travel & Tourism 2015: Connecting Global Climate Action (WTTC, November 2015)

**EarthCheck™** is the leading benchmarking and certification program for the travel and tourism Industry which can assist operators to measure their energy consumption, report on their carbon footprint and help identify areas for potential improvement in energy management practices. Use the EarthCheck sustainability program to discover hands-on solutions, strategies and plans for action. EarthCheck provides an easy to use web based framework and software platform to collect and analyse operational data and to develop energy focused reports for buildings, enterprises and destinations.

**Inbound International Tourists Arrivals, Asia and the Pacific**



Source: World Tourism Organization (UNWTO) ©

**International Tourist Arrivals, Asia and the Pacific**



Source: World Tourism Organization (UNWTO) ©



More than 10% of global GDP is spent on energy, with the Asia Pacific region accounting for over 35% of global energy expenditures (13% of China's GDP, 12% of India's GDP and 10% for the rest of the Asia Pacific region<sup>5</sup>).

The total contribution of Travel & Tourism to GDP in the Asia Pacific region was 8.5% in 2015 and is projected to rise by 5.6% per year to 9.7% of GDP in 2026.<sup>6</sup> The compounded annual growth rate of the sector is projected to be greater than forecast for every other sector except for banking and is forecast to outpace the growth of the overall economy in the region (3.8%).<sup>7</sup>

Guest rooms in hotels can account for 40 to 80 percent of energy use in the hospitality industry.<sup>8</sup> Guests are not accountable for energy costs and concerns over the impact of energy efficiency initiatives on guest satisfaction further discourage implementation of energy management in guest rooms. Recent advances in sensors help strike a balance between these concerns and effective energy management.

Advances in machine warewashing systems in restaurant kitchens, on premise laundry systems, boiler and cooling water systems and heating ventilation and air conditioning systems help maximize the efficiency of energy-rich water used for these operations by leveraging chemistry, data and automation. Combined with building management systems (BMS), these solutions help optimize energy use in utilities and common areas of a hotel.

To get started using this tool, identify an Energy Champion and members of a supporting Energy Team. Engage your employees in discussions about your operation's energy efficiency practices. Once the Champion and Team are established, work together to answer the following questions.

<sup>5</sup>Global Energy Data (Enerdata, November 2011)

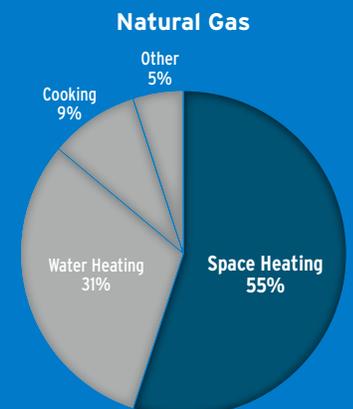
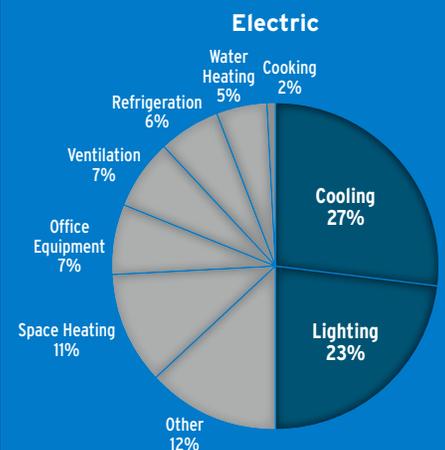
<sup>6</sup>Travel and Tourism Economic Impact 2016: Asia Pacific (WTTC, 2016)

<sup>7</sup>Benchmarking Travel and Tourism- How does it Compare to Other Sectors: Asia (WTTC, 2015)

<sup>8</sup>Balancing Hotel Energy Use and Guest Comfort (Schneider Electric, April 2015).

<sup>9</sup>EnergyStar® Building Manual: Hotels and Motels (USEPA, 2007)

While amenity levels and climate can significantly affect energy use patterns and intensities in a hotel, space cooling and lighting account for most of the electricity consumed by hotels and space heating accounts for most of the natural gas use.<sup>9</sup>





# Location

Rapid economic growth and demographic change in the Asia Pacific region is expected to increase energy use by about 80% between 2013 and 2040.<sup>10</sup> Electric power generation for the same period is projected to increase by a factor of 2.5.<sup>11</sup> Access to primary energy and reliable grid electricity remains a challenge for a significant percentage of the population.

	Y	N
Is your property located in an area with reliable supply of grid electricity?	<input type="radio"/>	<input type="radio"/>
Is your property located in an area with reliable supply of primary fuel for thermal needs?	<input type="radio"/>	<input type="radio"/>
Are you aware of the average heating and cooling degree days per year at your property location?	<input type="radio"/>	<input type="radio"/>
Do changing seasons significantly affect your energy use intensity (KWh/guest night or KWh/square meter)?	<input type="radio"/>	<input type="radio"/>
Do local regulations allow for purchase agreements with Independent Power Producers or retailers?	<input type="radio"/>	<input type="radio"/>
Do local regulations allow for grid-connected onsite power generation (Net Metering)?	<input type="radio"/>	<input type="radio"/>

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Climate can have a major influence on the energy consumption used in all tourism infrastructure, from hotels and visitor centres through to administration offices. The EarthCheck benchmarking and Certification program allows operators to track and compare their energy performance against their peers. The **EarthCheck™** program has factored in the influence of climatic zones into baseline and best practice energy performance benchmarks of more than 32 sub-sectors of tourism infrastructure operations across the world.

## Energy Tips

- Information on **heating and cooling degree days** (HDD/CDD) is available by location online at [www.degreedays.net](http://www.degreedays.net). For example, the 5-year average (2011-15) °C CDDs per year for Singapore is 3,500. The 5-year average (2011-15) °C HDDs per year for Sydney is 700. Neither of these Asia Pacific locations can thus compare their energy use intensity (EUI) to each other or to the benchmark for US hotels (600 KWh/m<sup>2</sup>/yr)<sup>12</sup> or the average for European hotels (300 KWh/m<sup>2</sup>/yr).<sup>13</sup>
- Installing energy efficient air conditioning/chiller equipment, variable frequency drives and capacitors on large motors and pumps, and utilizing energy management systems with sensors will yield significant savings in electricity use at locations with high HVAC use.
- In locations with high cooling degree days, indirect evaporative coolers with air-to-air or ground-to-air heat exchangers, combined with night ventilation techniques, are more energy efficient than compression-refrigeration systems.

<sup>10</sup>World Energy Outlook 2015 (International Energy Agency, 2015)

<sup>11</sup>Energy Outlook for Asia and the Pacific (Asian Development Bank, 2013)

<sup>12</sup>Energy Use in US Hotels- EnergyStar® Portfolio Manager Data Trends (USEPA, 2015)

<sup>13</sup>Analysis of Energy Use by European Hotels (Intelligent Energy Europe, 2011)



# Infrastructure

While hotel energy costs are typically 3-6% of operating costs, they constitute a higher fraction of controllable or manageable costs.<sup>14</sup> Typical infrastructure attributes that affect a hotel's energy use intensity are comfort level (HVAC), food preparation facilities, laundry facilities, heated pool & spa and ratio of guest space to public and common spaces.

	Y	N
Can you break down the property energy use by guest rooms, public areas and service areas?	<input type="radio"/>	<input type="radio"/>
Do changing occupancy rates significantly affect your energy use intensity (KWh/guest night or KWh/square meter)?	<input type="radio"/>	<input type="radio"/>
Does your property have on-premise laundry (OPL) facilities?	<input type="radio"/>	<input type="radio"/>
Does your property have heated water bodies in pool and spa areas?	<input type="radio"/>	<input type="radio"/>
Is the building construction and thermal performance of external envelope energy efficient?	<input type="radio"/>	<input type="radio"/>
Does the property currently have onsite combined heating cooling and power (CHCP) generation?	<input type="radio"/>	<input type="radio"/>
Do you have comparable best-in-class energy use benchmarks for your property's profile?*	<input type="radio"/>	<input type="radio"/>

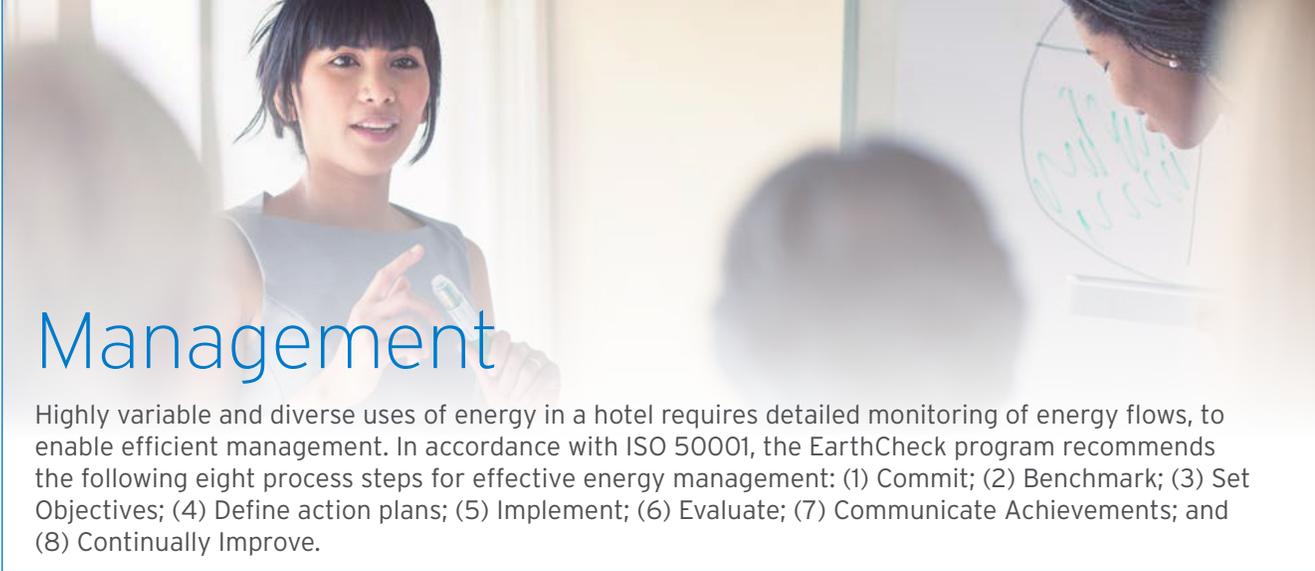
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## Energy Tips

- Varying and asynchronous energy demand is typical of guest room areas (bedrooms, showers, toilets). High internal energy loads and high rates of exchange with the ambient environment are typical of public areas (reception, lobby, bars, restaurants, meeting rooms, pool & spa). High intensity energy use and high air handling requirements (HVAC) are typical of service areas (kitchens, offices, laundry, staff facilities, utilities).
- Optimized water conditioning in **boilers** and **cooling towers**, to improve cycles of concentration, can conserve energy by reducing the discharge of blowdown water by up to 50%.
- Chemistry, data, dispensing engineering and automation can be leveraged to significantly reduce energy use in machine warewashing and laundry equipment. Ecolab's Optimized Low Temperature Chemistries, combined with the **One Pass Cleaning in dish machines** and the **Smart Wash Process in laundry** can reduce energy use by up to 50%.<sup>14</sup>

\*[EarthCheck](#)™ can provide energy and carbon benchmarks for your property relative to your sector and location.

<sup>14</sup>[Energy Efficiency and Conservation in Hotels- Towards Sustainable Tourism](#) (Bohdanowicz, Paulina, et al, 2001)



# Management

Highly variable and diverse uses of energy in a hotel requires detailed monitoring of energy flows, to enable efficient management. In accordance with ISO 50001, the EarthCheck program recommends the following eight process steps for effective energy management: (1) Commit; (2) Benchmark; (3) Set Objectives; (4) Define action plans; (5) Implement; (6) Evaluate; (7) Communicate Achievements; and (8) Continually Improve.

	Y	N
Do you have a facility energy management plan in place?	<input type="radio"/>	<input type="radio"/>
Have you investigated the availability of rebates (local, regional, national) to offset equipment and technology upgrades that will deliver energy efficiency?	<input type="radio"/>	<input type="radio"/>
Do you provide capacity building and training to all staff and suppliers in relation to energy management?*	<input type="radio"/>	<input type="radio"/>
Do you provide in-room material to guests, to encourage them to participate in your energy efficiency efforts?	<input type="radio"/>	<input type="radio"/>
Do you document the impact of maintaining and servicing boilers and HVAC systems on energy use?	<input type="radio"/>	<input type="radio"/>
Have you considered win-win outcomes from saving energy and water at the same time?	<input type="radio"/>	<input type="radio"/>

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## Energy Tips

- Prompt guests to turn off energy-consuming devices in guest rooms by posting friendly reminders
- Train housekeeping staff to turn down energy use to minimum levels after rooms are serviced
- Install keycard-activated guest room energy management system for HVAC and lighting control
- Optimize temperature settings for restaurants, meeting rooms and other public areas based on ongoing activities
- Develop a routine maintenance checklist for equipment to include cleaning condensers, intake louvers, evaporator coils and air filters to insure peak energy efficiency. **HVAC performance services** can improve cooling capacities of the system by up to 50%.
- Cold temperature **Sanitizing Floor Cleaners** can reduce energy use by eliminating hot water rinses.

\*The [EarthCheck™ Training Academy](#) can provide specialised training and capacity building tailored to your needs.

<sup>14</sup>[Energy Efficiency and Conservation in Hotels- Towards Sustainable Tourism](#) (Bohdanowicz, Paulina, et al, 2001)



# Audit

From your HVAC systems, hot water distribution systems, and lighting, to your pools and spas, restaurants, laundry services and office equipment, opportunities for energy savings across your entire operations are plentiful.

## HVAC

Y N

- Do you have the ability to control set points and monitor performance of all central and distributed HVAC units?
- Do you have the ability to limit the temperature range for set points in individual thermostats?
- Do you have energy recovery equipment installed on ventilators and dryer exhausts?

## HOT WATER USE

- Have you installed low flow shower heads and faucet flow restrictors in bathrooms?
- Have you installed heat exchangers to recover waste heat from the dish machines in the kitchen?
- Have you implemented a low temperature wash program in your on-premise laundry facilities?

## LIGHTING

- Have incandescent lamps in guest rooms been replaced with energy efficient LED lamps?
- In large open areas, do fluorescent fixtures have electronic and not magnetic ballasts?
- Have occupancy sensors or dimming systems been installed in restrooms and storage areas?
- Have you replaced all signage with energy efficient LED lighting?

## POOL & SPA

- Have thermal covers been installed in heated pools and hot tubs, to prevent heat loss and excess indoor humidity?

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## Energy Tips

- For additional guidance on energy audits and a comprehensive listing of best energy management practices please visit [EarthCheck™](#) or the [Energy Star](#) portal.



# Behaviours & Practices

Experience shows that no single energy conservation measure will yield optimal impact—a diversified approach to energy efficient practices is needed. Behavioural change, through the education of your staff and guests, is a major component of this approach.

## STAFF TRAINING

Y N

Is electronic and printed training material on energy efficiency readily available to staff?	<input type="radio"/> <input type="radio"/>
Do you use online training materials on energy savings for your staff?	<input type="radio"/> <input type="radio"/>
Do you provide on the job training on energy conservation for all functions?	<input type="radio"/> <input type="radio"/>
Do you send staff for short off-site training courses on energy management?	<input type="radio"/> <input type="radio"/>
Do you provide staff with written guidance on best energy management practices?	<input type="radio"/> <input type="radio"/>
Do routine on-boarding and training activities include energy savings topics?	<input type="radio"/> <input type="radio"/>

## OPERATOR PERCEPTION SURVEY

I have a good understanding of energy use and energy efficiency	<input type="radio"/> <input type="radio"/>
Energy monitoring would help reduce my energy use	<input type="radio"/> <input type="radio"/>
I could help reduce this property's energy use substantially	<input type="radio"/> <input type="radio"/>
Energy is a substantial business cost for this property	<input type="radio"/> <input type="radio"/>

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## Energy Tips

- **EarthCheck™** programs like Evaluate Plus and **EarthCheck™** Certified are user-friendly, web-based solutions that include an energy-benchmarking tool and a decision support sequence, which provides assistance in evaluating carbon emissions and mitigation. EarthCheck programs also include information on best practices and capacity building materials, a carbon footprint calculator and proved guidance on return on investment.
- The gap between perceptions held by property operators and the actual level of implementation of energy efficiency measures are well documented.<sup>15</sup>

<sup>15</sup>Becken, Susanne (2012). Operators' Perceptions of Energy Use and Actual Saving Opportunities for Tourism Accommodation. *Asia Pacific Journal of Tourism Research*, 18, 72-91.



# Carbon Intensity

Energy use within the tourism sector continues to contribute to GHG and climate change is already having a significant adverse impact on tourist destinations around the world. While the tourism sector prioritizes adaptation to climate change in vulnerable geographies that also face the challenges of low readiness, efforts to mitigate GHG from operations must accelerate.

	Y	N
Are you aware of the carbon intensity of the electricity you purchase (g CO2e/KWh)?	<input type="radio"/>	<input type="radio"/>
Does your property currently have onsite generation of renewable electricity (photovoltaic, wind)	<input type="radio"/>	<input type="radio"/>
Does your property currently utilize renewable thermal energy (solar thermal, biogas)?	<input type="radio"/>	<input type="radio"/>
Do you track the carbon footprint of fixed (buildings) and mobile (transportation) assets in your operations?	<input type="radio"/>	<input type="radio"/>
Do you have property or enterprise level greenhouse gas (GHG) reduction goals?	<input type="radio"/>	<input type="radio"/>
If yes, are your property level energy conservation goals aligned with GHG reduction goals?	<input type="radio"/>	<input type="radio"/>
Are you aware of local, regional or national incentives for investments in renewable energy?	<input type="radio"/>	<input type="radio"/>

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## Energy Tips

- While Europe has the world’s largest hotel stock (approximately 5.45 million hotel rooms, nearly half of the world’s total), these properties represent only 21% of the world total accommodation sector’s CO2 emissions. In 2005, accommodations in the Asia-Pacific region accounted for 29% of this total.<sup>16</sup>
- The ND-GAIN Country Index, a project of the **University of Notre Dame Global Adaptation Index**, summarizes a country’s vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. It aims to help businesses and the public sector better prioritize investments for a more efficient response to the immediate global challenges ahead. Many countries in the Asia-Pacific region rank poorly in the GAIN Index.
- The **EarthCheck™** Program is an approved reporting standard with the CDP (Carbon Disclosure Project). The CDP is recognised by the United Nations Framework Convention on Climate Change (UNFCCC) as the leading authority on carbon reporting. EarthCheck can support operators to benchmark energy performance and calculate Scope 1, 2 and 3 emissions in compliance to the CDP and other international reporting frameworks such as the Global Reporting Initiative (GRI).

<sup>16</sup>Hotel Energy Solutions: Fostering Innovation to Fight Climate Change, Public Report (UNWTO, 2011).



# Action Plans

## Action Plan Responsibilities

Review your answers to the previous questions, paying particular attention to the “no” responses. Each of these represents a potential for action. While reflecting on possible changes, discuss the following questions with your team:

- Where did you identify areas for potential improvement?
- Where did you identify potential risks?
- Do you need to budget for any infrastructure changes or facility upgrades?
- What behaviors need to change in order to generate a reduction in energy usage and carbon footprint for your operations?
- Have you investigated how energy savings performance contracts (ESPC) can be used to implement energy efficiency opportunities?

### Action Plan Tip

- Energy Management action plan templates and support documents are available in the **My EarthCheck** online portal.

Click here to go to [Goal Setting](#)



# Action Plan Responsibilities

Consider the Action Plan questions in the previous section and use the table below to generate an action plan, allocating responsibility to team members and other staff in the business.

In completing these tables, other energy management issues may arise. Add these to your action plan where appropriate.

**LOCATION**

**INFRASTRUCTURE**

**MANAGEMENT**

**AUDIT**

**BEHAVIOURS & PRACTICES**

**CARBON INTENSITY**

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## Goal Setting

## Action Plans

Setting goals is a useful way to achieve positive change in your energy and greenhouse gas management practices. As you develop your action plans, please consider them in the context of the short, medium and long term energy efficiency and greenhouse gas reduction goals established at the enterprise and/or property levels for your business. And remember, while long term goals frequently require capital investment, infrastructure changes often result in significant and lasting long-term savings.

### Tips

- Establish property level energy use and/or greenhouse gas footprint reduction goals (either absolute or intensity) that align with your corporate enterprise goals.
- If you have a full service property, consider energy use and/or greenhouse gas footprint reduction goals for individual departments (food and beverage, pool and spa, laundry, guest rooms etc.).

### Next Steps

- Develop and implement your energy use management strategy at the property level.
- Engage with your strategic suppliers to optimize the use of water and associated embedded energy.
- Measure and track your performance against that of peers and best-in-class **EarthCheck™** benchmarks.

Contact your Ecolab or EarthCheck representative and learn more: visit [www.ecolab.com](http://www.ecolab.com) and [www.earthcheck.org](http://www.earthcheck.org)