

1

RETURN TO ONLINE PROFILE

OTHER RESOURCES

Renewable Energy	2
 Natural Solutions to Climate Change 	4
A Note on Transport	6
 Nepal's Paris Agreement Tourism Targets 	6
 Useful Organisations and Links 	8
Carbon Footprint Calculators	10
Useful Publications	10
Organic Certification Schemes	11
• References	11

RENEWABLE ENERGY

With approximately two-thirds of global greenhouses gas (GHG) emissions originating from energy production and use,¹² renewable energy alongside energy efficiency has a crucial role to play in helping to keep global average temperature well below 2°C and provide clean energy for all.

Using renewable energy can enhance your green credentials and offer financial benefits too – through cost savings, the availability of grants or incentives to offset capital costs, and the potential to earn from the grid.

India's National Targets

The Government of India's goals for its <u>Nationally Determined</u> <u>Contributions for the Paris Agreement</u> include achieving 40% of electric power installed capacity from non-fossil fuels by 2030.¹³ Its targets to increase renewable power capacity to 175 GW by 2022 are projected to come primarily from solar followed by wind with a range of other technologies playing a smaller part (see figures 1 and 2 below).

Renewable energy technologies can reduce GHG emissions by between 76% (solar pv) and 97% (wind turbines) compared with conventional heating and electricity options.

Source: Sycom Projects Consultants

FIGURE 1 Targets in India for increasing renewable power capacity 175 GW by 2022

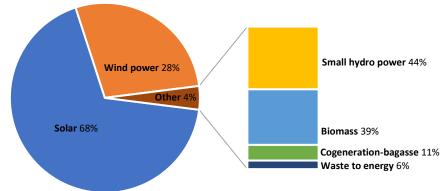
Solar 100 GW Wind 60 GW Bio-power 10 GW

Small hydro-power 5 GW (excluding large scale hydro)

TOTAL 175 GW

Source: Government of India, Ministry of New and Renewable Energy, Dec 2018

FIGURE 2 Estimated Potential of Renewable Power in India



Source: Energy Statistics 2019, Central Statistics Office, Government of India

Nepal's National Targets

Nepal presented its second nationally determined contribution report for the Paris Agreement in 2020 to the UN.¹⁴ Its current total installed capacity for energy generation is approximately 1,400 mw, mainly from hydropower. Its targets for 2030 to reduce emissions and support vulnerable communities include expanding clean energy generation from approximately 1,400 mw to 15,000 mw of which 5-10% will be generated from mini and micro-hydro, solar, wind and bio-energy plants.

Targets by 2030 are to ensure that 25% of households use electric stoves as the primary mode of cooking, and to install 500,000 improved cookstoves by 2025 and an additional 200,000 household biogas plants and 500 large scale biogas plants by 2025.¹⁵

Solar Power

Solar power can be used for a range of applications from hot water (solar thermal) and electricity (solar photovoltaics – direct and battery storage) to smaller applications such as fencing, solar cookers, torches and lanterns for pathways. See the India Renewable Energy Development Agency (IREDA) for further background on solar power and information on financing schemes in India. For Nepal, see the Alternative Energy Promotion Centre (APEC) (renewables – solar PV technology, solar thermal technology) and other organisations listed in the next section.



Photo: Oberoi Vanyavilas.

HARNESS SUN POWER FOR HEATING WATER SEE YOUR CARBON FOOTPRINT AND BILLS DROP			
Per Capita GHG (Green House Gas) emission from electricity consumption	Cost of 100 litre solar water heater (INR)	Expected yearly electricity saving on full use of solar hot water (units of electricity)	Monetary savings INR/year (at INR 7/ kwh)
0.5 tonne of CO₂e	15,000	1,000	7,000

NOTE: Illustrative example for India. Source: Sycom Projects Consultants

Wind



Photo: Dhole's Den

Wind, an option dependent on the suitability of wind conditions on the site, can be harnessed through small turbines or combined wind and solar power systems to generate electricity on-site. Businesses such as Orange County Resorts are also using off-site wind farms to generate more energy than their resorts consume and to reduce operational costs through grid payback. See Indian Wind Energy Association for state analysis and maps of wind energy potential across India. See also IREDA for further background on wind power and information on financing schemes in India. For Nepal, see APEC's section on wind energy and wind energy data and the next section.

Biogas

Biogas is produced from organic waste such as animal mature and other biodegradable waste through a process of anaerobic digestion and can be used to produce heat, light or cooking fuel. The residue can be used as a fertiliser. A small number of lodges are using biogas alongside LPG for cooking. At a community level, as a cleaner fuel than burning wood, biogas reduces indoor air pollution and dependency on forests. In India, see the Ministry of New and Renewable Energy and IREDA. For Nepal, see APEC improved cooking stoves, biomass densification and biomass gasification).



Photo: Aahana The Corbett Wilderness

Small scale hydro power

Small scale hydro power is a highly site-specific technology harnessing the power of rivers and streams. According to APEC, micro-hydro (10-100 kw) has the potential to be a major source of energy in Nepal's rural areas. See their website for information on $\underline{\text{Micro}}$ (10 to 100 kw), $\underline{\text{Mini}}$ (100 kw – 1 mw), $\underline{\text{Pico}}$ and $\underline{\text{Peltric}}$ (up to 10 and 5 kw respectively).

India's Ministry of New and Renewable Energy is responsible for hydro from small 2-25 mw through mico (100 kw or below) to mini (101 kw-2 mw). <u>Information on the state-wise location</u> of identified Small Hydro Power sites is available on their website. The Government aims to reach a cumulative target of 6,000 mw from small hydro by 2022. Financial assistance is available through their online portal (see https://mnre.gov.in/small-hydro/schemes).

Biomass

Biomass is the use of organic material for applications such as heating water, cooking or generating electricity. It relies on large quantities of wood or waste materials such as sugar cane, woodchip and rice husks and is likely to be less relevant to the nature tourism industry. The use of any wood should be

strictly from legal, sustainable sources. Briquettes made from lantana, an invasive weed, for use as a fuel have been developed by some rural enterprises but are not currently being produced on a commercial scale.

A range of lodges are supporting local communities through providing energy efficient chulhas, to reduce indoor air pollution, improve health and reduce dependency on forest resources complementing the Government of India and Nepal's programmes to introduce more efficient cooking stoves. For India, see the Ministry of New and Renewable Energy in India's National Biomass Cookstoves programme, and IREDA's biomass pages. For Nepal, see APEC's Improved Cooking Stoves.



Mahua Kothi - Taj Safari installing 180 fuel efficient, smokeless chulhas in nearby villages.

Air and geothermal heat pumps

Ground and air source heat pumps take low-level heat which occurs naturally underground or in the air and converts it to energy for heating or cooling buildings. Both systems require electricity to drive them. Their level of effectiveness in reducing carbon therefore depends on the energy source of the electricity. This technology, which is used in other parts of the world, is not yet used widely in India and Nepal.

NATURAL SOLUTIONS TO CLIMATE CHANGE

Protecting and restoring forests, wetlands and other ecosystems stores carbon and enables biodiversity to flourish. A study led by the Nature Conservancy and fifteen other expert organisations highlighted that <u>natural climate solutions</u> can deliver large-scale emissions reductions cost effectively and achieve a third of what is needed to keep climate change under 2°C. Forests and other habitats are themselves threatened by <u>climate change</u> calling for resilient species and well-informed planning with a continuing urgent need for reducing energy consumption and fossil fuel emissions. Whilst <u>natural climate solutions are not enough</u> on their own, <u>campaigners</u> call for their crucial role in addressing climate change and turning the tide on massive biodiversity loss to be urgently recognised and support for them stepped up.

India's forest and tree cover amounted to 24.56% according to a 2019 report against a target of 33%, with the country needing to double its rate of forest cover expansion to achieve its Paris Agreement target - creating a cumulative carbon sink of 2.5-3 billion tonnes of carbon dioxide (CO₂) equivalent by 2030.¹⁶

<u>Nepal's 2nd Nationally Determined Contributions for the Paris Agreement</u> targets are to maintain 45% of the total area of the country under forest and wooded cover and to manage 50% of Tarai and Inner Tarai forests and 25% of middle hills and mountain forests sustainably by 2030. According to the <u>Global Forest Resources Assessment in 2020</u>, 44.74% of Nepal is forest and other wooded land.¹⁷ Additional targets for the Paris Agreement include increasing the soil organic matter content of agricultural land to 3.95% by 2030, and creating an inventory of wetlands and sustainably managing vulnerable wetlands.





A NOTE ON TRANSPORT

Global transportation was responsible for 24% of direct CO2 emissions in 2019 from fuel combustion with road transportation accounting for nearly three quarters of transport CO₂ emissions.¹⁸ Electric car deployment has been growing rapidly over the past ten years.¹⁹ Electric cars produce less carbon dioxide than petrol cars across the majority of the globe except in countries heavily dependent on coal.20

INDIA

In India, the transport sector accounts for 18% of total energy consumption contributing around 142 million tonnes of CO₂ annually according to the Bureau of Energy Efficiency. The Government of India has ambitious plans to make India an electric vehicle nation alongside its expansion of renewable energy capacity. A further substantial advantage to the electrification of transport in India is reducing air pollution. Initial targets for 100% electrification of diesel and petrol cars by 2030 have been revised to 30% by 2030. More extensive and earlier adoption of electric three-and two-wheelers is reported in the press.

NEPAL

Nepal's Second Nationally Determined Contribution for the Paris Agreement includes the following targets for electrification of vehicles:

- 25% of sales of all private passenger vehicle sales including twowheelers and 20% of all four-wheeler public passenger vehicle sales by 2025 to be electric.
- 90% of all private passenger vehicle sales including two-wheelers by 2030 and 60% of all four-wheeler public passenger vehicle sales to be electric (not taking electric-rickshaws and electric-tempos Electric buggy at Barahi Jungle Lodge. into account).



By 2030 develop 200 km of the electric rail network.

AVIATION

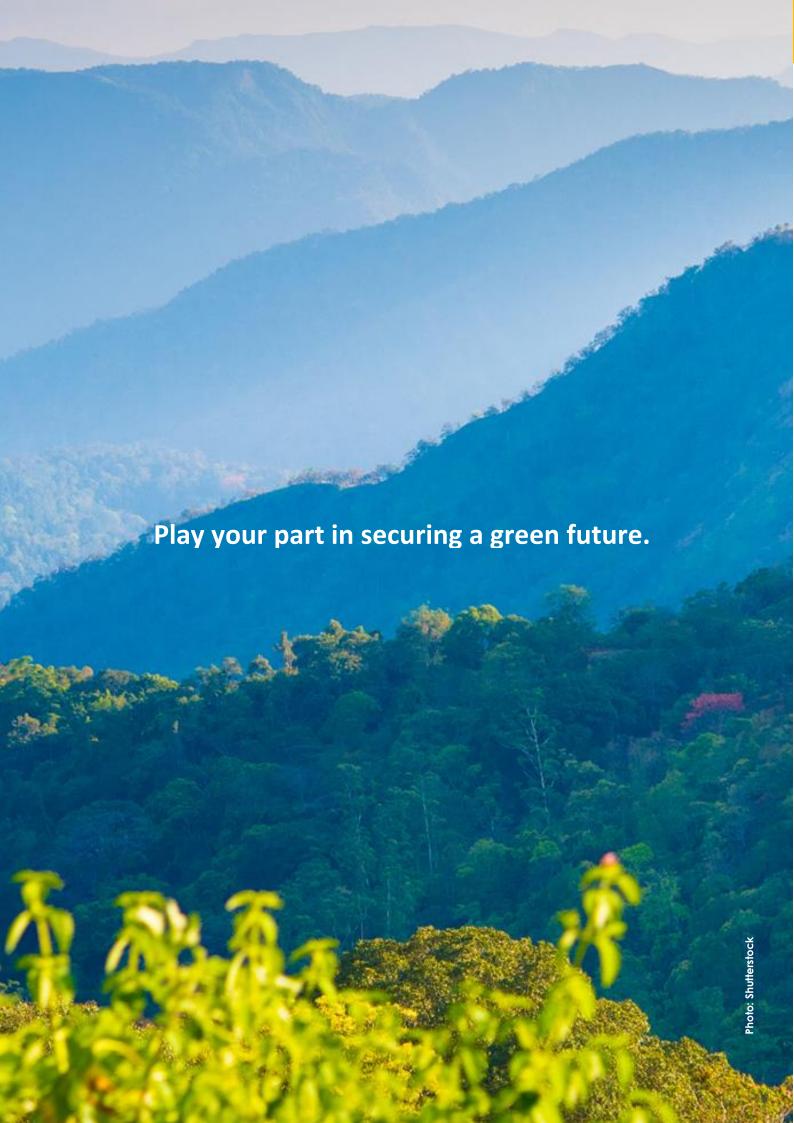
Aviation accounts for approximately 2% of global CO₂ emissions with additional emissions reinforcing the warming impact to 3.5% according to experts.²¹ CO₂ emissions have a long lifetime in the atmosphere and are cumulative with the aviation industry estimated to have already generated 32.6 bn tonnes of carbon into the atmosphere, nearly 50% of which was emitted over the past twenty years.

Domestic aviation emissions fall within the responsibility of national governments under the Paris Agreement. International aviation falls outside it and is covered by Corsia (Carbon Offsetting and Reduction Scheme for International Aviation), an initiative agreed by 192 countries through the UN's aviation agency ICAO. The aim of Corsia is to help the industry reach an 'aspirational goal' to make all growth in international flights after 2020 'carbon neutral' through offsetting. In contrast, the UN's shipping agency has agreed a sector-wide goal to reduce absolute emissions by 50% by 2050 compared to 2008.²² The conservation community are calling for stringent and more ambitious targets to address the climate crisis.²³

NEPAL'S PARIS AGREEMENT TOURISM TARGETS

Nepal's 2nd Nationally Determined Contributions for the Paris Agreement includes the following tourism targets:

- By 2025, formulate and implement nature-based tourism plans in at least five main tourist destinations.
- By 2030, ensure at least five tourism destinations are carbon neutral.
- By 2030, including measures in policies to offset the carbon footprint of emissions resulting from tourism transport.



USEFUL ORGANISATIONS AND LINKS

INDIA

• Bureau of Energy Efficiency (BEE)

BEE was set up as the statutory body to facilitate the implementation of India's Energy Conservation Act 2001. Its activities include <u>BEE star labelling</u> of equipment and appliances for energy efficiency and <u>Energy Conservation Building Code</u> for commercial and residential buildings. https://beeindia.gov.in/



Photo: Jaagir Lodge

Ministry of New & Renewable Energy (MNRE)

MNRE provides a portal to related organisations. https://www.india.gov.in/website-ministry-new-and-renewable-energy

The Indian Renewable Energy Development Agency (IREDA)

IREDA is a public limited government company financing and promoting self-sustaining investment in energy generation from renewable sources, energy efficiency and environmental technologies for sustainable development. See https://www.ireda.in/sectors for financing schemes on sectors including solar energy, wind energy, hydro energy, waste to energy, and energy efficiency and conservation.

https://www.ireda.in/



Solar Energy Corporation (SECI) Solar Energy Corporation (SECI)

SECI is a CPSU company under the control of MNRE with a mission to build green energy in India through the development of large-scale solar projects, promoting and commercialising the use of solar energy to reach the remotest corners of India, and exploration of new technologies. See briefings for business on solar photovoltaic and solar thermal. https://seci.co.in

National Solar Energy Federation of India

An umbrella organisation of solar energy stakeholders of India. http://nsefi.in/

Photo: Dhole's Den

• Indian Wind Energy Association

A not-for-profit organisation set up in 2002 to work as an independent body representing the interests of developers, manufacturers and investors in the Indian wind energy sector. http://www.inwea.org/

• Indian Biogas Association

A nationwide biogas association of operators, manufacturers, and planners of biogas plants, representatives from public policy, science and research in India, and all other stakeholders of biogas ecosystem.

http://biogas-india.com/

NEPAL

Nepal Energy Efficiency Programme (NEEP)

NEEP is the Ministry of Energy, Water Resource and Irrigation's programme to mainstream energy efficiency in Nepal.

http://energyefficiency.gov.np/

NEPAL (CONT.)

Alternative Energy Promotion Centre (AEPC)

AEPC was set up by the Government of Nepal's Ministry of Energy, Water Resources and Irrigation to promote renewable energy, raise living standards of rural people and protect the environment of Nepal. Linking public, NGO and private sectors, the agency is implementing programmes and projects in renewable energy sectors spanning mini and micro hydropower, improved water mills, solar photovoltaic and solar thermal, biogas, biomass, bio-fuels, and wind energy. Their website has a range of resources.

https://www.aepc.gov.np/

The Central Renewable Energy Fund (CREF)

CREF is responsible for delivery of subsidies and credits to the renewable energy sector in Nepal. https://www.cref.gov.np/en

Nepal Renewable Energy Programme (NREP)

NREP, a 4.5 year £18m programme funded by <u>DfID</u> which started in February 2019, is designed to support the Government of Nepal and the private sector plan and invest in renewable, sustainable energy for economic growth, poverty reduction and climate-smart development in communities across Nepal. The Photo: Barahi Jungle Lodge programme operates in Provinces 2, 5 and Karnali. Its



activities include governance, market assessment and a <u>SE Challenge Fund</u> covering 'middle ground' projects such as solar microgrids for communities and rooftop or canopy solar for commercial businesses, hotels, tourist destinations, hospitals, health centres and schools. Measurable goals include the provision of RE to 95,000 households, 500 small businesses and 200 schools and health centres.

Renewable Energy Confederation of Nepal

A forum of associations of private sector companies involved in supply and delivery of alternative energy systems and services and NGOs involved in the promotion of alternative energy in Nepal. https://recnepal.org/

Nepal Biogas Promotion Association

The umbrella organisation of biogas construction companies and biogas appliance manufacturing workshops in Nepal.

https://sites.google.com/site/nepalbiogas/

Biogas Sector Partnership-Nepal

A non-governmental organisation involved in developing and promoting appropriate rural and renewable energy technologies, particularly biogas, to improve livelihoods in rural areas. It also implements the Rainwater Harvesting Capacity Centre. http://bspnepal.org.np/index.html

INTERNATIONAL

Carbon Brief

A UK-based website covering the latest developments in climate science, climate policy and energy policy across the globe with expert briefings across a wide range of areas including <u>renewable energy</u> and <u>nature</u>.

https://www.carbonbrief.org/

INTERNATIONAL (CONT.)

Carbon Trust

A company working to accelerate the delivery of a sustainable, low carbon economy by helping businesses, governments and organisations across the globe to reduce carbon emissions and increase resource efficiency. Resources include a hospitality sector energy saving guide and a free carbon calculator.

https://www.carbontrust.com/

International Tourism Partnership

A non-competitive platform for hotel leaders to share ideas, build relationships and work collaboratively. See their Resources and their online magazine, Green Hotelier for free content on sustainable tourism and green hotels.

https://www.tourismpartnership.org/resources/

Natural Climate Solutions

A global initiative raising awareness of the need to harness the power of nature and ecosystems to avert climate disaster linking the twin crisis of climate and ecological breakdown and calling for more support. Read their call to action for an informed introduction to the current science. https://www.naturalclimate.solutions/thescience

The Nature Conservancy

The Nature Conservancy is an international notfor-profit conservation organisation focusing on One of Kipling Camp's Forest Creation Workshops co-hosted by climate change, protecting land and water, Afforestt involving local people. Photo: Kipling Camp. providing food and water sustainably and



healthy cities. Research led by TNC and fifteen other institutions demonstrated that nature-based solutions can provide up to 37% of the emission reductions needed by 2030 to keep global temperature increases under 2°C. See their resources including a Playbook for Climate Action and website naturalclimatesolutions.org. Their projects in India include a decision-support tool, DARPAN to select degraded lands for setting up renewable energy projects https://www.nature.org/

CARBON FOOTPRINT CALCULATORS

Green Key

A carbon calculator following the Hotel Carbon Measurement Initiative (HMCI) tool developed by the International Tourism Partnership in partnership with the World Travel & Tourism Council. Areas covered: gas and oil consumption; laundry (if outsourced); air conditioning or refrigeration leaks and maintenance, site owned/operated vehicles https://www.greenkey.global/online-hcmi

Carbon Trust

A free UK designed Carbon Footprint Calculator to help small and medium sized enterprises measure their corporate emission footprint following GHG Protocol. The calculator covers fuel consumption, energy use and tops ups made to air conditioning units. https://gbfcalc.azurewebsites.net/gbf/calc/

USEFUL PUBLICATIONS

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- Environmental Management for Hotels, The Industry Guide to Sustainable Operation, 2 Energy, International Tourism Partnership, third edition 2008, digital release 2014. A detailed guide on sustainable use of energy for hotels.
- <u>Hotel Carbon Measurement Initiative v.1.1 Methodology</u>, World Travel & Tourism Council and International Tourism Partnership, December 2016. See Appendix 3: Global Warming Potential (GWP) of Refrigerants for GWP listing of different refrigerants.

ORGANIC CERTIFICATION SCHEMES

India

- Bureau Veritas Certification India Pvt Ltd (BVQI), Mumbai
- Vedic Organic Certification Agency, Hyderabad
- Indian Organic Certification Agency, Ernakulam
- Food Cert India Pvt Ltd, Hyderabad
- National Organic Certification Association, Pune
- Eco Cert SA, Aurangabad
- Aditi Organic Certification Pvt. Ltd, Bengaluru



Certified organic kitchen garden at Spice Village Thekkady.

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- ⁶ https://www.iea.org/reports/sdg7-data-and-projections/access-to-electricity
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Information included may not be appropriate to every situation, destination and country and is intended for general guidance only and may be subject to change.



HELP US DRIVE THE CHANGE

Your corporate commitment to sustainability





TOFTigers is a global business-to-business nature travel charity with a mission to improve the ecological and economic sustainability of wildlands and wildlife across Asia. Well-planned and well-managed responsible tourism is a force for good bringing economic benefits to rural areas, restoring habitat, supporting conservation and local communities, changing poachers into protectors and giving visitors inspiring experiences of nature. We work with the travel trade, destinations, accommodation providers, governmental and conservation organisations to make this happen through training, advocacy, certification, promoting best practice and partnership working.

Our **certification programmes** place local communities, nature and environmental sustainability at the heart of business operations. They are a symbol of assurance for travellers and the travel trade that the places they select stay at have been reviewed by environmental experts and exceed a minimum standard on a journey towards best practice. The PUG certification is recognised by the United Nation's Global Sustainable Tourism Council (GSTC) and is aimed solely at nature focused accommodation. The Footprint certification has a broader client base that is not wholly nature focused and encompasses accommodation providers in rural, natural or more urban landscapes.

<u>Sign up for certification</u>, <u>get involved in our campaign</u> or view sustainable travel options <u>on our website</u> and download the <u>Great Wildlife Travel Guide</u>.

TOFTIGERS BEST PRACTICE SERIES

- Introduction
- Community Liaison and Support
- Energy and Carbon Footprint
- Nature Education and Conservation
- <u>Sustainable Building</u>

- Local Economy Employment, Skills and Enterprise
- Water Conservation and Treatment
- Waste Management and Recycling
- Cultural Heritage
- Health, Safety and Pollution

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