

# Lao People's Democratic Republic Resource Efficiency Policies

Natthanij Soonsawad, Raymundo Marcos Martinez,  
Heinz Schandl

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## Land and Water

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# Foreword

The Asia-Pacific region consumes over two-thirds of the world's natural resources, at a rate of resource efficiency three times lower than the rest of the world. The region is also in a continuous state of rapid urbanisation and economic growth. Such dynamics partly drive the rate of resource use, as infrastructure and housing are built for the first time and the economy transitions from primary to manufacturing activities.

The United Nations Economic and Social Commission for Asia and the Pacific seeks to support cities integrating resource use sustainability into their operations and development strategies. ESCAP is partnering with an institution with internationally recognised expertise in resource efficiency. The Partner Institution, CSIRO, is the world's leading research institution dealing with resource efficiency and material flows, which are the basis for designing sustainable consumption and production policies. The scientists at CSIRO are part of the UN Environment Programme International Resource Panel (IRP) modelling working group, which developed the modelling framework for the Global Resource Outlook 2019 (GRO2019). The partnership will help in establishing a baseline dataset and preliminary policy studies for countries and cities in the Asia-Pacific region. With access to material flow databases and proprietary systems models integrating global resource flows used in GRO2019, CSIRO is uniquely placed to present historical resource use trends to enhance policy design capacity towards sustainable consumption and production in Asia and the Pacific region.

This report has been produced under an agreement between ESCAP and CSIRO to strengthen the capacity of ASEAN policymakers to analyse the economic, social and environmental effects of resource consumption and the benefits of decoupling economic growth from natural resource use and its environmental impacts.

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# Country background

The Lao People's Democratic Republic (Lao PDR, often referred to as Laos) is a landlocked, mountainous country with an estimated population of around 7.3 million in 2020<sup>1</sup>. Recent strong economic growth has enabled Lao PDR to move from being a low-income economy to a lower-middle-income country in 2010 (Government of Lao PDR, 2018). Lao PDR was still in the Least Developed Country (LDC) category as of November 2021 (UN Committee for Development Policy, 2021). The economic growth of Laos relies heavily on natural resources, and the government has been implementing policies to move towards more inclusive and sustained growth. Sectors with high socio-economic development potential include agriculture, tourism, energy, and transport. Agriculture and tourism have the highest labour force participation rates (Government of Lao PDR, 2021).

## Macro-economic overview

Between 2016 and 2020, the Lao PDR economy grew steadily at 5.8% per year, on average. However, this growth rate fell short of the 7.2% annual growth target in the 8<sup>th</sup> National Socio-Economic Development Plan. The country's economic structure had not yet shifted towards industrialisation and modernisation as of 2021. The main drivers of economic growth came from the natural resource sector and the industrial sector, particularly power and construction (Government of Lao PDR, 2021). Although the country has had steady economic growth, there has been limited private sector investment and outdated trade laws and regulations affect long term economic improvements (USAID, 2019).

GDP per capita increased from \$2,025 USD in 2016 to \$2,554 USD in 2019. However, GDP per capita growth decreased from 5.4% in 2016 to -1.0% in 2020<sup>2</sup>. The sectors with slow economic growth were agriculture, mining and processing industries. Important factors influencing the decline in economic growth are natural disasters such as floods and the COVID-19 pandemic. The country's economy has recently begun to shift toward higher-quality processing and service sectors, which could result in job creation and income generation in a more sustainable direction (Government of Lao PDR, 2021).

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<sup>1</sup> <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=LA>

<sup>2</sup> <https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG?locations=LA>

# Resource Efficiency Context

## Legal framework

Laos has committed to fulfilling the global agenda for sustainable consumption and production (SCP). The country completed the Voluntary National Review of the Implementation of the 2030 Agenda for Sustainable Development in 2018. Laos released its National Green Growth Strategy in 2018 to guide the country's response to Sustainable Development Goal (SDG) 12 and other SDGs (SWITCH-Asia, 2021). In addition, the national development policy guidelines, the 9th National Socio-Economic Development Plan (NSEDP) and sectoral strategies described in the following sections provide an enabling framework for the country to achieve SCP.

Lao PDR's National Green growth strategy is defined as economic growth generating poverty reduction and quality of life improvements in a comprehensive, inclusive, and equitable manner by improving resource use efficiency, effectiveness, and sustainability. Achieving the green growth goals will help minimise environmental degradation and risks to the national economy due to climate and global economic uncertainties. The National Green Growth Strategy has three main objectives: 1) build awareness and create consensus on green growth action, 2) mainstream green growth concepts into national, sectoral and local frameworks, and 3) encourage and promote sectors and local governments to implement policies, plans, programs, and activities. Seven sectors are the main focus of green growth projects: Natural Resources and Environment; Agriculture and Forestry; Industry and Commerce; Public Works and Transport; Energy and Mines; Information, Culture, and Tourism; and Science and Technology (Secretariat for Formulation of National Green Growth Strategy of the Lao PDR, 2018).

## Sectoral policies related to resource efficiency

### Agriculture

**Status and challenges.** Lao PDR has developed and implemented several policies and strategies to ensure food security, including incentives for commodity production, food security projects, promotion of climate change resilient agricultural production, and development of agricultural products' storage capacity. Moreover, work has been done to monitor and build preparedness for dealing with pests and animal disease outbreaks and plan for drought and flood prevention and response. Nonetheless, many shortcomings, constraints and challenges remain in ensuring food security and increasing agricultural exports due to the overall challenges to domestic agricultural production.

**Current Policies.** Lao PDR is rich in arable land and has a relatively large agricultural land area per capita. The country has favourable conditions for agricultural production, especially for clean, modern and sustainable agriculture, which is increasingly in demand in domestic and international markets. Lao PDR has benefited from various preferential tariff schemes, particularly quota-free and duty-free market access for agricultural products to China and exports to the European Union. However, due to limited productivity, budget and technological capacities, and the impact of natural disasters, agricultural production has been unstable and unable to meet export demand and quality (Government of Lao PDR, 2021).

## Transport

**Status and challenges.** As Laos is a landlocked country, it offers opportunities for regional and international connectivity through land and air transport links, such as the Laos-China railway and the Vientiane-Vang Vieng expressway. The new transportation nodes could help transport domestic goods to neighbouring countries and enable the integration of value chains through modern logistics systems. As one of the key sectors in the NESDP, and Green Growth Strategies, the government has set out several strategies and policies for green and sustainable transport to ensure flexibility, cost-efficiency, economies of scale, and environmental sustainability, with targets for 2023 and 2030 (Government of Lao PDR, 2021).

While the country's growth rate of road transport vehicles (especially motorcycles) is relatively high compared to economic growth, the provision of public transportation services is not adequate, both in quantity and quality. Moreover, energy demand for the sector largely depends on imported fuel. In 2015, the total imported value of fuels used in the transport sector accounted for about 5% of national GDP (Government of Lao PDR, 2021). The transport sector contributes about one-third of total greenhouse gas emissions, the largest share across sectors (Kyophilavong, Phouphet Souphonphacdy, Daovinh Souphasy and Tounalom, 2021). Other challenges include high traffic congestion and road accidents in large towns due to the increasing number of personal vehicles (Secretariat for Formulation of National Green Growth Strategy of the Lao PDR, 2018).

**Current policies.** Green Growth Strategies include improving urban transportation infrastructure to expand options for pedestrians and bikers, improving public transportation services, and designing and improving road network infrastructure to be resilient to natural disasters. Another significant strategy aims to change people's behaviour towards the adoption of more sustainable transportation practices, e.g. car-sharing and biking. There are also policies to promote the production, importing and use of transport vehicles that use clean energy, e.g. hydro-energy, solar energy, to decrease the import and use of fuel and reduce greenhouse gas emissions (Secretariat for Formulation of National Green Growth Strategy of the Lao PDR, 2018).

## Energy

**Status and challenges.** Laos has the potential to increase its supply of clean energy, e.g. through hydro-energy, solar energy and wind energy projects. In particular, the country has considerable hydropower potential due to its topography and geography, which could significantly contribute to the domestic economy. The Government of Lao PDR has policies and strategies to produce and export hydroelectricity to meet the demand of ASEAN countries, especially neighbouring countries. This will help reduce the use of fossil energy, contribute to energy security, reduce poverty, and generate revenue. There are 63 hydro-energy power plants operating throughout the country and several more under construction. Laos is currently conducting feasibility studies on the production of wind energy, biomass and biogas (Secretariat for Formulation of National Green Growth Strategy of the Lao PDR, 2018; ADB, 2019).

Laos imports electricity from Thailand, Vietnam, and China, as its power transmission infrastructure is not yet developed in some rural areas. The proportion of clean energy use in the country is low. Most domestic energy is derived from firewood, charcoal, and fossil fuels due to the lack of electricity grid infrastructure. Moreover, the country faces financial, social and environmental constraints to the development of hydropower projects (ADB, 2019).

**Current policies.** The Government of Lao PDR has policies to promote sustainable hydroelectricity generation and amended the Law on Electricity in 2017. This law supports sustainable power projects with positive environmental and socio-economic impacts. The Ministry of Energy and Mines is coordinating with other relevant agencies to promote clean energy projects to turn Lao PDR into a pollution-free country by 2050. This goal also has the objective of decreasing dependency on imported fossil fuels in the transport sector and promoting the use of renewable energy.

The government also has policies to promote energy savings and alternative energy supply such as biofuels as sources of electricity in rural areas. Such policies are expected to result in:

- 1) energy savings and conservation to reduce greenhouse gas emissions (this also helps generate revenue from carbon credits in international markets);
- 2) promoting alternative energy by enhancing national, regional and international cooperation in technical capacity building;
- 3) encouraging investments in biofuel production and distribution;
- 4) ensuring effective, safe and inclusive access to electricity for 98% of all rural households (Secretariat for Formulation of National Green Growth Strategy of the Lao PDR, 2018).

Moreover, the current NESDP contains energy strategies to improve resource efficiency, such as encouraging electricity generation from clean local sources to improve people's livelihoods; promoting green infrastructure and improving energy efficiency in buildings; incentivising renewable energy investments; and developing guidelines on energy-saving and conservation for different sectors (Government of Lao PDR, 2021). The energy efficiency and conservation program have a target to reach a 30% share of renewables in the total energy supply by 2025. The promotion of biofuel production and use in 10% of the energy demand of the transport sector and a reduction of 10% in energy consumption in all sectors are expected to contribute to this target (Kouphokham, 2019).

## Water

**Status and challenges.** The government has set out plans and policies to ensure the sustainable management of water resources in both quantity and quality. This includes regularly monitoring water quality in ten high priority river basins while targeting to monitor 200 other sites nationwide. There are also strategies in four cities and four towns in the country to improve wastewater treatment systems (Government of Lao PDR, 2021). Moreover, in collaboration with international partners, including the Mekong River Commission and the World Bank, the government has implemented the Mekong Integrated Water Resources Management (IWRM) project. The IWRM aims to improve water resource and fisheries management in areas of the Lower Mekong Basin and strengthen the country's institutional and technical capacity (World Bank, 2018).

Challenges in water resource efficiency include a lack of resources for the management of protected areas and watersheds (Government of Lao PDR, 2021).

**Current policies.** Priority activities to be implemented for the water sector in the current NESDP aim at ensuring sufficient, efficient, effective and sustainable use of water, including promoting the establishment of coordination mechanisms for participatory management, allocating water use by sectors and localities, protecting upstream forests/water sources associated with river basins by implementing the National Water and Water Resources Management Strategy, and river basin management plans; protecting, improving and expanding both natural and artificial water bodies; and improving water quality and developing management plans to allocate water resources efficiently, effectively and sustainably. Furthermore, the NESDP aims to encourage investments in low-cost, effective infrastructure for the collection and treatment of wastewater in urban and rural areas (Secretariat for Formulation of National Green Growth Strategy of the Lao PDR, 2018; Government of Lao PDR, 2021).

## Materials and waste

**Current policies.** Laos has Building Code 2016 that addresses general specifications for building materials. However, the Building Code does not contain information on buildings' energy efficiency or low-carbon materials. There is no centralised green building standard or regulatory mechanism for high-performance,



energy-efficient buildings. Green building certification is voluntary, such as the World Bank building that obtained an international green mark platinum certification (Ministry of Energy and Mines Lao PDR, 2021).

Regarding waste, in the past decade, the government has enacted several laws and endorsed policies related to waste management as follows:

- Environmental Protection Law (2012) defines waste and its use in the country;
- Hazardous waste regulations – Prime Minister’s Office Notice (2016) banning import and export of electronic waste;
- Ministerial Instruction on Hazardous Waste Management (2015);
- Ministerial Agreement on Waste Management from Processing Industry and Handicraft (2012).

Lao PDR’s government also signed the Hanoi 3R (reduce, reuse, and recycle) Declaration for countries in the Asia-Pacific region to demonstrate commitment to implementing sustainable actions and measures for achieving resource efficiency and a green economy. The Declaration also addresses the goal of reducing waste, especially electronic waste (Ministry of Energy and Mines Lao PDR, 2021).

The NESDP contains strategies to improve the efficiency and effectiveness of waste management, including raising public awareness to change people’s littering behaviour, promoting waste separation for recycling and reuse, reducing single-use materials, promoting biodegradable products, and building and improving waste management infrastructure, especially in big cities. In addition, the government aims to encourage local and foreign investment in recycling and waste-to-materials businesses (Government of Lao PDR, 2021).

## Urban planning and land use

**Status and challenges.** Urbanisation in Lao PDR has occurred rapidly in recent decades, and the development of infrastructure and provision of public services have been unable to fulfil the needs of a growing population. This has caused several urban issues such as pollution, traffic congestion, infrastructure damage, and deteriorating living conditions. Furthermore, climate change related events (e.g. heatwaves, heavy rainfall, floods, droughts) have impacted roads, buildings and other constructions in urban areas, degrading their quality and shortening their lifespan. Therefore, the National Green Growth Strategy has identified sustainable urban development as a government priority (Secretariat for Formulation of National Green Growth Strategy of the Lao PDR, 2018).

**Current policies.** In the current NESDP, the government aims to develop aesthetic, green and liveable cities that also provide artistic and cultural values to urban dwellers. The NESDP includes policies to guide the design of urban spaces, construct new buildings and infrastructure resilient to climate change and natural disasters, and promote pedestrian-oriented spaces, sports facilities and playgrounds. Importantly, the government aims to improve wastewater treatment facilities and environmental management systems to help reduce municipal waste. The government has highlighted a need to implement pilot models of green cities and green rural areas to generate empirical knowledge toward more efficient transitions to sustainable and liveable areas (Government of Lao PDR, 2021).

## Industrial sector

**Status and challenges.** Laos is transitioning from an economy driven by primary production to one in which light industry plays an increasing economic role. Diversifying and restructuring the economy, promoting job-generating industries, and reducing imports while improving resource use through green industry processes could positively impact the country’s economy. Light industries like Small and Medium Enterprises (SMEs) can benefit from improvements to the tourism sector, which accounts for 13% of GDP and 13% of total employment. According to the United Nations World Tourism Organisation (UNWTO), international tourist arrivals increased by 14.4% in 2019, making Laos one of the fastest-growing tourist destinations. Promoting

tourism activities based on the country's resources, e.g. visits to nature conservation or agricultural areas, homestay programs, and handicraft markets, could have spillover effects on other economic sectors (Government of Lao PDR, 2021).

**Current policies.** The Department of Industry handles regulations related to green industries. Related policies are focused on promoting the adoption of green technology and practices in the manufacturing sector (Ministry of Energy and Mines Lao PDR, 2021). The NESDP promotes green industry practices through several strategies. For example, developing an integrated industrial system where waste from processing raw materials can be used as input by other industries. This could increase the efficiency of resource consumption and production by reducing waste generation. Small and Medium Enterprises (SMEs) could also benefit from green practices. For instance, organic agriculture and ecotourism could promote business opportunities for local people and more efficient use of natural resources (Government of Lao PDR, 2021).

## Lao PDR's Performance on Resource Efficiency Indicators (SDG 8 and SDG 12)

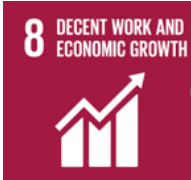
According to the UN Global Material Flow Database (International Resource Panel, 2022), Lao PDR's Material Footprint (MF) per unit of GDP (indicator 8.4.1) decreased from 12.53 kg per USD of GDP in 1970 to 3.18 kg in 2011 (Figure 1). Since then, the indicator has remained around the same level. Domestic Material Consumption (DMC) per unit of GDP (indicator 8.4.2) decreased from 11.46 kg per USD of GDP in 1970 to 4.04 kg in 2001. This indicator increased during the 2000s and 2010s, reaching 5.74 kg in 2019 (Figure 1). Both indicators have been above the corresponding averages for ASEAN countries since 1970.

DMC per capita remained relatively stable between 1970 and 2001 at around 3.7 tonnes. Afterwards, this indicator increased until reaching 14.7 tonnes per capita in 2019. MF per capita oscillated around 4.5 tonnes from 1970 to 2006 and then increased until reaching 9.6 tonnes per capita in 2019 (Figure 2). While MF and DMC per capita have increased significantly in recent decades, those metrics have been below the average for the ASEAN region since 1970. However, DMC per capita has been above the corresponding ASEAN average since 2016 (Figure 2).

According to the SCP Hotspot Analysis database<sup>3</sup>, the construction sector accounted for 32% of total raw material consumption in the country, followed by the agricultural sector with 14%, and food with 10%. While the construction sector has the largest share of raw material use, it employs 5% of the total workforce. By comparison, agriculture was the sector with the largest number of employees, at 44% of the total workforce. The large use of materials by the Lao PDR construction sector lowered the country's performance on total resource efficiency indicators.

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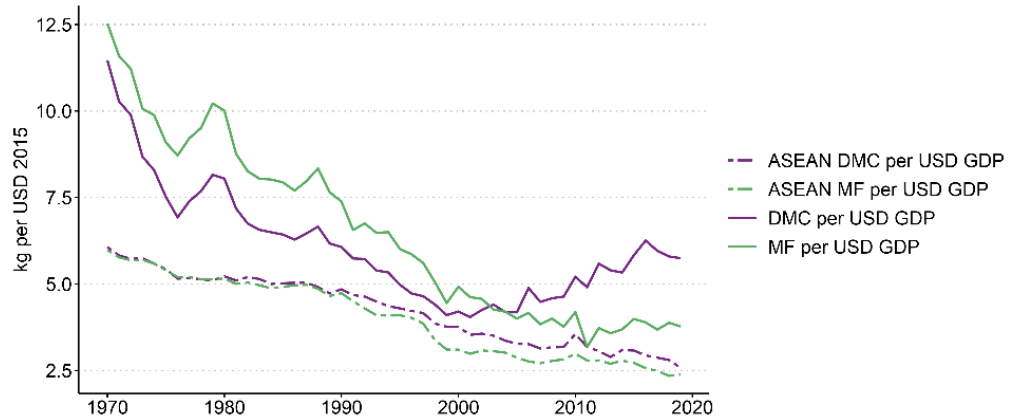
<sup>3</sup> <http://scp-hat.lifecycleinitiative.org/sector-profiles/>



**SDG Target 8.4** Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead.

**Indicator 8.4.1 Material Footprint<sup>4</sup> (MF) per unit of GDP:** 3.8 tonnes per 2015 US\$

**Indicator 8.4.2 Domestic material consumption (DMC) per unit of GDP:** 5.7 tonnes per 2015 US\$



Data source: International Resource Panel (2022)

Figure 1 Material footprint and domestic material consumption per unit of GDP in Lao PDR and ASEAN countries



**Target 12.2** By 2030, achieve the sustainable management and efficient use of natural resources.

**Indicator 12.2.1 Material footprint:** 69.1 megatonnes

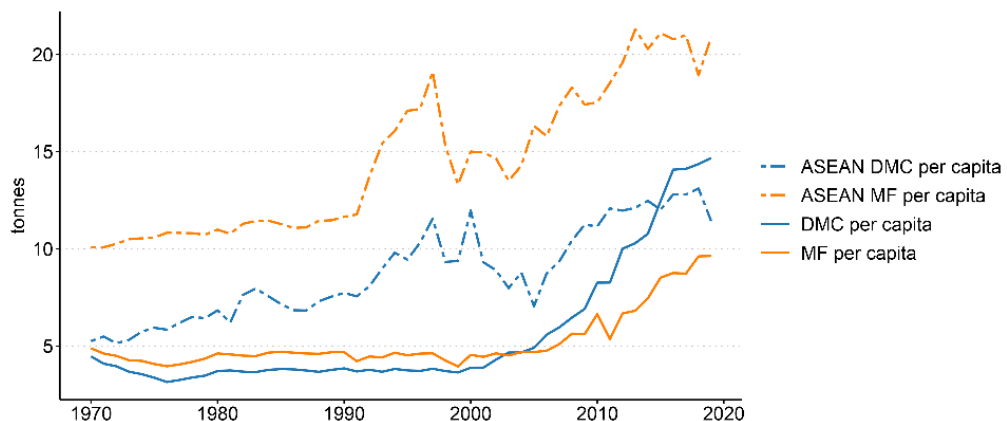
**Material footprint per capita:** 9.6 tonnes per capita

**Material Footprint per unit of GDP:** 3.8 tonnes per 2015 US\$

**Indicator 12.2.2 Domestic material consumption:** 105.2 megatonnes

**Domestic material consumption per capita:** 14.7 tonnes per capita

**Domestic material consumption per unit of GDP:** 5.7 tonnes per 2015 US\$



Data source: International Resource Panel (International Resource Panel, 2022)

Figure 2 Material footprint and domestic material consumption per capita in Lao PDR and ASEAN countries

<sup>4</sup> The total material footprint is the sum of the material footprint for biomass, fossil fuels, metal ores and non-metal ores, measured in tonnes per person per year.

## Enabling conditions and opportunities for resource policy implementation

**1. Continuous sustainability action and meaningful public participation:** Domestic and international entities have contributed to the development of businesses and the gradual transformation of the country's economy (Government of Lao PDR, 2021). The continuation of these efforts is necessary for achieving domestic sustainability goals. In addition, more informed and consistent involvement of citizens in the development and implementation of plans could lead to better sustainability outcomes. Local capability development to promote more meaningful public participation in SCP policies could be based on previous work done by international partners such as the Asian Development Bank, the European Union, USAID, and ASEAN.

**2. Capacity building for younger generations:** More than half of the country's population is under 25 years old (Government of Lao PDR, 2018), and the median age in 2020 was 24 years (United Nations, Department of Economic and Social Affairs, 2019). Therefore, there are opportunities to prepare younger generations for job opportunities generated by green growth strategies in agriculture, service/tourism, energy, and other sectors. Some examples of this approach are the Participatory Development Training Centre, and Women in Laos, which promote empowerment and capacity building in local communities.

**3. Benefiting from local resources:** The current NESDP includes a policy to promote One-District, One-Product projects (Government of Lao PDR, 2021). Such a policy could promote clean, modern and sustainable agricultural practices and the development of small processing and manufacturing industries in the form of SMEs, which can create jobs, incentivise income growth and strengthen communities, especially the most impoverished ones.

**4. Job creation in clean energy projects:** The energy sector plays a critical role in domestic efforts to reduce environmental degradation and GHG emissions, create job opportunities, and improve the competitiveness of national industries. Given the domestic and international efforts to increase the share of renewable energy in the energy mix to 30% by 2025 (Kouphokham, 2019), some lessons from successful projects could be transferred to other regions in the country. For example, in the remote villages of Kobong and Thapaiban, UNDP supported the installation of the successful Solar Flex-Grid<sup>5</sup>, a new frugal approach for sustainable electrification. This model could be applied in other rural areas experiencing the same issue and could create jobs in the assessment, installation and maintenance of such grids (Center for Strategic and International Studies, 2022).

**5. Economic incentives:** Besides providing subsidies or grants as incentives for implementing SCP practices, public-private partnerships can help bridge the gap for decentralised systems, such as those for small-scale energy and safe drinking water (SWITCH-Asia, 2021). Some areas that could create co-benefits and contribute to better resource efficiency and circular economies, like second-generation biofuel production from agricultural or food waste, need government support to develop local capacity and incentives to make project execution economically and environmentally viable.

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<sup>5</sup> <https://www.ndcs.undp.org/content/ndc-support-programme/en/home/impact-and-learning/library/flex-grid-installations-in-kobong-and-thapaiban.html>

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**For further information**

**Land and Water**  
Heinz Schandl  
[heinz.schandl@csiro.au](mailto:heinz.schandl@csiro.au)  
[csiro.au/land&water](https://csiro.au/land&water)