



Urban  
Pathways

NEPAL

POLICY ENVIRONMENT PAPER

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Urban Pathways Replication Cities



# ABSTRACT

This paper aims to identify policy measures in line with the UN's New Urban Agenda and in the context of the respective Nationally Determined Contributions of Nepal. This paper reviews current developments of Nepal to mitigate and its adaptation to greenhouse gas (GHG) emissions by focusing on the country's national policies and implementation strategies in keeping with the Paris Agreement on Climate Change (2015). A brief analysis of the Kathmandu Valley's strategies to accordingly mitigate and adapt is conducted by reviewing the sectors of energy, transport and resource/waste management.





# Urban Pathways





# COUNTRY OVERVIEW

The Federal Democratic Republic of Nepal (Nepal) is a developing country, located in South Asia. Within the area of 147,181km<sup>2</sup> an estimated population of 27 million live in Nepal. Annual population growth in the country was 1.1% in 2016 (World Bank, 2018), while average annual urban population growth is 3.15% (UNCRD, 2015). Kathmandu is the country's capital and the largest city (population of 1 million), followed by Pokhara, Lalitpur, Bharat-

pur and Birgunj metropolitan cities (population above 200,000). Agriculture, services (remittance), industry and tourism are the country's main economic activity. Nepal's GDP per capita is 729.1 US\$ (2016) (World Bank, 2018a). It is expected to grow at 3.5% in 2018 and 4.1% in 2019. Nepal GDP growth is expected by 4.9% in 2018 and 5.5% in 2019. Inflation rate in Nepal is forecasted at 5.5% in 2018, the second highest in South Asia after Bangladesh (ADB, 2018).

## SUMMARY OF NEPAL'S NATIONALLY DETERMINED CONTRIBUTION (NDC)

Nepal is one of the least contributors to the greenhouse gas (GHG) emissions. As of 2010, Nepal's own emissions bring about less than 0.1% of global emissions. With the current policies, Nepal's GHG emissions are expected to increase to between 50–53 MtCO<sub>2</sub>e by 2030 (an increase of 55–66% compared to 2010 levels). Even with this increase, the country's per capita emissions would only grow from 1.2 tCO<sub>2</sub>e/cap as of 2010 to 1.5–1.6 tCO<sub>2</sub>e/cap by 2030, still far below the 2012 world average of 7.6 tCO<sub>2</sub>e/cap. But Nepal is highly vulnerable to climate change which has a negative impact on its people, property and natural resources (Government of Nepal, 2016). Nepal's Nationally Determined Contribution (NDC) was submitted in October 2016. In its Paris agreement targets, it has plans to build resilience to climate change impacts as well as to reduce greenhouse gas (GHG) emission with an intent to move to a low carbon economic development pathway - but has not outlined a clear overall GHG emission reduction tar-

get or commitment (Climate Action Tracker, 2017). The Climate Change Management Division in the Ministry of Population and Environment, and REDD Implementation Centre under the Ministry of Forests and Soil Conservation are dedicated to develop required prerequisites or the effective implementation of the UNFCCC provisions. The National Planning Commission and relevant ministries have also made required arrangement to integrate climate change concerns into relevant policies and programmes (Government of Nepal, 2016). Nepal's main policy related to emissions mitigation is the Climate Change Policy 2011, the central goal of which is "to improve livelihoods by mitigating and adapting to the adverse effects of climate change, adopting a low-carbon emissions socio-economic development path and supporting and collaborating in the spirits of country's commitments to national and international agreements related to climate change" (Government of Nepal, 2011; Climate Action Tracker, 2017).

# MITIGATION PLANS AND ACTIONS

The GHG emission reduction plans, mainly on energy, mobility and resources, listed in Nepal's NDC are as follows (Government of Nepal, 2016):

- To achieve 80% share of electricity from renewable sources in the energy mix by 2050,
- To reduce dependency on fossil fuels by 50% by 2050,
- To expand its energy mix focusing on renewables by 20% by 2020;
- To increase the share of electric vehicles to 20% by 2020 from 2010 level;
- To decrease its dependency on fossil fuels in transport sector to 50% by 2050 through effective mass public transport and promoting energy efficient and electric vehicles;
- To built an electrical (hydro-powered) rail network by 2040;
- To maintain 40% of the total area of the country under forest cover;
- To reduce about 14 million tonnes of CO<sub>2</sub>e by 2020 with a sub-national project on REDD+; and
- To use renewable systems under the National Rural Renewable Energy Program (NRREP), reducing the

dependency on biomass and making it more efficient Nepal's mitigation actions include clean energy development pathways, particularly through enhancing the potential on hydro-power, solar power and wind energy, and energy-efficient technology in urban and rural areas. Nepal plans to generate clean energy as follows:

- 4,000 MW of hydroelectricity by 2020 and 12,000 MW by 2030;
  - 2,100 MW of solar energy by 2030 with arrangements to distribute it through the grid;
  - Additional 220 MW of electricity from bio-energy by 2030;
  - Additional 50 MW of electricity from small and micro hydropower plants;
  - Increase the share of biogas up to 10% as energy for cooking in rural areas; and
  - Equip every households in rural areas with smokeless (improved) cooking stoves (ICS) by 2030.
- As a part of waste management, Nepal promotes the generation of energy from waste.

# ADAPTATION PLANS

Nepal has initiated several activities to reduce climate threats and build resiliency, support climate vulnerable communities to cope with climate change impacts on people and nature. The key activities include institutional strengthening (forming the climate change management division under ministry) and establishing coordination mechanisms at the political level for necessary policy guidance and coordination and at local level for implementation on the ground (such as between Climate Change Council, Climate Change Coordination Committee and REDD Coordination and Monitoring Committee at the political levels and Multi-stakeholder Climate Change Initiatives Coordination Committee and REDD Working Group chaired

by Secretaries of the concerned ministries).

Nepal has also prepared its National Adaptation Programs of Actions (NAPAs) to Climate Change and adopted a National Framework on Local Adaptation Plan for Action (LAPA) to ensure integration of adaptation and resilience into local to national planning processes. In order to promote afforestation and enhance carbon sequestration, the Government of Nepal has a strategy to maintain at least 40% of the total area of the country under forest and announced a forest decade for 2014-2013 - with program such as 'one house one tree', 'one village one forest' and 'one town several parks' (Government of Nepal, 2016).



# POLICIES AND STAKEHOLDER MAPPING

In order to implement mitigation and adaptation plans and actions, it is necessary to understand main political, institutional players at various levels.

Nepal's form of governance is multi-party, competitive and federal democratic parliamentary system based on plurality (art. 74) (Constituent Assembly Secretariat, 2015). Nepal has seven main political parties. Based on the outcome of legislative election 2017, the Left Alliance secured an overwhelming majority in both the federal and bicameral legislature (the House of Representative and National Assembly) and the provincial assemblies (Bhattarai, 2017), as of April 2018. The Left Alliance formed the present government of Nepal and elected the Prime Minister who is the real executive head of the government. The

tenure of such government is maximum 5 years. Efforts are currently underway to unify the ruling Left Alliance by merging the CPN-UML and CPN-Maoist Center (Bhattarai, 2018). The common agenda of all the political parties is to advance economic prosperity and development (Bhattarai, 2017a) but a political party dedicated to environment protection (e.g. Green political party in Germany) does not exist in Nepal yet.

Nepal's new Constitution provides a federal form of governance with three levels – national, provincial and local, as declared in the new constitution passed in 2015. With the election at these three phases at the end of 2017, Nepal has successfully decentralised the power to local government units in terms of decision making and implementation of projects. As of April 2018, Nepal has 7 provinces, 77 districts and 753 local units (Khalid & Chughtai, 2017).



# ENERGY

Nepal's energy consumption is less, but it is growing (grew 27% from 2000 to 2013) with increased urbanisation and economic production (e.g. in industry and transport). Nepal does not have major oil, gas, or coal reserves and the reliance on imported fossil fuel makes it vulnerable. Petroleum accounts 11% of the country's primary energy supply. Around two-thirds of oil import in Nepal is used for transport and the rest is used for agriculture, forestry, household and commercial services. Coal provides 4% of Nepal's energy supply, mainly consumed for industry. Although Nepal has huge technical potential to generate electricity from hydropower (estimated 83,000MW), currently only 1% of this potential is harnessed (and imports deficit electricity from India). With the completion of new Upper Tamakochi Hydropower project (UTHEP), 456MW of electricity expected to be added by the end of 2018 (Lama, 2017). Beside that, Nepal's substantial solar and wind resources have not been harnessed to their full potential – both for reaching mountainous areas or supplying the national grid (Oxford Policy Management, 2017). A recent project to install solar panels in government buildings (including the Prime Minister's Office, the Ministry of Finance and the Ministry of Energy) has been started with the support from Chinese government (Giri, 2018).

Nepal Electricity Authority (NEA) is the state-owned utility, responsible for planning, development and op-

eration of electricity system (Oxford Policy Management, 2017). Nepalese suffered from a forced power cut (load-shedding) for up to 17 hours a day for a decade, which was ended in 2016 due to addition of more power to the national grid, proper management and the control in policy-corruption for ending the load-shedding (The Kathmandu Post, 2018). Some of the key stakeholders in governing Nepal's energy system are:

## Ministries

- Ministry of Energy (MoE), Department of Electricity (DoED)
- Ministry of Population and Environment (MoPE), Department of Environment (DoEnv)
- Ministry of Forest and Soil Conservation (MoFSC)
- Ministry of Industry (MoI), Department of Industry (DoI)
- Ministry of Commerce and Supplies (MoCS)

## Commissions

- Water and Energy Commission
- National Planning Commission

## Corporations

- Nepal Electricity Authority (NEA), Electricity Tariff Fixation Committee
- Nepal Energy Efficiency Programme (NEEP)
- Alternative Energy Promotion Centre (AEPC)

# MOBILITY

Nepal's economic growth, social transformation and rapid urbanisation has increased vehicle ownership and usage – higher trend in urban areas. Road transport dominates transport infrastructure in Nepal (cars, bus, motorcycle and marginal non-motorised transport). Urban rail system and BRT are not available yet but feasibility study is undergoing. Within 2008-2013, national average annual growth rate of motorcycle and 4-wheel light vehicles (car, jeep and van) was 19.5% and 8.4% respectively. One of the direct impacts of increasing vehicle population is the rapid increase in motor fuel (diesel and petrol). Nepal's per capita CO<sub>2</sub> emissions from fuel consumption is low (133kg) against the world average (4,504kg) in 2011, but the growth rate of emissions is high (UNCRD, 2015).

The sustainable transport in Nepal (mainly in urban areas) include improve infrastructure and promote public transportation and NMT, and create a suit

able environment for electric vehicles. As mentioned in Nepal's NDC, the government of Nepal has endorsed some policies aimed to promote electric vehicles (EVs) and has Environment-Friendly Vehicle and Transport Policy (2014). Some electric cars and scooters have been introduced in cities. Electrically powered 3 wheeler e-Tuk-Tuk/e-rickshaw (Safa Tempo) is a successful example of public EV in Nepal (e.g. in Kathmandu and in southern part of Nepal), in operation since 1996. It has 6-8 seating capacity serving people for shorter distance route. The government support towards EV initiative include reduced custom duty and provision of higher auto loan. Some of the key stakeholders related to transport sector in Nepal are:

- Ministry of Physical Infrastructure and Transport, Department of Transport Management (DoTM)
- Electric Vehicles Association (EVAN)
- Public and private transport companies
- Alternative Energy Promotion Centre (AEPC)





# WASTE MANAGEMENT

Nepal's urban basic services such as water supply, wastewater treatment and solid waste management (SWM) are not well developed, technically and financially. Nepal's municipal solid waste (MSW) is composed of 56% organic waste, 16% plastics, and 16% paper and paper products in aggregate. This shows a great potential for producing compost from organic waste, and reusing and recycling other materials, with only about 10% going to final disposal if resource recovery is maximised. The government of Nepal enacted the Solid Waste Management Act in 2011, with the aim to maintain a clean and healthy environment by minimising the harmful effects of solid waste on public health and environment. Local bodies/municipalities are responsible for the collection, transport, treatment, and final disposal of solid waste. The SWM Act was a major step to improve SWM practices in Nepal, but it has not been effectively translated into actions and results on the ground. The act mandates local bodies to take the required steps to promote reduce, reuse, and recycle

(3R), including segregation of MSW at source. It also provides for involving the private sector, community-based organisations (CBOs), and nongovernment organisations (NGOs) in SWM through competitive bidding. The stakeholders in municipal SWM are national and local governments, multilateral and bilateral development partners, the private sector, NGO, local communities and citizens. Ministry of Urban Development and Solid Waste Management Technical Support Centre (SWMTSC) under the Ministry of Federal Affairs and Local Development are key national stakeholder for solid waste management in Nepal. In order to maintain the city clean, large municipalities in Nepal (e.g. Kathmandu and Lalitpur) have contracted the private sectors for street cleaning, waste collection and transport services (ADB, 2013). Few large scale waste to energy projects have just started in Nepal (e.g. Bhairahawa city based bio gas plant is the largest biogas plant of Nepal with a capacity of 3,700 cubic metres that produces one bullet worth of LPG per day (The Himalayan Times, 2017)).



# KATHMANDU VALLEY

Kathmandu is the capital of Nepal. The Kathmandu valley includes 3 cities – Kathmandu, Lalitpur and Bhaktapur with total area of 570 sq. km. The population of the valley is 2.5 million with annual growth rate of 4.63% (3.5 million unofficial). This represents 9.32% of entire population of country. Some of the initiatives on energy generation/conservation, sustainable transport and waste management in the valley are discussed below.



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## ENERGY IN KATHMANDU

Nepal has a good potential for photo-voltaic solar power and its use has been initiated on the roofs of the Kathmandu valley. Most of solar photovoltaics (PVs) are installed privately on rooftops and are used mainly for lighting the building and operating some appliances. The excess energy generated from solar power are stored in batteries, but are not yet connected to national grid. A policy that allows net metering from any solar power above 500 Watts exist in Nepal but it has not yet been applied in the city (Chalise, 2017)

## TRANSPORT IN KATHMANDU

In the Kathmandu Valley, the number of vehicles registered tremendously rose—an increase of over 12-fold from 45,871 in 1990/1991 to 570,145 in 2010/2011. The highest number of vehicles type in the valley was motorised two-wheelers. Air pollution was the second leading cause of death in one of the main hospitals of the Kathmandu Valley in 2011. To reduce air pollution in the Kathmandu Valley, these 3 measures are urgently required: improving vehicle speed, promoting public transportation, and introducing electric vehicles that could reduce public transportation energy demand by more than 60% (Shrestha, Shrestha, & Shrestha, 2017).

Currently, 1,200 e-rickshaws (Safa Tempos) run in Kathmandu (Shahi, 2017). Less than 100 electric cars

are in the valley, mainly imported from India, China and South Korea (which is negligible compared to fossil-fueled cars). A few small electric cars are produced in Nepal by Hulas Motor Company as an experiment. Charging infrastructure is in very nascent state in Kathmandu (also in Nepal). Nepal Electrical Authority opened a demo charging station at its office in order to boost public interest in EVs. E-scooters are a solution to replace the growing and highly used fossil fueled scooters in the valley. Public transportation services, currently run by the private sector through individual operators, are still not adequate in the city.

The addition of e-bus can improve accessibility and environment.



# WASTE MANAGEMENT IN KATHMANDU

The Kathmandu valley generates around 1,000 tonnes of solid waste per day. 70% of the trash is dumped in nearby landfill site, without proper waste segregation. The Government of Nepal adopted a Public Private Partnership approach in 2018, Nepwaste Pvt Ltd, a joint venture of Investment Board Nepal (IBN) and Finnish organisations in order to develop and implement an Integrated Solid Waste Management Program for Kathmandu. It will transform informal sector of waste collection into a formal one and assure regular service of household waste collection. It aims to con

vert organic waste to energy. It is estimated that it will generate 5-7 MWs of electricity, organic fertiliser and fuels. Alternative Energy Promotion Centre (AEPC) has also initiated large scale biogas projects in urban and semi-urban areas of Nepal with the financial support from World Bank under Scaling up Renewable Energy Programme (The Himalayan Times, 2017). Nepal government has imposed a ban on import, storage, sale, distribution and use of plastic bags below 40 microns (The Himalayan Times, 2018), but due the lack of enforcement it is not fully implemented.





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