



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



SSTIC Impact Stories

Promoting green electric solutions for urban transport in Bhutan and the wider Hindukush-Himalaya region

SUMMARY

The project is being implemented by UNIDO in partnership with the Prime Minister's Office, the Thimphu City Council and the City Bus Service (CBS) with funding of the Austrian Federal Ministry for Europe, Integration and Foreign Affairs (BMeiA). It aims to create an enabling environment for the uptake of e-bus technology solutions in the public transport system of Bhutan. It brings a first e-bus pilot and charging infrastructure to the capital of Thimphu and provides critical capacity building and policy advisory support to the Government and public transport operators.

The project applies important South-South and triangular cooperation elements, including technology transfer from equipment suppliers from China and knowledge exchange on best practices from Austria and New Zealand. Moreover, the lessons learned of the project are disseminated through the Renewable Energy and Energy Efficiency Capability (REEECH) hosted by the International Centre for Integrated Mountain Development (ICIMOD) in Kathmandu, Nepal. REEECH was established by UNIDO and ICIMOD under the Global Network of Regional Sustainable Energy Centers (GN-SEC).

The UNIDO project contributes to the 2040

Bhutan Integrated Strategic Transport Vision and the efforts of the Government to switch to a low-carbon Intelligent Transport System (ITS). The sector faces multiple challenges, as it is a cause for rapidly growing air pollution and GHG emissions, and is characterized by fossil fuel import dependence and price fluctuations. The availability of low-cost hydropower base-load capacities makes the country an interesting place to pioneer the electrification of the transport system.

To strengthen the long-term capacities of the counterparts, the project applied a strong practical "learning by doing" approach. For the first time, a hardware

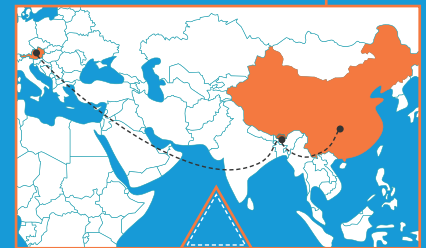
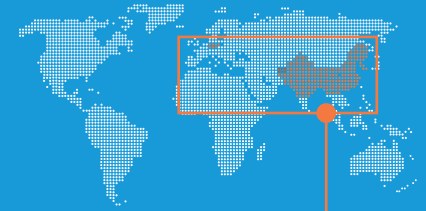
WORKING TOWARDS THE SDGs



TRIANGULAR COOPERATION:

Austria, Bhutan, China

IDENTIFIED COUNTRIES:



SOUTH SOUTH PARTNER INSTITUTIONS



- Companies and knowledge institutions in Austria, China and New Zealand
- Renewable Energy and Energy Efficiency Capability (REEECH) hosted by the International Centre for Integrated Mountain Development (ICIMOD)
- Global Network of Regional Sustainable Energy Centers (GN-SEC) - www.gn-sec.net/

DONORS & SUPPORTED BY:



- Austrian Federal Ministry for Europe, Integration and Foreign Affairs (BMeiA)

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procurement for e-bus equipment was undertaken in Bhutan. Throughout the process, a UNIDO senior e-mobility expert from New Zealand supported the counterparts in the preparation of relevant documents, selection of the best bids and quality assurance of the turn-key installations. The expert contributed also to the development of the Bhutan E-Mobility Roadmap 2020 to 2035 and the 2040 Thimphu Transport Vision of CBS. The UNIDO project sets an important benchmark for future investments of CBS, which has the intention to transit its entire fleet of around fifty buses gradually to electric.

in Kathmandu, Nepal. REEECH was established by UNIDO and ICIMOD under the Global Network of Regional Sustainable Energy Centers (GN-SEC).



WHAT IS SSTIC?






South-South and Triangular Industrial Cooperation (SSTIC)

Is a process whereby two or more developing countries pursue their individual and/or shared national capacity development objectives through exchanges of knowledge, skills, resources and technical know-how, and through regional and interregional collective actions. UNIDO's SSTIC services are following the guiding principles for South-South cooperation set out in the Buenos Aires outcome document:

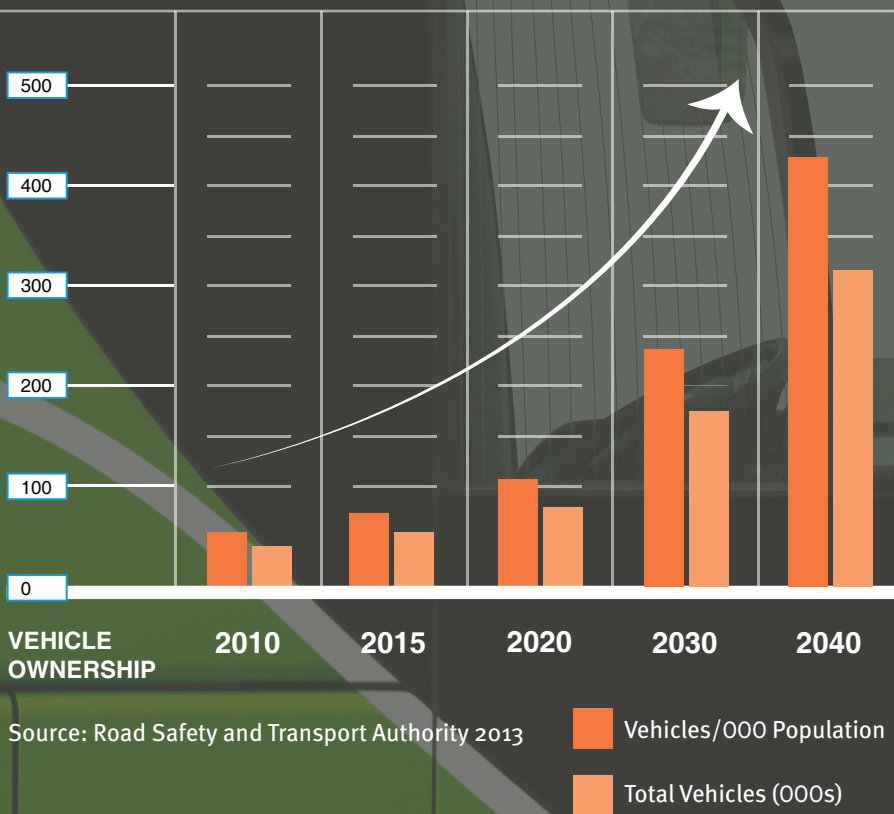
- 1 respect for national sovereignty
- 2 mutual benefit
- 3 national ownership and independence
- 4 equality
- 5 non-conditionality
- 6 non-interference in domestic affairs

SSTIC Highlights

The project includes the following South-South and triangular cooperation elements:

-  The pilot bus and charging infrastructure is supplied from China, a leading country regarding the production of e-bus systems within the region. The package includes trainings for the responsible engineers at CBS. UNIDO contributed with knowledge transfer from other projects implemented in China.
-  A study tour for the Bhutanese counterparts to Austria on urban e-mobility systems and solutions was organized between the 5th and 8th September 2022. The experts had the opportunity to visit various bus operators and demonstration sites in Vienna, Lower Austria and Styria. When it comes to electric mobility, Austria and Bhutan share common features due to their mountainous character and availability of hydropower baseload resources. Vienna is one of the leading European cities in the area of sustainable public transport and has adopted ambitious goals to become a climate-neutral city.
-  The counterparts receive continued capacity building support by a UNIDO senior e-mobility expert, who has provided training, backstopping and quality assurance throughout the procurement and installation process. The expert from New Zealand has contributed with lessons learned and best practice from his home country, where he was part of the national e-mobility program.
-  The lessons learned and model documents from Bhutan are disseminated in the wider region of the Hindukush-Himalaya through the Renewable Energy and Energy Efficiency Capability (REEECH) hosted by ICIMOD in Kathmandu, Nepal. REEECH was established with support of UNIDO under the Global Network of Regional Sustainable Energy Centers (GN-SEC) and is supporting the eight member countries Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan. In this context, UNIDO has organized various regional webinars on electric vehicles for policy makers and transport officials.
-  On a global level, the project in Bhutan is benefitting from the e-mobility experiences of other regions within the GN-SEC. UNIDO is actively facilitating joint learning and South-South and triangular knowledge transfer between the various regional centers. Currently, nine regional sustainable energy centers are operating under the GN-SEC covering most of the least developed countries (LDCs) and small island development states (SIDS). Under the GN-SEC platform, UNIDO facilitates South-South and triangular cooperation on solutions of common interest.

GROWTH IN VEHICLE OWNERSHIP



Bhutan prides itself on being one of the three carbon-negative countries globally and prioritizes eco-friendly development consistently. The government recognizes the significant potential for mitigating greenhouse gas emissions in the transportation sector, which has emerged as a pressing issue. To address this concern, the country's Transport Integrated Strategic Vision 2040 outlines a regulatory strategy that focuses on promoting energy-efficient modes of transport, enhancing transportation options, using cleaner fuels and technologies, implementing information technology, and offering incentives for green vehicles that are fuel-efficient.



A Bhutanese delegation at a showcase project of Postbus in Austria



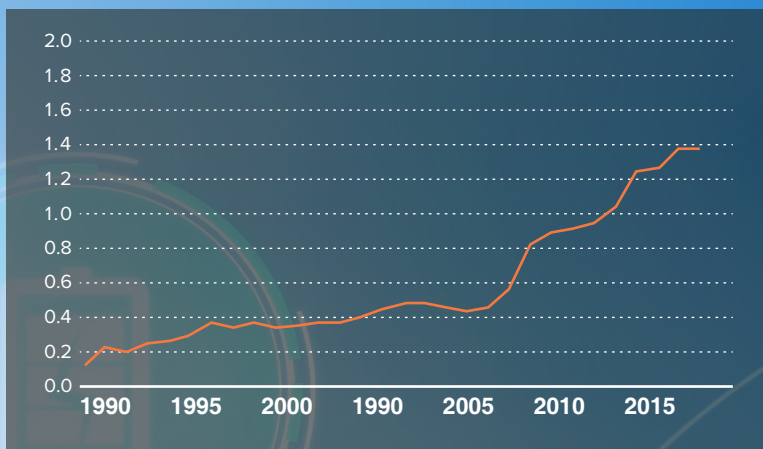
New E-bus in Thimphu

SSTIC Project Narrative

THE CHALLENGE

The introduction of e-buses is addressing various social, economic and environmental challenges in Bhutan and the capital of Thimphu simultaneously. Over the past decade, rapid urbanization has led to alarming growth of private vehicles. The number of passenger cars including taxis have increased between 12-13% per annum. A direct consequence of this growth is the rapid increase of local air pollution and related health impacts, changes in land-use, congestion, noise pollution and road safety.

Moreover, transport contributes with 45% to the overall energy-related GHG emissions in Bhutan. Social, economic and environmental costs due to vehicle emissions were estimated at 12 million USD in 2015, and are likely to triple by 2030. The introduction of e-buses, based on low-cost hydropower, offers the opportunity to reduce emissions, air pollution, transport costs and fossil fuel imports simultaneously. Bhutan imported 144,620 kl of diesel and 39,120 kl of petrol, worth Nu. 8.618 billion in 2017. The electrification of the bus fleet can reduce the currently very high operating costs of the City Bus Service (CBS).



CO₂ Emissions, Bhutan
(metric tons per capita)

Source: Climate Watch. 2020. GHG Emissions. Washington, DC: World Resources Institute.

1 THE GOAL What the project aims to achieve.

This UNIDO project aims to create an enabling environment for the uptake of e-bus technology markets in the public transport system of Bhutan. It brings a first e-bus pilot and charging infrastructure to the capital of Thimphu and provides critical capacity building and policy advisory support to the Government and public transport operators. A particular emphasis lies on strengthening the capacities of the e-mobility team in the Prime Minister's Office and the City Bus Service (CBS) to manage the transition of around fifty combustion engine powered buses to electric ones. The installed e-bus pilot sets an important benchmark for future investments of CBS.

The UNIDO project contributes to the 2040 Bhutan Integrated Strategic Transport Vision and the efforts of the Government to switch to a low-carbon Intelligent Transport System (ITS). The sector faces multiple challenges, as it is a cause for rapidly growing air pollution and GHG emissions, and is characterized by fossil fuel import dependence and price fluctuations. The availability of low-cost hydropower base-load capacities makes the country an interesting place to pioneer the electrification of the transport system.



2

METHODOLOGY

The methodology that led to successful outcomes, outcomes achieved

To strengthen the long-term capacities of the counterparts, the project applied a strong practical “learning by doing” approach. For the first time, a hardware procurement for e-bus equipment was undertaken in Bhutan. Throughout the process, a UNIDO senior e-mobility expert from New Zealand supported the counterparts in the preparation of relevant documents, selection of the best bids and quality assurance of the turn-key installation. The expert contributed also to the development of the Bhutan E-Mobility Roadmap 2020 to 2035 and the 2040 Thimphu Transport Vision of CBS. He provided various trainings to Bhutanese counterparts.



3

SOUTH-SOUTH IMPACT

How were South-South and Triangular cooperation utilized to achieve results?

The project applies the following South-South and triangular cooperation elements:



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A study tour on urban e-mobility systems and solutions for the Bhutanese counterparts to Austria was organized between 5th and 8th September 2022. The experts had the opportunity to visit various bus operators and demonstration sites in Vienna, Lower Austria and Styria. When it comes to electric mobility, Austria and Bhutan share common features due to their mountainous character and availability of hydropower baseload resources. Vienna is one of the leading European cities in the area of sustainable public transport and has adopted ambitious goals to become a climate-neutral city.



The counterparts receive continued capacity building support by a hired UNIDO senior e-mobility expert, who provided training, backstopping and quality assurance throughout the procurement and installation process. The expert from New Zealand contributed with lessons learned and best practice from his home country, where he was part of the national e-mobility program.



The lessons learned and model documents of Bhutan are disseminated in the wider region of the Hindukush-Himalaya through the Renewable Energy and Energy Efficiency Capability (REEECH) hosted by ICIMOD in Kathmandu, Nepal. REEECH was established with support of UNIDO under the Global Network of Regional Sustainable Energy Centers (GN-SEC) and is supporting the eight member countries Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan. In this context, UNIDO has organized various regional webinars on electric vehicles for policy makers and transport officials.

On a global level, the project in Bhutan is benefitting from the e-mobility experiences of other regions within the GN-SEC. UNIDO is actively facilitating joint learning and South-South and triangular knowledge transfer between the various regional centers. Currently, nine regional sustainable energy centers are operating under the GN-SEC covering most of the least developed countries (LDCs) and small island development states (SIDS). Under the GN-SEC platform, UNIDO facilitates South-South and triangular cooperation on solutions of common interest.

4

SUSTAINABILITY AND REPLICABILITY

How is it sustainable and replicable?

To strengthen the long-term capacities of the counterparts and to achieve sustainability beyond project closure, UNIDO applied a strong practical “learning by doing” approach. The purchase of the e-bus equipment was delegated to the Bhutanese procurement system, but the process was accompanied by a very experienced UNIDO senior e-mobility expert. This allows CBS and other involved counterparts to operate and monitor such procurements and installations in the future. Moreover, the bus pilots sets an important benchmark for future replication and investments directed towards switching the entire fleet of CBS to electric. Furthermore, the involvement of REEECH and the GN-SEC allows joint learning and knowledge transfer of lessons learned and model documents to other HKH countries and beyond. In most of the HKH countries, air pollution, GHG emission and fossil fuel dependency are a major concern of Governments.

SSTIC Executive Summary

The project assisted the Government of Bhutan in its efforts to introduce an intelligent public transport system and switch towards electric buses fuelled by clean hydropower. The support included the installation of a first pilot e-bus and charging infrastructure in the capital of Thimphu, as well as capacity building and policy advisory support to the Prime Minister's Office, the Thimphu City Council and the City Bus Service.

The project applied important south-south and triangular cooperation elements, including technology transfer from equipment suppliers from China and knowledge exchange on best practice with Austria and New Zealand. Moreover, through regional webinars the lessons learned of the project were shared with other countries of the Himalaya-Hindukush.

Bhutan and the wider mountain region face various social, economic and environmental challenges, exacerbated by the severe impacts of climate change on mountain livelihoods. In recent years, unsustainable trends in the urban transport sector have led to increasing GHG emissions, severe health impacts of air pollution and cost escalations due to the dependence on fossil fuel imports.

In Bhutan, the transport sector accounts for more than 45% of the GHG emissions. A rapid urbanization centered around the capital region has led to an exponential growth of private vehicles, which represent the root cause of air pollution and traffic congestion.

Ultimately, the project contributes to the achievement of Sustainable Development Goals (SDGs) No. 7, 9, 11, 13.

SCAN IN THE QR CODES FOR MORE INFORMATION



View project in UNIDO
OpenData Platform



Report on the expert
meetings and training on
electric mobility



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Scan the QR code to access more information about SSTIC. You will be directed to a website or a resource that provides detailed information about the concept, principles, benefits, and examples of SSTIC in action.



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