

Title: AIM developed a 2050 net-zero scenario for Luang Prabang City

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**Background**

2019: the Decree on Climate Change

- Defines principles, regulations, and measures on management, monitoring of climate matters.
- Climate change must be mainstreamed into the national socio-economic development plans and sectors.

2020: 2020 updated NDC

- National level 2030 unconditional mitigation target: 60% GHG emission reductions compared to baseline scenario.
- The 60% GHG emission reductions national level 2030 target demonstrates the enhanced contribution of the country to the Paris Agreement, considering the 34% GHG emission reductions compared to the baseline scenario achieved in 2020.
- 2030 Conditional mitigation scenario and targets towards net zero emissions 2050

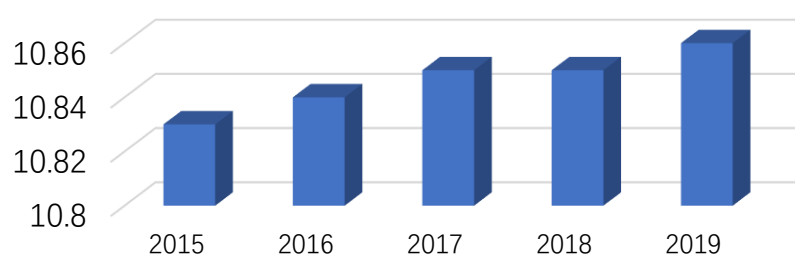


Fig. 1. Annual GDP growth rate

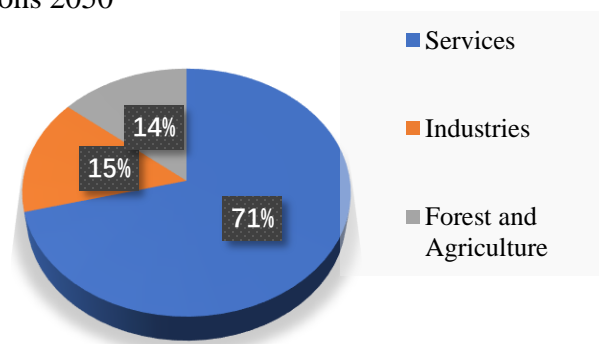


Fig. 2. Proportion of economic structure in 2019

- Average economic growth rate during 2015-2019 was 10% that very high growth needs to consider sustainably.
- Services are the main economic driver that means that urbanization growth have been very fast.

Table 1. Proportion of economic structure

Sectors	2015	2019
Services	62	71
Industries	17	15
Forest and agriculture	21	14

**Objectives of the study**

- To develop a net-zero carbon scenario in 2050 for Luang Prabang city
- To support Luang Prabang’s government to develop actions and plans to achieve the national mitigation target.

Source: Report on provincial social-economic development, 2020

**Framework of the study**

Base year: 2015 (based on availability of data); Target years: 2050; Sectors: Energy-use sector; Target GHGs: carbon dioxide (CO<sub>2</sub>)

Scenarios: 2050BaU (Business as usual); 2050CM (Countermeasure); 2050ZE (Zero Emission)

**Methodology**

ExSS (Extended Snapshot Tool) is a comprehensive estimation tool for socio-economic indicators and GHG emissions designed for a backcasting study.

ExSS estimates: (1) socio-economic activity level of the sectors in future based on users’ assumptions; (2) future GHG emissions in scenarios; and (3) counter measures necessary to achieve the target.

ExSS is a designing tool of a future society, rather than a projection or prediction of likely future.

**Data collection**

- Base year data: Base year 2015: Population and Household; Input Output table; Transport demand (Passenger & Freight); Building; and Energy demand, energy supply

- Reference for future scenarios: 2050BaU, 2050CM and 2050ZE: Population projection; Economic projection / planning; Transport planning; Energy strategy; Potential of renewable energy and etc.

Table 2. Socio-economic vision 2050

	Unit	2015	2050	2050/2015	CAGR
Population	persons	431,900	645,127	1.49	1.2%
No. of households	households	81,000	174,359	2.15	2.2%
GDP per capita	USD	1,384	3,209	2.32	2.4%
GDP	mil. USD	598	2,070	3.46	3.6%
Passenger transport	mil.per.km	8,342	17,452	2.09	2.1%
Walk		14	32	2.29	2.4%
Bicycle		164	375	2.29	2.4%
Motorbike		7,908	13,790	1.74	1.6%
Car		204	2,472	12.12	7.4%
Bus		52	783	14.98	8.0%
Freight transport	mil.ton.km	73	302	4.13	4.1%
Truck		51	147	2.87	3.1%
Ship		22	155	7.05	5.7%

**Result**

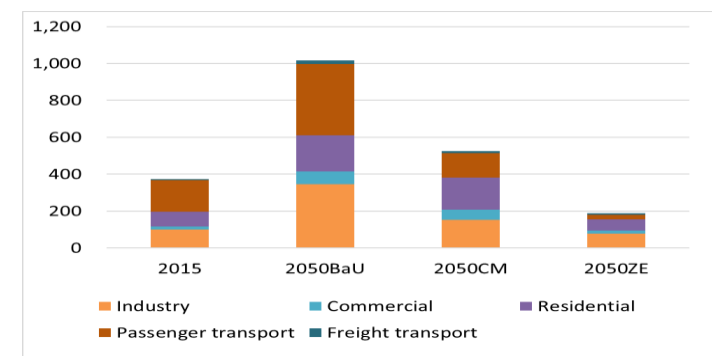


Fig. 3. Final energy consumption (Ktoe)

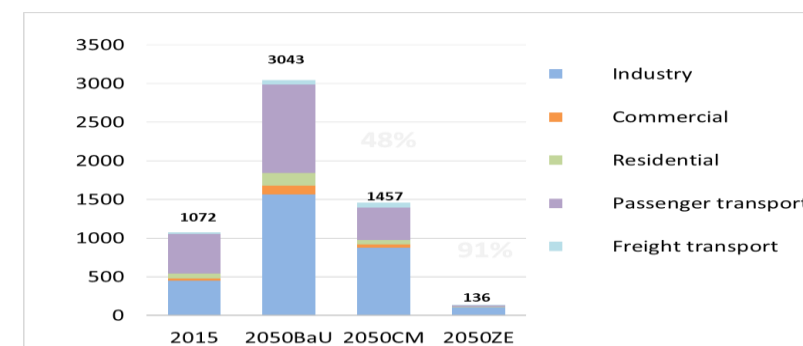


Fig. 4. CO<sub>2</sub> emissions (KTco<sub>2</sub>)

Table 3. Actions towards achieving 2050 net-zero

	Industry	Commercial	Residential	Passenger Transport	Freight Transport	Total (ktCO <sub>2</sub> )
<b>Action 1. Green Industry</b> Promotion of energy efficient equipment and fuel shift	237					237
<b>Action 2. Green Building</b> Diffusion of low-energy building (EMS, Insulation, Fuel shift)		24	59			83
<b>Action 3. Green Transport</b> Energy efficient vehicle and modal shift				107	89	196
<b>Action 4. Green Power</b> Renewable energy, reduce transmission loss	1,362	467	130	405	27	2,391
<b>Total (ktCO<sub>2</sub>)</b>	<b>1,599</b>	<b>491</b>	<b>189</b>	<b>512</b>	<b>116</b>	<b>2,907</b>

**Conclusion:**

- Introduction of mitigation actions will significantly affect final energy consumption and CO<sub>2</sub> emission in target year.
- Green power action will play most remarkable role towards achieving 2050 net-zero
- Additional support from developing partners is the key factor to achieve net-zero target.

**Next steps:**

- Expanding analysis scope to AFOLU and waste sectors
- Further dialogue with LPB city to bridge scenario research with LPB policies and actions
- Seeking possibility of city-to-city collaborations