

Thailand's Energy Efficiency Policies and Phase-Out of Fossil Fuels in Power Generation

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Hong Kong, China



Outline



Energy Situation in Thailand



Energy Plan toward Carbon Neutrality



Energy Efficiency Plan (EEP 2024)



Case Studies



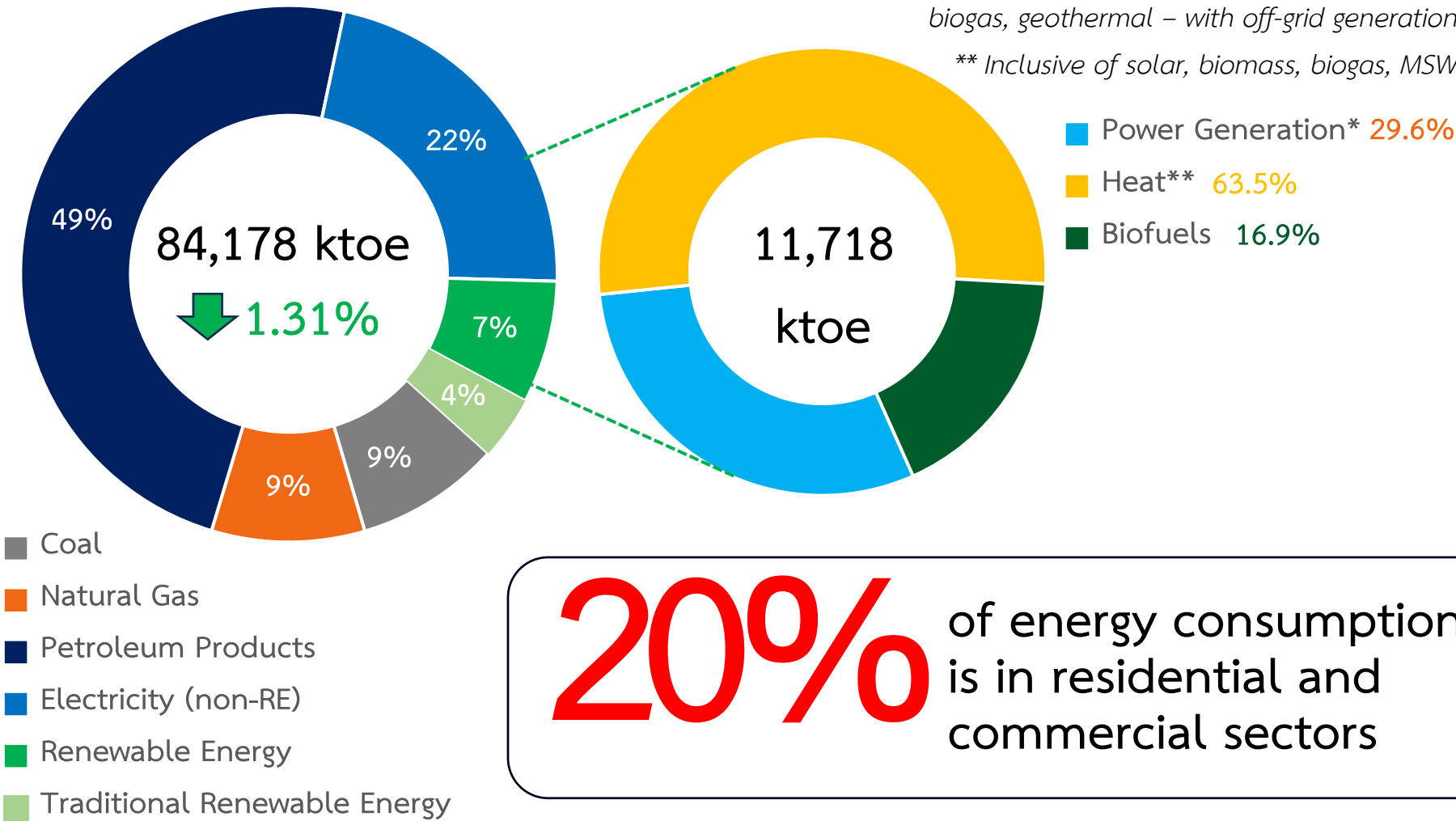
Alternative Energy Development Plan (AEDP 2024)



Department of Alternative
Energy Development and Efficiency

MINISTRY OF ENERGY

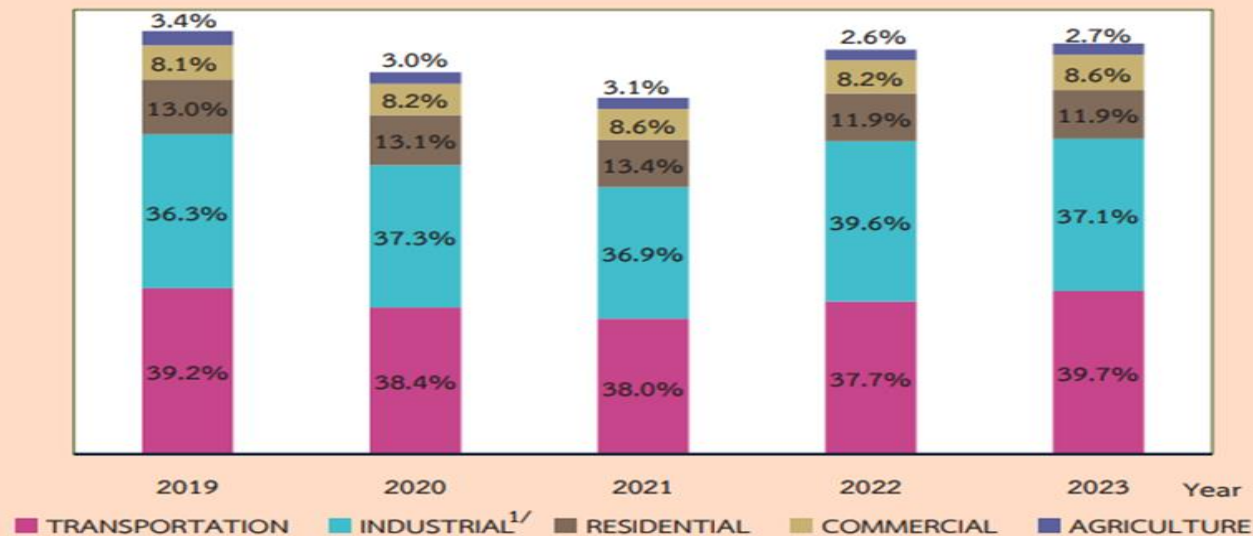
Final Energy Consumption 2023 by Fuel





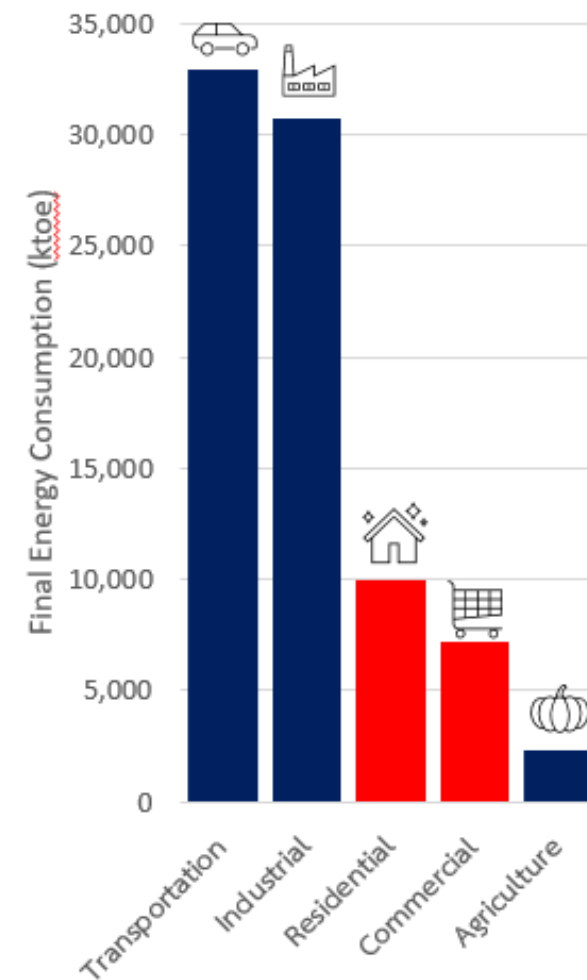
Thailand's Energy Situation 2023

The Proportion of Final Energy Consumption by Economic Sector



Final Energy Consumption

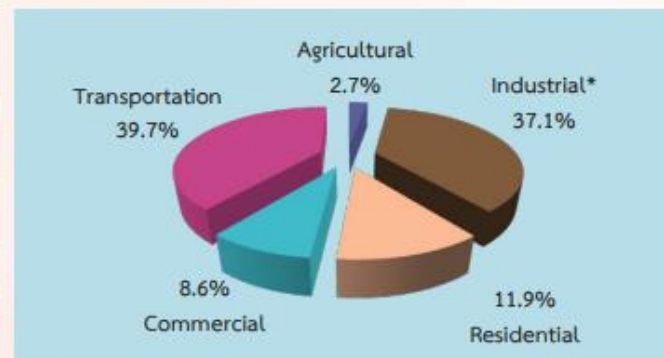
2023 by Sector



Final Energy Consumption by Economic Sectors 2023

FINAL ENERGY CONSUMPTION BY ECONOMIC SECTOR	QUANTITY (ktoe)			GROWTH (%)	
	2021	2022	2023	2022	2023
1. Agricultural	2,234	2,152	2,266	(3.7)	5.3
2. Industrial*	26,598	32,437	30,862	22.0	(4.9)
3. Residential	9,675	9,726	9,856	0.5	1.3
4. Commercial	6,194	6,706	7,136	8.3	6.4
5. Transportation	27,460	30,927	33,032	12.6	6.8
Total	72,161	81,948	83,152	13.6	1.5

* Including manufacturing, mining and construction.



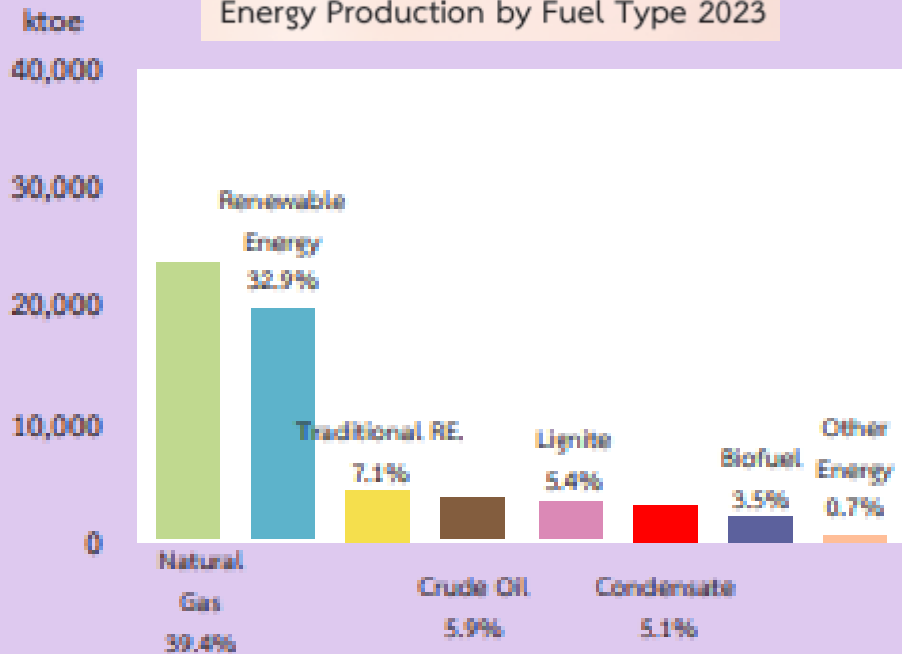
* Industrial including manufacturing (30,600 ktoe), mining (125 ktoe)



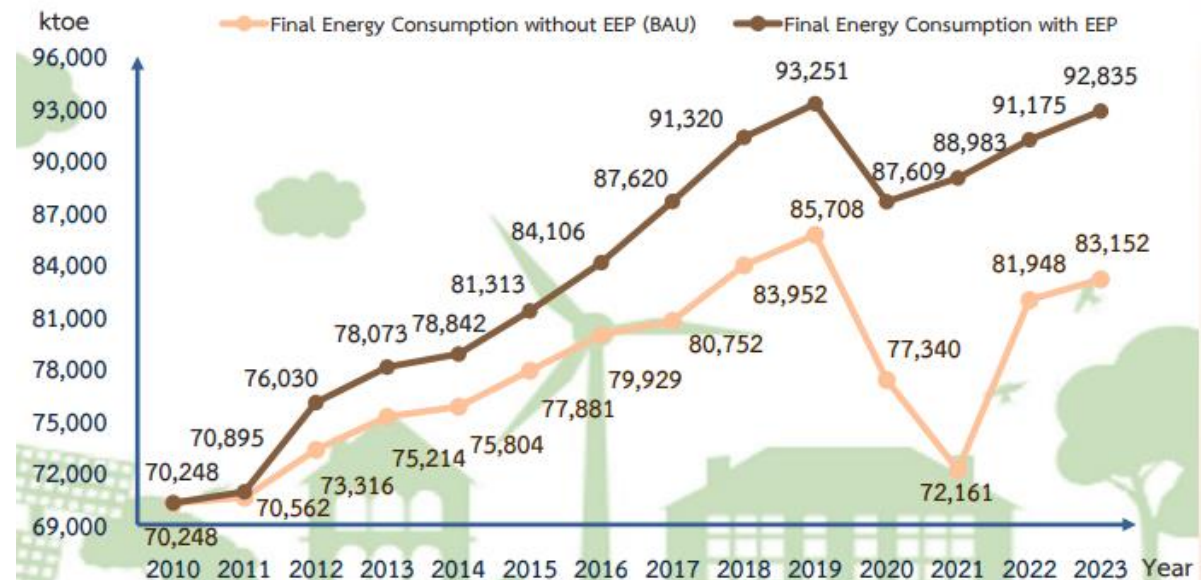
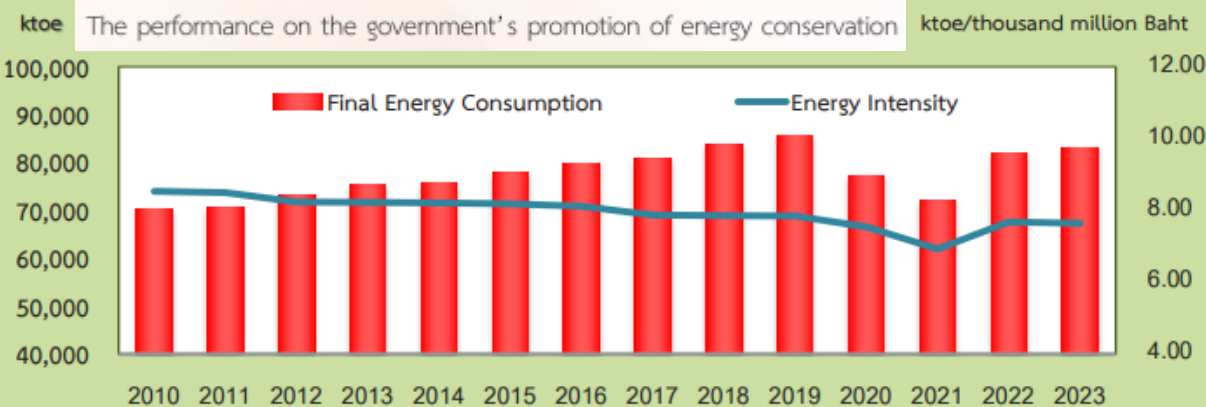


Thailand's Energy Situation 2023

Energy Production by Fuel Type 2023



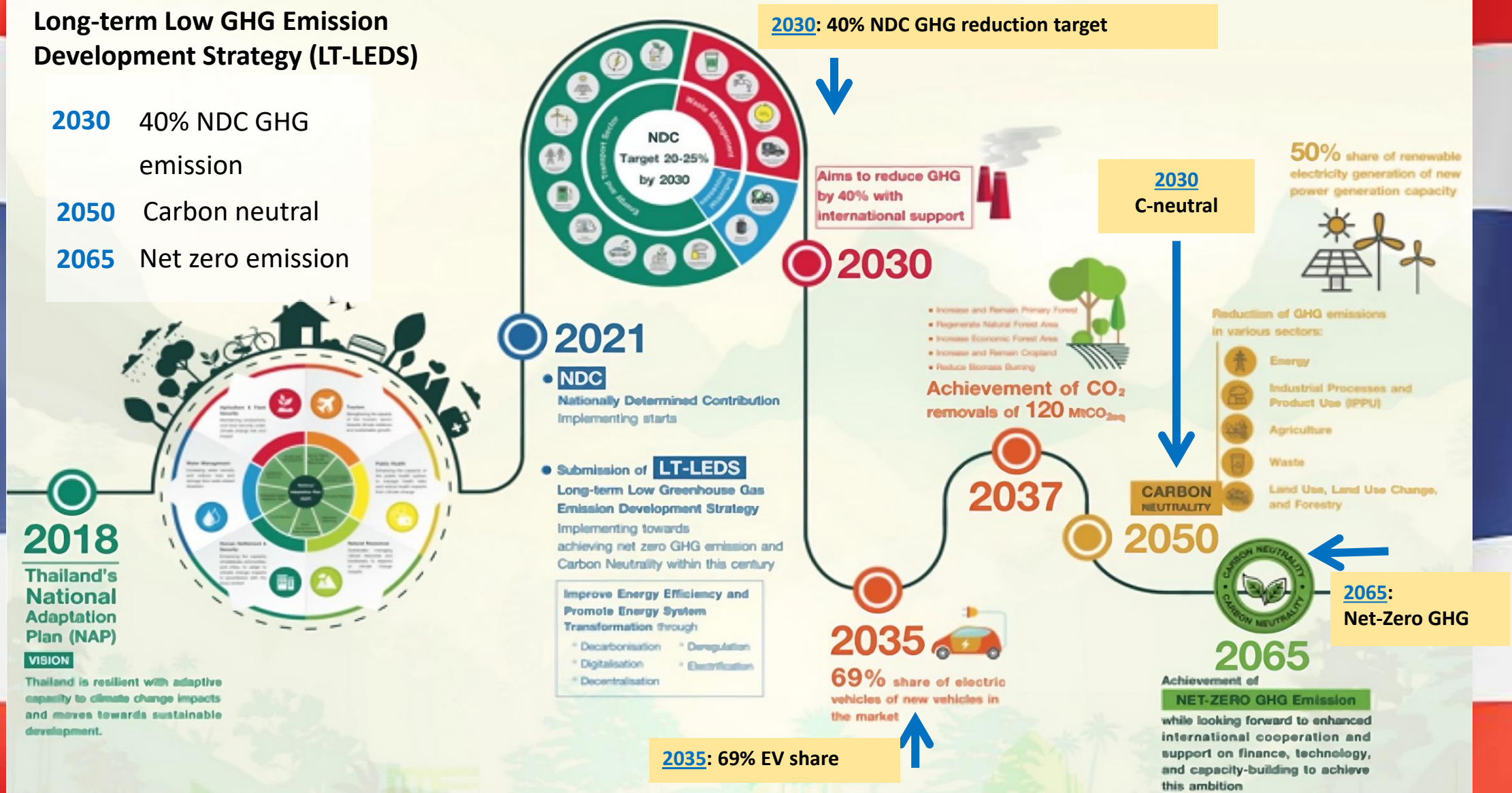
ENERGY SAVING RESULTS
BASED ON THAILAND ENERGY EFFICIENCY PLAN (2018 - 2037)



Thailand: Commitment towards Climate Change

Long-term Low GHG Emission Development Strategy (LT-LEDS)

- 2030** 40% NDC GHG emission
- 2050** Carbon neutral
- 2065** Net zero emission



IN 2021 COP26

Thailand: National Energy Plan (NEP)

Target

1. Promote clean energy utilization and **reduce CO₂ emission to be 'ZERO' within 2065-2070**
2. **Strengthen competitiveness and investment potential** of Thai entrepreneurs **for adaptation in the low-carbon economy**, including promote the modern innovation investment to create economic value.
3. In line with **"Thailand's Long-term GHG Development Strategy"**

PDP	POWER DEVELOPMENT PLAN แผนพัฒนากำลังผลิตไฟฟ้าของประเทศไทย*
EEP	ENERGY EFFICIENCY PLAN แผนอนุรักษ์พลังงาน*
AEDP	ALTERNATIVE ENERGY DEVELOPMENT PLAN แผนพัฒนาพลังงานทดแทนและพลังงานทางเลือก
GAS	GAS PLAN แผนบริหารจัดการก๊าซธรรมชาติ
OIL	OIL PLAN แผนบริหารจัดการน้ำมันเชื้อเพลิง

Policy Direction to Thailand's Energy Plan

1.



Increase Energy Efficiency and Conservation **> 30%** (~ 40%) by applying modern technology and innovation for energy management

2.



Transform the energy in transportation to be green electricity (**30@30 EV promotion**) To increase the ability of GHG emission reduction through energy efficiency improving in transport sector, as well as solving the PM 2.5 problem

3.



Increase RE proportion in New Power Generation 50% in 2040 (~ 80%) by consideration of RE cost reduction, with energy storage system

4.

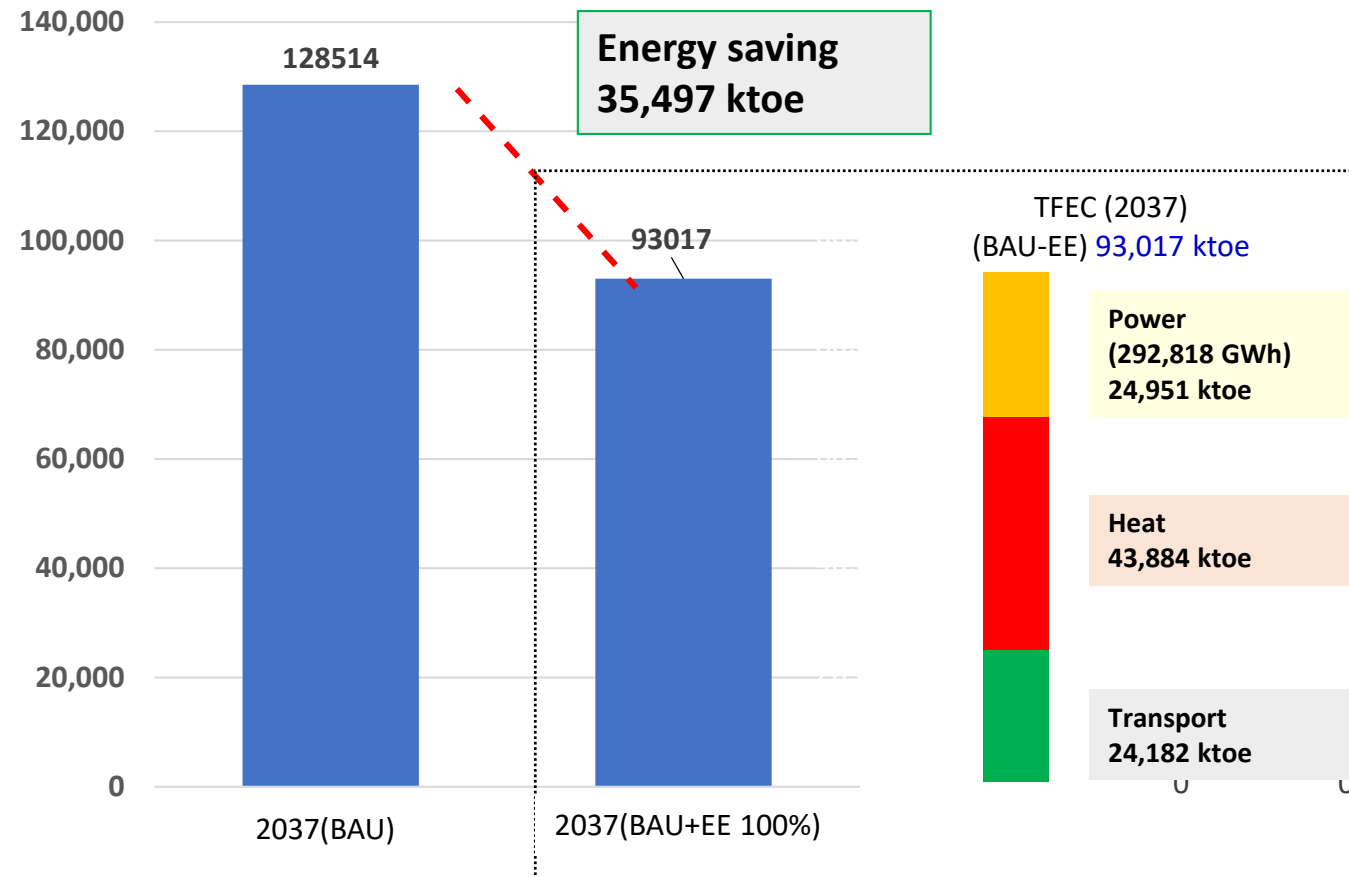


Coping the Energy Transition by energy business re-structuring By using 4D1E direction : **D**igitalization **D**e-Centralization **D**e-Regulation **D**e-Carbonization and **E**lectrification

(Draft) Energy Efficiency Plan 2024 – 2037 (EEP 2024)

Reduce 36% of energy intensity (EI) by 2037
(compares with Y 2010)

Final energy consumption(ktoe)



(Draft) Energy Efficiency Plan 2024 – 2037 (EEP 2024)

Target Saving:
35,497 ktoe

NEW

3 Strategies – 14 Measures

5 Target
Sectors

Industry

Building

Residential

Agriculture

Transports

Compulsory

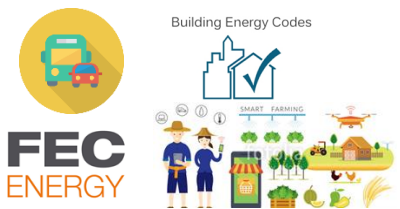
- Energy management standards in designated factories and buildings
- Enforcement of energy codes (Industry, Building, Residential, Agriculture)
- Energy efficiency in road transport

Voluntary

- Energy efficiency standards and labelling for equipment
- Financial Incentive
- Promoting Innovation (IOT, Smart Technology, Big Data, AI)
- Energy efficiency in transport sector (EV, All modes of transport)
- Energy efficiency in agricultural sector (Smart Farming, Agricultural Mechanization)
- Energy efficiency in residential sector (Efficient Home, Smart Home)
- Promoting energy efficiency in equipment utilizing renewable energy (Biomass boiler, biomass furnace, RE generator, solar thermal)
- Energy efficiency by the supply side – Generation, Transmission, and Consumption
 - Promoting Efficiency in generation and grid system
 - Energy Efficiency Resource Standards (EERS)

Complementary

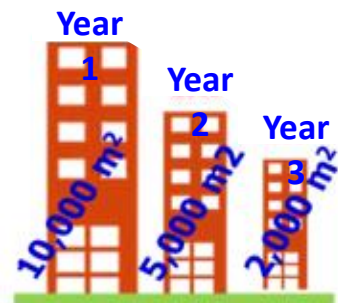
- Human Resource Development
- Public awareness
- Research and Development of technologies and innovations



Energy Efficiency Implementations

Building Energy Code (BEC)

9 types of Building



New or retrofitted buildings being constructed which have total area equal to **2,000 m² or more** must be designed under the energy conservation requirements.

Standard and Labelling



*Construction products

*Agricultural machines

*Business and industrial products

*Home products

Smart Farm

Subsidy to change/improve equipment or machines or materials for higher efficiency, to use RE technologies application and to apply technology/innovation for farm management



Target groups



Poultry



Pig Farming



Dairy



Aquaculture Farm

Direct Subsidy to improve equipment/machine efficiency

Direct subsidy to stakeholders to change/improve equipment or machines or materials for higher efficiency



Case Study

“Small Hydropower Plant”





KIRIDHARN Hydro-electric Powerplant Project



Kiridharn Hydro-electric Powerplant Project is a middle multipurpose irrigation development project of DEDE. The project located between Klung district and Makham district of Chanthaburi province and has completed in 1986.

Objectives of the project are:

- To maximize the benefit of irrigation area development both electric power production and agriculture management.
- To produce fresh water for people living around the Chanthaburi municipalities.
- To prevent salted water.
- To stabilize in a high voltage line system and reduce the loss of electric power in the system

Location Kiritharn Dam is an earth dam the Huai Saphan Hin River, located in Bo Welu Subdistrict, Khlung District.
Kiritharn Hydroelectric Power Plant is located in Pathwi Subdistrict, Makham District, Chanthaburi Province.

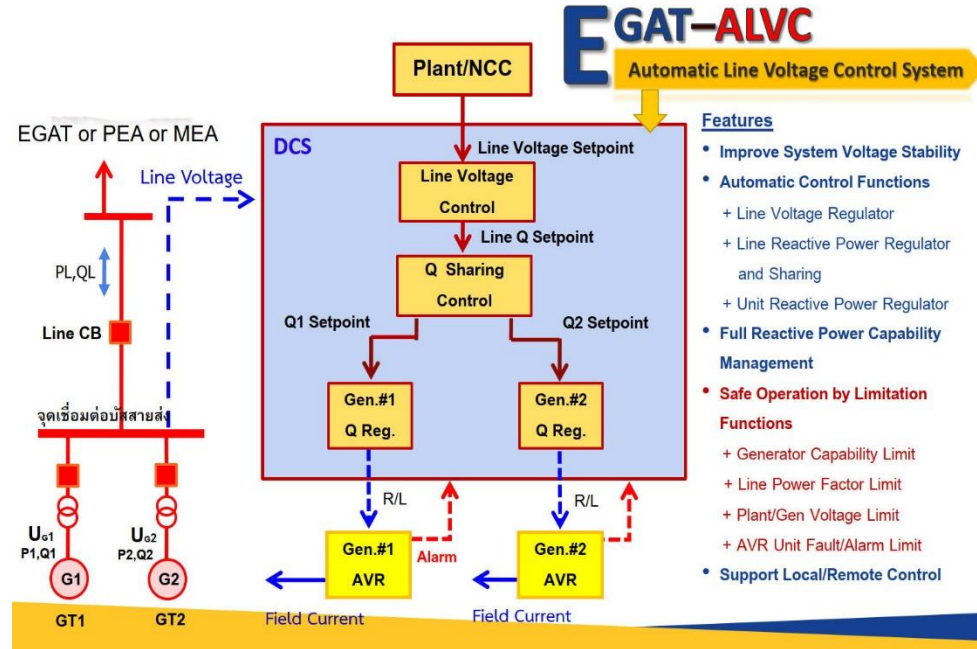
Project Description

Dam High 33 m. Long 1,337.5 m. Reservoir capacity 75.8 mil m³. Dam level 209 MSL.
Concrete diversion tunnel Dia. 2.4-2.2 m. Long 731.87 m. Water pipe dia. 2.2-1.2 m. Long 467.11 m.

Powerhouse Francis Turbine 6,200 kW 2 Unit Total 12,400 kW. Synchronous Generator 3 Phase 7,800kVA. 6,600 V./115 kV



Automatic Line Voltage Control System (ALVC)

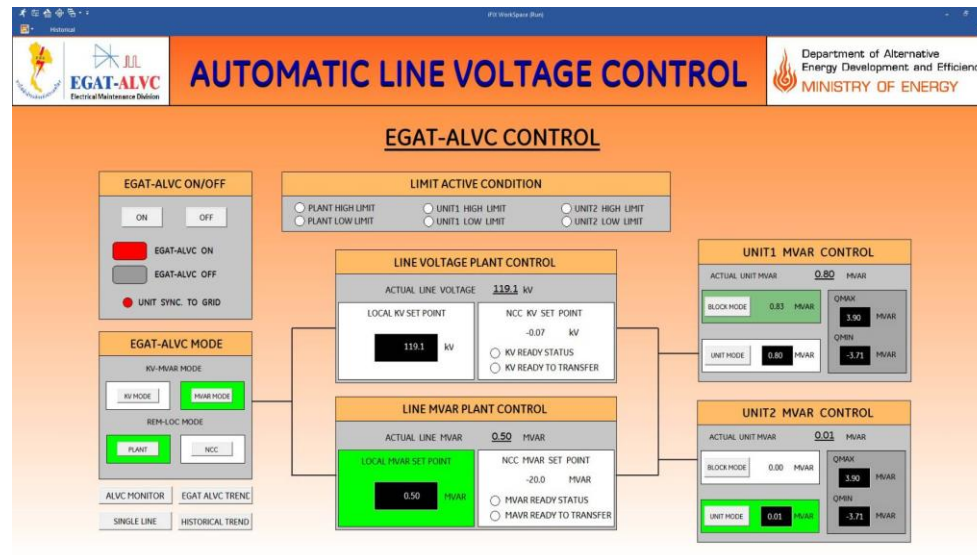


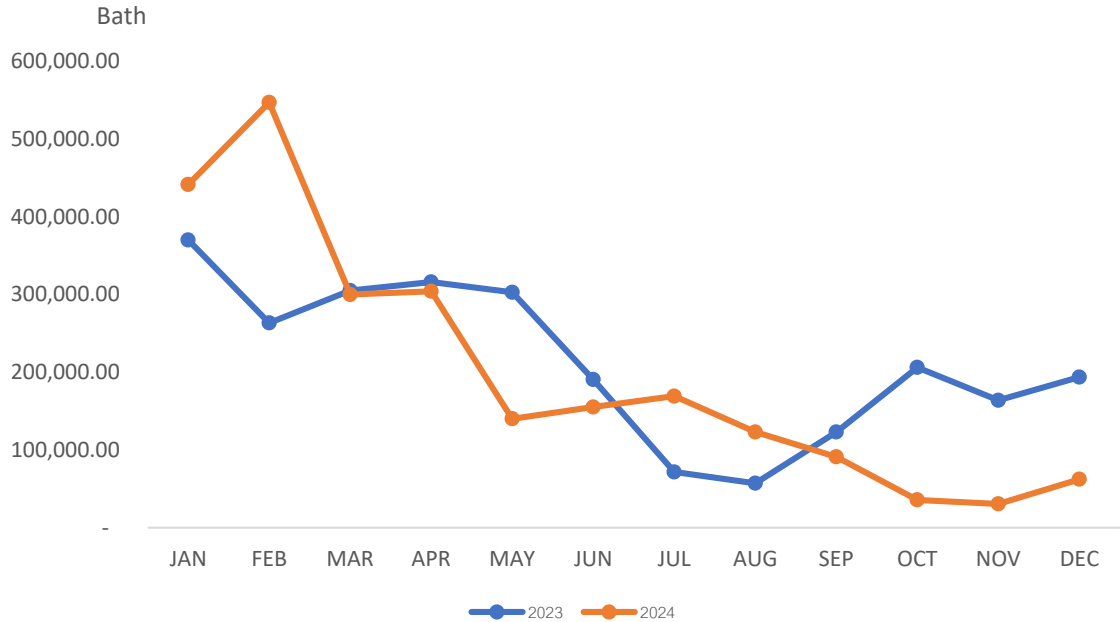
The problem of high electricity costs used in the production process (Var Charge)



Install ALVC equipment

Automatic Voltage Stabilization Control System (EGAT-ALVC) for controlling voltage levels to be increased/decreased to the appropriate range in a timely manner according to the standards set by the National Power System Control Center.



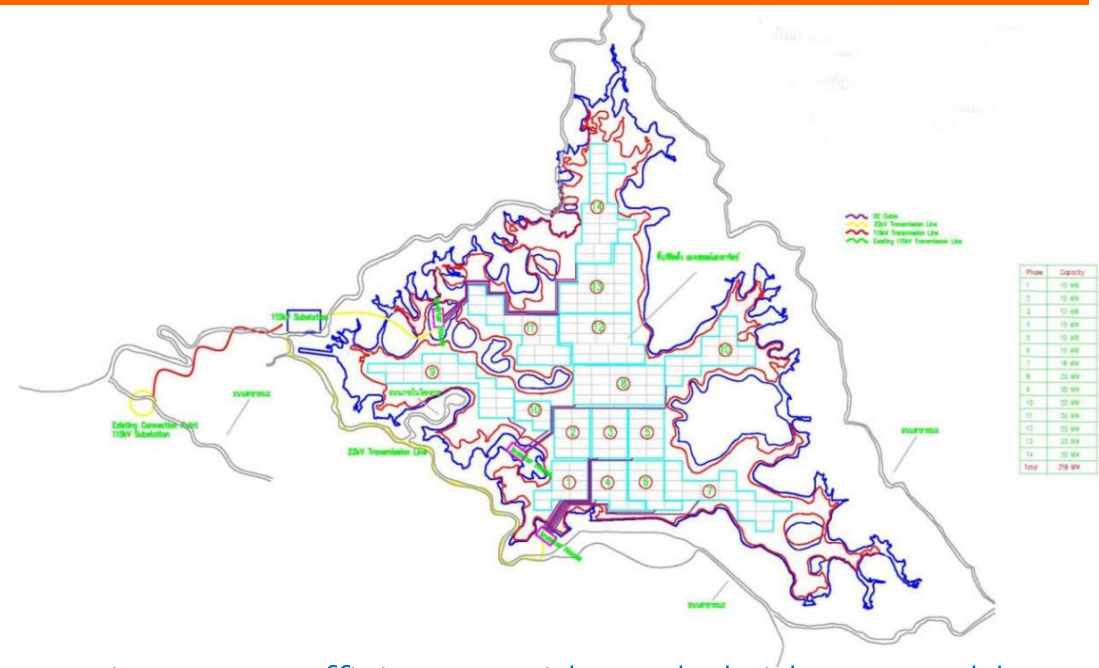
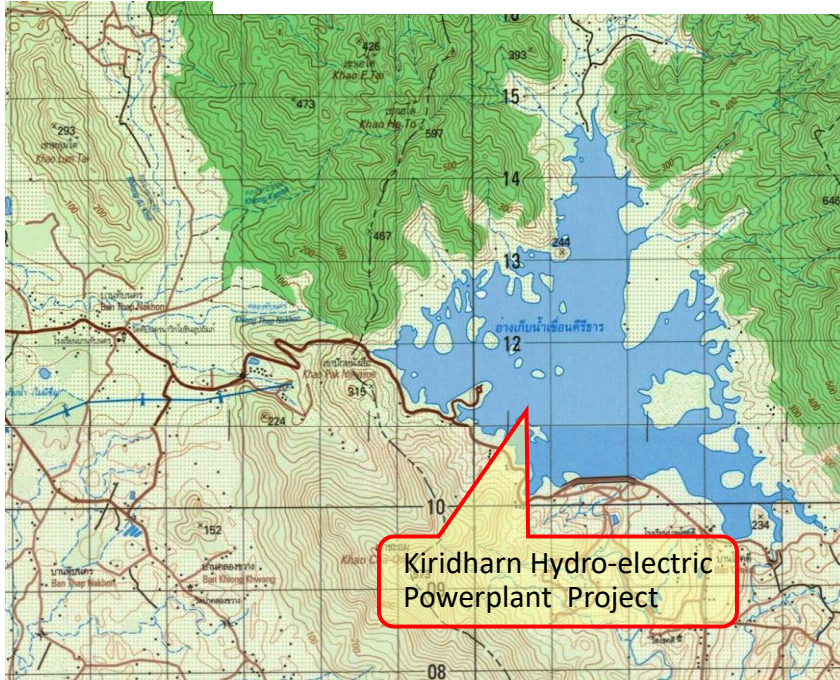


	2023	kWh	Bath	2024	kWh	Bath
1	JAN	26,140.00	369,864.09	JAN	30,320.00	441,125.02
2	FEB	23,490.00	263,196.21	FEB	35,920.00	546,715.15
3	MAR	23,770.00	304,915.96	MAR	30,250.00	299,748.39
4	APR	18,410.00	315,908.88	APR	20,460.00	303,943.15
5	MAY	32,580.00	302,601.53	MAY	29,380.00	139,951.32
6	JUN	30,900.00	190,374.97	JUN	25,620.00	155,084.91
7	JUL	10,370.00	71,567.43	JUL	10,490.00	169,117.44
8	AUG	5,990.00	57,075.28	AUG	2,560.00	123,003.02
9	SEP	2,030.00	122,910.34	SEP	5,240.00	90,975.13
10	OCT	1,710.00	206,055.59	OCT	1,170.00	35,626.02
11	NOV	9,850.00	163,770.69	NOV	70.00	30,549.00
12	DEC	27,350.00	193,539.97	DEC	6,490.00	62,252.48
	avg	17,715.83	213,481.75	avg	16,497.50	199,840.92

Kiritharn Project has started using ALVC system since May 2024, compared to 2023, electricity cost is reduced.



Floating Solar Kiritharn Project 20 MW



Project to increase efficiency with a hybrid renewable energy power generation system, Kiritharn Hydroelectric Power Project, by increasing efficiency with renewable energy in the area to make it a hybrid renewable energy power plant, as a guideline for using the electricity generation area efficiently, in line with the Alternative Energy Development Plan 2015-2036 (AEDP2015), by installing a solar cell power generation system on the water surface (Floating Solar) at Kiritharn Dam, Makham District, Chanthaburi Province, size 20 MW.

Rooftop solar power generation system construction project.

To reduce utility costs, small hydropower plants.



Produce and distribute electricity in parallel to the distribution system of the original hydropower project of the PEA for use within the project. Helps reduce utility costs (electricity costs) of the project.

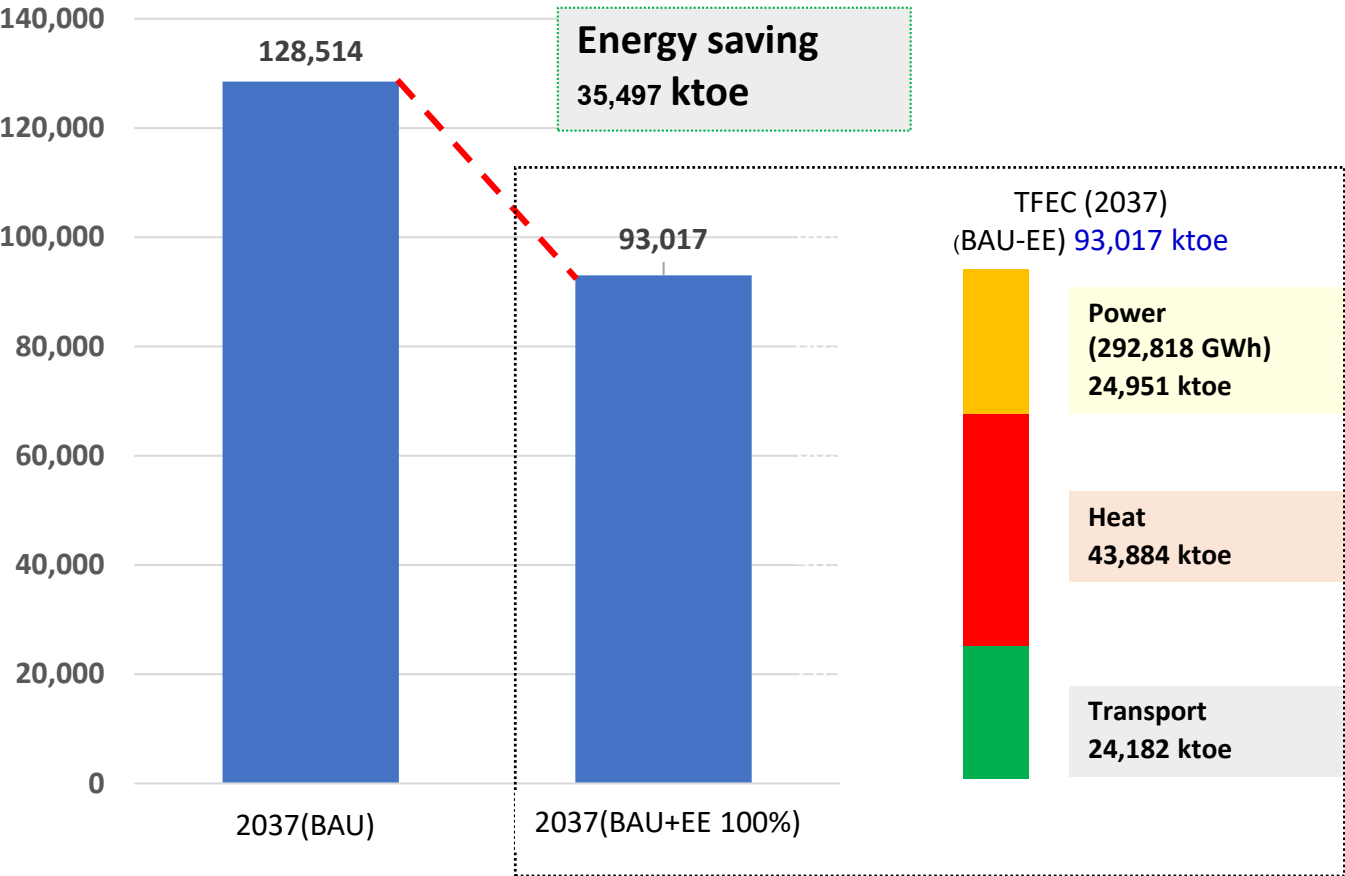
- 1 location has been constructed.
- In 2024, 3 locations will be under construction.
- In 2025, 3 locations are in planning
- Total production capacity 165 KW
- Total power generation units 232,140 kWh / year
- It is expected to help reduce electricity costs by 1,063,200 baht / year.



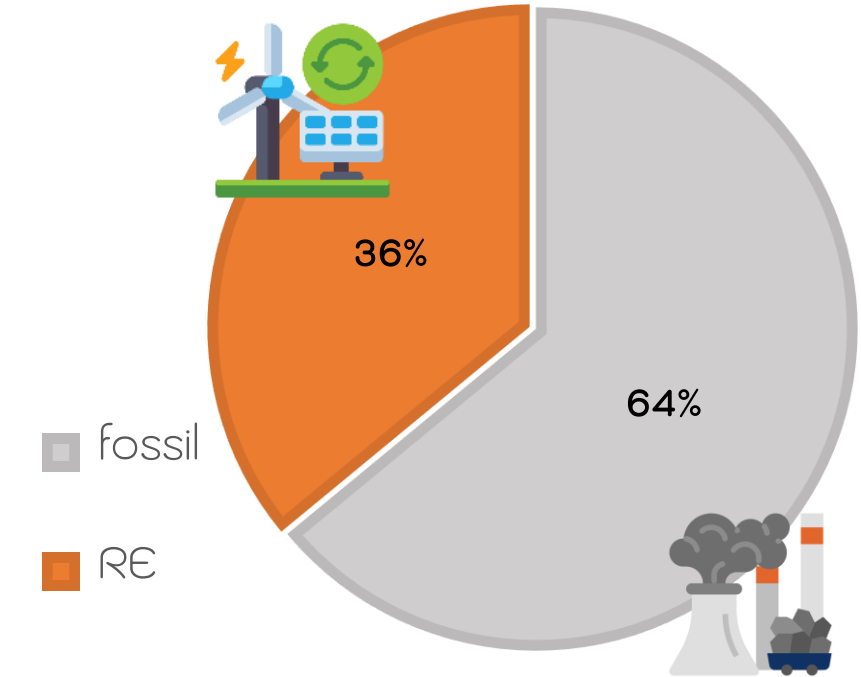
***Target 25 small hydropower projects by 2030.**

(Draft) Alternative Energy Development Plan 2024 – 2037 (AEDP 2024)

Reduce 36% of energy intensity (EI) by 2037
(compares with Y 2010)



Increase RE share to be 36% of total final energy consumption (TFEC) by 2037



Sector	Total final energy consumption (ktoe)	RE generation (ktoe)
Power	24,951	15,332
Heat	43,884	17,061
Transport	24,182 ¹⁸	1,621

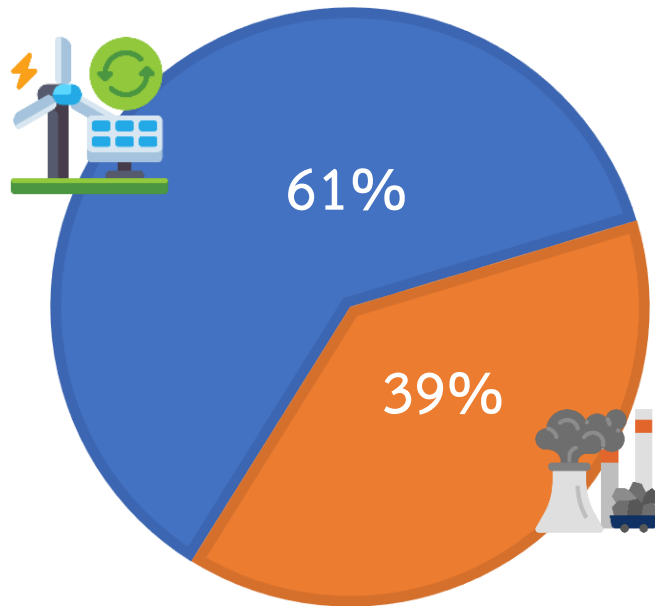
(Draft) Alternative Energy Development Plan 2024 – 2037 (AEDP 2024)



Demand;
292,818 GWh
(24,951 ktoe)

RE&Import

Fossil



Power Generation



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AEDP 2024 target (electricity)

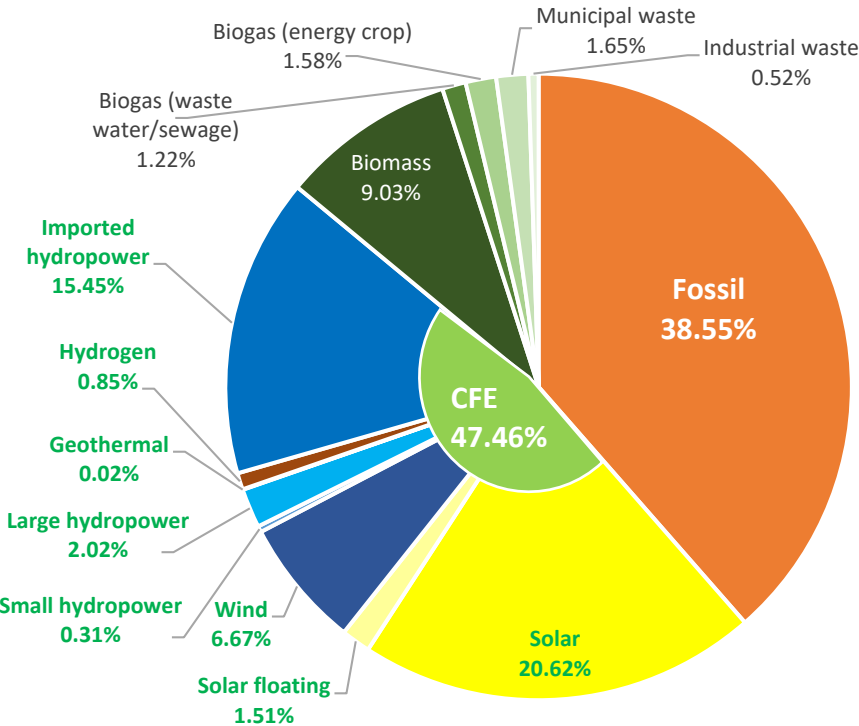
Type of energy	Target at 2037		
	MW	GWh	ktoe
1. Solar	38,974	60,365	5,144
2. Solar floating	2,789	4,415	376
3. Wind	9,379	19,522	1,664
4. Small hydropower	347	912	78
5. Large hydropower	2,918	5,919	504
6. Geothermal	21	73	6
7. Hydrogen		2,503	213
8. Imported hydropower	10,295	45,249	3,856
9. Biomass	5,490	26,424	2,252
10. Biogas (waste water/sewage)	925	3,572	304
11. Biogas (energy crop)	757	4,614	393
12. Municipal waste	1,142	4,834	412
13. Industrial waste	249	1,530	130
Total (A)	73,286	179,933	15,332
Electricity demand (B)		292,818	24,951
RE power/Total electricity demand (%) (A/B) 61.00			
RE power/TFEC(%) 16.00			

Note: This information is preliminary and should not be used for definitive reference.

(Draft) Alternative Energy Development Plan 2024 – 2037 (AEDP 2024)



**Demand;
292,818 GWh
(24,951 ktoe)**



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Carbon-free Energy (CFE)

Conclusion

- The Department of Alternative Energy Development and Efficiency (DEDE) has been focused on alternative energy development and promoting energy conservation.
- DEDE supports Thailand's 20-year national strategy and National Energy Plan (NEP). Thailand aims to reduce GHG emissions by 30% by 2030 (40% with international support), achieve carbon neutrality by 2050, and reach net-zero emissions by 2065.
- AEDP and EEP are key components.
- EEP 2024 plans to reduce 36% of energy intensity (EI) by 2037.
- AEDP 2024 targets a 36% share of renewable energy in total final energy consumption (TFEC) by 2037 and 61% renewable energy in electricity generation.
- Fossil fuel for power generation will decrease to 39% by 2037 and phase out by 2065.



Thank You



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