

Thailand's experiences on Energy Statistics and Data Collection

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BY PASSARIN PETCHUMLI

PLAN AND POLICY ANALYST
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT
AND EFFICIENCY (DEDE)
MINISTRY OF ENERGY, THAILAND

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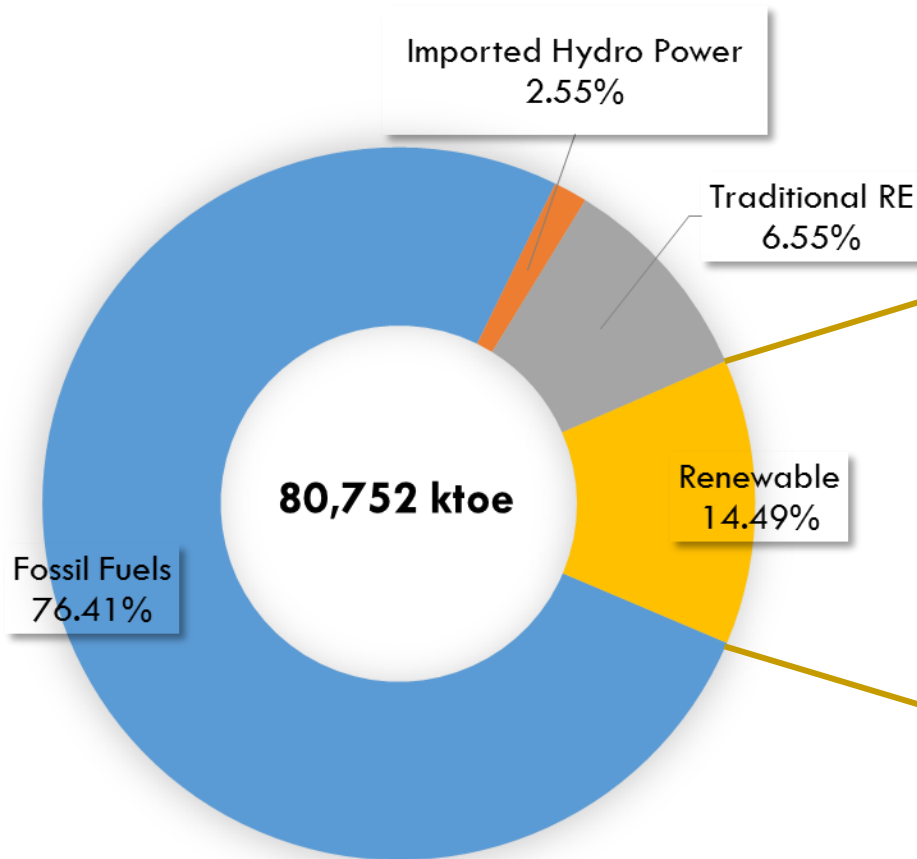
Energy Efficiency Data

Energy Statistics Publication

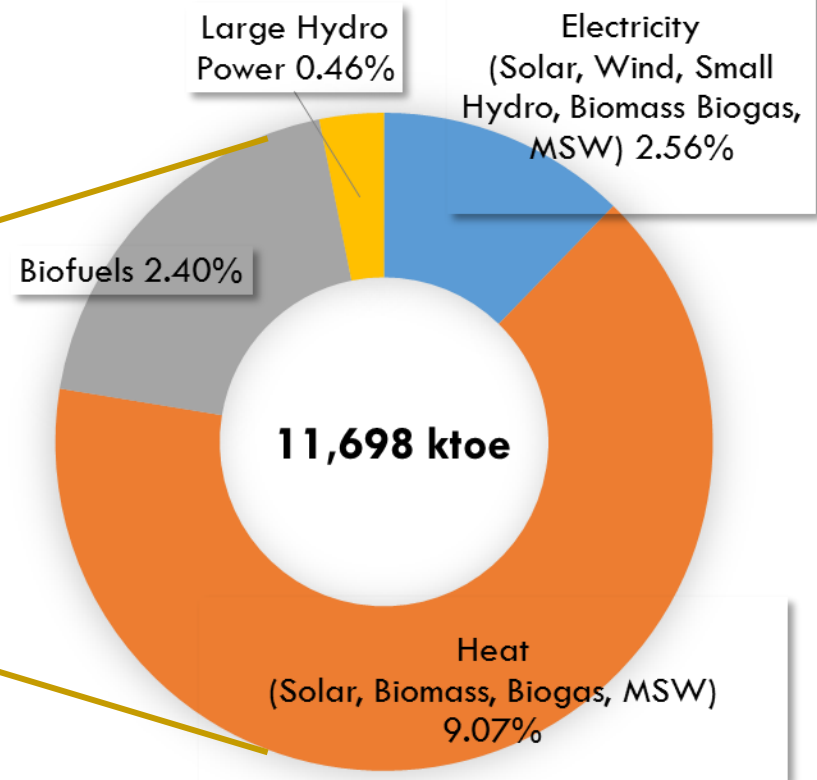


Thailand Energy Situation 2017^p

Total Final Energy Consumption 2017^p



Renewable Energy Consumption 2017^p

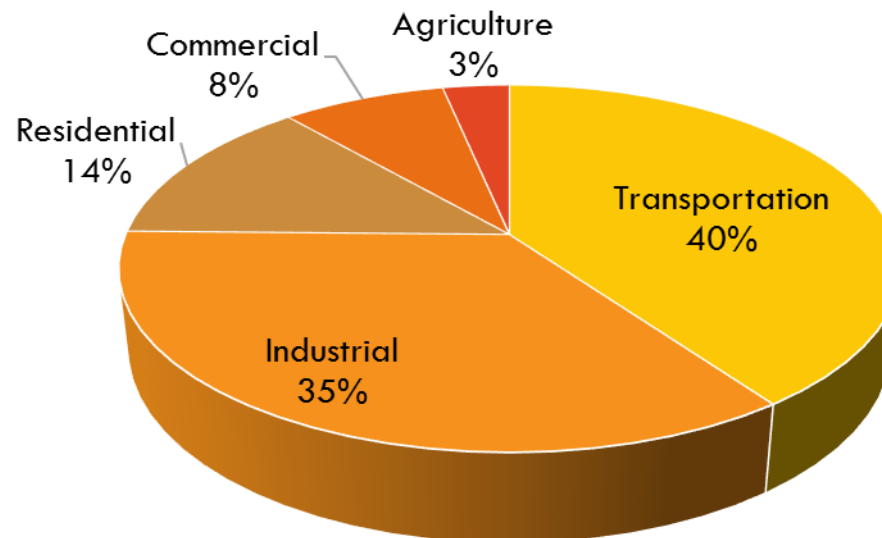


Energy Consumption by Sector

Unit : ktoe

| Sector | Total Final Energy Consumption | | | | |
|-------------------|--------------------------------|---------------|---------------|---------------|-------------------|
| | 2013 | 2014 | 2015 | 2016 | 2017 ^P |
| 1. Agriculture | 3,906 | 3,957 | 4,064 | 2,987 | 2,642 |
| 2. Industrial | 27,192 | 28,117 | 27,796 | 29,475 | 28,452 |
| 3. Residential | 11,367 | 11,459 | 11,767 | 11,071 | 10,761 |
| 4. Commercial | 5,806 | 5,470 | 5,632 | 6,215 | 6,546 |
| 5. Transportation | 26,943 | 26,801 | 28,622 | 30,181 | 32,351 |
| Total | 75,214 | 75,804 | 77,881 | 79,929 | 80,752 |

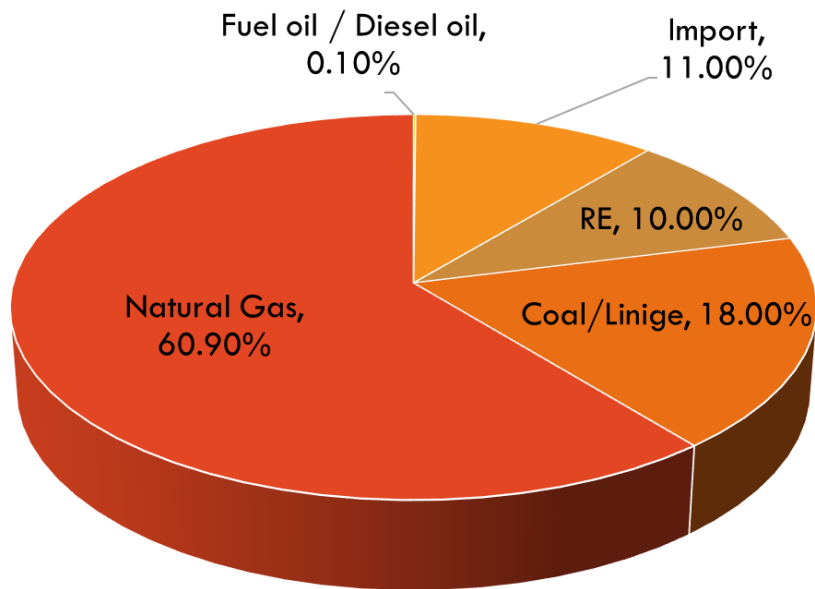
Share of Energy Consumption by sector 2017^P



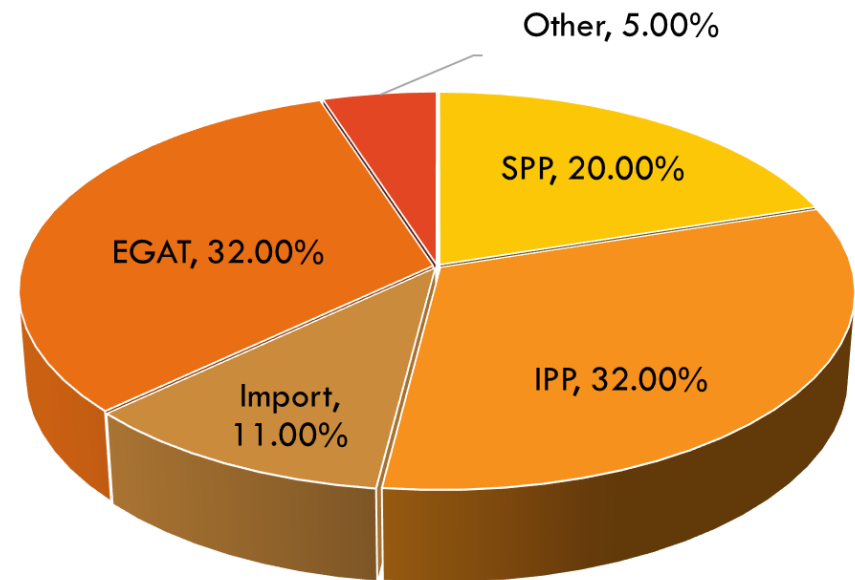
Power Generation 2017^p

Total Power Generation = 49,047.54 MW

Power Generation by Fuel Type

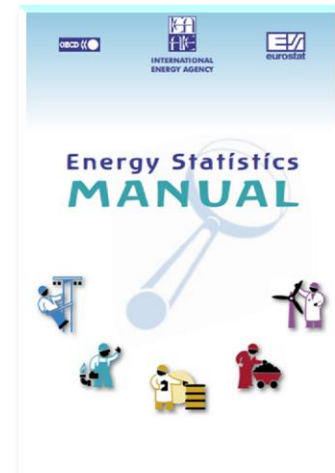
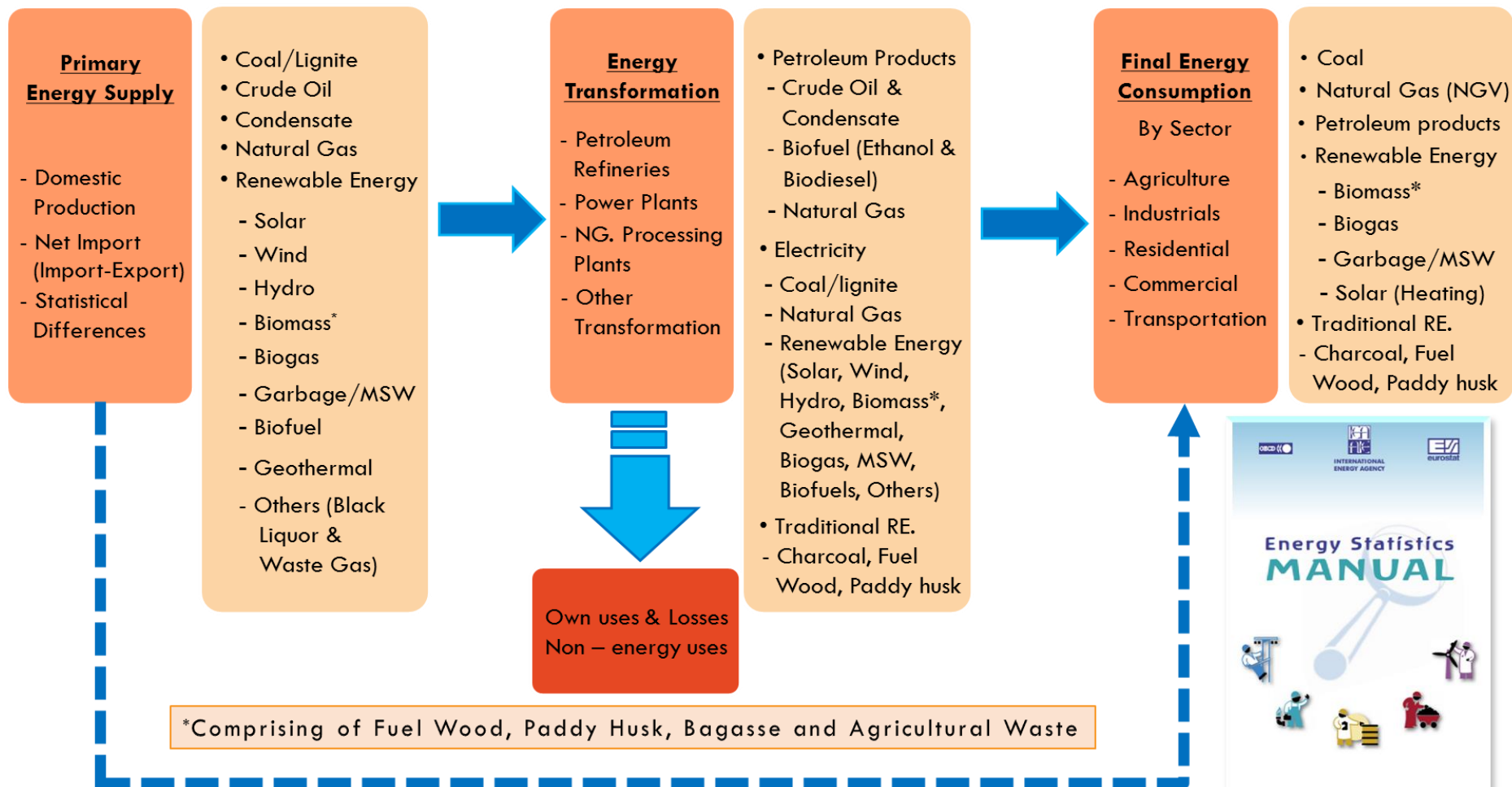


Power Generation by Producer



Thailand Energy Statistics Structure

Energy Supply = Energy Demand



Energy Balance of Thailand

1. RE are including solar, wind, hydro, geothermal, biomass, waste, biogas, biofuels
2. Traditional RE are including fuel wood, charcoal, paddy husk, agri. waste
3. Others Energy are including black liquor and residual gas

unit : ktoe

| พลังงานหมุนเวียน RENEWABLE ENERGY | | | | | | | | | | พลังงานหมุนเวียนดั้งเดิม TRADITIONAL RENEWABLE ENERGY | | | | | เชื้อเพลิงชีวภาพ BIO FUELS | | | พลังงานอื่น ๆ OTHER | | รวมทั้งสิ้น GRAND TOTAL | TYPE | | | | | | |
|--|--------------------------|------------|---|---|--------------------------------------|------------------|-------------------|--------------------|--|--|---|---|--------------------|-------------------------|-------------------------------|-------------------------|--------------------------------------|---|----------------------------------|----------------------------|--|-------------------|--|--------------------|-----------------------------|--------------------------------------|-------------------------|
| ชีวมวล SOLID BIOMASS | | | | | | | | | | รวมพลังงานหมุนเวียน TOTAL RENEWABLE ENERGY | รวมเชื้อเพลิงชีวภาพทั้งหมด TOTAL BIO FUELS | รวมเชื้อเพลิงชีวภาพทั้งหมด TOTAL BIO FUELS | เมทานอล ETHANOL | ไบโอดีเซล BIO DIESEL | เมทานอล ETHANOL | ไบโอดีเซล BIO DIESEL | รวมพลังงาน TOTAL RENEWABLE ENERGY | รวมพลังงานหมุนเวียน TOTAL RENEWABLE ENERGY | | | | | | | | | |
| พลังงานความร้อน (ความร้อน) SOLAR (HEAT) | พลังงานความร้อน SOLAR | ลม WIND | พลังงานน้ำขนาดเล็ก SMALL HYDRO POWER | พลังงานน้ำขนาดใหญ่ LARGE HYDRO POWER | พลังงานความร้อนใต้พิภพ GEOTHERMAL | ไม้ FUEL WOOD | ฟาง PADDY HUSK | กากอ้อย BAGASSE | กากพืชใช้ทำเกษตร AGRICULTURAL WASTE | | | | | | | | | | รวมชีวมวล TOTAL SOLID BIOMASS | MSW MDW | กากพืชใช้ทำเกษตร AGRICULTURAL WASTE | ฟาง PADDY HUSK | กากพืชใช้ทำเกษตร AGRICULTURAL WASTE | เอทานอล ETHANOL | ไบโอดีเซล BIO DIESEL | เมทานอล ETHANOL | ไบโอดีเซล BIO DIESEL |
| (35) | (36) | (37) | (38) | (39) | (40) | (41) | (42) | (43) | (44) | (45) | (46) | (47) | (48) | (49) | (50) | (51) | (52) | (53) | (54) | (55) | (56) | (57) | (58) | | | | |
| 0.000023672 | 0.08521 | 0.08521 | 0.08521 | 0.08521 | 0.08521 | 0.37848 | 0.34083 | 0.17834 | 0.30021 | | 0.1149 | 0.00000049539 | | 0.37848 | 0.68364 | 0.34083 | 0.30021 | | 0.51000 | 0.86198 | | 0.000023672 | | | | | |
| 9.2 | 384 | 95 | 42 | 369 | 0 | 229 | 1,063 | 7,602 | 4,991 | 13,885 | 103 | 899 | 15,786 | 5,881 | - | 524 | 2,154 | 8,559 | 724 | 1,232 | 1,956 | 295 | 74,398 | 1 | DOMESTIC PRODUCTION | | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 68 | - | - | 68 | - | - | - | - | - | 78,976 | 2 | IMPORTS | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | (16) | - | - | (16) | - | - | - | - | - | (11,960) | 3 | EXPORTS | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | (30) | (27) | - | - | (3,351) | 4 | STOCK CHANGE/STATISTICAL DIFFERENCES | |
| 9.2 | 384 | 95 | 42 | 369 | 0 | 229 | 1,063 | 7,602 | 4,991 | 13,885 | 103 | 899 | 15,786 | 5,881 | 52 | 524 | 2,154 | 8,611 | 727 | 1,202 | 1,929 | 295 | 138,063 | 5 | TOTAL PRIMARY ENERGY SUPPLY | | |
| - | (384) | (95) | (42) | (369) | (0) | - | (697) | (3,777) | (2,794) | (7,268) | (39) | (267) | (8,464) | - | - | - | - | (3,325) | (727) | (1,202) | (1,929) | - | - | (8,325) | 6 | PETROLEUM REFINERIES | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1,157 | 7 | NG. PROCESSING PLANTS | |
| - | - | - | (42) | (369) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | (295) | (26,503) | 8 | POWER PLANTS | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 9 | HYDRO |
| - | - | - | - | - | - | - | - | (671) | (3,565) | (2,747) | - | (6,983) | (9) | (9) | - | - | - | - | - | - | - | - | (295) | (10,741) | 10 | STEAM THERMAL | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | (274) | 11 | GAS TURBINE | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | (15,167) | 12 | COMBINED CYCLE | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | (6) | 13 | DIESEL | |
| - | - | - | - | - | - | - | - | (26) | (212) | (38) | - | (276) | (543) | (479) | - | - | - | - | - | - | - | - | - | (315) | 14 | GAS ENGINE | |
| - | (384) | (95) | - | - | (0) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 15 | OTHERS |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 16 | OTHER CONVERSION |
| - | (384) | (95) | (42) | (369) | (0) | - | (697) | (3,777) | (2,794) | (7,268) | (39) | (267) | (8,464) | (4,926) | 1,779 | (178) | - | (3,325) | (727) | (1,202) | (1,929) | (295) | (36,538) | 17 | TOTAL TRANSFORMATION | | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | (7,777) | 18 | OWN USES | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | (1,319) | 19 | LOSSES | |
| 9.2 | - | - | - | - | - | 229 | 366 | 3,825 | 2,197 | 6,617 | 64 | 632 | 7,322 | 955 | 1,831 | 346 | 2,154 | 5,286 | - | - | - | - | - | 92,429 | 20 | TOTAL FINAL ENERGY CONSUMPTION | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 11,677 | 21 | FINAL NON-ENERGY USES | |
| 9.2 | - | - | - | - | - | 229 | 366 | 3,825 | 2,197 | 6,617 | 64 | 632 | 7,322 | 955 | 1,831 | 346 | 2,154 | 5,286 | - | - | - | - | - | 80,752 | 22 | FINAL ENERGY CONSUMPTION | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2,642 | 23 | AGRICULTURE | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 118 | 24 | MINING | |
| - | - | - | - | - | - | 229 | 366 | 3,825 | 2,197 | 6,617 | 64 | 632 | 7,313 | - | - | - | - | - | - | - | - | - | - | 28,262 | 25 | MANUFACTURING | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 72 | 26 | CONSTRUCTION | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 10,761 | 27 | RESIDENTIAL | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6,546 | 28 | COMMERCIAL | |
| 9.2 | - | - | - | - | - | - | - | - | - | - | - | - | 9.2 | 955 | 1,831 | 346 | 2,154 | 5,286 | - | - | - | - | - | 32,351 | 29 | TRANSPORTATION | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 25,408 | 30 | ROAD | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 80 | 31 | RAIL | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5,505 | 32 | AIR | |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1,358 | 33 | WATERWAY | |



Renewable Energy Data

Row = 24 Column = 25

Renewable Energy Consumption : 1.Electricity 2.Heat 3.Biofuels (Ethanol & Biodiesel)

TABLE 2 THAILAND ALTERNATIVE ENERGY BALANCE 2016

หน่วย : พันตันเทียบเท่าฟอสซิล

unit : Ktoe

| ประเภท | พลังงานทดแทน ALTERNATIVE ENERGY | | | | | | | | | | | | | | | | | | | | | | | | TYPE | | |
|----------------------------|--|---------------------|------------|--------------------------------------|--------------------------------------|---------------------------------------|---------------------|---------------------|---------------------|---|----------------|--------------------------|--------------------------|---------------------|---|-----------------------|---|--------------------|-------------------------|--|------------------|------------------|-------------------------|---|----------|---|---|
| | พลังงานทดแทนเชิงพาณิชย์ COMMERCIAL ALTERNATIVE ENERGY | | | | | | | | | | | | | | | | | | | พลังงานทดแทนดั้งเดิม TRADITIONAL ALTERNATIVE ENERGY | | | | | | | |
| | แสงอาทิตย์ (ความร้อน) SOLAR (HEAT) | แสงอาทิตย์ SOLAR | ลม WIND | พลังน้ำขนาดเล็ก SMALL HYDRO POWER | พลังน้ำขนาดใหญ่ LARGE HYDRO POWER | พลังงานความร้อนใต้พิภพ GEO THERMAL | ชีวมวล FUEL WOOD | ชีวมวล PEDI/PLSK | กากขี้เถ้า POKSE | กากขี้เถ้าเกษตรกรรม AGRICULTURAL WASTE | ขี้เถ้า ASH | กากขี้เถ้า MHW (HEAT) | กากขี้เถ้า MHW (HEAT) | กากขี้เถ้า BOGAS | กากขี้เถ้า (กากขี้เถ้า) BOGAS (HEAT) | พลังงานอื่นๆ OTHER | ไฟฟ้าจากพลังงานทดแทน ELECTRICITY FROM ALTERNATIVE ENERGY | เอทานอล ETHANOL | ไบโอดีเซล BIO DIESEL | รวมพลังงานทดแทนอื่น TOTAL COMMERCIAL ALTERNATIVE ENERGY | ฟืน FUEL WOOD | ถ่าน CHARCOAL | กากขี้เถ้า PEDI/PLSK | กากขี้เถ้าเกษตรกรรม AGRICULTURAL WASTE | | รวมพลังงานทดแทนดั้งเดิม TOTAL TRADITIONAL ALTERNATIVE ENERGY | รวมพลังงานทั้งหมด TOTAL ALTERNATIVE ENERGY |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) | (25) | | | |
| ค่าการแปลงหน่วย | 0.08521 | | | | | | | | | | | | | | | | | | | | | | | | unit | | |
| ไฟฟ้า | 1 | 288 | 29 | 27 | 268 | 01 | 199 | 826 | 306 | 58 | 51 | 70 | 2122 | 2122 | 2122 | 2122 | 2122 | 2122 | 2122 | 2122 | 2122 | 2122 | 2122 | 2122 | 2122 | 1 | ELECTRICITY GENERATION |
| ค่าการแปลงหน่วย | 0.000023672 | | | | | | | | | | | | | | | | | | | | | | | | unit | | |
| ความร้อน | 1 | 67 | | | | | 162 | 193 | 3248 | 2904 | 75 | 583 | 7182 | 7182 | 7182 | 7182 | 7182 | 7182 | 7182 | 7182 | 7182 | 7182 | 7182 | 7182 | 7182 | 1 | HEAT PRODUCTION |
| ค่าการแปลงหน่วย | 0.000023672 | | | | | | | | | | | | | | | | | | | | | | | | unit | | |
| การผลิตพลังงานทดแทนขั้นต้น | 1 | 67 | 288 | 29 | 27 | 268 | 01 | 162 | 995 | 6432 | 8274 | 29 | 75 | 196 | 583 | 220 | - | - | 17,596 | 8,013 | - | 268 | 1,077 | 9,368 | 26,963 | 5 | TOTAL PRIMARY ALTERNATIVE ENERGY SUPPLY |
| การผลิตพลังงานทดแทนขั้นต้น | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1,747 | 8,013 | 63 | - | - | 9,368 | 26,963 | 6 | FERROULIM FERRETES |
| การผลิตพลังงานทดแทนขั้นต้น | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1,747 | 8,013 | 63 | - | - | 9,368 | 26,963 | 7 | NG PROTEIN GRANIS |
| การผลิตพลังงานทดแทนขั้นต้น | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1,747 | 8,013 | 63 | - | - | 9,368 | 26,963 | 8 | FORMER PLAINS |
| การผลิตพลังงานทดแทนขั้นต้น | 5 | 67 | 288 | 29 | 27 | 268 | 01 | 162 | 995 | 6432 | 8274 | 29 | 75 | 196 | 583 | 220 | - | - | 17,596 | 8,013 | 40 | 268 | 1,077 | 9,368 | 26,963 | 9 | HYDRO |
| การผลิตพลังงานทดแทนขั้นต้น | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1,747 | 8,013 | 40 | 268 | 1,077 | 9,368 | 26,963 | 10 | SEMI THERMAL |
| การผลิตพลังงานทดแทนขั้นต้น | 7 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1,747 | 8,013 | 40 | 268 | 1,077 | 9,368 | 26,963 | 11 | GASTURBINE |
| การผลิตพลังงานทดแทนขั้นต้น | 8 | - | (288) | (29) | (27) | (268) | (01) | - | (802) | (3,184) | (5,370) | (29) | - | (196) | - | (220) | - | - | (8,291) | (5,871) | 2122 | (198) | - | (3,947) | (10,491) | 12 | COMBINED |
| การผลิตพลังงานทดแทนขั้นต้น | 9 | - | (288) | (29) | (27) | (268) | (01) | - | (802) | (3,184) | (5,370) | (29) | - | (196) | - | (220) | - | - | (8,291) | (5,871) | 2122 | (198) | - | (3,947) | (10,491) | 13 | DESEL |
| การผลิตพลังงานทดแทนขั้นต้น | 10 | - | - | - | - | - | - | - | (801) | (3,133) | (5,349) | (29) | - | - | - | (220) | - | - | (8,137) | (5,871) | 2122 | (198) | - | (3,947) | (10,491) | 14 | GASOLINE |
| การผลิตพลังงานทดแทนขั้นต้น | 11 | - | - | - | - | - | - | - | (801) | (3,133) | (5,349) | (29) | - | - | - | (220) | - | - | (8,137) | (5,871) | 2122 | (198) | - | (3,947) | (10,491) | 15 | OTHER |
| การผลิตพลังงานทดแทนขั้นต้น | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | (8,137) | (5,871) | 2122 | (198) | - | (3,947) | (10,491) | 16 | OTHER CONVERSION |
| การผลิตพลังงานทดแทนขั้นต้น | 13 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | (8,137) | (5,871) | 2122 | (198) | - | (3,947) | (10,491) | 17 | TOTAL TRANSFORMATIONAL ALTERNATIVE ENERGY |
| การผลิตพลังงานทดแทนขั้นต้น | 14 | - | (288) | (29) | - | - | (01) | - | (802) | (3,184) | (5,370) | (29) | - | (196) | - | (220) | - | - | (8,291) | (5,871) | 2122 | (198) | - | (3,947) | (10,491) | 18 | OWN USES |
| การผลิตพลังงานทดแทนขั้นต้น | 15 | - | (288) | (29) | - | - | (01) | - | (802) | (3,184) | (5,370) | (29) | - | (196) | - | (220) | - | - | (8,291) | (5,871) | 2122 | (198) | - | (3,947) | (10,491) | 19 | LOSSES |
| การผลิตพลังงานทดแทนขั้นต้น | 16 | - | (288) | (29) | - | - | (01) | - | (802) | (3,184) | (5,370) | (29) | - | (196) | - | (220) | - | - | (8,291) | (5,871) | 2122 | (198) | - | (3,947) | (10,491) | 20 | TOTAL FINAL ALTERNATIVE ENERGY CONSUMPTION |
| การผลิตพลังงานทดแทนขั้นต้น | 17 | - | (288) | (29) | (27) | (268) | (01) | - | (802) | (3,184) | (5,370) | (29) | - | (196) | - | (220) | - | - | (8,291) | (5,871) | 2122 | (198) | - | (3,947) | (10,491) | 21 | FINAL ALTERNATIVE ENERGY CONSUMPTION (COMMERCIAL & TRADITIONAL) |
| การผลิตพลังงานทดแทนขั้นต้น | 18 | - | (288) | (29) | (27) | (268) | (01) | - | (802) | (3,184) | (5,370) | (29) | - | (196) | - | (220) | - | - | (8,291) | (5,871) | 2122 | (198) | - | (3,947) | (10,491) | 22 | FINAL COMMERCIAL ALTERNATIVE ENERGY CONSUMPTION |
| การผลิตพลังงานทดแทนขั้นต้น | 19 | - | (288) | (29) | (27) | (268) | (01) | - | (802) | (3,184) | (5,370) | (29) | - | (196) | - | (220) | - | - | (8,291) | (5,871) | 2122 | (198) | - | (3,947) | (10,491) | 23 | FINAL ENERGY CONSUMPTION |
| การผลิตพลังงานทดแทนขั้นต้น | 20 | 67 | - | - | - | - | 162 | 193 | 3248 | 2904 | - | 75 | - | 583 | - | 2122 | 684 | 1,063 | 11,051 | 2,142 | 2,162 | 70 | 1,077 | 5,461 | 16,502 | 24 | PERCENTAGE OF COMMERCIAL ALTERNATIVE ENERGY CONSUMPTION |
| การผลิตพลังงานทดแทนขั้นต้น | 21 | | | | | | | | | | | | | | | | | | 11,051 | | | | | 5,461 | 16,502 | 21 | FINAL ALTERNATIVE ENERGY CONSUMPTION (COMMERCIAL & TRADITIONAL) |
| การผลิตพลังงานทดแทนขั้นต้น | 22 | | | | | | | | | | | | | | | | | | 11,051 | | | | | | | 22 | FINAL COMMERCIAL ALTERNATIVE ENERGY CONSUMPTION |
| การผลิตพลังงานทดแทนขั้นต้น | 23 | | | | | | | | | | | | | | | | | | 79,929 | | | | | | | 23 | FINAL ENERGY CONSUMPTION |
| การผลิตพลังงานทดแทนขั้นต้น | 24 | | | | | | | | | | | | | | | | | | 1383 | | | | | | | 24 | PERCENTAGE OF COMMERCIAL ALTERNATIVE ENERGY CONSUMPTION |



Energy Efficiency Data

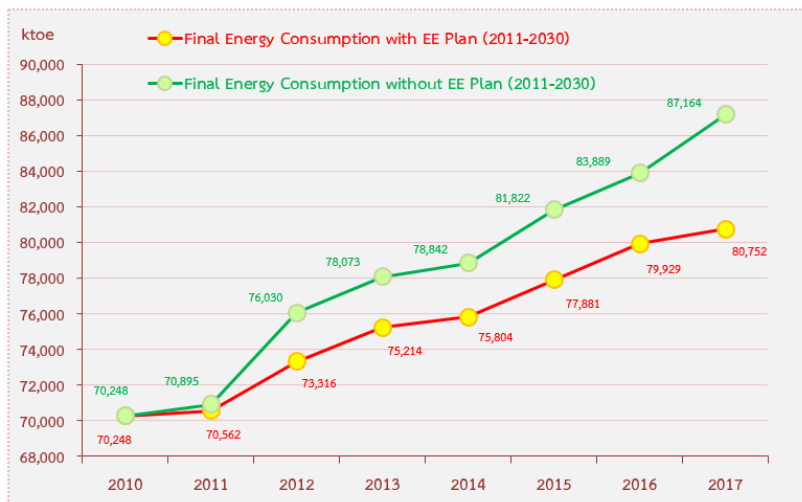
| Items | Unit | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 ^P |
|--|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------|
| Final Energy Consumption | (ktoe) | 70,248 | 70,562 | 73,316 | 75,214 | 75,804 | 77,881 | 79,929 | 80,752 |
| Gross Domestic Product : GDP ^{1/} | (million baht) | 8,232,421 | 8,301,570 | 8,902,835 | 9,142,088 | 9,232,084 | 9,581,080 | 9,823,122 | 10,206,516 |
| Energy Intensity : EI | (ktoe/billion baht) | 8.54 | 8.50 | 8.24 | 8.23 | 8.21 | 8.13 | 8.14 | 7.91 |
| Final Energy Consumption : BAU case | (ktoe) | | 70,895 | 76,030 | 78,073 | 78,842 | 81,822 | 83,889 | 87,164 |
| Energy Intensity, EI : BAU case | (ktoe/billion baht) | | 8.54 | 8.54 | 8.54 | 8.54 | 8.54 | 8.54 | 8.54 |
| Energy Saving from EI on Whole Kingdom | (ktoe) | | 333 | 2,714 | 2,859 | 3,038 | 3,941 | 3,960 | 6,412 |

Source : 1. Calculating EI by DEDE

2. Referina GDP from National Economics Social Development Board

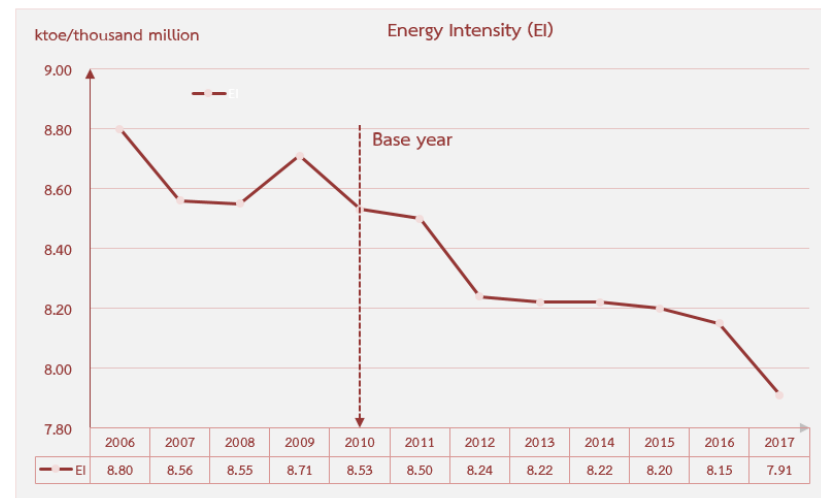
ENERGY SAVING RESULTS

BASED ON THAILAND 20-YEAR ENERGY EFFICIENCY PLAN (2015-2036)



DECREASING OF ENERGY INTENSITY

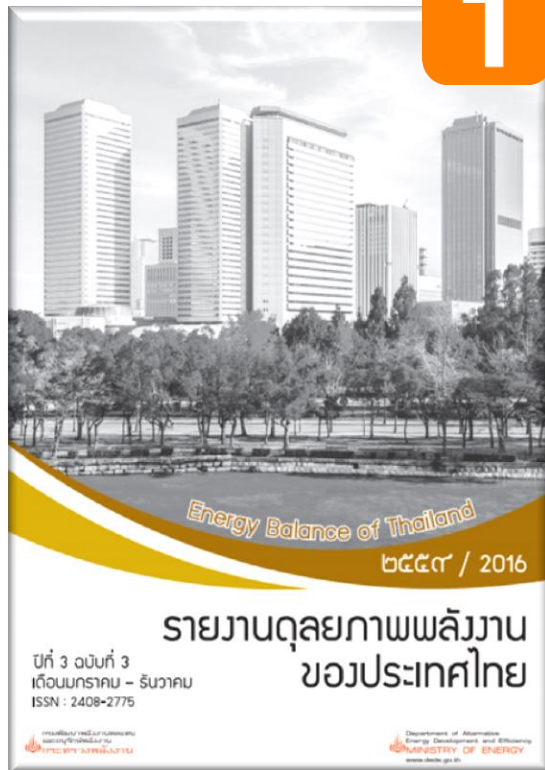
BASED ON THAILAND 20-YEAR ENERGY EFFICIENCY PLAN (2015-2036)



Energy Statistics Publication

Energy Balance of Thailand

1



Thailand Alternative Energy Situation

2



Thailand Energy Efficiency Situation

3



Thank you for your kind attention.
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