

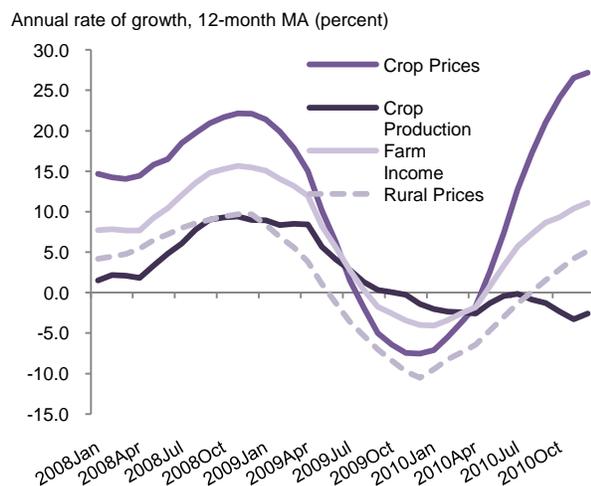
## SHARED AND SUSTAINABLE GROWTH

### 3.1 Developments in Labor Markets and Social Protection

#### *Labor markets and household income*

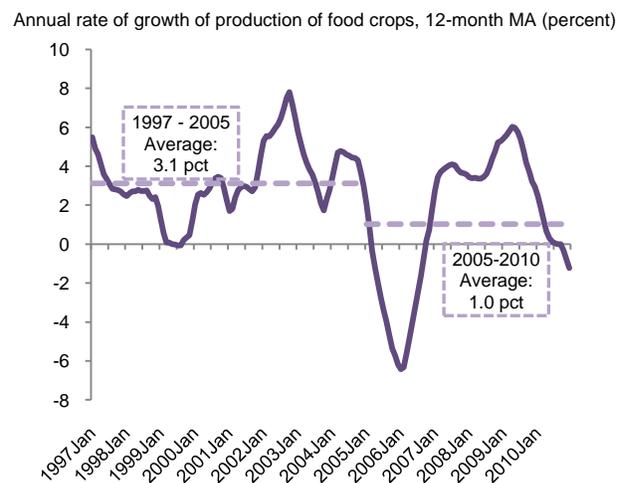
**Higher agricultural prices helped raise the incomes of rural households despite drops in production due to volatile weather conditions.** Prices of key agricultural products such as cassava and rubber increased sharply in 2010. Cassava was up 52 percent on strong biofuel demand from China, while rubber prices were up 56 percent, also driven by Chinese demand. Rice prices were largely stable, closing 2010 about 6 percent higher than the 2009 average. In addition, the government's price insurance scheme provided additional income to rice farmers, since the government's insured price was above market prices for nearly all of the harvest season. Higher prices offset production declines driven by natural disasters, first droughts then floods. Crop production was 3 percent lower in 2010 compared to 2009, but agricultural incomes were up 11 percent in the same period. Importantly, agricultural incomes continued to rise faster than rural inflation, suggesting that purchasing power of rural households has been increasing (Figure 1). The outlook for 2011 remains solid, although risks are elevated. Recent floods in the South and heightened concerns about increasingly erratic weather patterns raise the risks that production yields may again be volatile (Figure 2). In addition, higher oil prices may erode gains to farming households. Agriculture is energy intensive due to the role of oil in fertilizers, harvesting and transportation. Fertilizer prices have recently increased, while the cap on diesel prices may be removed as early as the first half of this year. Moreover, increased oil prices would eventually pass through to rural consumer prices and erode purchasing power.

**Figure 1. Farm income has risen faster than rural prices despite weak output.**



Source: BoT, MoC and World Bank staff calculations.

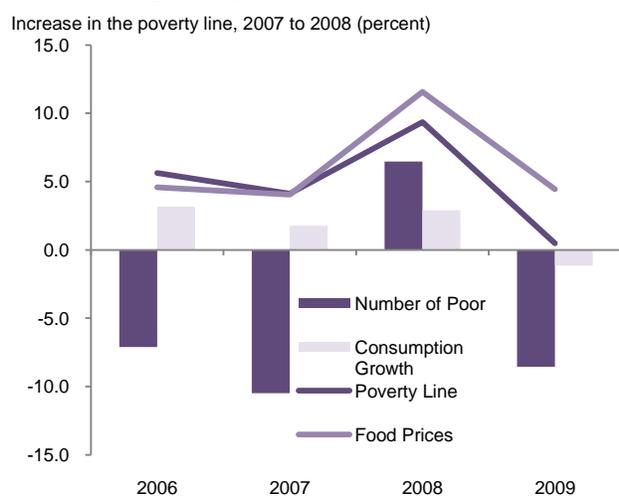
**Figure 2. The production of food crops experienced higher volatility since 2005.**



Source: BoT and World Bank staff calculations.

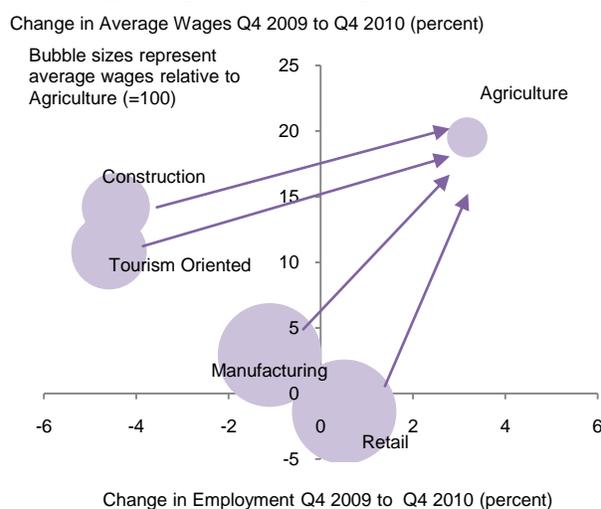
Although most households (including many among the poor) benefit from higher agricultural prices and related effects on wages, some of the most vulnerable are likely suffer through higher food prices. In 2008, Thailand posted its first increase in the number of people living below the poverty line since the 1997 crisis, with 350,000 Thais pushed into poverty (Figure 3). Growth in consumption expenditure in the bottom 20 percent of households was 9.7 percent, but soaring food prices led to a sharp increase in the poverty line (food comprises 56 percent of the consumption basket of the poorest households). Adjusting for the increase in the poverty line, the consumption growth among the poorest 20 percent of households all but disappears. Many vulnerable households (i.e., those just above the poverty line) are net food buyers, and therefore their income gains were surpassed by the higher cost of living, leading to an increase in the number of individuals living below the poverty line. Notwithstanding the global financial crisis and contractions in GDP and private consumption, food prices moderated in 2009, supporting a decline in poverty.<sup>1</sup> In 2009 the poverty rate was 8.1 percent.

**Figure 3. Higher food prices are linked to the increase in poverty observed in 2008.**



Source: NSO, MoC, and World Bank staff calculations.

**Figure 4. Wages and employment in agriculture soared, pulling unskilled wages.**



Source: NSO and World Bank staff calculations.

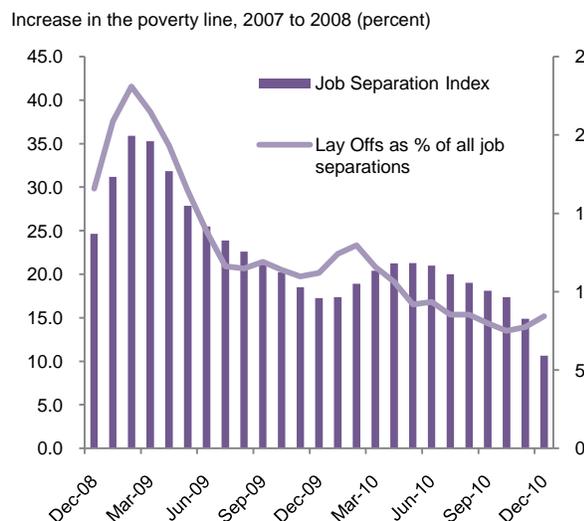
**Firm agricultural prices led to an increase in agricultural wages, which helped push all wages upward in 2010.** Real agricultural wages increased by 16.5 percent in the fourth quarter of 2010. Faced with higher competition for labor from the agricultural sector, non-agricultural firms had to raise wages in an attempt to reduce turnover to agriculture, pulling real non-agricultural wages higher by 4.3 percent. Figure 4 shows that, excluding agriculture, there is a negative correlation between changes in wages and changes in employment levels among unskilled sectors. Importantly, there is also a correlation between these two variables and the gap between agricultural wages and average wages in other sectors (the size of the bubbles in the chart): the lower the average wages in the sector (the closer they are to agricultural wages), the more likely workers are to go back to agriculture when agricultural wages increase, and the higher are the required wage increases to retain workers. Overall, real wages were up 6.3 percent in the fourth quarter of 2010 from the same period in 2009.

**Higher wages are also a sign of a tighter labor market, as corroborated by low level of lay-offs as a share of total job separations.** While the unemployment rate in Thailand is structurally low and not necessarily a good indicator of labor market conditions, other indicators suggest job markets are

<sup>1</sup> Lower food prices are only part of the reason poverty declined, since income growth for the poorest 20 percent of the population was also stronger in 2009 than in 2008 despite the crisis.

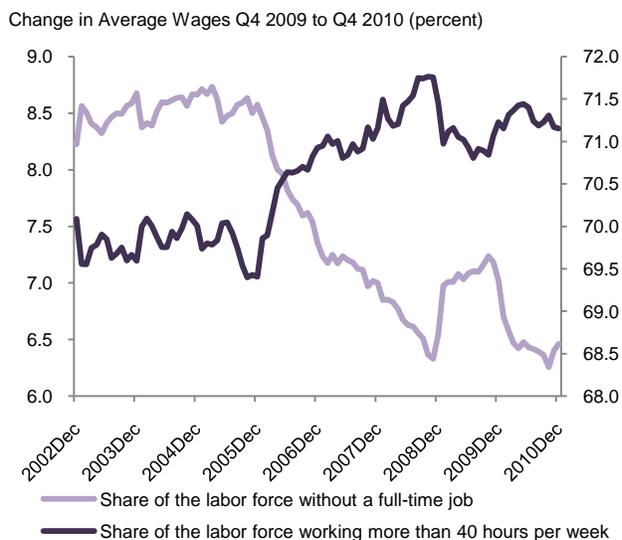
tightening. In the fourth quarter, a high proportion of job separations were due to resignations rather than layoffs suggests that workers left jobs likely to pursue alternative employment opportunities (Figure 5). Other indicators of labor market conditions also point to greater tightness. The proportion of the labor force that is unemployed or working less than 20 hours per week reached a low of 6.3 percent in October (Figure 6). Meanwhile, the share of the labor force working more than 40 hours per week recovered from the crisis, but remained well below pre-crisis peaks. This category is influenced by sluggish gains in manufacturing employment, where overtime is an important component of overall income.

**Figure 5. Job separations declined, along with the share of lay-offs.**



Source: NSO, MoC, and World Bank staff calculations.

**Figure 6. The number of people without full-time jobs declined to all-time lows.**

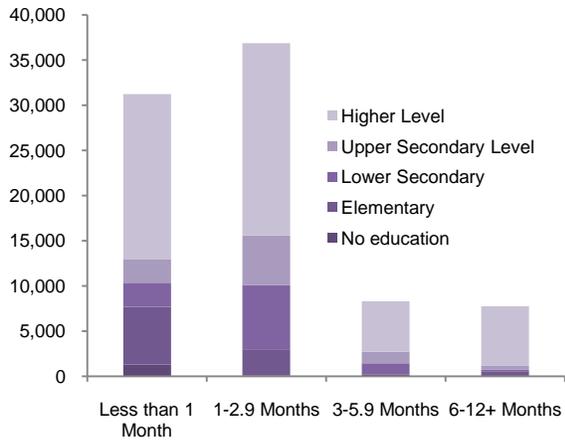


Source: NSO and World Bank staff calculations.

**The small number of unemployed workers actively looking for a job is concentrated in high-skilled groups, where matching frictions are more salient in the job search process.** Friction may be measured by the average time it takes for unemployed individuals to receive an offer of employment. During the third quarter of 2010, workers with advanced education spent on average three months longer than those with no education to find employment (Figure 7). Such concentration of unemployment in highly-skilled sectors may reflect a mismatch of skills demanded and supplied (many job vacancies were for low-skilled workers) but also normal labor market frictions since low-skilled labor may be easier to match with jobs compared with labor with higher but more specific skills. It also suggests that labor markets for unskilled workers are particularly tight, which is also reflected by greater reliance on migrant workers in low-paid unskilled sectors. In sectors such as construction, agriculture and fishery, strict regulatory measures on employment of migrant workers provided incentives for firms to hire non-registered migrants from Myanmar, Laos, and Cambodia (Figure 8).

**Figure 7. Job matching frictions are greater among higher-educated workers.**

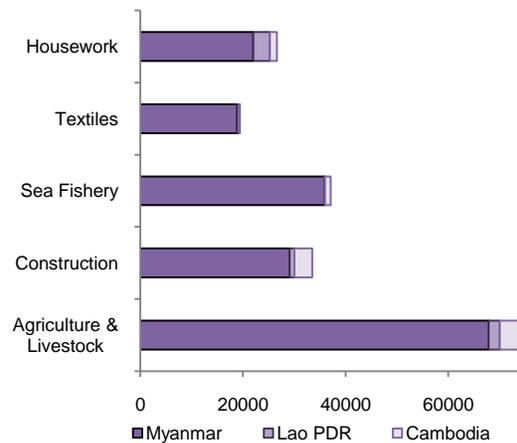
Job seeking duration by educ. level, Q3 2010 (number of job seekers)



Source: NSO, MoC, and World Bank staff calculations.

**Figure 8. Migrant labor is prevalent in lower wage areas such as construction and agriculture.**

Non-registered Migrant Labor by Sector in February 2011

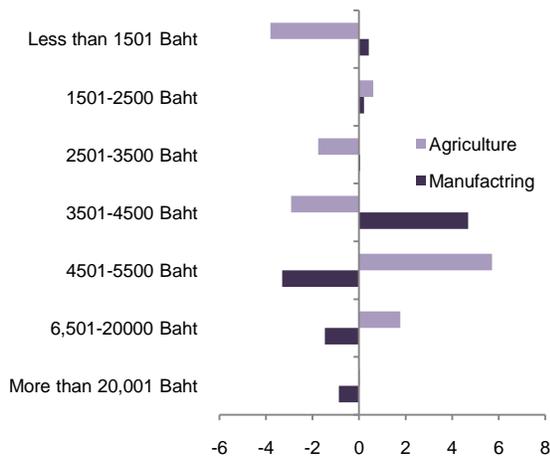


Source: NSO and World Bank staff calculations.

**Reflecting the external orientation of the sector and related competitive pressures, manufacturing firms have attempted to control labor costs in a variety of ways.** Employment growth in the sector has been limited, suggesting higher output has come from capital deepening. In addition, wage growth has been slow. In contrast with agriculture, where higher average wages were reflected in a higher proportion of workers in higher wage brackets, the manufacturing sector saw a marked decline of its share in high tiered wage groups and shifted towards the median wage group (Figure 9), suggesting an emphasis in hiring low-wage labor. In addition, the composition of labor incomes in manufacturing is more diversified, including a higher proportion of fringe benefits and overtime, which can be cut in face of a shock to demand (Figure 10).

**Figure 9. Manufacturing firms hired lower wage workers.**

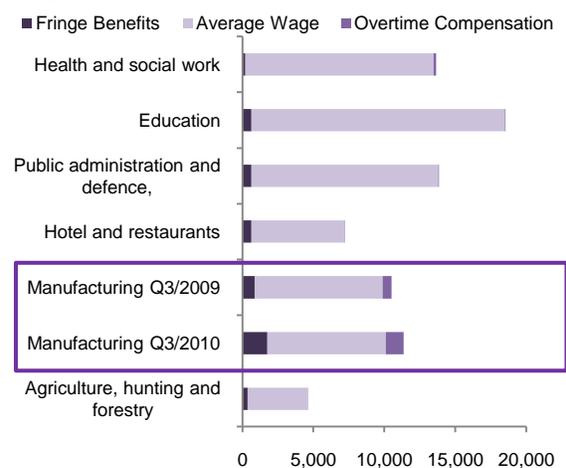
Number of employed by income level, Q3 2008 – Q3 2010 (pct change)



Source: NSO and World Bank staff calculations

**Figure 10. Increases in overtime and fringe benefits raised manufacturing labor incomes.**

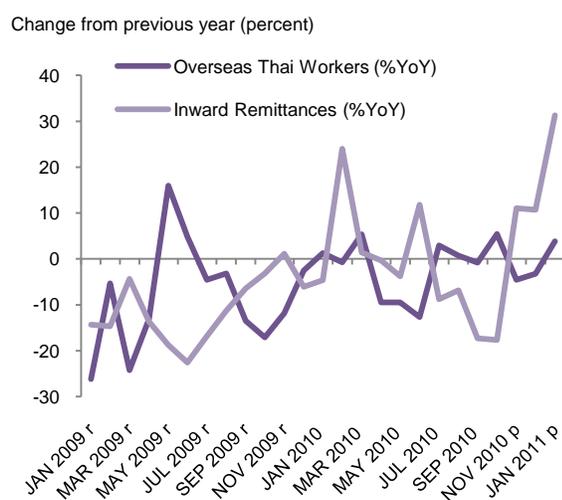
Average Labor Income Breakdown by Sector (THB)



Source: NSO and World Bank staff calculations

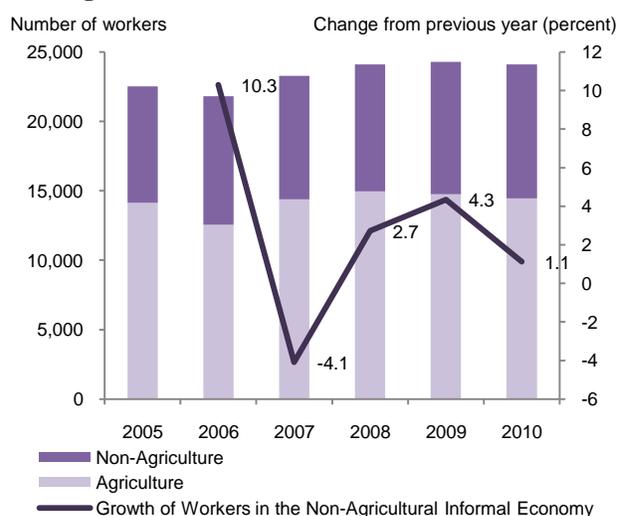
**Putting further pressure on labor markets, there was a trend in 2010 for Thai workers to return to employment abroad.** In the midst of the global recession in November 2008, a large number of overseas Thai workers returned home as opportunities for employment in the EU, Middle East, and Asia declined. As recovery has begun to take hold in advanced economies, Thai workers regained confidence and started to return abroad in 2010 (Figure 11). Overall, the number of overseas Thai workers grew by 4 percent in January 2011 from the same period of the previous year. The main destinations for Thai workers included Taiwan, Singapore, South Korea, Libya, and Qatar. It is expected that the number of Thai workers abroad will continue to grow as a result of the signing of bilateral agreements to increase quotas for registered Thai workers in South Korea and Taiwan.

**Figure 11. Thai workers are returning abroad after the crisis.**



Source: NSO and World Bank staff calculations

**Figure 12. Informal workers increased in the non-agricultural sector.**



Source: NSO and World Bank staff calculations

**The number of non-agricultural workers in the informal sector has increased since the global recession.** As of 2010, the Thai informal labor market counted 24 million workers, or 62 percent of the combined workforce.<sup>2</sup> The highest share of informal workers is in the agricultural sector, which is characterized by smallholder production. The size of the informal agricultural sector has remained relatively constant since 2007 and stands at 14.4 million workers (Figure 12). On the other hand, the number of workers in the non-agricultural informal sector (primarily retail trade) has increased by over 7 percent since 2007 and represented approximately 9.6 million workers as of 2010.

### *Social protection: initiatives in extending pension coverage in Thailand<sup>3</sup>*

**Given the large number of workers in the informal sector and Thailand's ageing society, more emphasis has been placed on increasing the reach of pension schemes.** Similarly to other countries, Thailand has gone through a demographic transition from high to low levels of fertility and mortality, resulting in an increase in the elderly population (aged 60 and older). Successful implementation of family planning programs and health system development in Thailand over the past decades are important factors contributing to the decrease of fertility and lengthening of life expectancy at birth. The total

<sup>2</sup> The informal sector in Thailand is defined by the National Statistics Office based on a proxy of qualitative characteristics and the number of employees (less than 9). Because of the issues in definition, it is possible that the size of the informal sector may be overcompensated by the number of registered micro enterprises.

<sup>3</sup> Contributed by Magnus Lindelow, Piriya Pholphirul and Sutayut Osornprasop.

fertility rate dropped from 6.4 in the 1950s to 1.8 in 2008, and is projected to decline to 1.5 during the next 20 years (Table 1).<sup>4</sup> Life expectancy at birth increased from 54 years in 1960 to 69 in 2008. It is projected to increase further to 76.8 years in 2025 and 79.1 years in 2050.<sup>5</sup> As a result of the demographic transition, Thailand's population is rapidly aging. In 1950, with only 5 percent of its population aged 60 years and over, Thailand ranked as the seventh most aged country in Southeast Asia. It has now moved up to Southeast Asia's second most aged country, after Singapore, with elderly people constituting over 10% of the population. The elderly population will increase from the current 6.8 million to 9 million in 2015, 12.9 million in 2025, and is projected to exceed 20 million in 2050.<sup>6</sup> Based on the projected demographic data of the UN World Population Prospect, the dependency ratios<sup>7</sup> of the elderly population in Thailand will increase from 9.6 percent in 2000 to about 26.4 percent in the next 40 years (see Table 2).

**Table 1. Fertility Rate in Selected ASEAN Countries**

Countries	(Percent)	
	2000-2005	2010-2020
Thailand	1.8	1.81
Cambodia	3.7	2.96
Lao PDR	3.7	3.54
Malaysia	2.9	2.58
Myanmar	2.3	2.32
Vietnam	2.3	2.08

Source: UN World Population Prospect

**The sharp increase in the share of elderly in the population presents a number of challenges.** In the short term, the ageing society leads to labor shortages and need of immigration to fill in vacancies (see Box 7). In the long term, it leads to lower growth in productivity, national income and consumption.<sup>8</sup> The question of how to provide old-age income security to a growing elderly population has also become a prominent policy issue.

<sup>4</sup> United Nations, World Population Ageing, 1950-2050; World Development Indicators, 2010; UNFPA, *Population Ageing in*

*Thailand: Prognosis and Policy Response*, 2006.

<sup>5</sup> United Nations, World Population Ageing, 1950-2050.

<sup>6</sup> UNFPA, *Population Ageing in Thailand: Prognosis and Policy Response*, 2006.

<sup>7</sup> The dependency ratio of the elderly population is the ratio of the population aged 60 or over to the population aged 15-59 (working age).

<sup>8</sup> Due to higher aging population, the number of workers in relation to the population needing support tends to be reduced and the national saving rate lowered, resulting in slower growth in national income and consumption. Due to higher government spending on health care and pensions, those who work may have to pay higher taxes. This could create disincentives to work and for firms to invest, leading to a fall in productivity growth. The shortage of workers may also push up wages causing wage inflation.

**Table 2. Dependency Ratios for the Population aged 60 and older**

Country	2000	2025	2050
<b>Asia</b>	8.5	14.6	23.6
East Asia			
<b>China</b>	10	19.6	31.1
<b>Hong Kong-China</b>	14.8	30.8	39.5
<b>Japan</b>	23.3	36	44.2
<b>Republic of Korea</b>	11.2	27.1	40.8
South East Asia			
<b>Thailand</b>	9.6	19.1	26.4
<b>Cambodia</b>	4.6	8.3	16.2
<b>Lao PDR</b>	5.4	7.4	14.4
<b>Malaysia</b>	6.2	13.2	22.2
<b>Myanmar</b>	7.7	13	23.6
<b>Singapore</b>	10.6	31.7	39.6
<b>Viet Nam</b>	7.8	15.2	26.6

Source: UN World Population Prospect

**Currently, only private employees (formal sector) and civil servants are covered by compulsory and contributory public pension systems.** Private sector employees are covered through the Social Security Fund;<sup>9</sup> civil servants through the Government Pension Fund (GPF) Scheme<sup>10</sup>; state enterprise employees through the State-Owned Enterprise (SOE) Scheme<sup>11</sup>; and private school teachers are covered through the Private School Teacher Welfare Fund (PS Scheme).<sup>12</sup> There are also independent public entities that offer voluntary retirement saving opportunities, including (1) Provident Fund; (2) Retirement Mutual Fund, and (3) Private Insurance.<sup>13</sup> Coverage does not extend to the entire population especially those self-employed

<sup>9</sup> This is defined benefit type of old age pension where a member retiree will receive a monthly pension at the rate of 15 per cent of the average salary of the last 60 months before retirement. Under the Social Security Fund, formal private workers and employers each will contribute 3 percent of workers' earnings (up to the ceiling of 15,000 baht per month), and the government add additional 1 percent (all together 7 percent) to be covered for 7 exigencies: 1) Sickness and Injuries, 2) Maternity, 3) Disability, 4) Death, 5) Child Allowance, 6) Unemployment, and 7) Old-age. In order to receive benefits in the old-age provision section, the workers must contribute to the Social Security Fund for not less than 180 months, and that person will have aged at least 55 years and no longer working.

<sup>10</sup> The Government Pension Fund is a defined contribution pension scheme. Public officials contribute 3 percent of their monthly salaries, while government adds another 3 percent to the Fund in these public officials' names. At retirement, these public officials will have a choice of receiving lump-sum gratuities or monthly pensions. Parts of these payments will come from government's budget, but for those who have made contributions to the Fund will also receive benefits from the investment incomes of the Fund.

<sup>11</sup> The State-Owned Enterprise Scheme is a privately managed, voluntary savings, defined contribution type of pension scheme. Employees are required to save a certain rate of monthly wages (at least 3 percent of wages, and not exceeding 15 percent), while employers contribute an equal or greater amount. In terms of benefits, the employees will receive lump-sum payments at the time of their resignation or retirement.

<sup>12</sup> The Private Teachers' Provident Fund system is a mandatory, defined contribution scheme for teachers of private schools under the Private School Act. The current contributions rates are 3 per cent of salaries from teachers, 3 per cent from school owners, and 6 per cent from the government. These private school teachers will receive payment in lump sum when they resign from their employment after 5 years of service.

<sup>13</sup> The Provident Fund was enacted to encourage private sector employees to save for retirement. The fund is a voluntary defined benefit and is arranged upon agreements between employers and employees to set the Fund Committee that oversees the provident fund. The scheme regulatory authority is under the Securities and Exchange Commission (SEC). The concept of the retirement mutual fund (RMF) aims to provide another voluntary retirement savings to those employees who are not in the provident fund or who want to make the additional contributions. But to be able to benefit from the tax privileges, the investor must invest in the RMF at least once a year for 5 years

and informal workers.<sup>14</sup> The above-mentioned schemes primarily cover formal sector workers and those in the high-income informal sector, and approximately two thirds of the labor force is not covered by any formal old-age income security scheme.

**A 500 Baht universal pension scheme was introduced in April 2009.**<sup>15</sup> In the first stage, (April-September 2009), the government financed the scheme as part of the economic stimulus package. For the fiscal year 2010 (October 2009-September 2010), the Order of Ministry of Interior on Old-Age Allowance Payment B.E. 2550 (2009), financing will be through the general government budget. Under this scheme, all elderly (over 60 years old), who are not residing in homes for the elderly or other public facilities, and who do not receive a regular income permanently (i.e. government pension recipients, government employed persons), are eligible. In principle, the elderly or the authorized representative must register at the local authorities.<sup>16</sup> As of fiscal year 2010, the number registered 500 baht pension recipients are approximately 77.5 percent of elderly population while the remaining of 1.22 million elderly have not yet registered with the scheme (Sakunphanit and Suwanrada, 2010). Nevertheless, given current (2007) average income of 80,639 Baht per capita per year, or about 6,720 Baht per person per month, 500 baht per month remains a very low amount (7.4 percent of average income). The universal 500 baht pension scheme is expected to be transferred from local authorities to the central government.

**The Thai government recently announced a package of assistance measures focusing on the informal sector and including a pension component.** In January 2010 the Thai government launched a 9 billion-bath package of assistance measures largely targeting the informal sector. Under the name “Pracha Wiwat” (People’s Agenda), the scheme aimed to expand the coverage of social security and improve the well-being of grassroots communities. The funding is allocated to nine “gifts” covering social security reform, credit access, food and energy subsidies, and improved security through crime reduction (Table 3).

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with at least 3 percent of the earnings or at least 5,000 baht whichever is lower, and will not sell or redeem these savings before the age of 55, after maintaining these savings for at least 5 years. The private insurance was supported from the government in term of tax exception. Premiums paid to an insurance policy with a term of at least 10 years at an insurance company incorporated in Thailand are tax exempted for the actual amount paid but cannot exceed 50,000 baht per year. Benefits received from the life insurance policy are also tax exempted.

<sup>14</sup> These schemes were claimed to only target high-income classes in informal sector to voluntarily participate, it has been criticized from not focusing on the medium or low income classes, which are the majority of the population without formal old-age income maintenance tool.

<sup>15</sup> The 500 Baht universal pension scheme is a re-modeled version of the Old Age Living Allowance (OAA) program, initiated in 1993 to provide income for the poor elderly or the disabled elderly. In the first year there were 20,000 older persons that were granted an income of 200 baht per month per head. The number of receivers then increased to 400,000 persons in 2002 while the allowance was increased to 300 baht per month. By 2007, the number of beneficiaries had increased to 1,755,266 persons and the allowance was increased to 500 baht per month. In 2009 starting from April, the government has decided to make the scheme universal.

<sup>16</sup> Beneficiaries can receive payment through one of four means: (1) to receive cash directly at local authority office by himself, (2) to delegate authorized representative to receive cash directly at local authorities office, (3) to have pension be transferred to bank account of the elderly and (4) to have pension be transferred to bank account of the authorized representative.

**Table 3. Summary of the Pracha Wiwat (People’s Agenda) Scheme**

<b>Gift 1:</b> Amendments to the social security law to allow workers in the informal sector to join the social safety net via a co-payment system. The contribution scheme aims to cover costs for healthcare provisions, death, and retirement.
<b>Gift 2:</b> Expanding credit access for taxi drivers, motor-cycle taxi drivers, and street vendors for an unspecified interest rate.
<b>Gift 3:</b> New registration procedure for motorcycle-taxi driver with the purpose of eliminating the influence from the local mafia.
<b>Gift 4:</b> Allocation of new areas of operation to street vendors in Bangkok
<b>Gift 5:</b> Cost controls through subsidization of liquefied petroleum gas (LPG) for households
<b>Gift 6:</b> Free electricity to six million households who consume less than 90 units per month.
<b>Gift 7:</b> Cutting the cost of animal feed aimed to lower the final price of livestock.
<b>Gift 8:</b> Improving the diversity and transparency in the trading system of agricultural product.
<b>Gift 9:</b> Improved security and crime control in Bangkok by 20 percent within six months

“Gift 1” is the most meaningful from a long-term perspective, and is related to three MOF initiatives related to old-age income security:

- 1) **National Saving Fund Act:** The Thai government (Proposed by the Ministry of Finance), approved, on October 2009, draft on National Saving Fund Act B.E. to establish the defined-contribution national pension system to those who are not covered in any pension schemes. The National Saving Fund aims to allow general people without social welfare services such as farmer and vendor to apply. The new savings program aims to cover around 24 million (or two-third of labor force) workers who currently lack any formal retirement coverage (Government Pension Fund, Social Security Fund, or other voluntary provident funds). Under the program, workers will contribute from 100 to 1,000 baht per month and the government will match the contributions with 50 baht per month for members aged 20 to 30 years, 80 baht per month for members aged 30-50 years, and 100 baht per month for members aged 50 to 60. A worker aged 20 who contributes the minimum 100 baht per month to the fund until retirement at 60 will receive pension benefits of around 3,000 baht per month, including a monthly 500-baht payment already given by the government from the 500 Universal Pension. MOF anticipates membership of around 7 million within 1-2 years. This act is currently with the Council of the State for the pass through the decision making of the parliament
- 2) **Amendment of Social Security Fund Act:** The Cabinet, on September 1<sup>st</sup>, 2009, approved an amendment of Social Security Fund Act to extend benefits to spouses and dependents of social security members. Proposed by the Ministry of Labor, approximated 5.88 millions of spouse and children of the social security members will be moved from the Universal Coverage scheme (UC) to Social Security Scheme (SSS) coverage of social security scheme. Four types of benefit compensation (Sickness, Maternity, Disability, and Death) will be covered under the system with additional estimated expense of 2,452 baht per person or 14,416 million Baht in total in the year 2009. Even though old-age pension entitle is not yet included for those spouses and dependents of social security members, this can be another method of increasing household saving from mitigating some risks.
- 3) **Promotion of Community-based Social Welfare Fund:** In many areas of Thailand, for example Songkhla, Lamphang, Trat or Khonkaen provinces, a large number of communities have initiated their own “Community-based Social Welfare Fund”. The objective of such fund is for such community to solve the problem of the inadequacy or the lack of publicly provided social welfare services. These schemes provide various types of welfare through the lifecycle of the community members ranging from family support, maternity fee, educational loan,

community business loan, subsidy for medical expenses, and subsidy for funeral expenses. In some groups, pension is also one of the special-feature benefits.<sup>17</sup>

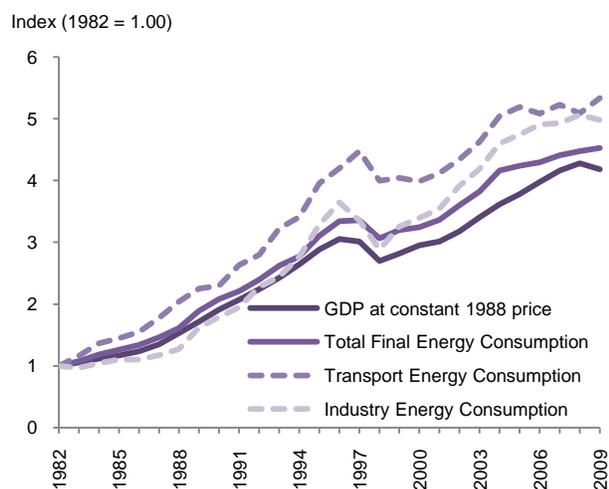
While these initiatives are significant, one of the key features of current old-age security systems in Thailand is the high degree of fragmentation. Currently, there is no coherent vision for how different parts of the pension system will come together over the medium to long term. Questions are also likely to arise regarding the financial sustainability of recent initiatives, which is likely to lead to debates about whether to target public subsidies.

### 3.2 Boosting Energy Efficiency for Sustainable Growth<sup>18</sup>

#### *Energy intensity of the Thai economy*

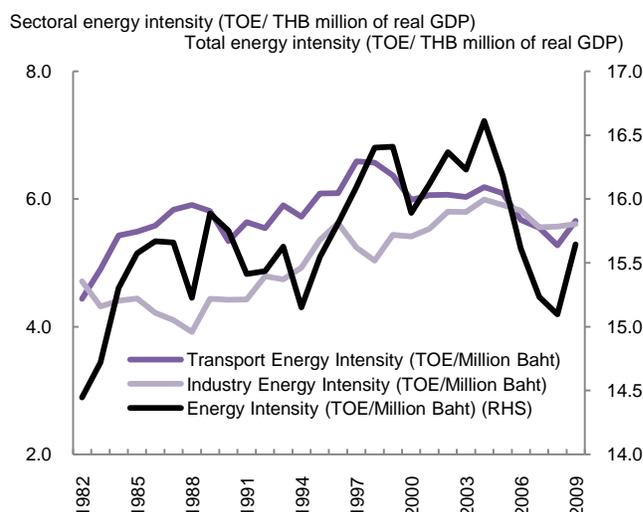
Following years of rapid growth in energy consumption, energy intensity in Thailand started to decline in 2004. Energy consumption in the most energy intensive sectors in the Thai economy—transport and industry—grew faster than GDP between 1982 and 2009 (Figure 13). This resulted in total energy consumption growing faster than GDP and in a pattern of increasing energy intensity (defined as total final energy consumption per unit of GDP). This pattern was reverted in 2004, however, when energy intensity began to steadily decline (Figure 14). Energy consumption of the transport sector grew faster than GDP and total final energy consumption during the period 1982 – 2004, and then slowed down in response to higher oil prices. Industrial energy consumption lagged GDP growth in the early 1980s but picked up in 1988. As with transport, energy consumption in industry flattened since 2004.

**Figure 13. Energy consumption has grown in line with patterns of economic growth.**



Source: Bank of Thailand, Department of Alternative Energy Development and Efficiency, and staff calculations.

**Figure 14. Energy intensity increased since 1994, but entered a decelerating trend since 2004.**



Source: CEIC, DEDE, and World Bank staff calculations.

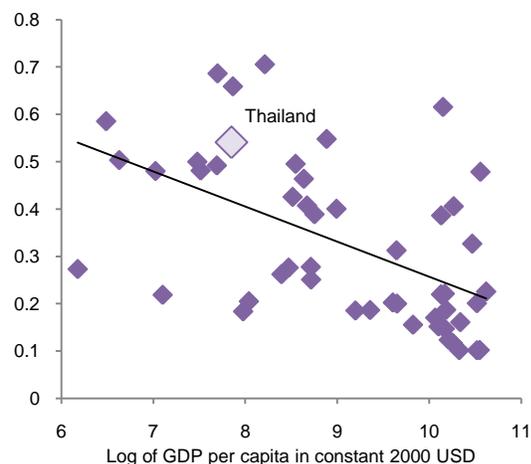
<sup>17</sup> Suwanrada (2009) pointed out some limitations of the community-based social welfare fund, particularly to pension benefits. First, the program has no interregional insurance function but financially independent without any cross-subsidization across communities. Second, financial sustainability of such scheme depends on largely on internal situation which seems to be varied by communities such as number of members, percentage of elderly and dependents, the return of fund, etc.

<sup>18</sup> This section was prepared by Xiadong Wang, Pajnapa Peamsilpakulchorn, Natsuko Toba and Yabei Zhang with contributions from Anthony Burgard.

**But levels of energy intensity remain high compared to peers regionally and globally.** Despite recent improvements, earlier patterns resulted in energy intensity remaining elevated relative to Thailand's income level (Figure 15). The intensity of energy consumption in the industrial and transport sectors is also apparent on the regional level where Thailand has remained one of the most energy intensive countries in East Asia. In terms of energy intensity, Thailand ranked second highest among its neighbors in East Asia (Japan, South Korea, and Malaysia), lagging closely behind China in 2005.

**Figure 15. Energy intensity in Thailand is above average considering its income level.**

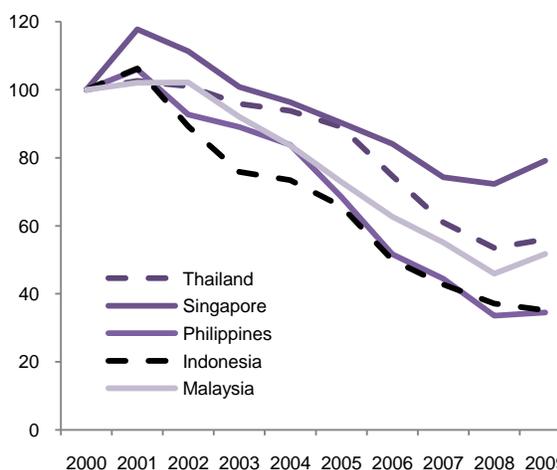
Energy Intensity (tons oil equivalent per USD 1,000 of real GDP)



Source: BP Oil, WDI and World Bank staff calculations  
Note: Data is for 2007-2009. Excludes countries in the former Soviet Union as outliers.

**Figure 16. Thailand is one of the most oil intensive countries in the region**

Oil intensity index (oil consumption tons / real GDP)



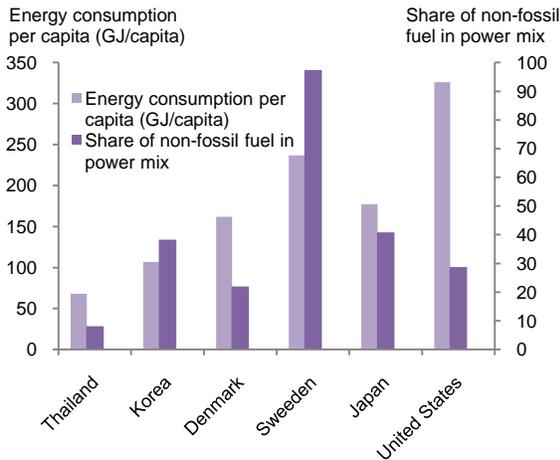
Source: CEIC, BP Oil, and World Bank staff calculations

**Oil intensity—and dependence on fossil fuels more generally—is also high but declining.** Although oil intensity has been on a downward trend at a national and regional level, Thailand ranks second in ASEAN, behind only Singapore in terms of oil intensity (Figure 16). Thailand's energy consumption per capita is still below that of advanced economies, but its reliance on fossil fuels is comparatively high (Figure 17).<sup>19</sup> Thailand is a net importer of oil, and remains dependent on other foreign sources of fossil fuels, which also include natural gas and coal. While Thailand has begun to move towards use of more diversified sources of energy such as solar and wind, as well as direct imports of hydro electricity from Laos, these sources remain a small share of the total energy mix and imports of crude oil, natural gas, and coal continue to lead energy imports (Figure 18).

**Growth in electricity consumption is also declining, but usage patterns vary substantially.** Growth in electricity consumption appeared to be on a decelerating (if irregular) trend prior to the global financial crisis (Figure 19). Between January 2008 and January 2011 electricity consumption by households, SMEs, and large enterprises grew by 7.8, 2.6, and 9.0 percent, respectively. The relatively lower growth in usage by SMEs reflects their participation in less energy-intensive sectors of the economy (food processing, textiles, services), whereas the relatively high growth in electricity usage by households may be related to the economic recovery but also to government programs that provide free electricity to households using up to a certain amount of energy.

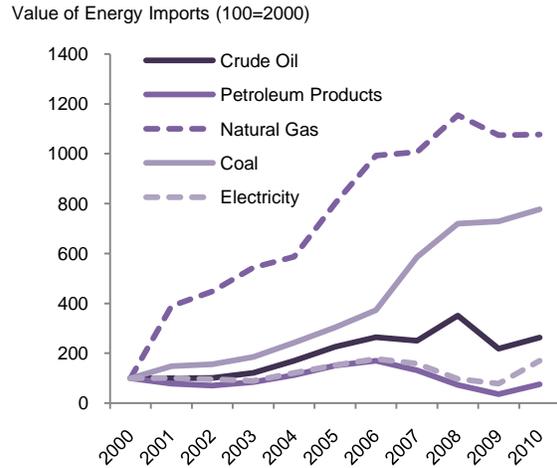
<sup>19</sup> Fossil fuels include petroleum, coal and natural gas.

**Figure 17. Despite falling oil intensity, reliance on fossil fuels is still comparatively high.**



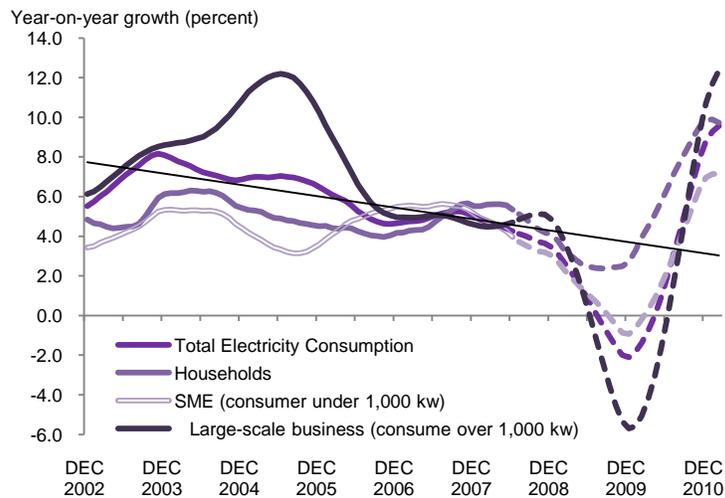
Source: World Bank

**Figure 18. Reliance on foreign energy sources continues to rise.**



Source: Bank of Thailand, DEDE, and staff calculations

**Figure 19. Growth in electricity usage shows a long-term decelerating trend.**



Source: EPPO and World Bank staff calculations.

**Drivers of energy consumption growth**

**The industrial sector accounts for the majority of energy consumption growth in the last decade.** Energy consumption increased by 49 percent between 2000 and 2010, mainly driven by a 58 percent increase in energy consumption in industry. The industrial sector became the leading energy consumer in the country surpassing the transport sector (Table 4). This increase reflected a higher share of industry in real GDP. Unlike most developing countries (including China), which see the share of services grow relative to manufacturing as they develop, in Thailand the energy-hungry industrial sector grew in real terms vis-à-vis the services sectors.

**Table 4. Energy Consumption by Sector in Thailand, 2000 and 2010**

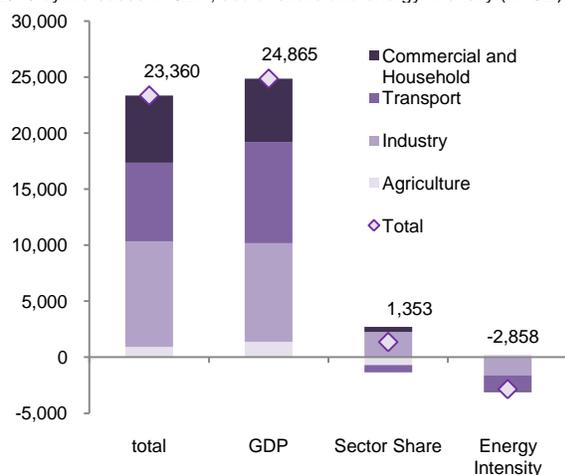
Sector	2000		2010	
	KTOE	%	KTOE	%
Industry & Mining	16,293	34.1	25,989	36.2
Transport	18,022	37.7	25,061	35.2
Household	7,434	15.6	11,013	15.5
Agriculture	2,791	6.5	3,701	7.8
Commercial	3,117	5.8	5,520	5.2
Construction	149	0.3	120	0.2
<b>Total</b>	<b>47,806</b>	<b>100%</b>	<b>71,166</b>	<b>100%</b>

Source: Department of Alternative Energy Development and Efficiency

**Gains in energy efficiency achieved by switching to more energy-efficient industrial and transportation equipment were partly offset by structural changes in the economy.** The total increase in energy consumption between 2000 and 2010 can be decomposed into the contributions from increasing output, the change in the share of the sector in total output, and changes in energy intensity (Figure 20). The decomposition reveals that growth in energy consumption has been driven mostly by output growth. Some gains in energy efficiency were realized, especially in the transport sector, leading to a decline in energy intensiveness. However, these gains were partly offset by the structural change in the economy towards more energy-intensive sectors (especially industry). The transportation sector has become more energy efficient while its share in output declined, leading to slower growth in the sector's energy consumption compared to GDP. In the industrial sector, however, gains in energy efficiency were more than offset by the gain in the sector's share of total output.

**Figure 20. The increase in energy consumption was due mainly to GDP growth.**

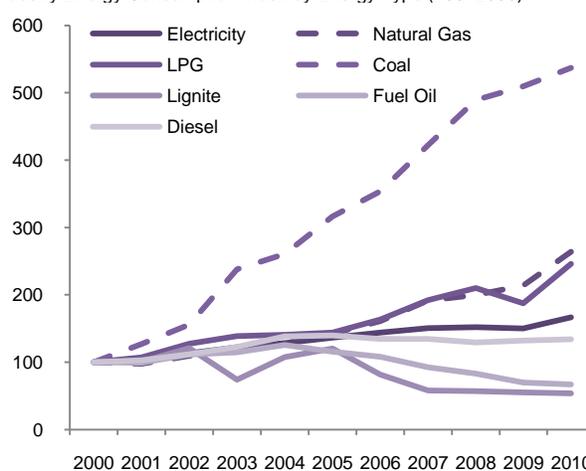
Additive decomposition of the change in energy consumption, 2000-2010 by increases in GDP, sector share and energy intensity (KTOE)



Source: NESDB, DEDE, and World Bank staff calculations.  
Note: Decomposition using the LMDI method.

**Figure 21. Coal and Diesel remain the most dominant sources of energy for industry.**

Industry Energy Consumption Index by Energy Type (100=2000)

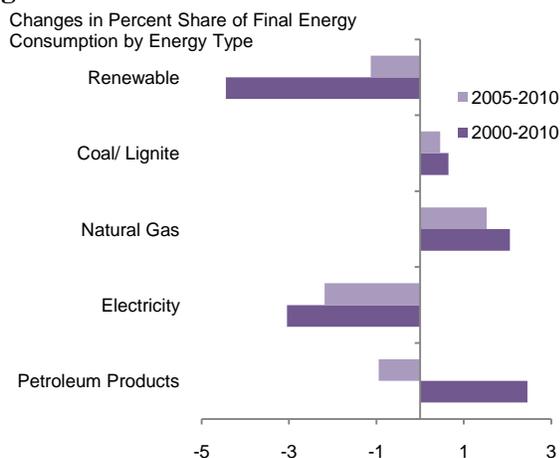


Source: Ministry of Energy, Thailand  
Note: Fuel Oil and Diesel Indices are derived figures.

**The expansion of the industrial sector has been a key contributor to the growth in energy consumption.** Between 2000 and 2010, the share of manufacturing output in real terms increased by four percentage points, supported by the strength of the electronics and automobile sectors but also the lack of dynamism in services sectors. Moreover, Thai industry has changed considerably from textile, garment and agro industries in 2000 to petrochemical, electronics, and automotive industries. These structural moves—towards more energy-intensive sub-sectors—led to higher energy consumption in the economy.

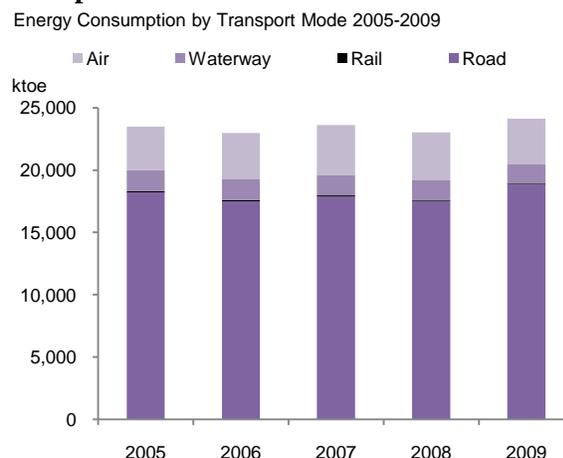
This offset some but not all the gains in energy efficiency achieved by new and more energy efficient equipment, as output still grew faster than energy consumption. On the other hand, the industrial sector has also on average become more reliant on fossil fuels, with diesel and coal remaining the most dominant sources of energy consumption (Figure 21 and Figure 22).

**Figure 22. Declining oil intensity may be leading to increased use of coal and natural gas.**



Source: DEDE

**Figure 23. Road transport continues to be the largest source of energy consumption for the Transport sector**

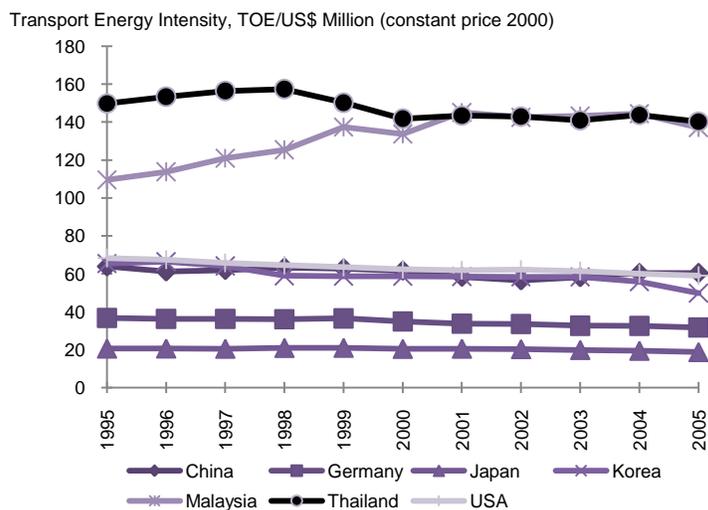


Source: Ministry of Transport, Thailand

**The transport sector has reduced its weight on energy consumption growth, but remains energy intensive relative to other countries.** The transport sector has historically been a major consumer of energy due to the structure of Thailand's logistics networks. Land transport has been and continues to be the most cost effective methods of shipment for most producers due to the expansiveness of Thailand's highway system and a relative lack of development in its railway networks. In 2009, land transport accounted for 78.6 percent of modal shares of freight transport with rail contributing only 0.4 percent (Figure 23). The marginal modal share of rail is in sharp contrast to what is observed in countries like China (51 percent), Germany (20.7 percent), Japan (6 percent), South Korea (9.1 percent), and the USA (44.8 percent) where rail has played significant role in freight transport<sup>20</sup> (Figure 24). Therefore, although consumption in the transport sector has grown by less than overall GDP due to improvements in energy efficiency of transport equipment and a reduction in the sector's share of GDP, the sector remains comparatively energy intensive.

<sup>20</sup> Data on percentage share of rail from total freight tonne-kilometers for Germany (2006), Japan (2006), Korea (2005) and the USA (2005) are from OECD/ITF (2008). Data for China (2005) is from World Bank (2007a).

**Figure 24. Thailand's transport sector is relatively energy intensive**



Source: International Energy Agency and staff calculations.

### *Policies to boost energy efficiency*

**Boosting energy efficiency is a cost-effective option to reduce Thailand's vulnerabilities to higher oil prices and enhance energy security in the long-term, but implementation of an effective policy package will require substantial coordination.** Many EE measures are financially viable for investors at current prices, but are not fully realized, due to many market failures and barriers (Box 6). A mix of compulsory and voluntary measures focused on both the demand and supply side is required to overcome these barriers. Policy instruments will include strengthening regulations and enforcement as well as intensifying the use of price and market incentives (such as fiscal measures) and raising public awareness. The objectives of fiscal measures in this context are often twofold. The first is to influence consumers or producers' resource conservation behavior. Secondly, the revenues collected are sometimes used to remedy negative impacts or to promote activities that will improve the environment performance or reduce energy consumption. However, experience has shown that fiscal measures need to be complemented by enforceable regulations.

#### **Box 1. Energy efficiency faces many market barriers and failures**

- **Low or underpriced energy.** Low energy prices undermine incentives to save energy.
- **Regulatory failures.** Consumers who receive unmetered heat lack the incentive to adjust temperatures, and utility rate-setting can reward inefficiency.
- **A lack of institutional champion and weak institutional capacity.** Energy-efficiency measures are fragmented. Without an institutional champion to coordinate and promote energy efficiency, it becomes nobody's priority. Moreover, there are few energy-efficiency service providers, and their capacity will not be established overnight.
- **Absent or misplaced incentives.** Utilities make more profit by generating and selling more electricity rather than by saving energy. For most consumers, the cost of energy is small relative to other expenditures. Because tenants typically pay energy bills, landlords have little or no

incentive to spend on efficient appliances or insulation.

- **Consumer preferences.** Consumer decisions to purchase vehicles are usually based on size, speed, and appearance rather than on efficiency.
- **Higher up-front costs.** Many efficient products have higher up-front costs. Individual consumers usually demand very short payback times and are unwilling to pay higher up-front costs. Preferences aside, low-income customers may not be able to afford efficient products.
- **Financing barriers and high transaction costs.** Many energy-efficiency projects have difficulty obtaining financing. Financial institutions usually are not familiar with or interested in energy efficiency, because of the small size of the deal, high transaction costs, and high perceived risks. Many energy service companies lack collateral.
- **Limited awareness and information.** Consumers have limited information on energy-efficiency costs, benefits, and technologies. Firms are unwilling to pay for energy audits that inform them of savings.

Source: Wang and others 2010.

### *Assessment of the current policy landscape*

**Thailand has had energy conservation plans since 1995, but achieving the plans' targets has proven challenging.** The Energy Conservation and Promotion Act of 1992 established the Energy Conservation Fund (ENCON) and set the first targets for energy savings in different sectors. The plan and targets were revised twice, most recently in 2005. The current implementation has been more successful in integrating support from the private sector with partnerships from established Thai commercial banks, but efficiency gains have been relatively slow, with the industry and transport sectors reaching only 28 percent and 13 percent of set targets by 2007 (Table 5). Below we analyze current policy initiatives.

**Table 5. Targets and Achievement of the Current Energy Conservation Plan (2005-2011)**

Areas	Target 2011	Achieved 2005-2007	% Against Target	To be Achieved 2008-2011
KTOE				
<b>Energy Efficiency</b>				
Transport	3,413	437	13%	2,976
Industries/Commercial/Agriculture	3,190	892	28%	2,298
Residential	1,217	225	18%	992
<b>Total</b>	<b>7,820</b>	<b>1,554</b>	<b>20%</b>	<b>6,266</b>
<b>Alternative Energy</b>				
Renewable Energy	6,688	3,274	49%	3,414
NGV	2,170	312	14%	1,858
<b>Total</b>	<b>8,858</b>	<b>3,586</b>	<b>40%</b>	<b>5,272</b>

Source: Energy Conservation Plan 2005-2011 (rev.2004)

Note: Exchange Rate of 30THB/USD

### **1. Mandatory Regulations**

**Energy manager programs have not worked well.** As part of the implementation of the ENCON Act, an energy management scheme was expected to be implemented. Factories and buildings with more than 1,000 kW of power demand or energy consumption of more than 20 million MJ/year were required to appoint a “Personnel Responsible for Energy”, implement energy management, record and report annually their energy data, conduct an energy audit annually, and implement the recommendations. However, a survey by UNIDO indicated that only 18.8 percent of the respondent factories had one person

spending full time on energy management. About 44 percent of the factories surveyed spent less than 10 hours per week on energy management. Much of the planned investments in the designated factories and buildings did not materialize mainly because the energy managers program is essentially an input-based, rather than output or performance-based regulation. The designated factories or buildings do not have mandatory targets on energy savings or energy consumption benchmarks, and there is no penalty when they could not meet the target or implement the submitted energy conservation plans.

**Building codes have been substantially improved in 2010.** Thailand started building code regulation in 1995 to implement the ENCON Act, aiming to improve energy efficiency of the design and construction of the new and existing buildings. The 2007 revision to the ENCON Act requires that each designated building that uses more than 3000 kW of electricity to have two personnel responsible for energy (PRE) in place, while those designated buildings with usage less than 3000kW of electricity need only have one PRE. The 2007 revision also requires that an annual energy audit must take place and the results reported to the DEDE (APERC 2010). However, the past building code in Thailand has achieved limited success, due to (a) a lack of differentiated standards for various types of buildings (public, commercial, etc.); and (b) weak enforcement, resulting in low participation and implementation rates. The new building code implemented in 2010 introduced the idea of designing new buildings with energy efficiency as a cornerstone of the construction. The new code also addressed some of the pitfalls in the past such as including the building system and life cycle cost analysis. Approvals are made during the construction permitting process by the central and local administrative offices and the Ministry of the Interior coordinates with DEDE in enforcement.

**Thailand put in place one of the most extensive appliance energy efficiency standards and labeling programs in the region** (DEDE 2011). This includes:

- 1) Minimum Energy Performance Standards (MEPS): This is a mandatory program, where standards are set up by DEDE and regulated by Thai Industrial Standards Institute (TISI) under the Ministry of Industry. The MEPS currently covers six types of products—air-conditioners, refrigerators, motor, ballast, fluorescent lamps and compact fluorescent lamps, and 16 more are under development;
- 2) High Energy Performance Standards (HEPS): This is a voluntary program, where standards are set up by DEDE and labeling programs responsible by DEDE and EGAT. The HEPS currently covers 8 products, and 27 more are under development; and
- 3) Labeling for appliances: This program is largely voluntary, and based on a five-star ranking system. It covers both electric appliances (refrigerators, air conditioners, compact fluorescent lamps, electromagnetic ballasts, electric fans, automatic rice cookers, lighting luminaries, T5, electric ballasts, double-oscillating fans, T5 luminaries, exhaust fans, standby 1 Watt televisions, and standby 1 Watt monitors) and non-electric appliances (LPG stoves, variable speed drives, glazing, and insulators).

## **2. Fiscal measures**

**Until recently, taxes and levies on fuels have been instrumental in keeping domestic consumption in check and responsive to price signals in the international market.** Fiscal measures in the past have been focusing on taxes and levies on fuels. The revenues collected also provide a revenue source for the Oil Fund, the Environment Fund and the ENCON Fund. However, to mitigate the shocks of sharp rising global oil price, the government recently put a price cap on diesel products, which account for half of domestic consumption of petroleum products, at THB 30, or USD 1. The difference between the market price and the price cap was being financed out of the Oil Fund. As the fund was running out of resources, the government recently replaced the subsidy with a removal of the excise tax on diesel. This measure distorts market signals for energy conservation and utilizes substantial fiscal resources could be directed to more targeted interventions towards needy households.

**Thailand has a number of tax incentives to encourage investment in energy efficiency, but the policies are not always coordinated and have not yielded the intended results.** These include: (i) Pilot Program for Tax Privilege for Energy Conservation was made available for both building and factory owners. This measure provides a tax deduction for 100 percent of the savings generated by an EE investment, up to a cap of THB 2 million (USD 50,000), (ii) Cost-Based Tax Incentives Program is a tax measure which allows companies to receive a 25 percent tax break for investments in projects that result in EE improvements. The tax incentives apply to the first THB 50 million (USD 1.25 million) invested, and can be spread over 5 years, (iii) Import Duty Exemption, administered by the Board of Investment, is an incentive which aims at offering an exemption on import duties for new investments in energy conservation businesses, such as high efficiency machines or equipment and renewable energy equipment and manufacturing, ESCOs, etc. These incentives have not succeeded in substantially increasing EE investments, in part because of lack of coordination. For example, the BOI also offers double-deduction for energy use by certain promoted companies.

### *Policy options*

**It is estimated that the largest potential for savings lie in the transport sector followed by industry, commercial buildings and residential sector.** The potential energy savings in the transport sector could largely be achieved by improving fuel efficiency of vehicles (e.g. fuel economy standard, car labeling, eco driving), and to a lesser extent through modal shift to public transport and to rail for freight. Within the industry sector, non-metal and food industries are estimated to have the largest potentials. In the building sector, one third of the potential energy savings could come from reduction in electricity uses in large and medium-sized commercial buildings.

**But improving energy efficiency faces the following challenges:** (1) lack of performance-based mandatory regulations in the industrial and transport sectors; (2) difficulties in access to financing, particularly for small and medium size enterprises (SMEs) and energy service companies (ESCOs)<sup>21</sup>; and (3) institutional fragmentation: as EE involves multiple sectors and ministries, there is a need for a clear institutional champion to coordinate multiple stakeholders and lead EE program implementation. To address these barriers, Thailand needs to (1) strengthen effective mandatory regulations and fiscal measures in the transport and industrial sectors; (2) develop and implement innovative financing mechanisms; and (3) reform institutional arrangements. We look at each of these policy areas in turn.

#### **1. Strengthening EE regulations and fiscal measures**

**Pricing and fiscal policies should go hand in hand with regulations.** Economy-wide energy-intensity targets, appliance standards, building codes, industry performance targets (energy consumption per unit of output), and fuel-efficiency standards are among the most cost-effective measures for boosting EE. However, weak enforcement of regulations is a concern in Thailand and regulations are also vulnerable to rebound effects; this suggests that pricing and fiscal policies must also play an important role.

**Fuel taxes have proved to be one of the most cost-effective ways to reduce transport energy demand.** In addition, congestion charges and insurance or tax levies on vehicles based on kilometers travelled, and higher taxes on light trucks and SUVs have also proven effective. On other hand, the higher first costs of energy efficient products are usually a barrier for consumers to adopt them, particularly low-income consumers. Financial incentives to offset these up-front costs, such as consumer rebates and

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<sup>21</sup> An energy service company is a business providing a broad range of energy solutions including design and implementation of energy savings projects, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management.

energy-efficient mortgages, can change consumer behavior, increase affordability, and overcome barriers to market entry. Revenues raised from tax levies could be used to finance such financial incentives.

**The focus of regulatory policies should be on standards for large industries and fuel economy.**

Given that the transport and industrial sectors are identified to have the largest energy saving potentials, and Thailand has already put in place improved building codes in 2010 and extensive appliance standards and labeling program, it is recommended that the government may consider increasing the use of mandatory regulations in the industrial sector such as industry performance targets for large energy-intensive enterprises, and in the transport sector such as fuel-efficiency standards in the future. A World Bank study shows that improving automobile fuel economy standards to the current EU level would contribute to more than 60 percent of energy savings in the transport sector in Bangkok (Wang and others 2010).

## **2. Develop and implement innovative financing mechanisms**

**The existing Energy Efficiency Revolving Fund can be leveraged by targeting it at medium and large-scale industrial enterprises and tying financing to industrial energy performance standards.**

The Energy Efficiency Revolving Fund is a featured fund under the ENCON Fund that aims to increase access to financing for EE projects through co-financing with local banks. As participating banks become more familiar with the EE business through learning by doing, the Revolving Fund could require more co-financing from participating banks. This financing instrument can serve as the “carrot” and be linked with the industrial energy performance targets recommended above to reduce energy intensity in the industrial sector.

**A standard offer approach could be adopted and managed by competitively selected performance-based Energy Efficiency Utilities.** The Standard Offer is a mechanism under which a utility or a public agency “purchases” energy and/or demand savings using a pre-determined rate, which is called the “Standard Offer”. These rates are based on the value of the energy and demand savings to the utility system. Any energy user or ESCO that can deliver energy and demand savings is paid the fixed amounts upon completion of the project and certification of the achieved savings. The ENCON Fund can provide a standard offer of energy saving subsidies to ESCOs. This approach provides transparency and certainty on subsidies of energy savings to ESCOs, so that it can help them generate EE projects quickly and increase access to commercial financing. To this end, the Energy Efficiency Utility (EEU) concept could be useful for managing the standard offer approach.<sup>22</sup>

**The government can also consider providing a partial risk guarantee for ESCOs.** Domestic banks usually do not need credit guarantee to their established clients with good credit ranking, nor will they lend to those clients with unacceptable credit ranking even with a credit guarantee. Partial risk guarantees can be effective to enhance credits and mitigate risks for ESCOs, in order to increase the confidence of the banks.

## **3. Reform institutional arrangements**

**As with any broad policy area the weakest links in policy design lay in the coordination, efficiency and credibility of implementation.** An approach to increasing energy efficiency on the national level

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<sup>22</sup> Energy Efficiency Utilities (EEUs) implement the government’s main energy conservation programs or key aspects of them. The EEUs prepare comprehensive programs of investment project promotion, targeted subsidies, awareness-building activities, community organizing, and technical assistance, and execute these programs under a comprehensive contract with the government. Entities to operate the EEUs are typically procured through a public bidding process, and the performance contracts provide for a tying of compensation to the energy savings levels validated by the government.

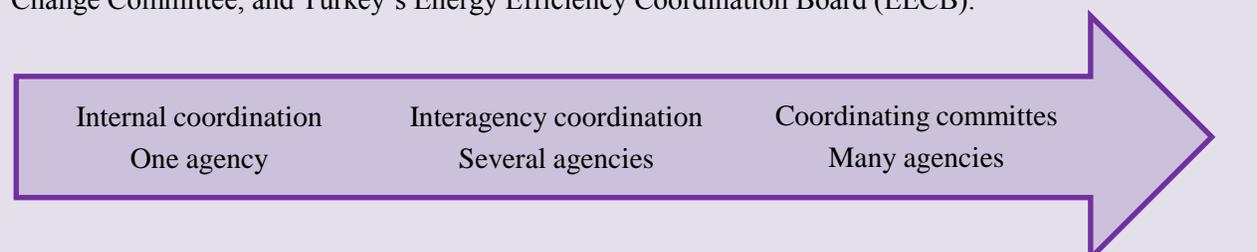
thus requires a coordinated multi-sector approach, with key sectors taking energy, transport, land use, water, waste, and environment into consideration. Given this fragmented nature of energy efficiency measures, a national institutional champion is essential. For example, many countries have established a dedicated energy-efficiency agency in coordinating multiple stakeholders (EPPO, DEDE, Ministry of Industry, Transportation, and others), implementing energy-efficiency programs, and raising public awareness. When comparing different institutional models, a national EE agency that is powerful and has good representation at the cabinet level or directly under the Prime Minister may have the influence and clout needed to obtain the cooperation and coordination from other agencies. Furthermore, the sector and provincial/local levels need to be assigned with clear responsibilities with incentives and penalties to ensure effective implementation (Box 7).

**More frequent meetings of the National Energy Policy Committee (NEPC) and a strengthened role for DEDE could help enhance coordination.** The Prime Minister and other Ministers who are responsible for EE policies need to closely cooperate on a regular basis. The NEPC was set for this purpose, but it has not frequently met in recent years. In addition, DEDE could be given the authority for developing, coordinating, and overseeing EE policy implementation among all Ministries. For example, there are no clear roles and responsibilities between the Ministry of Energy and Ministry of Transport on EE improvement in the transport sector. Given the large potential for energy efficiency gains in the sector, greater coordination could yield large payoffs. Similarly, DEDE has difficulties in obtaining information on energy use in the industry sector as required by law. Furthermore, DEDE has no authority over buildings in the Provinces, which are under the Ministry of Interior, even though DEDE has a mandate to promote EE in buildings.

**It is important to strengthen EE policy coordination and implementation at the sector and local levels.** As actual EE measures will be implemented at the sector and local levels, national EE targets should be disaggregated at the sector and local levels in consultation with sector and local authorities based on their EE improvement potentials. Subsequently, proper incentives for good performers and disincentives for poor performers should be developed.

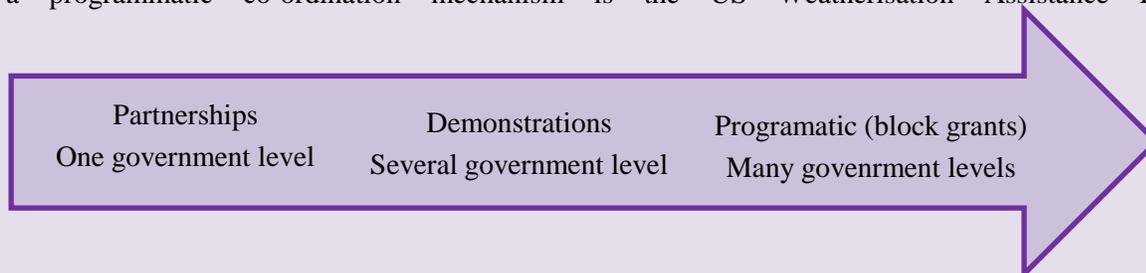
### Box 2. How to improve coordination for EE

**Horizontal co-ordination.** When two or three institutions have overlapping or shared EE policy responsibilities, an effective approach to co-ordination may be a memorandum of understanding (MOU) or other bilateral intra-governmental agreement, specifying responsibilities, targets, resource flows, etc. The US Department of Energy (DOE) and the US Environmental Protection Agency (US EPA) share responsibility for EE policy in the United States, and have utilized the EPA-DOE MOU to govern their shared implementation responsibilities for activities such as ENERGY STAR Program. When EE is dispersed among many agencies, inter-agency agreements and coordinating committees become important. Examples of coordinating committees include: Australia’s Ministerial Council on Energy, Canada’s Council of Energy Ministers, Korea’s Green Growth Committee, Singapore’s National Climate Change Committee, and Turkey’s Energy Efficiency Coordination Board (EECB).



**Vertical co-ordination.** A number of mechanisms are available for national governments to use in co-

ordinating EE implementation with sub-national governments. These mechanisms seem valid for countries with either federal or unitary forms of government. Most vertical co-ordination mechanisms are programmatic approaches in which the national government takes the lead, providing guidelines, assigning tasks and offering funding and technical assistance to sub-national levels. A typical example of a programmatic co-ordination mechanism is the US Weatherisation Assistance Program.



In some countries, the national government has utilized sub-national jurisdictions to demonstrate program innovations which, if successful, can be replicated. Co-operative partnerships between national government and sub-national jurisdictions work well in unitary states with a limited and manageable number of sub-national jurisdictions. This is the case of the SwissEnergy program. Although there is no single approach for improving co-ordination among and between government levels, policy makers should keep in mind the following co-ordination mechanism guidelines.

- **Plan co-ordination early.** To encourage co-operation between policy makers and implementers, co-ordination should take place early in the policy design phase.
- **Build EE capacity as a prerequisite for good co-ordination.** Building EE capacity is a prerequisite to effective co-ordination and co-operation, especially when expansion of EE responsibilities to non-energy agencies. It is important to build capacity within partner institutions commensurate with the work program and co-ordination role.
- **Co-ordinate EE and climate change policy.** Energy efficiency and climate change policies need to be coordinated when responsibility for each falls under different agencies.
- **Identify strengths of each government level.** Policy makers should actively take advantage of the strengths of each government level and co-ordinate to ensure that these are maximized to implement EE.
- **Clearly define objectives and areas of responsibility.** National and sub-national governments should clearly define the objectives and areas of responsibility for any co-ordination effort.
- **Create clear accountability.** Accountability is at the core of co-ordination between inter-agency or intergovernmental. Those policies and programs should ensure that accountability systems are in place from the beginning.

Source: IEA 2010.