

Fragmentation in the Public Administration for Climate Change Mitigation: A Major Institutional Constraint for Energy Policy in the Transportation Sector of Thailand

Ratchaphong Klinsrisuk ^a, Vilas Nitivattananon ^b, Winai Wongsurawat ^c and Edsel Sajor ^b

^a Faculty of Environment and Resource Studies, Mahidol University, Salaya, Phutthamonthon, Nakhonpathom 73170, Thailand

^b Urban Environmental Management, School of Environment, Resources, and Development, Asian Institute of Technology, Pathumthani 12120, Thailand.

^c College of Management, Mahidol University, 69 Vipawadee Rangsit Road, Samsennai, Phayathai, Bangkok 10400, Thailand

Abstract

This paper focuses on how fragmentation in public administration has become a major institutional constraint on CO₂ emission mitigation policies in Thailand, particularly for energy policy in the transportation sector. Most of our data are narratives and descriptions derived from in-depth interviews with various governmental agencies and academics. It was found that in practice, the environmental policy link between separated sectors continues to be weak because of the lack of appropriate institutional structure for integration. We conclude that the institutions tend to be independent, fragmented, and working on relatively narrow mandates. The closed decision-making processes and the organizational structures strongly bias the different administrative units towards their respective interests.

Keywords: public administration fragmentation; energy; transportation; CO₂ mitigation

1. Introduction

1.1. Background

The trend of cross-cutting government policies in CO₂ emission mitigation has caused an increased interdependence between government agencies. This interdependence may exist because individual activities significantly affect the interests of others. Mateo (1992) and Hjorth and Dan (1994) stated that fragmentation across sectors, sometimes called the “silo effect”, refers to a situation in which each set of activities is managed within the narrow scope of individual sectors.

In Thailand, although the Ministry of Natural Resources and Environment (MNRE) is the major agency in charge of conserving the environment at the national level, other line agencies overseeing industrial, transport, and energy sectors are all related parties. None of these agencies have shown adequate policy leadership. While multiple agents are all supposed to focus on conserving the environment, in reality economic development and revenue generation have received priority even when they do not agree with environmental conservation (Li and Chan, 2009). For instance, the basic objectives of the energy sector focuses on energy supply security, particularly in the transport sector. It has traditionally focused on protecting domestic consumers

from energy shortages rather than aiming at mitigate CO₂ emission. A lack of adequate environmental policy integration and coordination compromises the effectiveness of the entire package of measures and objectives (Stead, 2008).

The use of fossil-based energy in various economic sectors produces significant amounts of green house gases (GHG) emission, which cause global climate change. In the Bangkok Metropolitan Region (BMR), Thailand motorized transportation has increased because unsustainable development has led to an underdeveloped local infrastructure. Specifically, the road and bridge networks are poorly planned and public transport is highly inaccessible despite growing urban sprawl. The trend has led to rapid increases of motorized vehicles. As Hinti *et al.* (2007) stated increasing levels of vehicle ownership, combined with increasing transportation activity, which is linked to income growth, has spurred the growth of energy demand.

The road transportation sector, especially in the BMR, consumes high levels of energy, which is fossil-based. There are no strategies for curbing energy consumption in the transportation sector so far. This situation increases energy inefficiency and CO₂ emissions. Thus, CO₂ emissions from the transportation sector are larger than those from any other economic activity in Thailand. Therefore, the dynamics of

energy-related CO₂ emissions in the transportation sector challenge government policy to mitigate such global negative externalities.

The objective of this paper is to discuss how integration of CO₂ emission mitigation policy has become ineffective due to administrative separatism, using Thailand as a case in point. We focus on the silo organisational behavior particularly in the energy policy in road transportation sector and its effect on energy consumption and CO₂ mitigation policy until 2010.

1.2. Approach and methodology

We use a mix of descriptive and assessment research. The descriptive part reviews the historical evolution of key policy discourses and practices that have made Thailand dependent on fossil fuel. The assessment part analyses the bureaucratic-administrative conditions and the actual practices of silos that have prevented the integration of CO₂ mitigation policy.

Secondary data were drawn from various governmental agencies in the form of official government documents, official studies, formal reports, and published articles. In-depth interviews were carried out with experts and relevant governmental officers. The 17 interviewees served at the Energy Policy and Planning Office, the Office of Transport and Traffic Policy and Planning, and the Office of Natural Resource and Environmental Policy and Planning. We also interviewed experts from professional and academic sectors. The data from the interviews were used to identify perceptions and supplement and validate the findings from the secondary data. All discourses, both document texts and conversation also served as cross-checks for our explanation and conceptualization.

2. Literature Review

There have been increasing calls from the academic community for effective multidimensional and comprehensive policies that connect several core elements of environmental conservation. Policy challenges have led to innovations in policy implementation, and policy actors are increasingly aware of the need to coordinate between policy areas and sectors. This section reviews the administrative separatism and GHG emissions theories in the literature.

2.1. Public administration separatism

Gururaja (2003) showed that energy and transport pose a basic dilemma for sustainable development. Both are necessary to achieve socio-economic goals. Yet fossil-based energy systems cause environmental

degradation, especially atmospheric pollution and climate change. Therefore, there is an increasing need for policy to integrate environmental priorities to balance economic and environmental perspectives. The different agencies tend to have different objectives in managing resources (Van Lier, 1998), which causes a lack of coordination.

Administrative separatism refers to the characteristic that different agencies or ministries of government work in silos – they neither cooperate, nor coordinate and are sectarian and ultra-independent and sometimes even try to undermine each other. It is an undesirable organizational behavior within various bodies of the government bureaucracy. Mateo (1992) and Hjorth and Dan (1994) defined two types of public administration separatism as follow; sectoral and geographical fragmentation. Sectoral fragmentation describes cases where each group of activities is managed within the narrow perspective of its own part. As effective management frequently requires shared responsibilities among stakeholders, such fragmentation could therefore lead to drawbacks in management as the sharp separation of line functions between various responsible stakeholders produce problems in obtaining suitable levels of alignment and coherence between them.

Geographical fragmentation describes the case where the responsible stakeholders are not able to cope with the problems because of their limitation of jurisdictional constraints (Ongley and Wang, 2004). It is the outcome from not having correspondences between administrative and resources constraints since the resource problems often extend across local, provincial, national, and international constraints. Therefore, organisations and institutions with conventional jurisdictions appear to be deadlocked by “not in my backyard” syndrome (Priscoli, 2004).

Various studies have noted that the factors leading to the fragmentation are mostly caused by stakeholders that do not always coordinate (Wang, 2001; Moss, 2004; Carter et al., 2005). More particularly, Van Lier (1998) explained that two stakeholders usually have different objectives in managing the resources. Moreover, other researchers analysed the cause of fragmentation to be deficiencies in management capacity (Braga, 2001), insufficient knowledge (Ekmekci and Gunay, 1997), ambiguous goals, supporting objectives and measurable targets (Slocombe, 1998).

Consequently, Anja and Ewald (2006) conclude that administrative fragmentation, departmentism, and coordination issues are increasingly considered as causes of inefficacy and inefficient policies. Li and Chan (2009) note that in a fragmented environmental governance system, the multiple goals of the multiple agents may create counterproductive conflict.

2.2. Relationship between energy, transport, and CO₂ emission

In this sub-section, we discuss the link between fossil-based road transportation and GHG emissions, particularly CO₂. The transportation sector is the primary source of CO₂ emissions in many countries, and CO₂ is the most common component of the GHG emissions that leads to climate change.

Global climate change is a growing major concern in today's society. The use of energy in various economic sectors produces significant amounts of GHG emissions, which cause global climate change. Future GHG emissions are intrinsically linked with economic growth and relevant policy (Gottinger, 2003). Two critical environmental problems, local air pollution and global climate change, share a common cause: the by-products of fossil fuels combustion. From the environmental perspective alone, it is likely that a reduction of vehicle combustion would positively affect both climate change and air pollution.

Energy-related CO₂ emissions from road transportation are rising because of the increasing use of motorized vehicles (Gururaja, 2003). Economic growth also causes increasing transportation activity (Hinti et al., 2007). Ultimately, energy-related CO₂ emissions is spurred by highly urbanized areas such as Bangkok. Therefore, the rapid increase in motorization and the resulting unsustainable development cause energy inefficiency and CO₂ emissions. The dynamics of energy-related CO₂ emissions in the transportation sector challenge government policy to mitigate such negative externalities.

The passenger car is the most significant contributor to fossil fuel consumption and, thus, GHG emissions and climate change (IPCC, 2007). Road vehicles typically use oil as the fuel base, although

alternatives using natural gas, biofuels and synthetic fuels have emerged. Transportation accounts for roughly 23% of global carbon emissions from energy use (Meyer et al., 2007).

CO₂ emissions from fossil fuel consumption in Asia increased from 2,136 million tons in 1980 to 7,692 million tons in 2005, with an average annual growth rate of 5.3 per cent (IEA, 2007: cited in Timilsima and Shrestha, 2009). In most Asian countries, the transportation sector already accounts for a substantial share of total CO₂ emissions. Therefore, any attempt to address climate change in Asia must address emissions from energy-based carbon emission the transportation sector (Timilsima and Shrestha, 2009). Energy-related CO₂ emissions from the transportation sector are a challenge for government policies.

3. Thailand's Situation of Government Climate Change Framework and GHG Emissions

3.1. Government's overall policy commitment and administrative set up for GHG emissions mitigation

Global climate change has become a topic of increasing interest. Thailand, in June 1992, signed the United Nations Framework Convention on Climate Change (UNFCCC) and ratified the Convention in March 1995. Realizing the growing major concern of GHG emission as a global threat, the country has been conducting to the world efforts to address GHG emission issues, as a Non-Annex I country. In February 1999, Thailand signed the Kyoto Protocol, and ratified it on 28th, August 2002. The Ministry of Natural Resources and Environment (MNRE), as a result of the Cabinet Resolution, is the responsible agency for the implementation of the UNFCCC and the Kyoto Protocol in Thailand. In 2007, the MNRE redesigned the institutional

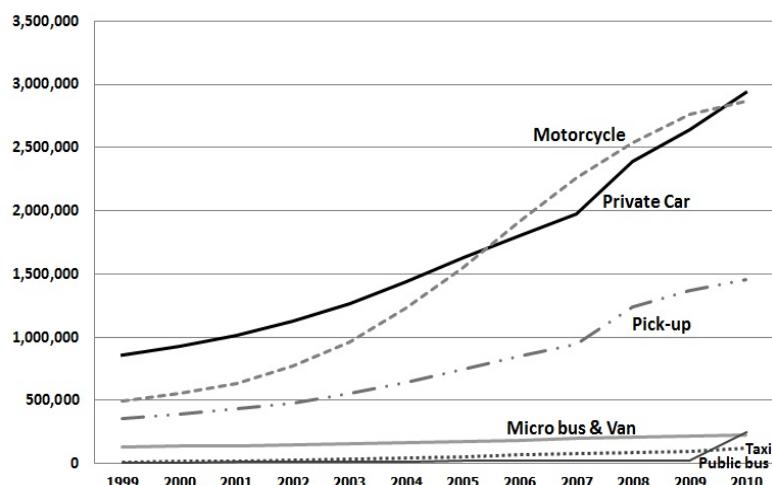


Figure 1. Vehicle population accumulation in BMR (Source: Department of Land Transportation)

Table 1. Thailand's energy in transport sector by modes

Transport mode	1999		2006		2010	
	ktoe	%	ktoe	%	ktoe	%
Road Transport	14,588	79.7	17,499	76.1	19,234	75.6
Rail Transport	103	0.6	103	0.4	104	0.4
Domestic Water Transport	65	0.4	63	0.3	67	0.3
International Water Transport	845	4.6	1,626	7.1	1,864	7.3
Domestic Air Transport	288	1.6	249	1.1	354	1.4
International Air Transport	2,408	13.2	3,445	15.0	3,815	15.0
	18,297	100	22,985	100	25,438	100

Source: Department of Alternative Energy Development and Efficiency

framework for Thailand's implementation of the UNFCCC and the Kyoto Protocol. The Thailand Greenhouse Gas Management Organization (Public Organization), or TGO, was the newly established autonomous governmental organization with the specific purpose of implementing agency on GHG emission reduction in Thailand.

Similar political declarations and strategies have been made at the sectoral level. The government aims at "giving importance to the management of greenhouse gas emission in order to help alleviate global warming" by setting the target to boost the management of GHG emission rate from energy production and consumption in several sectors (energy policy statement of Mr. Abhisit Vejjajiva, Prime minister, to the National Assembly, Monday 30th December, 2008 (B.E.2551), Energy Policy (Topic 4.4, pp. 26-27)).

3.2. Energy related CO₂ in the transport sector in Thailand

Passenger transport volumes are on the increase with increasing economic wealth, as growing numbers of predominantly urban households are able to afford private motor vehicles and more people are traveling further away both for commuting and for vacations. Moreover, it has been and still is the symbol of civilization, with growth pattern intimately linked to the overall growth of the economy.

The Thai government has approved and implemented large-scale mass rapid transport projects like the BTS Sky train and the MRT subway since 1998. However, the number of registered vehicles has not decrease. In fact, it has been increasing every year.

From Fig. 1, Thailand currently has 25 million registered motor vehicles for its 65 million people. In BMR alone, the 5.5 million population owns 5.9 million vehicles, among which 3.0 million are passenger cars.

From Tables 1 and 2, Thailand transport heavily depends on road-based modes. As a result, the majority of total transport energy consumption, about 76%, is in road transport. The share of for road transport would reach 98%, if we excluded international air and water transport. In 2008, energy consumption in this sector (excluding jet and fuel oil) was 17,996 kilotonne of oil equivalent (ktoe), a decrease by 0.7% from 2007 because of high oil prices, while the use of alternative transport energy, i.e. Liquidity Petroleum Gas (LPG) and Compressed Natural Gas (CNG) increased. By fuel, diesel held the largest share accounting for 62% in 2011, followed by gasoline at 29%, LPG at 5% and NGV at 4%. In comparison, the consumption of diesel and gasoline increased by 6.5% and 2.4% respectively in 2011. However, LPG consumption increased by 2.5% from 794 ktoe to 973 ktoe, and CNG increased significantly by 27.4%, from 1,623 ktoe to 2,068 ktoe.

Table 2. Thailand's energy consumption by fuel in road transport sector (Unit: ktoe)

Energy Type	2006	2007	2008	2009	2010	2011
Gasoline	5,376	5,466	5,305	5,606	5,726	5,863
Diesel	11,795	11,769	11,102	11,400	11,291	12,026
LPG	535	667	905	778	794	973
NGV	97	212	684	1,282	1,623	2,068
Total	17,803	17,114	17,996	19,066	19,234	20,3112

Source: Department of Alternative Energy Development and Efficiency

Table 3. CO₂ Emission from energy consumption by economic sector (unit: ton)

Year	Transport	Industry	Other	Total
1999	46,892.62	29,454.96	13,773.95	90,121.53
2000	45,559.69	29,266.93	13,494.84	88,321.46
2001	46,536.65	30,338.02	13,838.97	90,713.64
2002	49,245.40	34,351.98	14,609.10	98,206.48
2003	53,002.59	35,478.44	15,590.93	104,071.96
2004	56,546.03	40,320.51	16,370.73	113,237.27
2005	57,520.14	42,599.19	15,473.96	115,593.29
2006	54,831.18	41,056.60	16,219.54	112,107.32
2007	55,571.15	43,769.83	17,017.47	116,358.45
2008	52,524.27	47,993.05	17,437.74	117,955.06
2009	55,870.52	49,921.38	18,156.50	123,948.40
2010	57,069.60	54,283.11	18,822.89	130,175.60

Source: Energy Policy and Planning Office (EPPO)

From Table 3, this fossil-based dominance in Thailand combined with motorization, have led to unprecedented CO₂ consequences in transport sector. CO₂ levels in transport sector are illustrated to be the highest compared to other sectors.

From the energy prospective, as a national agenda, the Thai government has set energy policies to promote alternative energy that has been pursued very seriously. The total amount of fuel consumption in Bangkok areas has remained high and stable, albeit the consumption pattern of each fuel type has been obviously changed towards a greater use of alternative fuels, such as Gasohol 91 and 95, Biodiesel (B5), LPG and NGV. The decrease in demand of benzene and diesel substituted by gasohol and biodiesel (B5) might release the greater amount of CO₂ (PCD, 2008). According to air quality monitoring results in Bangkok of Pollution Control Department, the amount of CO presented in the atmosphere is quite stable, whereas CO₂ and O₃ were found a higher concentration, particularly along the roadsides. As well as the combustion process of both CNG and LPG is similar. Bakhshani and Abdullah (2008) described that the oxidation of CO will take more speed and its concentration will decrease and the CO₂ concentration will increase throughout oxidation of CO.

4. Energy Policy and Administrative System

4.1. Energy policy discourse

Thailand has established energy conservation as a national culture to enhance energy security and CO₂ emissions reduction that result from energy consumption in all sectors including household,

industry, transportation, and commerce. Thailand's energy policy aims to reduce energy consumption through energy efficiency and conservation programmes. APEC (2010) stated that there are currently four major campaigns addressing this energy conservation objective:

1. Providing incentives for private sector investment in energy-saving appliances;
2. Creating incentives for households to reduce electricity consumption;
3. Supporting the development and standardization of electrical appliances and energy efficient buildings;
4. Promoting alternative energy sources in power generation and Transportation for enhancing energy supply security.

In response to the above policy direction and to support energy and conservation programmes, the Ministry of Energy established the Energy Conservation (ENCON) Fund as a mechanism to promote and provide financial support to government agencies, state enterprises, non-governmental organizations, individuals and businesses in the implementation of renewable energy (RE) and energy efficiency (EE) projects. The Energy Conservation Act, B.E. 2535 (1992), initiated the ENCON Fund to promote energy conservation and related investment by focusing on factories and buildings. Two decrees were passed under the Energy Conservation Act (1992): the Royal Decree on Designated Buildings, B.E. 2538 (1995), and the Royal Decree on Designated Factories, B.E. 2540 (1997). The ENCON Fund, chaired by the Minister of Energy, invited delegates from other sectors, including representatives from the Ministries of Industry, Commerce, Interior, and Finance, with the stated goal of cooperating

on a regular basis to achieve energy efficiency goals. Surprisingly, no delegate from the Ministry of Transportation serves as a committee member of the ENCON Fund. Although APEC (2010) stated that it is critical to strengthen policy coordination among the relevant ministries, especially between the Ministry of Energy and the Ministry of Transportation, because energy.

From the energy policy discourse, this could be interpreted that there is a lack of clarity about energy conservation programmes relating to CO₂ emission reduction in transport sector. For the transportation sector, the Ministry of Energy only aims to provide sufficient energy for the public at affordable prices. The Ministry of Energy promotes alternative energy such as biofuels and CNG, whose main component is still fossil fuels, by managing the differential price between conventional fuels and alternative fuels through the Oil Fund as a mechanism to managing prices (Energy strategy directed by Mr. Wannarat Channukul, Minister of Energy, on 12 January 2009, pp. 12).

4.2. Politico administrative mechanism

In this section, we discuss the background, management, and stakeholders of the Oil Fund that is the only one politico administrative mechanism for energy sector to manage the fluctuation of energy supply particularly in the transport sector.

The Oil Fund was established by Prime Ministerial Decree B.E. 2/2546 (2003) to prevent fuel oil shortages under the Emergency Decree on Remedy and Prevention of Shortage of Fuel Oils B.E. 2516 (1973) with the aim of stabilizing the domestic retail oil price level. Prime Minister Thaksin Shinawatra signed it on 29 December 2003. The decree also defined the duties of the National Energy Policy Committee (NEPC), chaired by the Prime Minister, and the Board of Directors of the ENCON Fund then authorized NEPC Article 1 of Decree 2/2546, which identified the criteria for the calculation of fuel prices, the price of fuel oil in Thailand and the price of imported fuel in Thailand. Article 6 determined the wholesale ex-refinery price and calculated the retail price of fuel.

The government has stipulated that the domestic oil businesses (from both importers and domestic producers) pay an ‘Oil Fund Levy’ at different rates imposed by the NEPC. Presently, the Oil Fund Levy scheme applies to Benzene 95, 91, Gasohol, Kerosene, Diesel and fuel oil. Thailand has to import oil, so she cannot determine the prices by herself. Due to the volatility and increase in world oil price, developing the Oil Fund would alleviate the country from being affected by global oil crisis. In 2003, the US invaded Iraq causing high instability in the world oil market.

The Thai government at that time used the Oil Fund as a tool for maintaining retail oil price through the compensation scheme.

After 2004, the government of Thailand abolished the determination of ex-refinery, import and wholesale prices. A clear formula was devised linking import prices to cost insurance and freight (CIF) prices from the Singapore spot market with a time lag of one week. Ex-refinery prices are based on the Singapore posting but with clearer guidelines. The structure of energy prices consists of the ex-refinery, wholesale and retail prices, all of which are released according to oil prices on the world markets. The retail price is based on the fuel excise tax, municipality tax and value-added tax, which is under the authority of the Ministry of Finance.

In 2004, the oil prices began to rise again. The government issued the Prime Ministerial Decree No. 4/2547 (2004) ‘The Determination of Measure for Remedy and Prevention of Shortage of Fuel Oils’ (date of the enforcement from 24 December 2004) under Emergency Decree on Remedy and Prevention of Shortages of Fuel Oils B.E. 2516 with the aim of intervening oil prices through the Price Freeze.

Since that time, every governments has used the Oil Fund to avoid the impacts on the macroeconomic performance of the nation caused by global oil price volatility. Oil Price Freeze measures have been imposed to stabilize the economic situation.

5. Actual Practices of Silos that have Prevented and Incoherent Integration of CO₂ Mitigation

In this section, we analyse the actual practices of silos that directly affect the higher demand for alternative energy that continues to contribute to CO₂ emission as discussed above.

5.1. Energy policy vis-à-vis the overall policy of government on CO₂ mitigation

The government of Thailand has set energy policies to enhance national energy security particularly through the promotion of alternative energy. The government has pursued indigenous energy source such as bio-fuel and CNG seriously as a key measure to reduce the country’s economic dependence on imported energy (APEC, 2010). However, those kinds of alternative fuels are fossil-based energy (fossil fuel 90% and ethanol 10%) and continue to contribute to CO₂ emission. In this situation, the road transportation sector consumes high levels of energy, which is mostly fossil-based. Thus, CO₂ has been emitted at relatively high levels. There have been no politically acceptable strategies for curbing energy consumption and CO₂ emission

mitigation in the transportation sector so far.

Thailand's energy price structure comprises ex-refinery price and retail price, by which ex-refinery price will fluctuate according to the international pricing mechanisms. The retail price will largely depend on excise tax, municipal tax, the Oil Fund, the Energy Conservation Promotion Fund, and VAT under the authority of the Ministry of Finance. The channel of energy control for the Ministry of Energy, particularly in renewable energy, has been the Oil Fund levies or compensation for biofuels such as E85, CNG, and LPG. When the authorities set low Oil Fund levies for different types of gasohol and biodiesel, the retail prices of such fuels fall below that of traditional oil resulting in an increase in the demand for alternative fuels. Particularly, the Ministry of Energy employs the ceiling price scheme for biodiesel at 30 baht per liter by using the Oil Fund for subsidizing the retail price.

Market margin = Retail price – Ex-factory price - Tax - Oil Fund contribution

It can be seen from the relation above that the Oil Fund is a mechanism for maintaining gasohol and biodiesel market margins. If the Oil Fund levy is low, the margin of biofuels is high. This effect is a potential incentive for biofuel sellers to lobby for low Oil Fund levies.

In case of pricing structure in relation to supporting CNG promotion and CNG network expansion, cabinet resolution agreed with the criteria for CNG pricing in collaboration with the Petroleum of Thailand Limited Company (PTT) to control CNG price at 8.50 THB/kg, and then react to periodic upward changes by using a 'ladder strategy' to reflect the real costs. The government designated the National Energy Policy Committee (NEPC) chaired by the Prime Minister to carry out the

compensation of retail CNG price because PTT needed to sell CNG at a price below its real cost. By using the Oil Fund, government compensated CNG price for cars at 2 THB/kg.

Although LPG is not defined as alternative energy under the renewable energy promotion of the government, the Ministry of Energy maintains the wholesale price of LPG at 330 USD/ton (10.99 THB/kg) in order to keep the retail prices in the country stable and below its true cost. In 2008, the imported LPG price was about 550 USD/ton (18.59 THB/kg), which is quite high and does not motivate entrepreneurs and sellers to sell LPG in the country. Eventually, since 2009 the quantity of domestic LPG production was about 350,000 ton/month and was not enough to serve the high trends of LPG demands in the country. LPG imports were thus needed to meet the requirements. This phenomenon causes the major burden to the Oil Fund as the LPG import subsidy rose to an average of 10 THB/kg.

As mentioned above, the key tool that the government uses to control oil prices is the 'Oil Fund', especially subsidising the domestic retail oil prices such as biofuel, CNG, and LPG. The tool is a politico-administrative mechanism of the energy sector. Through this price regulation scheme, Thailand was able to completely phase out the use of conventional benzene and diesel oil by substituting it with the biofuels, CNG, and LPG.

From Fig. 2, however, the total amount of fuel consumption in Thailand has remained high and stable, albeit the consumption pattern of each fuel type has been obviously changed towards a greater use of alternative fuels, such as Gasohol 91 and 95, Biodiesel (B5), LPG and CNG. The proportion of the use of Benzene 91 and 95 has been decreasing while the use of Gasohol 91 and 95 has been increasing. Thus, the Oil Fund has directly affected the higher demand of alternative energy

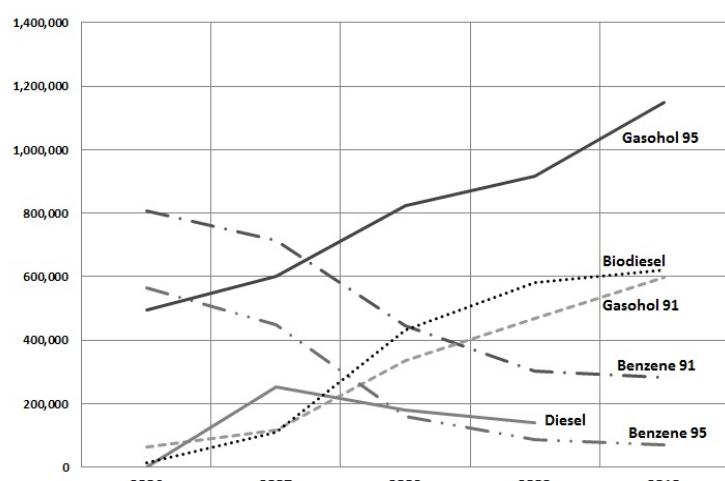


Figure 2. The energy consumption by fuel type (Unit: 1,000 litre) (Source: Data from Department of Energy Business Compiled by authors)

and thereby not integrated with other related policies on CO₂ mitigation. Eventually, CO₂ is increasingly emitted from combustion process of using biofuel in the transportation sector especially in the BMR. Therefore, these actual practices of administration of energy sector vis-à-vis overall policy of government on CO₂ mitigation becomes ineffective due to administrative separatism.

5.2. Discussion of incoherent policy for CO₂ mitigation

In Thailand, different administration systems manage the environmental, energy, and transport sectors. Horizontal organisational structures strongly bias the different administrative systems towards their respective interests. Different public agencies have developed institutionalized contexts for any given solution. Thus, there is often poor coordination between the different agencies. Moreover, the Thai government does not integrate the CO₂ emission reduction into the sectoral policy objectives. In practice, the Thai government is giving the first priority to economic objectives rather than preventing or mitigating CO₂ emission. The public sector seems to favour fossil fuel-based private car use or at least avoid confronting this problem. Thus, the energy sector uses the Oil Fund to maintain fuel price levels for road transport and occasionally subsidizes fuel prices such as LPG, NGV and biofuel. As a result, travel by private vehicle have lower cost compared to public transport, the transportation sector still consumes high level of energy and of CO₂ emission. We concluded that CO₂ emission mitigation policy has become ineffective due to fragmentation in the public administration, particularly energy administrative system.

The simple fact is that a government comprises multiple line agencies performing various tasks and following up different interests, which might not agree with the intention of conserving the environment. It is important to note that the primary objectives of the energy sector and the transportation sector are different: energy security and vehicle mobility efficiency. These two sets of policy foci are incoherent with environmental conservation, especially CO₂ emission mitigation. The Ministry of Energy and the Ministry of Transportation take different approaches to the attack the current problems. The energy sector has set a policy goal of enhancing national energy security, particularly by promoting alternative energy to decrease dependency on energy imports. To respond to these policy directives, the government of Thailand has also established the Oil Fund by providing incentives for private vehicle users for utilising alternative energy, including biofuels and CNG. Meanwhile, the transportation sector provides the infrastructure to support citizen mobility, such as

road and bridge networks and public transportation. In recent years, transportation policy has focused on moving vehicles rather than moving people. Policy has developed road systems and above-grade junctions rather than mass transit systems. As a result, bigger infrastructure budgets and more cars on the streets have caused chronic traffic problems, which lead to economic losses, resources losses and damage to the environment. Most of today's mass rapid transit only cover short distances and does not cover every area in Bangkok. Other public transit systems also fail to meet the needs of travelers. In addition, mega-projects for rapid transit have developed slowly and have not covered all the BMR area yet.

Due to the priority of highly economically and financially viable objective, the public remains unwilling to sacrifice the use of private automobiles, and car users form a significant political and social group. The middle class, especially in Bangkok, can exert a strong influence on the political process to ensure that measures such as congestion pricing or floating fuel prices are not seriously considered. Government bodies avoid confrontation with both car users and the automobile industry because the latter is an important part of successful economic development in Asian countries including Thailand. As noted above, Han (2009) stated that car ownership is promoted as an expression of new wealth and freedom of movement and as a way to promote the domestic market and national automobile manufacturing. This approach causes rapid increases in private vehicle ownership and energy consumption, which leads to higher CO₂ emissions. These sets of policy imply that the Thai government aims to protect the vehicle users by providing infrastructure and affordable energy price rather than preserve the environment and reducing CO₂ emission. Therefore, issuing a decree to prevent fuel oil shortages is a significant public sector politico-administrative mechanism that aims at public receptiveness to policies.

6. Conclusions and Recommendations

The interdependent nature of the new challenges and issues today contrasts sharply with the nature of the institutions that exists. These institutions tend to be independent, fragmented, and work on relatively narrow mandates with closed decision processes. The organizational structures strongly bias the different administrative units towards their respective interests. Those responsible for managing natural resources and protecting the environment are institutionally separated from those responsible for managing the economy. Prime Ministerial Decree B.E. 2/2546 (2003) under Emergency Decree on Remedy and Prevention of

Shortage of Fuel Oils B.E. 2516 (1973) has been issued to establish the Oil Fund for stabilising fuel price. This is a significant politico-administrative mechanism aiming at public receptiveness for car users who can exert a strong influence on the policy process. This is an administrative mechanism that represents a major institutional constraint for energy policy to mitigate CO₂ emission. We conclude that these actual practices of current organizational deficits have prevented integration of CO₂ emission mitigation policy in Thailand.

We recommend that the performing of environmental policies and strengthening of environmental rules are a function of, among other factors, the political intention of leaders and capacity of corresponding organisations. Public administration theorists believe that the coordination creates coherent policies and reduces redundancies and contradictions in and between policies. In addition the rational for promoting policy integration as a mechanism for enhancing the mitigation of CO₂ emission policy paths are as follow. First, Thailand must have a national committee that champions CO₂ emission reduction policies. CO₂ emission consequences of sectoral policies must internalise the environmental costs at an early stage. Second, policy-makers must strike a workable balance between the environmental conservation and important needs of the economic sectors. Such tasks are complex and difficult to implement in concrete terms at the sectoral level because there will be inevitable trade-offs. Thus, we need strong commitment from the leader.

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Correspondence to

Ratchaphong Klinsrisuk
Faculty of Environment and Resource Studies,
Mahidol University, Salaya,
Phutthamonthon,
Nakhonpathom 73170,
Thailand.
Tel: (66 2) 4415000
Fax: (66 2) 4419509
E-mail: ratchyecons@hotmail.com