

LEGAL MEASURES ON COMPRESSED NATURAL GAS FUEL SYSTEM COMPONENTS INSTALLATION*

Poohdith Prakithonrungsee **

ABSTRACT

The installation process of Compressed Natural Gas (hereinafter “CNG”) components and equipment in vehicles, has no standard to adequately cover the operations, resulting in the consumer facing non-standardized installation issues. Results of the study find that the Ministerial Regulation Stipulate on Components and Equipment of CNG fuel system Act B. E. 2550 (2007), gives no clear-cut definition of the term, “Qualified Installer.” There has been no stipulation, neither the standard of installation building, nor exact qualifications of the qualified installer, nor adequate safety standard management, nor liability, nor penalty measure (both civilly and criminally), with respect to the damage consequently arising inspections and testing measures.

In this respect, this thesis has proposed that the Ministerial Regulation Stipulate the Components and Equipment of the CNG Fuel System Installation Act B. E. 2550 (2007) should be revised in reference to the virtue of the Department of Land Transportation by stipulating the establishment of the installation building, amending the verbiage regarding the standard and the term be amended in the Engineers Act, B.E 2542 (1999), by specifying the penalty provision as the liability for the punishment of a fine or imprisonment if the qualified engineer refrains from the duty of inspection and testing.

Keywords: CNG, compressed natural gas, natural gas, alternative fuel, engine retrofit, components installations

บทคัดย่อ

ในปัจจุบันการประกอบธุรกิจศูนย์บริการติดตั้งค่าน้ำคบและเครื่องอุปกรณ์บรรจุก๊าซธรรมชาติอัด (CNG) ในรถยนต์ มีการให้บริการโดยมีมาตรฐานที่แตกต่างกัน เนื่องจากกฎหมายที่บังคับใช้กับผู้ประกอบธุรกิจศูนย์บริการติดตั้งยังไม่มีการกำหนดมาตรฐานของศูนย์บริการติดตั้งค่าน้ำคบและเครื่องอุปกรณ์บรรจุก๊าซธรรมชาติอัด (CNG) ในรถยนต์ให้ครอบคลุมเพียงพอ ทำให้ผู้ใช้บริการ ประสบปัญหาจากการให้บริการจากศูนย์บริการติดตั้งที่ไม่ได้มีมาตรฐาน

จากการศึกษาพบว่า กฎหมายตรา กำหนดส่วนความและเครื่องอุปกรณ์ของรถที่ใช้ก๊าซธรรมชาติอัดเป็นเชื้อเพลิง พ.ศ. 2550 นิยามคำว่า “ผู้ติดตั้ง” ไว้ไม่ชัดเจนไม่มีการกำหนดมาตรฐานของศูนย์บริการติดตั้ง คุณสมบัติของผู้ติดตั้ง การจัดการความปลอดภัยที่มี

* The article is summarized and rearranged from the thesis “Legal Measures on Compressed Natural Gas Components System Installation” Master of Laws in Business Laws (English Programme), Faculty of Law, Thammasat University, 2014.

** Graduate student of Master of Laws Program in Business Laws (English Program), Faculty of Law, Thammasat University.

มาตรฐานเพียงพอ ไม่ได้กำหนดเกี่ยวกับความรับผิดชอบมาตราการการลงโทษทั้งทางแพ่งหรือทางอาญาในเรื่องของความเสียหายที่เกิดจากวิศวกรผู้ตรวจสอบที่ไม่ได้ทำการตรวจสอบและทดสอบตาม โดยผู้ที่ก่อหายได้เสนอแนะให้มีการแก้ไขเพิ่มเติมกฎหมายระหว่างกำหนดล่วงควบและเครื่องอุปกรณ์ของรถที่ใช้กําชธรรมชาติอัคเป็นเชื้อเพลิง พ.ศ. 2550 โดยกำหนดให้การจัดตั้งศูนย์บริการติดตั้งการมีมาตรฐานการติดตั้งรับรองไว้อ้างขัดเจน โดยกำหนดให้มีไทยปรับหรือไทยจำกัด รวมถึงการกำหนดมาตรฐานการทดสอบและตรวจสอบของวิศวกรผู้ติดตั้ง

คำสำคัญ: จีเอ็นจี, กําชธรรมชาติอัค, พลังงานทางเลือก, การดัดแปลงเครื่องยนต์, การติดตั้งล่วงควบและอุปกรณ์

Introduction

The problem with oil prices rising steadily is that it becomes a national crisis for Thai people.¹ These factors result in higher product price and transportation expenditure, whereas impacting the public land transportation as well as private land transportation, thus, the living cost also increases because of oil prices increasing.²

Most alternative energy costs are less than oil. In fact, the Ministry of Energy by PTT Public Company Limited has been promoting and supporting the use of natural gas to replace oil in the transportation sector, this alternative energy is called “natural gas for vehicle” (hereinafter “NGV”), or universally known as “compressed natural gas” (hereinafter as “CNG”). Government recently issued a Ministerial regulation or Announcement of Ministry to support the consumers who use CNG as fuel; however, the CNG fuel system components installation service needs to be initially concerned about public safety, as we have seen the news³ of explosions of the CNG vehicles or at CNG service center businesses.⁴ Installation must be done by standardized services with a qualified installer. After the installation, the vehicle still has to be inspected and tested by a qualified engineer who is authorized to inspect and test the vehicle before consumer use.

The problems mentioned above indicate that legislation of a proper legal measure is needed. The laws relating to controlling the CNG fuel system components installation services in Thailand are the Motor Vehicle Act B.E.2522 (1979), Ministerial Regulation to

¹ Deloitte Center for Energy Solutions, *Oil Prices in Crisis Considerations and Implications for the Oil and Gas Industry*, 2015, 1

² ดวงณี เลิศอํานวยลาก, มนตรี สมหอม, ภูรินทร์ พงศ์ไพรเจน, พุทธาด เทพยศ, ณัฐา นรคง, และรัณภูรณ์ ไชยเชษฐ์ ฝ่ายกิจดพลังงาน พลังงานทางเลือก NGV, 2551, 24 (DaungmaneeLertumnuoy, MontreeSomhom, PhuvarinPongpairoj,

PutthachartThepyos, NatthaNorarakong, and ThunyaphornChaichet, **Struggle the Energy Crisis : Alternative Energy NGV**, 2008, 24

³ ไทยรัฐออนไลน์, “ภัยจากรถติดแก๊ส,” Thairath (6 มกราคม 2558) (Thairath online, “Risk of Gas vehicles,” Thairath (January 6, 2015), available at <http://www.thairath.co.th/clip/10883> (last visited July 2, 2015)

⁴ Independent News Network, “อุตติแก๊สคลั่งชั้นเป็นไฟไหม้ครุภาระอุด4คัน-เจ็บ,” Innnews (7 กุมภาพันธ์ 2556)(Independent News Network, “CNG service exploded around Taling Chun district burned 3 units of building, burned 4 cars, injured 4 person”), Innnews (February 7, 2013), available at <http://www.innnews.co.th/shownews/show?newscode=433068> (last visited June 20, 2015)

stipulate components and equipment of CNG fuel system Act B.E. 2550 (2007)⁵ and Announcement of the Department of Land Transport issued under the Ministerial Regulation regarding the qualified installer of components and equipment of the CNG fuel system and also standard of components and equipment in CNG fuel systems. Presently, there is no legal provision that is applicable to the installation service of components and equipment of CNG fuel systems. This thesis aims at helping public safety and to set the suitable standard for every service.

1. Problems

1.1 The problem with the definition of “ผู้ติดตั้ง” in (hereinafter as "qualified installer")

Ministerial Regulation to stipulate components and equipment of CNG fuel systems Act B.E. 2550 (2007)⁶ defines as a person who installs components and equipment. The Announcement of the Department of Land Transport to stipulate on the rules, procedures and issuing the certification of The CNG fuel system Act B.E. 2550 (2007)⁷ define that a person who was been licensed or registered by the Department of Land Transport is to install components and equipment of CNG fuel systems. In the Announcement of Department of Land Transport concerning stipulation of the rules, procedures, and conditions in giving approval and cancellation of approval for being the qualified installer of CNG fuel systems, Act B.E.2550 (2007)⁸ defines that "qualified installer" is the person who is the manufacturer and general qualified installer. It will be seen that the definition of "qualified installer" gives no clear-cut term of "qualified installer." This will directly affect the entrepreneur who repairs CNG vehicles because this is not covered under such a system. There is a gap of non-standard maintenance centers that are not approved to be qualified installers.

1.2 The Problem with Buildings in Which the Installation of CNG and Liquefied Petroleum Gas (hereinafter as LPG)

Establishment of services to install LPG components and equipments has no adequate standard as CNG services. This is because LPG services are easily established by obtaining approval only from the Department of Land Transport, but they then can smuggle in and

⁵ กฎกระทรวงกำหนดเครื่องอุปกรณ์และส่วนควบและของรถที่ใช้ในการขับส่งที่ใช้กําชธรรมชาติด้วยกําลังตามกฎหมายว่าด้วยการขนส่งทางบก พ.ศ.2550 (Ministerial Regulation to stipulate on components and equipment of CNG fuel system Act B.E. 2550 (2007)

⁶ *Id*

⁷ ประกาศกรมการขนส่งทางบกเรื่องกำหนดหลักเกณฑ์วิธีการและข้อกำหนดที่ต้องปฏิบัติเมื่อได้รับการติดตั้งเครื่องอุปกรณ์และส่วนควบของรถที่ใช้กําชธรรมชาติด้วยกําลังตามกฎหมายว่าด้วยการขนส่งทางบก พ.ศ.2550 (The Announced of the Department of Land Transport to stipulate on the rules, procedures and issuing the certification of The CNG fuel system Act B.E. 2550 (2007))

⁸ ประกาศกรมการขนส่งทางบกเรื่องกำหนดหลักเกณฑ์วิธีการและเงื่อนไขในการให้ความเห็นชอบและการยกเลิกการให้ความเห็นชอบการเป็นผู้ติดตั้งเครื่องอุปกรณ์และส่วนควบของรถที่ใช้กําชธรรมชาติด้วยกําลังตามกฎหมายว่าด้วยการขนส่งทางบก พ.ศ.2550 (The Announced of the Department of Land Transport to stipulate on the rules, procedures and conditions in giving an approval and cancellation of an approval in being the qualified installer of The CNG fuel system Act B.E. 2550 (2007))

install both kinds of gas that do not follow the criteria regulations to certify standards for installation of CNG fuel system components in a light vehicle.

1.3 The Problem with “วิศวกรผู้ตรวจสอบ” (hereinafter “inspecting”)

The “qualified engineer” who examines and tests the CNG systems⁹ is that the engineer who is authorized to examine and test for approval of the certification. Unfortunately they usually (and incorrectly) refrain from duties in examination and testing before approving the certification, this violates the Announcement of the Department of Land Transport to stipulate the rules, procedures and conditions in giving an approval and cancellation of an approval in being the qualified engineer of The CNG fuel system Act B.E. 2550 (2007) section 16.¹⁰ There is no penalty to be liable for punishment, only warnings, license suspension, or temporary license withdrawal. The worst case is only engineer license revocation, which does not impose civil or criminal penalties.

1.4 The Problem with the Qualified Installer Criterion

The qualified installer issue is stipulated under the Announcement of the Department of Land Transport stipulating the rules, procedures and conditions in giving an approval and cancellation of an approval for the qualified installer of the giving an approval and cancellation of an approval for the qualified installer of the CNG fuel systems Act B.E. 2550 (2007) section 7 (2)¹¹ requires the credentials of a certified CNG fuel system installer, a qualification level of diploma or higher or equivalent in Electrical or Mechanical or passing the training courses related to the installation, which course was held at the Department of Labor. Another option is a course at the Office of Vocational Education Commission¹² or any others courses that are approved by the Department of Land Transport.

This is a profession that requires knowledge, expertise and experience. If a person does not have the expertise and experience in such work, this shall cause damage to life and property of consumers¹³ (and potentially other unknown victims) that use the service; therefore, measures should be taken to develop a standard for qualified installers by providing a licensing exam to qualify a CNG installer to stringently ensure qualifications before operation.

⁹Gasthai.com, “มหัตภัยถังถัง NGV,” (Gasthai.com, “Danger from NGV cylinder”), available at <http://www.gasthai.com/boardgas/question.asp?id=501504> (last visited July 3, 2015)

¹⁰ ประกาศกรมการขนส่งทางบกเรื่องกำหนดหลักเกณฑ์วิธีการและเงื่อนไขในการให้ความเห็นชอบและการยกเลิกการให้ความเห็นชอบการเป็นผู้ตรวจสอบส่วนควบคุมและเครื่องอุปกรณ์ของรถที่ใช้ถังบรรจุเชื้อเพลิงตามกฎหมายว่าด้วยการขนส่งทางบก พ.ศ.2550 ข้อ 16(The Announced of the Department of Land Transport to stipulate on the rules, procedures and conditions in giving an approval and cancellation of an approval in being the qualified engineer of The CNG fuel system Act B.E. 2550 (2007) Section 16)

¹¹ ประกาศกรมการขนส่งทางบกเรื่องกำหนดหลักเกณฑ์วิธีการและเงื่อนไขในการให้ความเห็นชอบและการยกเลิกการให้ความเห็นชอบการเป็นผู้ติดตั้งส่วนควบคุมและเครื่องอุปกรณ์ของรถที่ใช้ถังบรรจุเชื้อเพลิงตามกฎหมายว่าด้วยการขนส่งทางบก พ.ศ.2550 ข้อ 7 (2)(The Announcement of the Department of Land Transport to stipulate on the rules, procedures and conditions in giving an approval and cancellation of an approval in being the qualified installer of the CNG fuel system Act B.E. 2550 (2007)) section 7 (2))

¹² คณะกรรมการอาชีวศึกษา (Office of the Commission of Vocational Education)

¹³ *Supra* note 6.

1.5 The problem of the CNG cylinder or tank¹⁴.

The Announcement of the Department of Land Transport stipulating the standard of components and equipment of the CNG fuel system Act B.E.2550 (2007)¹⁵ have specified five standards: including the Thai industrial standard (hereinafter as “MorAorGor”), International Organization for Standardization (hereinafter as “ISO”), Economic commission for Europe Regulation (hereinafter as “ECE R”), American National Standards Institute / Canadian Standards Association (hereinafter “ANSI / CSA”), American Society for Testing and Materials (hereinafter as “ASTM”),¹⁶ if the importer or possessor installs the CNG cylinder or tank does not meet the qualified standards and includes equipment used in installations. Mainly, there have been no legal measures made to control the importing of CNG cylinders and tanks to handle the improper CNG cylinders or tanks distributed to the market. The parties, who import, posses, distribute or install non-standard CNG cylinders or tanks need to be penalized.

Although the installation of the system CNG is the most popular among the consumers who want to save money, some consumers still are concerned about the long-term support from the government, including the safe usage of CNG; therefore, this thesis has studied the current situation in order to identify the problems of the consumer of the CNG fuel system components installation services to analyze and find solutions to solve this problem. This thesis desires to set up a standard for the CNG fuel system components installation service. This will ensure the trust of consumers in that they choose a proper service center to install CNG fuel system components and equipment.

2. Thai legislations concerning compressed natural gas fuel system components installation service

2.1 Legal issue on the definition of qualified installer

Due to Thai legislations that stipulate the definition of “qualified installer” which are;

a). “Qualified installer” means “one who installs components and equipment” under Ministerial Regulation stipulations on CNG fuel system components and equipment (B.E. 2550 (2007)), and

b). “Qualified installer” means “one who obtains certification from The Department of Land Transport to be an installer of components and equipment for vehicles that utilize CNG as fuel” under the Announcement of the Department of Land Transport stipulation on rules, procedures and conditions of giving an approval and cancellation of being qualified installer of CNG fuel system components and equipment (CNG fuel system B.E. 2550 (2007)).

¹⁴*Id.*

¹⁵ประกาศกรมการขนส่งทางบกเรื่องกำหนดมาตรฐานส่วนควบและเครื่องอุปกรณ์ของรถที่ใช้ก๊าซธรรมชาติอัดพ.ศ. 2550 (The Announcement of the Department of Land Transport to stipulate on the standard of components and equipment of the CNG fuel system Act B.E.2550 (2007))

¹⁶*Id.*

Moreover, the rules, procedures and conditions of the qualified installer are also stipulated under the Announcement of the Department of Land Transport stipulates rules, procedures and conditions in giving an approval and cancellation of being a qualified installer of components and equipment of CNG fuel systems B.E. 2550 (2007) number⁷ (2) that is;

c). Qualified installer must have at least avocational certificate in mechanics or similar. They must have completed the training program for CNG installation, such as the training program from the Department of Energy Business (DOEB), training program from Department of Skill Development or training program that is certified by the Department of Land Transport.

From the above rule, if the entire CNG fuel system components installation services hire non-qualified repairers as mentioned to repair and install the CNG fuel systems, it can be claimed that they have never disrupted The Announcement of Department of Land Transport regarding to stipulation of rules, procedures and conditions in giving an approval and cancellation of being a qualified installer of components and equipment of the CNG fuel components system Act B.E. 2550 (2007) number 7 (2), The Department of Land Transport cannot give warning and temporary suspension, certified letter or revoke the qualified installer certification.

On the other hand, from the study of New South Wales State, Australia in the case of work on an NGV installations¹⁷ can only be carried out by a business licensed by the Motor Vehicle Repair Industry Council¹⁸ (hereinafter “MVRIC”). The required license for a “Natural Gas Mechanic” is issued under the Motor Vehicle Repairs Act, 1980. The work for which the license is needed includes installing an NGV system to a motor vehicle or repairing or adjusting any NGV equipment that has already been fitted to a vehicle. The tradesperson performing the installation, repair or service must hold a tradesman’s certificate as a “Natural Gas Mechanic,” issued by the MVRIC.¹⁹ It can be noted that the mentioned law has clearly defined the type of working mechanic of each category and prevented each type of mechanic from working on something beyond their qualifications.

Therefore, this thesis would like to propose a definition of “qualified installer” in the Announcement of Department of Land Transport to stipulate the rules, procedures and conditions in giving an approval and cancellation in being a qualified installer of CNG fuel system components (B.E. 2550 (2007)). The definition should be clear and fully cover the maintenance of CNG vehicles to clarify the scope of responsibilities of the qualified installer and maintenance mechanic.

2.2 Legal Issue on Standard of the CNG Fuel System Components Installation Building

¹⁷*Supra* note 125.

¹⁸Parliament of New South Wales, “Motor Vehicle Repair Industry Council,” available at <http://www.parliament.nsw.gov.au/prod/PARLMENT/hansArt.nsf/V3Key/LA19951019039> (last visited May 4, 2015)

¹⁹RTA, “*Vehicle Standards Information No. 16 for Vehicle Owners & Operators in New South Wales*”, RTA (April 2,1998), www.rta.nsw.gov.au/dvpr/vss.htm(last visited July 31, 2015)

The entrepreneur of the CNG fuel system components installation service can obtain approval to be a qualified installer from The Board of Certified Standards for NVG services²⁰, which consist of the three agencies: the Department of Energy, Department of Land Transport and the company PTT Public Company Limited (PCL), which aims to improve operation standards to be acceptable for the general consumer. The Board of Certified Standards for NVG services regulates rules and procedures by issuing the "Announcement of The Board of Certified Standards for NVG services regarding to criteria to certify standards of NGV fuel system components and installation of light-vehicles."²¹ The announcement is not an approval license to allow establishment of the CNG fuel system component installation shop. The objective is aimed to guarantee the standard of CNG service by issuing signage to owners and/or operators (who apply for this certification) to display at their CNG installation service.

Although, all the criteria seems practically effective, unfortunately the Announcement has not been published in the Government Gazette or even legislated by the Ministry of Energy. Moreover, there has been no provision supporting it, no sanction to obligate and no penalty punishment for any wrongdoing; thus, the status of the Announcement could only serve as guidance to the entrepreneur, who only needs to be certified by the board.

Therefore, this thesis proposes to enhance the Announcement of The Board of certified standards for NVG services regarding criteria for certified standards of NGV fuel system component installation services to light-vehicles, to be decreed under Department of Land Transport then amended by adding sanctions and penalty punishment for the owner and/or operator who shall not comply with said Announcement.²²

2.3 Legal Issue for Refraining From Performing Duties in Inspection and Testing of Qualified Engineer

With regards to safety issues of the CNG fuel system components installation service, Announcement from the Department of Land Transport concerning the stipulated procedures and conditions for approval and cancellation to be an examiner and tester of the components and equipment of the CNG fuel system installation B.E.2550 (2007) in article 16 indicate that if the qualified engineer does not follow the rules, procedures and conditions regulated by the Department of Land Transport, the Department of Land Transport has the authority to warn, temporarily suspend the approval letter, or revoke the letter of approval. Similarly, the Engineers Act B.E. 2542 (1999) also appointed measurements with only warnings and temporary license suspensions. In the event of misconduct in professional ethics, they only get a warning, probation, and license suspension for a period no more than five years, or the

²⁰ คณะกรรมการรับรองมาตรฐานสถานประกอบการติดตั้งอุปกรณ์ NGV (The Board of certified standard for NVG service)

²¹ ประกาศคณะกรรมการรับรองมาตรฐานสถานประกอบการติดตั้งส่วนควบคุมและเครื่องอุปกรณ์บรรจุก๊าซ NGV เรื่องหลักเกณฑ์การรับรองมาตรฐานศุนย์ติดตั้ง NGV สำหรับรถยนต์ขนาดเล็ก (Announcement of The Board of certify standard for NVG service regarding to criteria to certify standard of NGV fuel system components installation of light-vehicle)

²² Interview with Mr. Thanachot (anonymous surname), The engineers of the Department of Quality Security Safety Health and Environment section Compressed Natural Gas of PTT PCL., via the phone (25 June, 2015)

license is revoked as a disciplinary action. There's no civil or criminal penalty, thus, Engineering Act B.E. 2542 (1999) should appoint the penalty of misconduct in professional ethics of qualified engineer. There should be a civil and criminal penalty against using unsafe products in the name of Product Safety Act B.E. 2551 (2008).

Moreover, personnel that install the CNG components and equipment should have at least the qualification of a convocation certificate in mechanics or be qualified per completion of a training program that is CNG related, such as a training program for installation of CNG components and equipment by the Department of Skill Development; however, these programs aim to enhance labor skills and are very short programs. The qualified installer that passes these programs would not have enough experience and expertise in vehicle retrofitting; however, under a U.S. legal provision that the Department of Transportation (hereinafter "DOT") has the duty to commission federal regulations concerning vehicle safety issues. Moreover, there is the National Skill Development and National Institute for Automotive Service Excellence (hereinafter "ASE") that also approves the qualification letters and test the expertise of the mechanics. These approvals are valid for only five years. Similarly, Thailand should adopt this five-year approval of qualification in order to have qualified installers of a higher caliber working on the CNG fuel system component installation services.

2.4 Legal Issue on Standard of CNG Cylinder or Tank

Currently, the CNG Cylinder or tank is required to follow Thai Industrial Standards Institute (hereinafter "TISI"): TISI 370, or United Nation Economic Commission for Europe (hereinafter "UN ECE"): ECE R110. Most of the cylinders or tanks are imported. This could lead to difficulties in controlling the standard as Thailand does not have regulations on importation of cylinders or tanks. The Ministry of Commerce should control the importation of the CNG cylinders or tanks by the issued Announcement. There should be an approval letter in order to import the cylinder or tank. Moreover, TISI should announce the regulation, procedure and condition for submitting the approval letter for CNG cylinders or tanks that will be imported. Currently, there is no regulation on controlling and dealing with unapproved cylinders or tanks. There is no penalty on importers, distributors and qualified installers of unapproved CNG cylinders or tanks. In New South Wales, Australia, the installation of gas systems on vehicles section 27 has prevented any party from distributing any cylinder or tank that could be used to connect with the vehicle except that cylinder or tank which is suitable, safe for gas, as well as has the SAA certificate. For the installation in section 30(1), it states that connection of a cylinder or tank to a vehicle should not be done unless there is a document showing the compatibility.

The European Union (hereinafter "EU") has a certified standard of gas tank in ECE R110, which states that cylinders or tanks need approval from the Economic Commission of EU. The manufacturer has to submit an approval request in order to get an approval number. Approved gas cylinders or tanks must have this permit with details of the approval number, capacity of the cylinder or tank, pressure on operation, pressure on testing, weight, and year of approval. In Thailand, the CNG cylinder or tank that is to be used must follow standard of

ECE R110. Therefore, the Department of Commerce must announce the penalty for the importer, distributor and qualified installer of unapproved CNG cylinders or tanks.

Conclusion

Based on the study regarding legal measures on compressed natural gas fuel system components installation, in order to intensify standards for the CNG service center, this study would like to propose the amendment of related regulations as follows:

1) The Definition of Qualified Installer

The Ministerial Regulation to stipulate components and equipment of CNG fuel systems Act B.E. 2550 (2007), The Announcement of the Department of Land Transport to stipulate on the rules, procedures and conditions in giving an approval and cancellation of an approval in being the qualified installer of The CNG fuel system Act B.E. 2550 and The Announcement of Department of Land Transport concerning stipulation of the rules, procedures, and conditions in giving approval and cancellation of approval for being the qualified installer of CNG fuel systems, Act B.E.2550 (2007) should be extended the definition of qualify installer to cover the meaning of CNG engine vehicle. Those definitions should be aligned accordingly.

2) Standard of CNG Fuel System Components Installation Building

The study would like to proposes the enhancement of the Announcement of The Board of certified standards for NGV services regarding criteria for certified standards of NGV fuel system component installation services to light-vehicles, to be decreed under Department of Land Transport then amended by adding sanctions and penalty punishment for the owner and/or operator who shall not comply with said Announcement

3) Wrongful Refrain from Official Duty on Inspections and Examinations of Qualified Engineer

The study would like to amend Engineers Act B.E. 2542 (1999) by appointing a fine or imprisonment of the engineer who fails to examine and test the components and equipment and generates the certificate of examination and test for the vehicle that has not yet been checked, but falsely claims to be safe. There should be a civil penalty on the occurred damage, in which it should be different from other regular penalties by using a rule of a damages fine as punishment following the Product liability Act, B.E. 2551 (2008).

4) Standard for CNG Cylinder or Tank

The study would like to suggest that the Ministry of Commerce should consider legislation to enact an announcement for the regulation of imported CNG cylinder in which they would be prohibited or heavily controlled requiring an import certificate. There should be law enforcement in the form of the Ministry of Commerce announcement with the purpose to convict the importer, distributor and qualified installer who are involved with the non-standard CNG cylinder or tank. Finally, there should be an institute that has authority to

inspect the imported CNG cylinder or tank as well as management of non-standard cylinder or tank. Furthermore, installation of CNG fuel cylinder or tank should only be performed by qualified system installers.

REFERENCES

Books and Book Articles

Thai Books

ปรีดี เกษมกรรทร์. คำบัญชายหลักกฎหมายแพ่งทั่วไปชุด 1. กรุงเทพฯ: ไทยสัจจะกัลป์การพิมพ์, 2515 (Pridi Kasemsub. *General law of civil code set 1*. Bangkok: Thai Sungkapan publishing. 2515 (1972))

ไภทชิต เอกจิริยการ. คำอธิบายกฎหมายจ้างแรงงานจ้างทำของรับขนยืมฝากรหัศร์. กรุงเทพฯ: วิญญา, 2539 (Pathaichid Eakjariyakorn, *The explanation book for hire of services, hire of work, carriage, loan, deposit*, page 101, 2539)

สงกรานต์ สีมา. เปลี่ยนใจใช้แก๊สตอนคุ้นใจคนใช้เครื่องเบนซิน. กรุงเทพฯ: จุปิตัศ, 2550 (Songkarn Srima. *Change your mind for using CNG: Specially for gasoline system*. BKK. Jupitus, 2007)

ศันนกรณ์ โสตถิพันธุ์. คำอธิบายกฎหมายลักษณะละเมิดจัดการงานนอกสั่งและความมิควรได้. กรุงเทพฯ: วิญญา ชน. (2550). (Sanunkorn Sodethipan. *Wrongful act and Manage of affairs without mandate*. Undue enrichment. Bangkok: Winyuuchon, 2550 (2007))

สมกิต ชาดาชานะสุนทร. อบรมเครื่องเรื่องก้าวในร้อยันต์ใหม่ล่าสุด NGV/ LPG. นนทบุรี, 2549 (Somkid Thadachanasoonthorn. *Fully equipped about NGV/LPG*. Nonthaburi, 2549 (206))

สุยมศุกนิตย์. คำอธิบายกฎหมายคุ้มครองผู้บริโภค. พิมพ์ครั้งที่ 4. กรุงเทพฯ: สำนักพิมพ์จุฬาลงกรณ์มหาวิทยาลัย, 2545 (Susom Suphanid. *Consumer protection book*. 4th edition. Bangkok: Chulalongkorn university Publishing, 2545 (2002))

สุยมศุกนิตย์. องค์การเอกชนเพื่อคุ้มครองผู้บริโภค. กรุงเทพฯ: วิญญาชน, 2544 (Susom Suphanid. *Private organization for consumer protection*. Bangkok: Winyuuchon, 2544 (2001))

โสภณ รัตนากร. คำอธิบายกฎหมายลักษณะพยาน. พิมพ์ครั้งที่ 8. กรุงเทพฯ: นิติบรรณการ, 2539 (Sophol Ratanakorn. *Law of witness*. 8th edition. Bangkok: Nitibannakarn, 2539 (1996))

สำนักงานคณะกรรมการคุ้มครองผู้บริโภค. กฎหมายคุ้มครองผู้บริโภค. กรุงเทพฯ, 2530 (Office of the consumer protection board. Consumer protection law. Bangkok, 2530 (1987))

เชื้อ ชูสำ. รถยนต์ระบบแก๊ส. พิมพ์ครั้งแรก. กรุงเทพฯ: โอเดียนสโตร์, 2524 (Chaua Chukhum. *Gas system vehicles*. 1st edition. Bangkok: Odean Store, 2524 (1981))

พงษ์พันธุ์ ชุมกุเพชร. คู่มือติดตั้งก๊าซธรรมชาติ *NGV* และ *LPG*. พิมพ์ครั้งแรก. กรุงเทพฯ: โปรดิฟฟ์ชั่นแนล เซ็นเตอร์, 2549 (Pongpan Chompoopetch. *Handbook of NGV and LPG installation.* 1st edition. Bangkok: Professional Center, 2549(2006))

ดวงมณี เลิศอันวยลักษ, มนต์รี สมหอม, ภูวนิทร์ พงศ์ไพบูลย์, พุทธชาด เทพยศ, ณัฐรานรคง, นิษฐ์ภารณ์ ไชยเชษฐ์. ฝ่าวิกฤตพลังงาน พลังงานทางเลือก *NGV*. พิมพ์ครั้งที่ 1. กรุงเทพฯ : ชีเอ็คยูคัชั่น, 2551(Daungmanee Lertumnuoy, Montree Somhom, Phuvarin Pongpairoj, Putthachart Thepyos, Nattha Norrakong, Thunyaphorn Chaichet. *Struggle the Energy Crisis : Alternative Energy “NGV”.* 1st edition.Bangkok : Se-Education, 2551 (2008))

Articles

รายงานวิจัยฉบับสมบูรณ์. สกบ. กับการคุ้มครองผู้บริโภค. พิมพ์ครั้งที่ 11. กรุงเทพฯ: อรุณการพิมพ์, 2550 (Final report. *Office of the consumer protection board and Consumer protection.* 1st edition. Bangkok: Arun Publishing, 2550 (2007))

ดร. อรศรี งามวิทยาพงษ์. วิกฤตพลังงานกับแนวทางสู่การแก้ไข. กรุงเทพฯ: วารสารสื่อพลังงานรู้ขักกัด, 2549 (Dr. Orrasri Ngarmwittayapong. *Energy crisis and solution.* Bangkok Energy journal, 2549 (2006))

National Energy Policy Office, *Natural gas for vehicles.* Bangkok: Energy planning journal, 2543 (2000)

LivioGambone, P. Eng. – Technical Manager Transportation Fuels, *Overview of NGV Fuel Tank Testing Requirements*, CSA group, MOVE Program Review November 18, 2013

Deloitte Center for Energy Solutions, *Oil Prices in Crisis Considerations and Implications for the Oil and Gas Industry*, 2015, 1

Thesis

โภณจนาท เจริญสุข. มาตรการทางกฎหมายที่เกี่ยวกับธุรกิจให้บริการซ่อมบำรุง. วิทยานิพนธ์นิติศาสตร์มหาบัณฑิตสาขาวิชากฎหมายธุรกิจ, บัณฑิตวิทยาลัยมหาวิทยาลัยรามคำแหง, 2545 (Gojanaj Charoensuk. *Legal measure concerning on vehicles maintenance.* Master's thesis.Ramkhumheng University.Law.2545 (1981))

Electronic Media

U.S Department of energy, “*Alternative Fuel Data Center*,”<http://www.afdc.energy.gov/laws/fed_summary> (accessed January 1, 2015)

CleanNG, “*History of CNG*,”<<http://www.gocleanng.com/learn/cng-history>> (accessed June 20, 2015)

Automotive alternative registration board, 2555, “*History (Online)*,”<<http://www.aafrb.com.au/about.aspx>> (accessed May 7, 2015).

LPG Exceptional energy, 2555, “*History of LPG (Online)*,”<http://www.exceptionalenergy.com/en_GB/what-is-lpg/history>(accessed May 5, 2015).

PTT PCL, “*NGV INSTALLATION*,” <<http://www.pttplc.com/en/Products-Services/Consumer/For-Vehicle/NGV/PTT-NGV/Pages/Installation.aspx>> (accessed June 19, 2015)

RTA, “*Vehicle Standards Information No. 16 for Vehicle Owners & Operators in New South Wales, April 2, 1998.* <<http://www.rta.nsw.gov.au/dvpr/vss.htm>> (accessed June 8, 2015)

CSA group, “*Importance of Specifying ANSI Safety Standards for CNG Components, December 10, 2014,*”<<http://webstore.ansi.org/>> (accessed August 8, 2015)