

CHAPTER IV

ELECTRICAL AND ELECTRONIC INDUSTRY GLOBAL MARKET PRESSURES

This chapter describes the influential CSR and environmental management global market pressures on the Thai EE industry. The influential international market pressures in EE industry are presented by exporting countries and regions which coincide with country main exporting destinations. It does not attempt to confine the framework of global market pressures but to demonstrate the level CSR environmental issue regionally and globally.

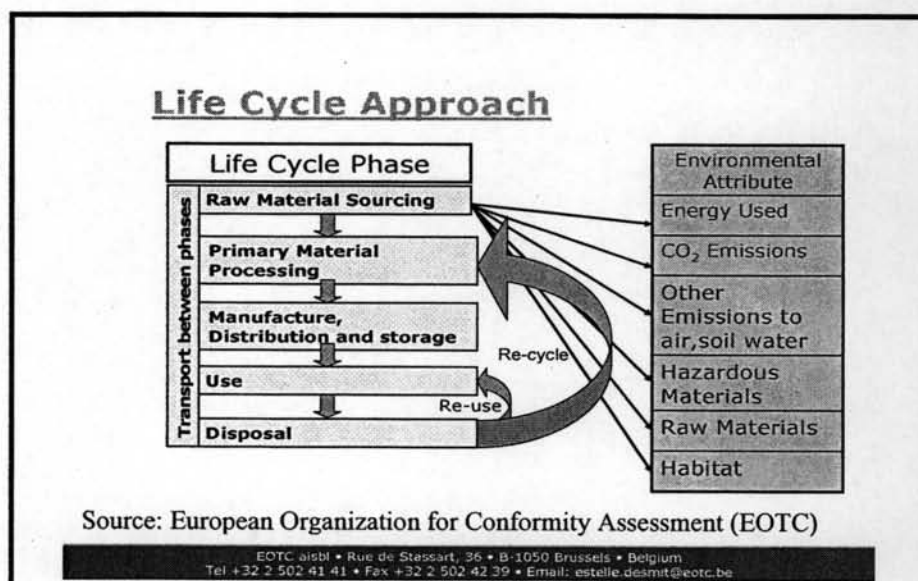
4.1 The European Union Directives

Given that Thailand is an export-driven economy, EE exports will have to comply with certain environmental regulatory standards in order to gain access to the EU market. Easier access to an enlarged EU single market will help enhance competitiveness in the global market place where environmental concerns are becoming increasingly important. Businesses and consumers will benefit greatly not only from better products and sustainable environments, but also economic gain from efficient use of resources.

All products cause environmental degradation in some way, whether from manufacturing process or disposal. In response to global environmental concerns, the European Commission (EC) announced on Integrated Product Policy (IPP) (COM (2003) 302 final) that it would seek to identify and stimulate action on products with the greatest potential for environmental improvement. The first phase consists of a research to identify the products with the greatest environmental impact from a life-cycle perspective consumed in the EU with partner institutions of the European Science and Technology Observatory (ESTO). The results showed that products from only three areas of consumption - food and drink, private transportation, and housing

– all together are responsible for 70-80 percent of the different environmental impacts from private consumption. These products also account for approximately 60 percent of consumer total expenditure (Europa 2007,b).

Housing main energy consumption is from home appliances or energy using products (EUP). In order to reduce impacts of the most detrimental products, a complete life-cycle of a product or a service is studied in detail. Life-cycle impact assessment (LCA) covers all areas from a ‘cradle-to-grave’ view of the production process. Starting from the extraction of natural resources, progressing through the production, design, manufacture, assembly, to distribution, marketing, sale and use to their eventual disposal as waste. At the same time, it also involves diverse stakeholders such as designers, industries, marketing people, retailers and consumers.



In the last phase, the commission addressed policy measures by launching directives for the products that are identified as having the greatest potential for environmental improvement at the least socio-economic cost. EE industry related directives and measures are;

4.1.1 Waste Electrical and Electronic Equipment Directive (WEEE)

The WEEE (75/442/EEC) directive was adopted on 13th February 2003 along with RoHS to address problems associated with the disposal of electronic waste by regulate measures for infrastructure, processes and products to minimize the generation and impacts of e-waste on the environmental by promoting 'Reduce-Reuse-Recycling' of EE equipment. It seeks to achieve this by making producers responsible for financing the collection, treatment, and recovery of waste electrical equipment, and by obliging distributors to allow consumers in both international and domestic markets to return their waste equipment free of charge (Europa 2007,a). Nevertheless, in an ever complex and diverse global production system¹ producer responsibility is the main component of WEEE directive or known as extended producer responsibility (EPR) encompassing international manufacturer and suppliers amid the increasing import of EE products and equipment in the EU.²

4.1.2 Reduction of certain hazardous substances Directive (RoHS)

The (2002/95/EC) directive came into force on 1st July 2006 to limit the use of hazardous substances in EE equipment to accelerate the recovery and elimination of e-waste and to help protect human health. The directive restricts the use of six hazardous materials in product' manufacturing process; with substitution requirements such as various heavy metals (lead, mercury, cadmium, and hexavalent chromium) and brominated flame retardants (polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE) in EE products to be put on the market. Producers and suppliers will be responsible for taking back and recycling electrical

¹ Industrial activities are increasingly being out-sourced to other regions and countries to perform specific tasks in accordance with their available natural and human resources. A case study revealed that one part of raw material inputs was produced in Japan then shipped to Thailand to be assembled in conjunction with other parts locally manufactured.

² According to DEP export to EU had increased import on electrical products for input materials by 20% in 2007 for electronic but remained unchanged for electrical products due to intense competition especially from China.

and electronic equipment.³ The directive monitors manufacturing processes of both domestic and international manufacturers who will put their EE products in the EU market. This provides incentives to environmental friendly design electrical and electronic equipment more efficiently while taking waste management aspects fully into account.

4.1.3 The Directive on the Eco-design of EuP

The EuP (2005/32/EC) directive addresses environmental impacts across the whole ‘cradle to grave’ product life cycle and provides coherent broad rules for eco-design to reduce disparities among national regulations in the intra-EU trade.⁴ It is not a binding requirement but its aim is to increase the effectiveness and synergies of other EU acts and initiatives concerning environmental aspects of products (e.g. RoHs, WEE) on minimum energy efficiency requirements with regard to energy efficiency during use. The directive defines conditions and criteria for requirements regarding environmentally characteristics and implementation measures on specific products and environmental aspects (such as energy consumption, waste generation, water consumption, extension of lifetime) after conducting impact assessment and broad consultation with interested parties (Europa 2007,b).

With an attempt to accelerate movements toward improving the environmental performance of EuP, manufacturers are encouraged to design products while considering the environmental impacts throughout their entire life cycle for European consumers including public and private purchasers. Commission implements an “Eco-label” scheme as part of a wider approach on IPP within the new



³ A Buy-back system; manufacturers offer to buy discarded EE products from their clients and consumers (like WEEE). Even though it is not RoHS main objective, it helps imposing WEEE concept on international producers and suppliers.

⁴ Uncoordinated measures that could lead to an overall negative result; for example eliminating a toxic substance from a product, such as mercury from lamps, might lead to increased energy consumption, which on balance could have a negative impact on the environment (Europa 2007,b).

action Programme.⁵ The logo represents that such products have been carefully assessed to make minimal environmental impacts than other similar competing products, or those products that can have misleading environmental claims. The scheme criteria are established for individual product groups such as textiles, appliances as refrigerators and dishwashers.

4.1.4 Registration, Evaluation, Authorization and Restriction of Chemical Substances (REACH)

REACH is a new European Community Regulation (EC/1907/2006) adopted in 18 December 2006 on chemicals and their safety use. It gives a greater responsibility to industry to manage unacceptable risks from chemicals to human health and the environment on a community wide basis, and to provide safety information on the substances by setting appropriate hazardous chemicals database and conduct in-dept evaluation of industrial chemicals. Only registered substances are allowed to be manufactured or imported. Manufacturers are required to research on the properties of their chemical substances and register the information in a central database run by the European Chemical Agency (ECHA)⁶ (Europa 2007,a). Restrictions apply to all manufacturers, importers, distributors, and downstream users that come in contact with the substances enhancing risk management mechanisms beyond those already implemented.

4.1.5 Conformity Assessment

Conformity assessment is defined by the International Organization for Standardization/International Electrotechnical Commission Guide 2: 1996 as "Any

⁵ The Sixth Environment Action Programme of the European Parliament and the Council adopted on 22nd July 2002 sets out the framework for environmental policy-making in the EU for the period 2002-2012 and outlines actions that need to be taken to achieve them.

⁶ The Agency in Helsinki acts as the central point in the REACH system. It manages the databases necessary to operate the system, co-ordinates the in-depth evaluation of suspicious chemicals and runs a public database in which consumers and professionals can find hazard information.

activity concerned with determining directly or indirectly that relevant requirements are fulfilled" (NIST 2000). Examples of conformity assessment activities are sampling, testing and inspection, evaluation, verification and assurance of conformity (supplier's declaration), certification, registration, accreditation, and approval as well as their combinations.

In Europe, conformity assessment varies in levels of difficulty and complexity, depending on the level of risk associated. A systematic risk assessment on one hand, and good documentation of the design decisions concerning health and safety on the other are essential components for conformity. All possible risks related to product designs must be identified and every possible measure has been taken to remove them. If the risk of injury is low and subject to harmonized standards⁷, no third party conformity assessment procedure is required. After performing a critical product design and a technical review as well as performing the necessary product evaluations that the product meets the essential requirements of a directive, a manufacturer or supplier may affix the CE mark⁸ as Declaration of Conformity. Products meeting these essential 'Health and Safety' requirements can

be placed on the market in any countries within the European Economic

Economic Area (EEA) Union and move freely throughout all 18 countries. As the risk of injury increases, the level of complexity of the conformity assessment process and associated procedures and costs increase.



EE products and equipment standards are subject to both harmonize (voluntary) standards such as WEEE, and mandatory standards under the New Approach Directives.⁹ Therefore, each manufacturer and supplier is obligated to

⁷ Technically speaking, harmonized standards are voluntary. Manufacturers can elect standards, or use non-Harmonized Standard (e.g. an American Standard) to meet essential requirements.

⁸ It is required by law if the product falls under one of the "New Approach Directives" (These laws have replaced old national laws to reduce trade barriers providing a more practical approach to govern families of product limited to "Essential Health and Safety Requirement").

⁹ *ibid*

distinct specification declaration and conformity procedures according to the products design and technical specification requirements.

4.2 The United States Electrical and Electronic Products Standards

Electronic products are a part of everyday life. The continuum expansion use of electronic information and communications technologies is likely to be one of the keys to achieve global sustainability in the 21st century technological era. The United States has recognized that its current industrial technology and infrastructure electronic products also have unacceptably high social and environmental impacts.¹⁰ The production processes in producing electronic products consumes substantial electricity and energy as well as contain significant amounts of hazardous substances and environmentally sensitive materials. With a purpose to help alleviate these problems many US organizations are striving to purchase environmentally friendly products through standards and specifications for green products.

The Electronic Industries Alliance (EIA)¹¹ in conjunction with Japan Green Procurement Survey Standardization Initiative (JGPSSI) and Electronic Components, Assemblies & Materials Association (ECA)¹² developed Joint Industry Guide (JIG) for Material Composition Declaration of Electronic Products. The International Electrotechnical Commission (IEC)¹³ under the supervision of the US-national

¹⁰ <http://www.greenelectronicscouncil.org/epeat/index.htm>

¹¹ EIA is a network of business professionals collectively formed association comprises of manufacturers and suppliers of passive and active electronic components, assemblies, commercial and industrial electronic equipment by sector as ; Telecommunication, Electronic components, Government electronic and IT, National science and technology education partnership and JEDEC (www.eia.org).

¹² ECA represents the electronics industry sector, it is strategically positioned to be service oriented providing the dynamic link into a network of programs and activities offering business technical information; market research, trends and analysis, access into industry and government leaders, technical and educational trainings (www.eaus.org).

¹³ IEC is the international standard and conformity assessment for electrical, electronic and related technology collectively known as 'Electrotechnology' (www.iec.ch).

Electronic Component Certification Board (ECCB)¹⁴ had formulated quality assessment system for electrotechnical equipment and component (IECQ), providing an international assessment and a certification tool to support the ‘Business to Business Supply Chain Management System’ with an aim to eliminate international trade barriers (NECTEC 2007).

The IECQ QC080000 HSPM addresses an industry issue on hazardous substance management with a purpose to assist industry worldwide with voluntary conformity assessment management systems. Upon the recognition that global environmental requirements have spread beyond the EU with dominant RoHS legislation concomitant with increasing public awareness and demand, it is essential to adopt international acceptable standard due to the risk of not doing something face the risk of being a dumping ground (NECTEC 2007). Unlike the EU directives and China RoHS regulations which are designed to address specific product level technical requirements, IECQ aims to provide single international set of requirements incorporating customer and market specifications as well as a single international system to assess and certify manufacture (IECQ 2008).

Documents available in five versions: Chinese, English, French, Japanese, Korean. The scheme has been approved by



Japan and EU under the recognition of endorsed mark. Certificates issued has continual satisfactory increase since its initiation in 2005 from 3 certificates, to 138 in 2006 and 449 as of October 2007 (ECCB 2007).

As an aspiration to induce green electronic products, the Institute of Electrical and Electronics Engineers, Inc (IEEE)¹⁵ developed environmental procurement tool ‘EPEAT’ designed to help institutional purchasers in the public and private sectors to assess and evaluate product criteria based on their environmental attributes. At the

¹⁴ ECCB is the US-national authorized institution with an aim to provide national and international value-added certified recognition for organizations involved with electronic components and related products and processes through the IEC quality assessment system (www.eccb.org).

¹⁵ IEEE is a non-profit organization of world leading professional association for the advancement of technology with more than 370,000 members including more than 80,000 students, in over 160 countries to foster technological innovation and excellence for the benefit of humanity (www.ieee.org).

same time, it helps promote and foster environmentally friendly operation on manufacturers worldwide. EPEAT is the implementation of the IEEE 1680-2006 Standard for Environmental Assessment of Personal Computer products (including laptop and desktop computers, and monitors). Criteria encompass material selection, product design, chemical substances, energy conservation, product longevity, waste management, packaging and corporate performance. Recognizing that SME often lacks capability to do so, criteria are partially categorized as additional requirements to allow greater flexibility. In the year 2007 there were 567 registered products, desktop (101), integrated system (11), Monitors (311), and notebooks (144) (EPEAT 2007). EPEAT evaluates environmental performance according to three tiers of performance as follow;



Product meets all required criteria plus at least **75%** of the optional criteria that apply to the product



Product meets all required criteria plus at least **50%** of the optional criteria that apply to the product



Product meets all required criteria

Such movements towards environmental friendly operations are driven by State legislation (e.g California, Maine, New Jersey) and the Presidents GSA executive order (NECTEC 2007), but possess authority as instruction not law. Thus, on one hand helps reduce international trade barriers among existing environmental directives such as WEEE and RoHS from the EU, on the other hand imposes non-tariff barrier on US electronic products import goods encompassing stakeholders throughout the whole production chain. According to a US representative, Mr. Stanley Salot, at the workshop on standards and conformity assessment activities on 21st July 2007, South East Asian region alone hold as much as 40 percent of the world electronic equipment and component manufacture. Thus, developing nations especially with export led economy like Thailand is obliged to follow suit in order to place produced products in international markets.

4.3 Japan Industrial Products Standards

The international markets in which Japanese companies do business are growing ever more competitive. Besides, consumers are demanding companies to clearly demonstrate in a tangible form of greater accountability for their products (JSA 2007). In this business climate, the society places greater trust on those companies which do the implementation and are registered to a quality management system. Japanese Industrial Standards (JIS) specifies the standardization used for industrial activities in Japan and products specifications to be put on the market, with a purpose to contribute to the improvement of the product quality, increase product efficiency, rationalize production processes, and at the same time promote fair trade and public welfare by enacting and enforcing appropriate and reasonable industrial standards for industrial products (JSA 2007).

The standardization process is coordinated by Japanese Industrial Standards Committee and published through Japanese Standards Association. Initially Japan standards for industrial activities were established by private enterprises coexisted with government specifications for procurement with an aim to increase material outputs during the World War II (1921). After the War, the Japanese Standards Association was established in 1945, followed closely by promulgation of the Japanese Industrial Standards Committee regulations (JES) in 1946. Upon enactment of the Industrial Standardization Law in 1949, legal foundation for the present Japanese Industrial Standards (JIS) was formed. The Industrial Standardization Law was revised in 2004 and the "JIS mark" for product certification system was changed, effective on October 1, 2005 upon re-certification (JISC 2005).



Original
JIS Mark



NEW: Mining and
Manufacturing goods



Processed Goods



Special Categories

The old mark is allowed to be used until September 30, 2008 as the transition period of 3 years, and every manufacture is subject to certification revision for authority's approval for new JIS mark. Under the previous law, the commodities or items subject to JIS mark labeling system were designated by the government. Under the new law, business may voluntarily select any commodities or items for JIS mark among all certifiable products. As of November 17, 2005 there were 1,673 standards subject to the new JIS mark labeling system (JISC 2005). The standards were developed in conjunction with ISO specifications. For example, quality management system JIS Z9900 series was accredited to ISO 9000.

Electrical products and equipment related legislation and regulations are imposed on both manufacturers and importers as well as the certified third party. Industrial Safety and Health Law on machine tools¹⁶ which involves dangers in operation is liability of manufacturer permission, inspection and conformity to construction with a view to prevent industrial accidents. Electrical Appliances Material Safety Law regulates hand carrying power tools¹⁷ as well as electric products (such as air cleaner, computer, cash register and vending machine) to prevent the occurrence of danger resulting from electrical appliances; conformity shall display legally required labeling on electrical equipment PSE mark representing name of registered entity and electrical specifications such as voltage.

In addition, voluntary labeling based on industrial sector was enforced from April 2001 to ensure safety in workplace.

Twelve registered certification organizations (including foreign organizations), such as Japan Electrical Safety & Environment Technology Laboratories (JET) and Japan Quality Assurance Association (JQA), upon confirmation of the safety test and the improvement for the quality control system of commodity will grant Safety certification mark (S Mark). The Home Appliances Recycling Law, effective on April 2001, obligates



¹⁶ Such as lathe, grinder, and forge rolling machine. Hand book for Industrial Products Import Regulations Section IV-4 Machine Tools, P: 143.

¹⁷ Ibid, such as drill, saw, grinder, and parts.

that manufacturers and suppliers of home appliances establish a take-back system¹⁸ for recycling and appropriate disposals. Products subject to law are TV sets, refrigerator, washing machines and air conditioner (JETRO 2006).

Electronic Products and equipment are subject to additional Poisonous and Deleterious Substances Law regulating chemical substances in input materials and production processes. And Electricity Utilities Industry Law is to promote energy saving products, secure public safety, and contribute to environmental preservation by regulating installation, construction, maintenance and operation of manufacturing facilities. There is however no legally required labeling based on the law for electronic parts.

In order to ensure that Japanese conformity assessment system can meet the obligations set forth in the WTO/TBT Agreement,¹⁹ all manufacturers and suppliers within production chain are to be closely monitored and audited by importing companies. According to an interview with EEI on 25th September 2007, Thai manufactures will be audited and must take necessary adjustment or development in order to become a supplier for Japanese firms, as well as inauguration of Japanese representative at the factory or local offices. Unlike self declaration system of the EU and US, this imposes much more stringent control on manufactures as viewed by FTI²⁰ to be the most stringent. Furthermore, Japan industrial standards are recognized as mutual standards with IEC of the US and ISO certification, meaning products that meet JIS standards are considered as equivalent to ISO and the US standards compliance.

¹⁸ Unlike the EU buy- back system where manufactures and suppliers buy discarded products, Japan take-back system require those whose discard must pay disposal fee.

¹⁹ World Trade Organization/ Agreement on Technical Barriers to Trade

²⁰ According to an interview with Ms.Pornrat Petchpakdee, manager of the Industrial Environment Institute of the Federal of Thai Industry on 27th September 2007.

4.4 The ASEAN Electrical and Electronic Equipment Mutual Recognition Agreement (ASEAN EE MRA)

The Association for South East Asian Nations (ASEAN)²¹ with an aim to stimulate economic integration ASEAN free trade area (AFTA) was established. ASEAN Member Countries have resolved to work on the elimination of non-tariff barriers through the Common Effective Preferential Tariff (CEPT) Scheme. A work program on the elimination of non-tariff barriers for industrial products, which includes, among others, harmonization of custom procedures, tariff nomenclature, GATT valuation agreement, green lane, custom surcharge, harmonization of product standards and conformity assessments, and mutual recognition agreement (MRA).

To achieve such vision, ASEAN Consultative Committee for Standards and Quality (ACCSQ) was established in 1992. It consists of regulatory body for technical regulations, standard body to regulate mandatory standards, and product working group²² to carry out technical assessments. Upon the third ASEAN Informal Summit of November to establish a free trade area (FTA) for goods, services and investments in the Information and Communications Technology (ICT) sector with recognition that mutual recognition or acceptance of test reports and equipment certification will enhance trade of electrical and electronic equipment in ASEAN and facilitate the implementation of the AFTA and the FTA for ICT sector (ASEN 2007). A Sectoral Mutual Recognition Arrangement for electrical and electronic equipment in accordance with the ASEAN Framework Agreement on Mutual Recognition Arrangements was signed in Ha Noi on December 1998. As corresponded to the agreement, ACCSQ formed a Electrotechnical Product Working Group (EPWG) in the year 2000.

²¹ The Governments of Brunei Darussalam, the Kingdom of Cambodia, the Republic of Indonesia, the Lao People's Democratic Republic, Malaysia, the Union of Myanmar, the Republic of the Philippines, the Republic of Singapore, the Kingdom of Thailand and the Socialist Republic of Vietnam, Member States of the Association of Southeast Asian Nations (hereinafter referred to as ASEN).

²² The product working group subsequently formed in the year 1998 corresponded to Sectoral MRA.

The ASEAN EE MRA is a multilateral agreement between 10 countries legally binding in accordance with the regulatory purpose which imposes mandatory standards requiring technical test report conformity assessment. Exporters can submit a test report from certified body to regulatory authority of the importing countries eliminating product declaration process which otherwise requires sample testing. Thus, it helps reduce trade barriers such as costs and time in conformity process as well as stimulate trade opportunities.

4.5 The ISO standards

The International Organization for Standardization (ISO) independent, federal non-government organization standard helps provide technical support and develop business functions. It is a global network that identifies what international standards are required by business, governments and society which develop in partnership with applicants sectors, and adopt them with transparency to be implemented world wide.²³ The standards are voluntary 'document agreement containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose' (ISO 2006). The organization also grants certification bodies to audit and monitor applicants such as Underwriter Laboratory (UL) and Management System Certification Institute (MASCI).

The ISO 9000 and 14000 are series of management system standards concerning the way in which organization manages its operation. ISO 9000 family addresses 'Quality management' overseeing whether everything has been done to ensure that products and services meet customer's requirements and satisfaction; issues such as leadership of management, organization' structure and decision making process, level of employee participation, and relationship with stakeholders. In Thailand 7,187 companies were certified as of October 2007 with

²³ On Aug 2006. ISO in brief (2006) see www.iso.org

100 new certificates by February 2008 (TISI 2008). However, certified bodies in EE sector remained unchanged.

ISO 14000 Series is a set of environmental management standard to help minimize the harmful affect on the environment caused by industrial activities, and to achieved continual improvement of its environmental performance consisting of Environmental Management Systems (EMS), Environmental Auditing and Related Environmental Investigations (EA), Environmental Labeling (EL), Environmental Performance Evaluation (EPE), Life Cycle Assessment (LCA), and Terms and Definitions (T&D). In Thailand 424 companies were certified as of October 2007 with 33 new registered companies by February 2008. Unfortunately, the EE sector figure did not change either (TISI 2008).

The ISO 26000 is being drafted with an aim to be an international standard providing “Guidelines for social Responsibility” and shall not be granted by the third party. The guidelines will be determined by consultation involving business, governments and activist organizations such as the human rights group Amnesty International, the environmental activist group Greenpeace and the anti-corruption campaigner Transparency International, according to the ISO's secretary-general, Alan Bryden.²⁴ Social responsibility core issues in the working draft text²⁵ are Environments, Human rights, Labour practices, Organizational Governance, Consumer Issues, Community Involvement / Social Development, and fair operating practices.

Although ISO standards may help provide practical solutions and guidelines. According to research interviews, it is also labor and financial intensive as well as time consuming. As a result one of the research case studies discontinued ISO certification but continued to operate in accordance with the standards.

²⁴ Herald Tribune March 15th 2006. Retrieved February 2, 2008 from <http://www.iht.com/articles/2006/03/15/news/rcorpiso.php>

²⁵ Report from the 4th ISO 26000 meeting in Sydney, Australia by (TEI 2007) see <http://www.tei.or.th/tbcds/csr/events/070522-ISO26000.pdf>