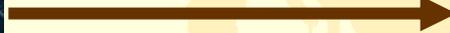


# Tracking Trends and Informing Actions

IEA Clean Energy Technologies Symposium  
Suntec City, Singapore  
2-3 November 2010

**BRIAN A. HITSON**

U.S. DOE Office of Scientific and Technical Information  
Chair, IEA Energy Technology Data Exchange



**"The calculus of innovation is really quite simple:  
Knowledge drives innovation;  
Innovation drives productivity;  
Productivity drives our economic growth."**

*(William Brody, President, Johns Hopkins University, 2005)*

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- *Energy RTD Information Systems in the European Research Area, European Commission, 2007*

# Energy and Environmental Records

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Energy planning, policy and economy

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Fuel Cells, energy storage/conversion

## Records

>1 million

698,611

556,554

427,497

210,457

197,692

78,594

78,170

# Renewable Energies

<u>Topic</u>	<u>Records</u>
Hydrogen	285,213
Solar or Photovoltaic	182,392
Biomass, biofuels, bioenergy	81,931
Wind	46,083
Hydro	35,846
Geothermal	34,920
Synthetic Fuels	29,538
Tidal and Wave	2,688
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	698,611

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Size	Title	Author (s)	Pub Date
<input type="checkbox"/>	<a href="#">Greenhouse gas emissions and energy balance of palm oil biofuel</a>	de Souza, Simone Pereira; Pacca, Sergio [Graduate Program on Environmental Engineering Science, School of Engineering of Sao Carlos, University of Sao Paulo, Rua Arlindo Bettio, 1000 Sao Paulo (Brazil)]; de Avila, Marcio Turra; Borges, Jose Luiz B. [Brazilian Agricultural Research Corporation (Embrapa - Soja) (Brazil)]	2010 Nov 15
<input type="checkbox"/>	<a href="#">Optimal planning of renewable energy-integrated electricity generation schemes with CO<sub>2</sub> reduction target</a>	Muis, Z.A.; Hashim, H.; Manan, Z.A. [Process Systems Engineering Centre (PROSPECT), Department of Chemical Engineering, Faculty of Chemical Engineering and Natural Resources, Universiti Teknologi Malaysia, Skudai 81310, Johor (Malaysia)]; Taha, F.M. [Department of Electrical Power Engineering, Faculty of Electrical Engineering, Universiti Teknologi Malaysia, Skudai 81310, Johor (Malaysia)]; Douglas, P.L. [Chemical Engineering Department, University of Waterloo Ontario (Canada)]	2010 Nov 15
<input type="checkbox"/>	<a href="#">Reassessing the "real scenario" regarding the environmental sustainability of palm oil</a>	Struebig, Matthew J. [School of Biological and Chemical Sciences, Queen Mary University of London, Mile End Road, London, E1 4NS (United Kingdom)]; Department of Biology, Universiti Brunei Darussalam, Ji. Tungku Link, Gadong BE1410, Bandar Seri Begawan (Brunei Darussalam)]	2010 Oct 15
<input type="checkbox"/>	<a href="#">Blends of biodiesels synthesized from non-edible and edible oils: Influence on the OS (oxidation stability)</a>	Sarin, Amit [Department of Applied Sciences, Amritsar College of Engineering and Technology, Amritsar 143001 (India)]; Arora, Rajneesh; Singh, N.P. [Punjab Technical University, Jalandhar (India)]; Sarin, Rakesh; Malhotra, R.K. [Indian oil Corporation Ltd., R and D Centre, Sector-13, Faridabad 121007 (India)]	2010 Aug 15
<input type="checkbox"/>	<a href="#">Will biofuel projects in Southeast Asia become white elephants?</a>	Sheng Goh, Chun; Teong Lee, Keat [School of Chemical Engineering, Engineering Campus, Universiti Sains Malaysia, Seri Ampangan, 14300 Nibong Tebal, Seberang Perai Selatan, Pulau Pinang (Malaysia)]	2010 Aug 15
<input type="checkbox"/>	<a href="#">Burning characteristics of palm-oil biodiesel under long-term storage conditions</a>	Lin, Cherng-Yuan; Chiu, Chu-Chiang [Department of Marine Engineering, National Taiwan Ocean University, Keelung 202 (China)]	2010 Jul 15

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**Full Text:**


Check availability note field for possible full text links.

**Title:** Sustainability of **palm oil** production and opportunities for Finnish technology and know-how transfer

**Creator/Author:** Panapanaan, V.; Helin, T.; Kujanpaae, M.; Soukka, R.; Heinimoe, R.; Linnanen, L.

**Research Org:** Lappeenranta Univ. of Technology (Finland). LUT **Energy**
**Publication Date:** 2009 Jul 01

**Report Number(s):** LUT/E-RR--1

**Resource Relation:** Other Information: 99 refs.

**Size/Format:** 116 p. pages

**Language:** English

**Description/Abstract:** The global demand for **palm oil** is growing, thus prompting an increase in the global production particularly in Malaysia and Indonesia. Such increasing demand for **palm oil** is due to **palm oil's** relatively cheap price and versatile advantage both in edible and non-edible applications. Along with the increasing demand for **palm oil**, particularly for the production of biofuel, is a heated debate on its sustainability. Ecological degradation, climate change and social issues are among the main sustainability issues pressing the whole **palm oil** industry today. **Clean** Development Mechanism (CDM) projects fulfilling the imperatives of the Kyoto Protocol are starting to gain momentum in Malaysia as reflected by the increasing registration of CDM projects in the **palm oil** mills. Most CDM projects in **palm oil** mills are on waste-to-**energy**, cocomposting, and methane recovery with the latter being the most common. The study on greenhouse gases (GHG) in the milling process points that biogas collection and **energy** utilisation has the greatest positive effect on GHG balance. On the other hand, empty fruit bunches (EFB) end-use as **energy** and high **energy** efficiency of the mill have the least effect on GHG balance of the mill. The range of direct GHG emissions from the **palm oil** mill is from 2.5 to 27 gCO<sub>2</sub>/MJ<sub>CPO</sub>, while the range of GHG emissions with all indirect and avoided emissions included is from -9 to 29 gCO<sub>2</sub>/MJ<sub>CPO</sub>. Comparing this GHG balance result with that of the EU RES-Directive suggests a further check on the values and emissions consideration of the latter. (orig.)

**Subject:** 09 BIOMASS FUELS; 54 ENVIRONMENTAL SCIENCES; BIOFUELS; DIESEL FUELS; **PALM OIL**; COMMERCIALIZATION; TECHNOLOGY TRANSFER; SUSTAINABLE DEVELOPMENT; GREENHOUSE GASES; ENVIRONMENTAL IMPACTS

**Availability:** Available in fulltext at <http://um.fi/URN:ISBN:978-952-214-758-5> or from Lappeenranta Univ. of Technology, P.O.Box 20, FI-53851 Lappeenranta, Finland

**Country of Publication:** Finland

**Resource/Doc Type:** Technical Report

**Coverage:** Miscellaneous

**Other Number(s):** OSTI ID: 967546; Other: ISBN 978-952-214-758-5; ISBN 978-952-214-737-0; TRN: FI0903305

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**Sustainability of palm oil production and opportunities for Finnish technology and know-how transfer**[Näytä kaikki kuvailutiedot](#)**Tiedostot**

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Julkaisun pysyvä osoite on <http://urn.fi/URN:ISBN:978-952-214-758-5>

<b>Nimeke:</b>	Sustainability of palm oil production and opportunities for Finnish technology and know-how transfer
<b>Tekijä:</b>	Panapanaan, Virgilio; Helin, Tuomas; Kujanpää, Marjukka; Soukka, Risto; Heinimö, Jussi; Linnanen, Lassi
<b>Muu tekijä:</b>	Lappeenrannan teknillinen yliopisto, Teknillinen tiedekunta / Lappeenranta University of Technology, Faculty of Technology
<b>Julkaisija:</b>	Lappeenranta University of Technology
<b>Päiväys:</b>	2009

The global demand for palm oil is growing, thus prompting an increase in the global production particularly in Malaysia and Indonesia. Such increasing demand for palm oil is due to palm oil's relatively cheap price and versatile advantage both in edible and non-edible applications. Along with the increasing demand for palm oil, particularly for the production of biofuel, is a heated debate on its sustainability. Ecological degradation, climate change and social issues are among the main sustainability issues pressing the whole palm oil industry today. Clean Development Mechanism (CDM)

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**Full Text:**


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**Title:** Saving **energy** and reducing pollution by use of emulsified **palm**-biodiesel blends with bio-solution additive

**Creator/Author:** Chen, Kang-Shin; Lin, Yuan-Chung [Institute of Environmental Engineering, National Sun Yat-Sen University, Kaohsiung 804 (China)]; Hsieh, Lien-Te [Department of Environmental Science and Engineering, National Pingtung University of Science and Technology, Pingtung 912 (China)]; Lin, Long-Full [Department of Environmental Engineering, Kun Shan University, Tainan County 710 (China)]; Wu, Chia-Chieh [Postgraduate Programs in Management, I-Shou University, Kaohsiung County 840 (China)]

**Publication Date:** 2010 May 15

**Resource Relation:** Journal Name: **Energy** (Oxford); Journal Volume: 35; Journal Issue: 5; Other Information: Elsevier Ltd. All rights reserved

**Size/Format:** page(s) 2043-2048

**Language:** English

**Description/Abstract:** Advances in biodiesel, emulsified diesel and artificial chemical additives are driven by consumer demand to save **energy** and reduce emissions from diesel engines. However, the effect of emulsified bio-solution/**palm**-biodiesel/diesel blends in diesel engines has not been assessed. Experimental results in this work demonstrate that the emulsified bio-solution/**palm**-biodiesel/diesel blends have the advantage in saving **energy** and reducing emissions of both polycyclic aromatic hydrocarbons (PAHs) and particulate matter (PM) from diesel engines. When comparing with P0 (premium diesel fuel as base fuel), E16P20 fuel (16 vol% bio-solution + 20 vol% **palm**-biodiesel + 64 vol% P0, an additional 1 vol% surfactant) saved 12.4% fuel consumption and reduced emissions of PM by 90.1%, total PAHs by 69.3%, and total BaP[sub eq] (benzo[a]pyrene equivalent concentration) by 69.6%. Emulsified **palm**-biodiesel with bio-solution can be considered as a clean and alternative fuel. (author)

**Subject:** 33 ADVANCED PROPULSION SYSTEMS; DIESEL FUELS; SOLUTIONS; DIESEL ENGINES; BIOFUELS; POLYCYCLIC AROMATIC HYDROCARBONS; MIXTURES; **PALM** OIL; ADDITIVES; PYRENE; EMULSIONS; FUEL CONSUMPTION; AIR POLLUTION ABATEMENT; SURFACTANTS; PARTICULATES; **ENERGY** CONSERVATION

**Related Subject:** Bio-solution additives

**Availability:** Available from: <http://dx.doi.org/10.1016/j.energy.2010.01.021>
**DOI:** <http://dx.doi.org/10.1016/J.ENERGY.2010.01.021>
**Country of Publication:** United Kingdom

**Resource/Doc Type:** Journal Article

**Other Number(s):** OSTI ID: 21318297; Journal ID: ISSN 0360-5442; ENE

**Source:** GB; RN10062619; TVI: 1010

**Announcement Date:** 2010 Jun 17

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Volume 35, Issue 5, May 2010, Pages 2043-2048

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## Saving energy and reducing pollution by use of emulsified palm-biodiesel blends with bio-solution additive

Kang-Shin Chen<sup>a</sup>, Yuan-Chung Lin<sup>a</sup>,  , Lien-Te Hsieh<sup>b</sup>, Long-Full Lin<sup>c</sup> and Chia-Chieh Wu<sup>d</sup><sup>a</sup> Institute of Environmental Engineering, National Sun Yat-Sen University, Kaohsiung 804, Taiwan<sup>b</sup> Department of Environmental Science and Engineering, National Pingtung University of Science and Technology, Pingtung 912, Taiwan<sup>c</sup> Department of Environmental Engineering, Kun Shan University, Tainan County 710, Taiwan<sup>d</sup> Postgraduate Programs in Management, I-Shou University, Kaohsiung County 840, Taiwan

Received 8 October 2009; revised 18 December 2009; accepted 19 January 2010. Available online 15 March 2010.

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Full Text:



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**Title:** The Politics of Nuclear Power and Waste Storage in Asia

**Creator/Author:** Sovacool, Benjamin (National Univ. of Singapore (Singapore)), e-mail: bsovacool@nus.edu.sg

**Research Org:** Center for Public Sector Research (CEFOS), Univ. of Goeteborg, Goeteborg (Sweden)

**Publication Date:** 2010 Sep 15

**Resource Relation:** Conference: Managing Radioactive Waste. Problems and Challenges in a Globalizing World; 15-17 Dec 2009; Goeteborg (SE); Other Information: Conference Literature; 118 refs., 3 tabs.

**Size/Format:** 33 p.

**Language:** English

**Description/Abstract:** A complex interplay of social, economic, and political factors makes anticipating the scale and scope of nuclear power expansion difficult for both established and aspiring nuclear nations. In response, this article investigates the forms of social, political, and economic organization conducive to nuclear power expansion. We define 'socio-political economy' as the dynamic forces of state and society which influence the nuclear power industry. We begin by developing a theoretical framework of nuclear socio-political economy based primarily upon the evolution of nuclear energy in France (with supplemental insights from the former Soviet Union, United Kingdom, and United States). This emergent framework posits that strong state involvement in guiding economic development, centralization of national energy planning, campaigns to link technological progress to a national revitalization, influence of technocratic ideology on policy decisions, subordination of challenges to political authority, and low levels of civic activism were influential factors in supporting the expansion of nuclear power in France. These six catalysts create conducive conditions in unique ways. First, a history of strong government intervention in guiding the direction of economic development is a requisite condition seemingly because nuclear power is a 'socio-technically inflexible' technology that requires a high degree of supply chain coordination which only the government is capable of unifying. Second, a highly centralized energy sector infuses the requisite control for planning and implementing a sustained expansion of nuclear power in the midst of a politicized environment. Third, the presence of a government strategy that attempts to link technological developments to a national renaissance fosters the formation of a national culture which tolerates risks associated with risk-prone technologies. Fourth, the dominance of a technocratic approach to policymaking appears to provide the necessary ideological support for the development of nuclear power aspirations. Fifth, conditions which minimize political and public debate over proposed government programs seem to enable governments to seamlessly make the jump from agenda item to nuclear power development program implementation in a less contentious manner. Sixth, conditions which keep civic activism to a minimum appear to help government planners avert high levels of public opposition which can threaten to derail nuclear power program development. We seek to validate the causal properties of these six catalysts for nuclear power expansion by testing for their presence during the main nuclear power developmental periods in India and China, two Asian nations that have significant levels of installed nuclear power capacity and ambitious plans for expansion. If these catalysts are 'influential' for factoring the expansion of nuclear power programs, they should be present in

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**Full Text:**  Check availability note and/or DOI field for possible full text links.

**Title:** Fourteen lessons learned from the successful nuclear power **program** of the Republic of Korea

**Creator/Author:** Choi, Sungyeol; Hwang, IlSeon [Department of Nuclear Engineering, Seoul National University, Shillim-dong, Gwanak-gu, Seoul 151-742 (Korea)]; Jun, Eunju [International Strategic Studies Division, KAERI, 1045 Daedukdaero, Yuseong, Daejeon 305-353 (Korea)]; Starz, Anne; Mazour, Tom [Nuclear Power Engineering Section, Department of Nuclear Energy, International Atomic Energy Agency, Vienna (Austria)]; Chang, SoonHeung [Department of Nuclear and Quantum Engineering, KAIST, Guseong-dong, Yuseong-gu, Daejeon, 3052-704 (Korea)]; Burkart, Alex R. [Office of Nuclear Energy, Safety, and Security, Bureau of International Security and Nonproliferation, US Department of State, 2201 C Street, N.W. Washington, D.C. 20520 (United States)]

**Publication Date:** 2009 Dec 15

**Resource Relation:** Journal Name: Energy Policy; Journal Volume: 37; Journal Issue: 12; Other Information: Elsevier Ltd. All rights reserved

**Size/Format:** page(s) 5494-5508

**Language:** English

**Description/Abstract:** This paper summarized a development history and lessons of Korean nuclear power infrastructures from the beginning of the nuclear power **program** in 1956 to the localization of complete scope of PWR technology in 1990. The objective of this paper is to show the guideline on the issues that the development of a national infrastructure for nuclear power using the realistic experiences in order to help the developing countries newly starting nuclear power **program** as a long-term energy supply option. Development strategies and lessons learned from the successful Korean experience have been presented based on milestones structure of IAEA in order to help decision makers, advisers, senior managers and national planners of nuclear power **program**. Lessons for national nuclear power **programs** include considerations before launching a **program**, preparation and decision making, and the construction of the first nuclear power plant. Scope of these lessons includes knowledge and human resources management, financial and industrial infrastructure development, nuclear safety, legislative and regulatory experiences, fuel cycle and waste management, international cooperation. Fourteen lessons learned either positive or not are derived from the Korean case and are suggested for incorporation in the IAEA's efforts in support of developing countries' development of nuclear infrastructure and planning. (author)

**Subject:** 29 ENERGY PLANNING, POLICY AND ECONOMY; NUCLEAR POWER; REPUBLIC OF KOREA; WASTE MANAGEMENT; NUCLEAR POWER PLANTS; PWR TYPE REACTORS; INTERNATIONAL COOPERATION; DECISION MAKING; FUEL CYCLE; RADIATION PROTECTION

**Availability:** Available from: <http://dx.doi.org/10.1016/j.enpol.2009.08.025>

**DOI:** <http://dx.doi.org/10.1016/J.ENPOL.2009.08.025>

**Country of Publication:** United Kingdom

**Resource/Doc Type:** Journal Article

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**Full Text:**  Check availability note field for possible full text links.

**Title:** Preliminary investigation of the potential of harnessing tidal energy for electricity generation in Malaysia

**Creator/Author:** Lee, K.S., Seng, L.Y. [Tunku Abdul Rahman Univ. (Malaysia). Dept. of Electrical and Electronic Engineering]

**Research Org:** ACTA Press, Calgary, AB (Canada); International Association of Science and Technology for Development, Calgary, AB (Canada)

**Publication Date:** 2008 Jul 01

**Resource Relation:** Conference: The 8. IASTED European conference on power and energy systems (EuroPES 2008), Corfu (Greece), 23-25 Jun 2008; Other Information: PDF 608-801 from track on **energy efficiency** and environment; Available for purchase online, for viewing with Adobe Reader; Related Information: In: Proceedings of the 8. IASTED European conference on power and energy systems (EuroPES 2008), by Bourkas, P.D. [National Technical Univ. of Athens (Greece)] (ed.), 427 pages.

**Size/Format:** page(s) 1-6

**Language:** English

**Description/Abstract:** Malaysia relies heavily on fossil fuels to meet its energy demands. However, Malaysia has started to explore the use of other forms of renewable energy such as solar energy, biofuels and tidal power. This paper focused on the potential of harnessing tidal energy in Malaysia for electricity production. There are several sites with great potential for tidal energy conversion, which could supplement the energy needs of Malaysia while reducing greenhouse gas emissions. Illustrations were included to show the amplitude of the main harmonic component of the tidal range around Malaysia. The main harmonic component found in the region has a maximum amplitude of 1.4 m, confirming the potential of tidal energy in Malaysia's Ocean. Since the tidal cycle is highly predictable, it has the potential to be a very reliable renewable energy source. Two main approaches are being researched internationally to harness the energy from tides, notably the barrage approach and the tidal stream approach. For the barrage approach, a physical barrier is created within the sea, and a sluice gate controls the flow of sea water. In the tidal stream approach, horizontal axis turbines are placed in the path of tidal currents to generate electricity, similar to the operation of wind turbines. This paper described the flow velocity, power output, availability of power supply and monthly yield of turbines using both the barrage and tidal stream approaches. The study showed that for the barrage approach, there are 6 sites in Malaysia where 14,970 kWh of energy can be generated monthly with a single turbine with a 5 m long blade. The tidal stream approach showed equally promising results at 2 sites. It was concluded that tidal energy is a promising form of renewable energy because of its cyclic, reliable and predictable nature and the vast energy contained within it. According to United Kingdom Department of Trade and Industry, 10 per cent of the United Kingdom's electricity needs could be met by tidal power. Tidal fences have been installed in the straits of San Bernardino in the **Philippines**. As a neighbouring country, Malaysia may also have a huge potential for tidal energy. 20 refs., 5 tabs., 8 figs.

**Subject:** 24 POWER TRANSMISSION AND DISTRIBUTION; 16 TIDAL AND WAVE POWER; POWER SYSTEMS; TIDAL POWER; RESOURCE ASSESSMENT; ELECTRICITY; YIELDS; ENERGY SOURCE DEVELOPMENT; MALAYSIA

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**Full Text:**  [Check availability note and/or DOI field for possible full text links.](#)

**Title:** Fast market penetration of energy technologies in retrospect with application to **clean** energy futures

**Creator/Author:** Lund, P.D. [Aalto University School of Science and Technology, Advanced Energy Systems, P.O. Box 14100, FI-00076 AALTO (Espoo) (Finland)]

**Publication Date:** 2010 Nov 15

**Resource Relation:** Journal Name: Applied Energy; Journal Volume: 87; Journal Issue: 11; Other Information: Elsevier Ltd. All rights reserved

**Size/Format:** page(s) 3575-3583

**Language:** English

**Description/Abstract:** The fast penetration of energy **technologies** in the past was analyzed and applied to investigate the prospects of new energy **technologies**. The results show that single energy sources have obtained quite a dominant position in the past. In the USA, at one time both oil and coal each represented over half of all the yearly additions to energy capacity for more than half a century and reached a dominant position in overall energy production. Oil showed a similar dominance on a global scale. For two decades nuclear power represented one third of all the new electricity added worldwide and over 60% in the countries possessing nuclear power. In some countries nuclear grew to around half of all electricity in less than just 10 years. Applying these empirical observations to new renewables and assuming similar growth conditions as for the old **technologies**, the share of renewable electricity could grow from its present 19% to 60% by 2050, which would drop the baseline CO<sub>2</sub> emissions by 27%. The share of new renewables of all electricity would come up to 42%. The rate of adoption of these new **technologies** would not exceed that of oil or nuclear in the past, but they would need to dominate new electricity investments from 2030 onwards. A hypothetical fast-track case for solar photovoltaics, assuming an expansion similar to that seen in the case of nuclear and oil, would lead to a 20-25% share of all electricity in 2050. An important observation is that the fast and high penetration of energy **technologies** implies, in most cases, a full lock-in into these, requiring a preferential position regarding investments and a favorable long-term policy framework. (author)

**Subject:** 11 NUCLEAR FUEL CYCLE AND FUEL MATERIALS; 14 SOLAR ENERGY; 29 ENERGY PLANNING, POLICY AND ECONOMY; 54 ENVIRONMENTAL SCIENCES; OILS; NUCLEAR POWER; COAL; ELECTRICITY; RENEWABLE ENERGY SOURCES; CARBON DIOXIDE; LEAD; MARKET; PARTICLE TRACKS; PHOTOVOLTAIC EFFECT; INVESTMENT; USA; CAPACITY; EMISSION; EXPANSION; GROWTH

**Related Subject:** Market penetration; Fast-track; New energy **technologies**; Energy history; Nuclear power; Renewable energy

**Availability:** Available from: <http://dx.doi.org/10.1016/j.apenergy.2010.05.024>

**DOI:** <http://dx.doi.org/10.1016/J.APENERGY.2010.05.024>

**Country of Publication:** United Kingdom

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**Title:** Implications of using clean technologies to power selected **ASEAN** countries

**Creator/Author:** Das, Anjana; Ahlgren, Erik O. [Department of Energy and Environment, Chalmers University of Technology, 412 96 Goeteborg (Sweden)]

**Publication Date:** 2010 Apr 15

**Resource Relation:** Journal Name: Energy Policy; Journal Volume: 38; Journal Issue: 4; Other Information: Elsevier Ltd. All rights reserved; Energy Security - Concepts and Indicators with regular papers

**Size/Format:** page(s) 1851-1871

**Language:** English

**Description/Abstract:** This paper focuses on energy system development of the three largest Association of South East Asian Nations (**ASEAN**) countries: Indonesia, Philippines and Vietnam. The energy infrastructures in these countries are in the process of rapid development and, therefore, technology choices are critical. Applying the energy system model MARKAL and scenario analysis, this paper examines and quantifies the role of clean and advanced energy technologies for efficient local resource exploitation and improving energy security and environmental conditions. The main focus is on the power sector and the paper also addresses the potential **ASEAN** markets for European energy technologies. The paper concludes that there is a large potential market for clean and advanced energy technologies in the studied countries. If adopted, these technologies will bring several benefits like reduction in primary energy requirement, reduced investments requirement in the power sector and other parts of the energy infrastructure, reduced import of primary energy, reduced CO<sub>2</sub> emissions and local pollution, reduced energy system costs and marginal cost of electricity supply. Finally, barriers for transfer and diffusion of advanced energy technologies are discussed. (author)

**Subject:** 29 ENERGY PLANNING, POLICY AND ECONOMY; CARBON DIOXIDE; ENERGY SYSTEMS; VIET NAM; COST; IMPORTS; INDONESIA; MARKET; PHILIPPINES; RESOURCE EXPLOITATION; ELECTRICITY; EMISSION; INVESTMENT; SECURITY; SIMULATION; M CODES; TECHNOLOGY ASSESSMENT

**Availability:** Available from: <http://dx.doi.org/10.1016/j.enpol.2009.11.062>

**DOI:** <http://dx.doi.org/10.1016/J.ENPOL.2009.11.062>

**Country of Publication:** United Kingdom

**Resource/Doc Type:** Journal Article

**Other Number(s):** OSTI ID: 21318143; Journal ID: ISSN 0301-4215; ENPYAC; TRN: GB10V0700

**Source:** GB; RN10062465; TVI: 1010

**Announcement Date:** 2010 Jun 17

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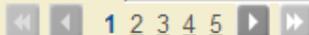
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1

[Thin film solar cells](#)

★★★★★ *Klenk, R.; Schock, Hans W.*

Proceedings of SPIE

Within a comparatively short time the research on [thin film solar cells](#) has led to photovoltaic conversion efficiencies exceeding 16% which makes this ... well as the electronic structure of the [cell](#).

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2

[Solar panel with corrugated thin film solar cells](#)

★★★★★ *ZWANENBURG ROBERT [NL]*

2003-01-02

[Esp@cenet's Worldwide Patent Database](#)



3

[Thin film amorphous silicon solar cells](#)

★★★★★ *Corporate author(s) and publication years;; European Commission*

1982-01-01

[EU Bookshop](#)



4

[Thin Film Solar Cells Derived from Sintered Semiconductor Quantum Dots: Cooperative Research and Development Final Report, CRADA number CRD-07-00226](#)

★★★★★ *Ginley, D. S.*

The NREL/Evident team will develop techniques to fabricate [thin film solar cells](#) where the absorption layers comprising the [solar cells](#) are derived from sintered semiconductor quantum dots.

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5

[Thin film cadmium telluride, zinc telluride, and mercury zinc telluride solar cells](#)

★★★★★ *Chu, T.L. (University of South Florida, Tampa, FL (United States))*

This report describes research to demonstrate (1) [thin film cadmium telluride solar cells](#) with a quantum efficiency of 75% or higher at 0. ... efficiency of 11.5% or greater, and (2) [thin film](#)

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# ETDE Membership

- **Task-sharing:** prepare and submit records of energy RTD activities published within the member country (from journals, technical reports, conference proceedings, books, etc.), including full text when available.
- **Cost-sharing:** make contribution to cover annual cost of the exchange (i.e., primarily, ETDEWEB), consisting of “base” fee and “additional” contribution (related to national energy R&D expenditures relative to other member countries).
- Contracting party has right to determine ETDEWEB access policies and any fees within its national borders.

# Conclusion

- Becoming a member in ETDE will:
  - ✓ Increase national research capabilities
  - ✓ Provide a sound basis for decision-making
  - ✓ Drive innovation

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