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Clean and Renewable Energy Re-Sourcing for Sustainable Development: Contesting Ideologies and Differential Strategies towards Eco-Modernity?

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Abstract

In spite of the controversies and disappointments on the 15th United Nations Climate Change Conference (COP15), 7-18 December 2009, it is instrumental to main-streaming eco-development initiatives for clean, renewable energy. Against the backdrops for next treaty for climate change (COP16), this paper examines initiatives for eco-innovations, synergy of alternative-clean energy for local self-sufficiency, with focus on the process for green energy sourcing. Using case studies from Asia-Pacific and taking the Risk Society (Ulrich Beck) debates, it examines the intertwined dynamics of technological innovations for clean technology and socio-cultural conditions and for bio-local-regionalism. After an introduction on recent re-discovery of alternative-clean energy paradigm, Part 2 of the paper examines clean and renewable energy development strategies; followed by Part 3, which critically discuss the embeddedness of alternative-clean energy paradigm, with specific reference to socio-ethical-cultural construction(s) of concepts of sustainability and self-sufficiency. It ends with remarks on the nexus between people and energy uses – the interfacing process between the praxis of bio-regionalism and the search for energy inter-dependence.

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1. Clean Energy Sourcing in Risk Society under Climate Change

The United Nations' climate change summit in Copenhagen (COP15; 7-18.December 2009) disappointed not just environmentalists and political leaders, but global society at large, by failing to produce a legally binding treaty on reducing greenhouse gas such as carbon dioxide. Historically, it is a double-failure of the United Nations' initiatives on Climate Change, following by the diplomatically sound-good but politico-policy weak declarations of both the Bali Conference on Climate Change (3-14.December 2007).[1] More specific, the post-Copenhagen preparative meetings for United Nations Framework Convention on Climate Change (UNFCCC), have been repeatedly toning down for a "flexible" and "comprising" approach for achieving something just for non-legally biding agreement for Cancun (Mexico) Climate Change Summit (COP16), 29.November to 10.December 2010 – and it will be likely the case, while he next hope will be another round of talks for Climate Change Summit in South Africa 2011....

The inertia against "the global solution for global problem" is ironically demonstrated also by well participation of the emerging economies, like the BRICS (Brazil, Russia, India and China, South Africa) countries and the once reluctant participant for global governance for climate change, U.S.A. Here, the role of BRICS has particularly critical in shaping global warming that since 2007, the BRICS countries, representing one-fourth of the world GDP, have contributed to over 30% of global energy use and 33% of CO_2 emissions from fuel combustion (IEA 2009a/b). At the very least, they are the growth engines, requiring more energy, emitting more greenhouse gas, for (or against?) global development.

Human agency driven global climate change redefines socio-economic and ecological risks. *Risks*, embedded in modern society, are structurally shaped by (yet also shaping) the societal linkages and community dynamics. The new configuration of risks, in contrast to natural disasters, is the involvement of people (as agency) -cum-new (say, in energy, material, bio-chemical and information related) technologies. In the pre-modern time, natural disasters related human casualties were interpreted (and also reinforced by religious belief) as a result of *Mother Nature*.

Global climate change can also be viewed as *Normal Accidents* (insightfully coined by Charles Perrow 1984) in technology disasters – risks being materialized into their worst form, they have been only limited explained by, and are managed within, a set of rational and scientific modelling in this phase of modernity; but rarely be dealt with totally by human society. At this historical conjuncture, it is appropriate to describe our present form of problematic modernity as *Risk Society* (Beck 1992). The contours of the risk paradigm are characterized by *Technology-Environment Interfacing Problem*, with invisibility, omnipotent

1) See http://unfccc.int/2860.php and http://unfccc.int/meetings/cop_15/items/5257.php, for the COP15 and COP16.

power of risks, plus the multiplication of techno-risks at geometrical rate and exponential scale. The case of Chernobyl exemplified such techno-syndrome.

Obviously, the *normal accidents*, in modern era, can rarely be explainable in spiritual nor (alternatively) devil terms, but only by people-made. Yet, the differential conceptions on risks and the communications of them are very much embedded in the time and location-specific cultural context (Douglas & Wildavsky 1982) and in the modern world, the state agency's definition on risk acceptability (Clarke 1989). In short, risks and people-made disasters are the inevitability of modern production and consumption system: climate change hence is irreversible!

Societal responses to local environmental risks have been quite diverse, contradictory yet counter-productive: location specific appeals for Not-In-My-Back Yard (NIMBY), Not-In-Other's Back Yard (NIOBY) and Best-Appropriate Back Yard (BABY). But global climate change has blockaded the "exit" and "distancing" strategies of human agencies: none of us can escape from global warming!

International agencies' initiatives under the framework of the United Nations and European Union are becoming important, as a last resort! The greening of market may attribute to individuals' commitment to *Save the World* - with the motto of *Think Globally and Act Locally*, for individual's health and quality of life: Lifestyle of Health and Sustainability (LOHAS). Under a new global green fashion, the quest for sustainable development has shaped the market conditions significantly (cf. Lai 2004, 2008a/b).

But, for Copenhagen Summit, 193-countries' diplomatic "consensus" at COP15 is not strong enough for moving any legal-binding policy mechanism for reducing greenhouse gas, nor a system, target and timeline for reducing emissions. Literally there is lack of global policy structure for combating climate change in post-Kyoto era (Crooks 2010). Hence, the embedded global risks of climate change have to be individually coped with by human communities (cf. Beck 1992, 2006).

This is indeed problematic for sustainability of the Earth. But because of this conundrum, the importance of developing alternative clean energy, undertaken by different agencies at different geo-spatial scale, regional, national and community levels, is therefore critical for our survival. This brief attempts to examine potentials and prospects of renewable energy re-sourcing in Asia-Pacific.

Population and economic growth demand energy -- this is particularly in Asia-Pacific, led by its *Economic Miracle* since 1970s and more recently, China's hyper-development and Indian economic renaissance (ADB 2010). The trend is also reflected by recent dramatic increase of global energy and mineral prices, juxtaposing the depletion of natural resources, with ever-increasing demands from the newly industrializing economies (NIEs). The limits of existing (and potential) energy sources, as well as their environmental impacts, have been articulated alongside with the climate change, with the changing paradigm to search for alternative, eco-friendly, energy re-sources, to replacing the fossil-fuel consumption. A shift

to alternative and renewal energy sources is more than obvious at global and local levels – this is self evident by the footprints of G7 and BRICS political leadership' energy re-sourcing trips in the last decade: where they visit and commit the budget for energy re-sourcing.

At global level, major sources of greenhouse gas are from, in terms of contributory ranking: power plants (in developed economies): 24%, slash-and-burn land clearance and deforestation (mostly in the developing ones): 24%, industrial production: 14%, transport: 14%, and agriculture: 14%, and domestic household: 8%. This pattern of greenhouse gas emissions reflects that global warming is much shaped by modernizing or westernization of lifestyle in the developing ones – recently, the international climate panel has confirmed the irreversible trend for global warming (IPCC 2007).

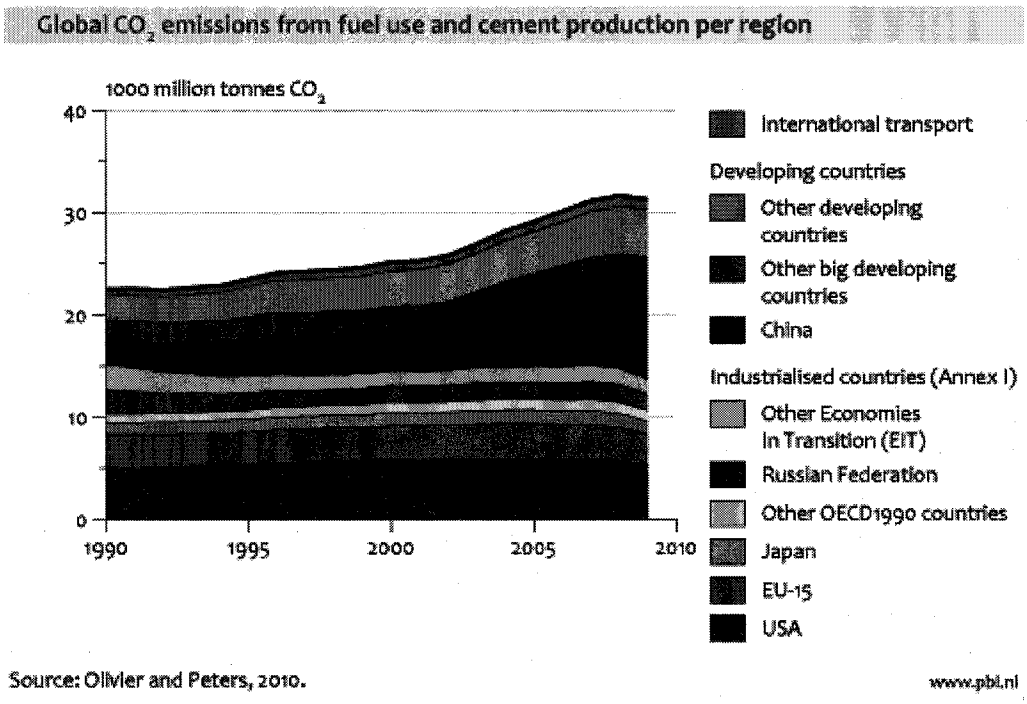
According to the estimates by International Energy Agency (IEA, 2009a/b, 2010a/b), major CO_2 emission countries: in total terms (millions of tonnes) used to be USA, and Japan in the early 1990s, but the new league table for 2008 is: China, USA, Russia, India, Japan, Germany, Canada, U.K., Iran and South Korea; and for CO_2 emissions per capita terms: USA, Canada, Russia, South Korea, Germany, Japan, U.K., Iran, China and India (Fig.1 and Fig.2).

Fig.1: Major CO_2 Emission Countries (2008)

Country	Million tonnes	per capita tonne (2008)	Per capita Change (1990-2008)
China	6,602	4.9	152%
USA	5,684	18.4	-5.6%
Russia	1,662	11.3	-23.7%
India	1,459	1.3	80%
Japan	1,197	9.0	4.7%
Germany	802	9.8	-18.3%
Canada	530	16.5	5.9%
United Kingdom	522	8.3	-13.3%
Iran	515	7.0	111%
South Korea	513	10.3	22.4%

(Source: IEA, 2010b)

Fig.2: Global CO_2 Emissions



More specific and worrying fact is that CO_2 emissions in China have more than doubled, and in India have increased by more than half for the period 2000 to 2008. And since 2008, China has been implementing a large economic stimulus package over a two-year period -- including investment in transport infrastructure and in rebuilding Sichuan communities devastated by the 2008 earthquake. Consequently, in 2009, CO_2 emissions in China jumped by 9% to 8.1 billion tonnes -- though China has doubled its installed wind and solar power capacity for the fifth year in a row. Whilst, India's increasing domestic demand (for fossil fuels energy) – making up three-quarters of the national economy, is relatively unaffected by the credit crunch. The Indian emissions continued to increase in 2009 by 6% to 1.7 billion tonnes of CO_2 it has now surpassed Russia as the fifth largest CO2 emitter (Grinzo 2010).

Contrasting the failure of the Climate Change Congress in Bali and COP15 to make quantitative quota for controlling green house gas emissions, the European Commission will adopt a tougher measure to tackling carbon emissions – the so-called *20-20-20-2020 targets*: 20% reduction of CO_2 emissions by 2020 (base year 1990), 20% of RU energy consumption come from clean and renewable resources, and 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.

Given the trend that transport-related CO_2 emissions in European Union grew by one-third between 1990 and 2005 and, in 2007, constituted 27% of the EU total, cars and vans were responsible for about the half (the Economist, 19.December 2007). The reduction of CO_2 is

slow in the last decade: about 1.5% a year rather than the 3% needed to meet the voluntary target of 140g/km by 2008 that the industry agreed to at the beginning of t his millennium; in 2007 Europe's cars still emitted an average of about 160 grams of CO_2 per kilometre (g/km). The European Commission is therefore insisting that by 2012, the fleet-average emissions from new cars sold in the EU must not exceed 130g/km, with another 10g/km reduction coming from other sources, such as low rolling-resistance tyres, more efficient air-conditioning and greater use of biofuels.

To mitigate greenhouse gas emissions, international policy learning and cross-border initiatives for sustainable future are important, juxtaposing transnational mobilizations for socio-ecological justice advocacies (Lai 2008b). More importantly, it has rightly pointed out that, in a globalization era, there is inter-play of local social agencies, national and (sub-) regional institutions, in shaping regional-global policy agenda (setting): the leading role (modelling) of the EU *20-20-20 targets* to mitigating CO_2 emissions is critically complex in geopolitics terms - neither fully national, nor fully transnational, with a multiplication of specialised trans-local orders that crisscross the old borders (Sassen 2008). Yet, for the EU, multilateralism for global and coordinated approach for Climate Change, within the UN framework, remains the core, preferred and only feasible option – in addition to its *20-20-20-2020 targets* policy commitment. More specific, the EU has additionally pledged a contribution of 2.4 billion Euros annually from 2010 to 2012, as a quick capital injection for preparing for the implementation of the new, multilateral climate change agreement (transitions from COP15 to COP16).

2. Re-Sourcing and Securing Clean Energy: Differential Scenarios and Strategies

The 2008-2009 global financial crisis affected global consumption of energy less than the expected (IEA 20101/b). Asia-Pacific region has been still, and will be, booming on energy consumption: in addition to economic dynamism of China and India that will generate more demand for energy consumption, Southeast Asia's energy demand will expand by 76% in 2007-2030, according to *World Energy Outlook 2009* (ADB 2010, IEA 2009a) – hence, it is almost certain that the robust and continuing energy demand in Asia-Pacific will not just drive the re-sourcing, production and consumption beyond its regional boundaries, but also shaping the course of energy-driven climate change globally. For instance, China and India become the top buyers for not just global energy end-products of coal, oil and natural gas, but also the energy companies and the ownership of energy-sources as well (*Financial Times*, 19.May 2010). And the new challenge is how to use clean and renewable energy to make less environmental damages, mitigating global climate change

Confronting global climate change and warming, human societies are moving towards an ecologically reflexive orientation, towards sustainable development (Beck 1992, 2006). Hence, it is the developmental trend from the pro-growth one to the post-material,

and sustainability one, respecting not just human rights but also animal rights and bio-diversity (CBD 2010, Lai 2008b). The search for green and renewable energy sourcing has paradoxically brought back, or the rejuvenation of, the once risky nuclear energy – the International Energy Agency (IEA) has projected that it will account for 10% of global energy sourcing in 2030 (IEA 2009a). In 2010, there are total 436 nuclear power plant; and 57 are newly commissioning or in the building stage: 11 new nuclear plants were completed in 2009, and the average commissioning rate of one to six new nuclear plant(s) every year from 1995 to 2010 (Fig.3). But the problem for nuclear energy is not just its high costing infrastructure building and de-commissioning, but also its risks radiate beyond nuclear power plant as shown in regional disasters of Chernobyl and Three Miles Island. More problematic, there is mis-matching of nuclear power plant expansionary needs for professionals and the reduction (attrition) of nuclear expert for up-keeping the existing and new stock of nuclear power plants: from 2010 to 2025, years, 50% of nuclear experts will be retired -- due to the stoppage of nuclear power development in mid-1980s (after 1985 Chernobyl disaster), that has driven the under-development of staffing / training of nuclear expertise.

Fig.3: Global Nuclear Power Plant

Nuclear Power Plant by Selected Asian Countries

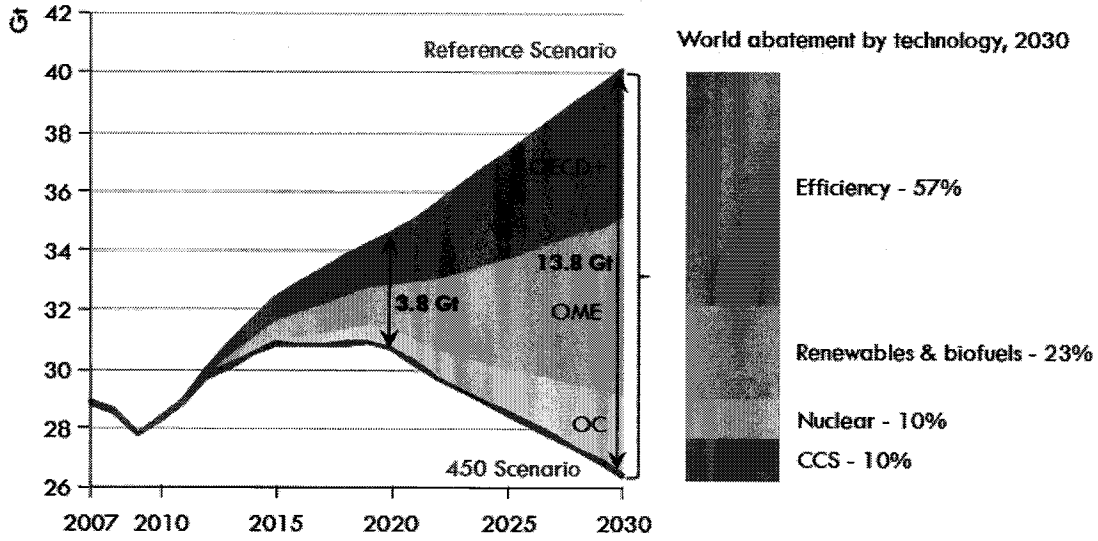
Japan:	54 (1)
S.Korea:	20 (6)
Taiwan:	6 (2)
China:	11 (23)
Russia:	32 (9)
India:	19 (4)
Pakistan	2 (1)

** Global Total: 436 (in building/completing stage: 57)
(Source: *Kobe Shimbun* 17.May 2010, p.8.)

For re-sourcing clean and renewable energy, there are contesting ideologies and strategies. To mitigate climate change and securing a sustainable development course, both international governmental organizations (IGOs), like International Energy Agency (IEA), and non-governmental organizations (NGOs) like the *Greenpeace International*, have been proposing

new strategies to increase the energy efficiency through better technological know-how and the shift from the existing energy sources to the alternative, clean and renewable, ones, to cap global climate change from the "status quo" of the 6 degree Celsius increase to the 2 degree Celsius. For the IEA, it is the so-called *450 scenarios* (capping the CO_2 within the 450 parts per million /ppm) with a mix of energy technological advancement – like the efficient use of energy, redeveloping nuclear energy and the use of new technology -- carbon capture and storage [CCS] (which has never been operated at mass and commercial scale), and the shift to renewable energy and biofuels (IEA 2009a/b, 2010a/b; Fig.4). But other advocacies have doubted the contribution of CCS and nuclear energy – which needs to be developed at a very fast rate of one nuclear power plant being commissioned every month up to 2030. For instance, *Greenpeace International* promotes their *[R]evolution* strategy which stresses for a fundamental shift of lifestyle (towards LOHAS, hence reducing yet smart energy consumption), decentralizing of energy sourcing and the use of alternative, clean and renewable energy, with better green policy guidance and incentives (Greenpeace 2008a/b).

Fig. 4: World Abatement of Energy related CO_2 Emissions



(Source: IEA 2009a)

The mitigating approaches for Climate Change, hence energy policy initiatives proposed by the IEA (2009a/b) and Greenpeace International (Greenpeace 2008a/b) are highly differentiated – reflecting and underpinning the underlying ideologies and worldviews. Two major differences are obvious: firstly, on the use of nuclear energy that the IEA predicted it

will take up to 10% of the world energy supply, whilst *Greenpeace International*, taking into the problems of commissioning and de-commissioning of nuclear power plant, noted that it will only contribute to circa 2% of the world energy supply. Another point of the debate is on the use of carbon capture and storage technology (CCS) which is still at experimental stage, IEA predicted that it will contribute to 10% of the carbon dioxide emissions, but Greenpeace International doubted this un-tested, non-commercialized, nor mass scale application of the CCS technology in the coming decades.

In spite of their different policy advocacies, both the IEA and *Greenpeace International* have consensus on the efficient use of the existing energy sourcing, shifting away from fossil fuels (coal, oil and gas) -- or within the fossil fuels sector (from coal and oil to the less pollute natural gas), and the adoption of the pro-active policy, in terms of regulation and incentives, for the alternative, clean and renewable energy development.

Though differential policy emphasis for energy sourcing and socio-technological development, the alternative, clean and renewable energy is mainstreaming for global sustainable development. At this historical conjuncture, it is important to note that, alternative-clean energy re-sources (biomass/fuels, geothermal, solar, wave, wind and alike) and technologies have made astounding progress in the last decade, promising a sustainable future for *Homo sapiens* and eco-system at large. In particular, alternative-clean energy contributes to various kinds of eco-efficiency and efficacy which can be redefined not just in terms of efficiency in traditional energy measures, but more importantly, the positive contributions to the reduction of carbon emissions, reducing the (risk) burden onto global-local eco-system at large.

But the diversification of renewable energy sources is contingently, coupling with different socio-technological interfaces – this makes the seemingly shift toward a sustainable future somewhat uncertain, if not problematic. For instance, nuclear energy though receiving rejuvenation recently in the wake of energy price upswing, it could hardly be any important role – even the best scenario by IEA (2009a) accounted if for around 10% of the total energy share in 2030; not to mention the building, regulatory and commissioning delays and the decommission problems involved (Greenpeace 2008b). For solar energy, the overall increasing supply of photovoltaic (PV) solar cells -- through which to capture solar energy has been increasingly available, has been reducing the cost-pricing, the cost of solar energy is still expensive: power from photovoltaic systems (solar cells) costs $200-600 a megawatt-hour (MWh), as compared with $50-70 per MWh for onshore wind power in America (*The Economist*, 15.April 2010; Fig. 5)

Fig.5: Global Power PV Suppliers, 2009-2010

2010 Ranking	2009 Ranking	Company	Country	MegaW	% Increase 2009-2010
1	2	First Solar	USA	101	100.5
2	3	SunTec Power	China	70	28
3	4	Sharp	Japan	60	25.8
4	1	Q-Cells	Germany	54	5.9
5	6	Yingli Green Energy	China	53	86.5
6	7	JA Solar	China	51	83.8
7	5	Kyocera	Japan	40	37.9
8	10	Trina Solar	China	40	90
9	8	Sun Power	USA	40	68
10	13	GinTech	Taiwan	37	104.4
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13	10	SANYO	Japan	26	23.8
22	15	Mitsubishi	Japan	12	18.9

(Source: Nikkei Shimbun, 8.June 2010, p.13)

Yet, the appeals, and inevitability for, alternative regime for new re-sourcing-structure for energy supply are more than obvious, as alternative and renewable energy resources, like wind, solar and others, have been harnessed demonstratively with minimal environmental consequences and immediate gain for greenhouse gas emissions reduction.

Beyond alternative energy re-sourcing, there is an emerging paradigm for new lifestyle of LOHAS and green ideologies, advocating for alternative energy re-sourcing from the consumption ends, from the dominant materialistic pro-growth development towards an eco-modernity. For this, an anecdotal brief on alternative lifestyles and worldviews is offered in the following discussion.

3. The Socio-Culturally embedded Energy Self-Sufficiency

The concept of sustainability is a contesting and arguable one, so as the ideas of self-sufficiency in a globalizing world; say the least: what is good (bad) energy sourcing, under which (stakeholder's) criteria.[2)] Yet, clean and renewable energy use is structurally anchored with different contextual and subjective conditions, particularly the embeddedness of the socio-ethical and normative-cultural construction(s) for new energy sourcing. Before

2) For the *problematique*, the UNESCO Bangkok Conference / Project (Engwerda-Smith and Macer 2007) addressed the scope and complexity of ethical issues of renewable, sustainable energy sourcing and technologies; see Conference Web site: http://www.unescobkk.org/index.php?id=energyethics

we further examine the complexity and contradictions of clean energy re-sourcing, let us examine global and local (pro-growth) developmentalism in its geo-historical context

3.1 The "Burnt-Out" of pro-Growth Developmentalism: Search for Renewable Energy

Historically, the dominant developmental model in Asia since the mid-20th century has been much following the successful experience of Japanese modernization, the pro-growth developmentalism; and not long ago with *Asia Miracle* of/with the newly industrializing economies (NIEs, like South Korea, Taiwan, Hong Kong and Singapore), ASEAN-4 (Indonesia, Malaysia, Thailand and the Philippines) and the Greater China. More specific, in early 1990s, most of the nation states have to champion its project for economic liberalization, embracing the global free market capitalism. They adopt the international financial institutes' (the World Bank and IMF) recipe for reform in macro economic policies, in order to make their economies more competitive. Their strategies are the deregulation of international capital flows and trades, and the re-making of (the once protected or socially guaranteed) labour market into a deregulated (less rigid, more dynamic and more flexible) one (Navarro et al. 2004). But in fact, paralleling exploitations of various kinds, they are burning(-out) the world, energy and resource-wise speaking!

The phenomenal success of Japanese economic developmentalism gives us some insights about national and regional energy sourcing. Its earlier modernization is path-dependent upon economic and technological structure and dynamics. Endowed with good technology, energy use is highly efficient in Japan. Yet, energy-wise it is one of the world's largest importers of energy in the world before the rise of China and India, and is still dependent much upon global sourcing of energy, with existing fossil fuels regime -- and one of the few culprits for global warming, as well as the questionably peaceful user of nuclear power.

Far from the misconception about the limited natural resources in Asia-Pacific, there is strong energy re-sourcing potentials in the region: Australia, Brunei and Indonesia (and Myanmar) have been major exporters of energy in and beyond the region. For instance, Australia is also a major supplier of energy resources in the region, coal, liquefied natural gas and uranium (for China and India in particular). And turning northward, despite its energy deficits, China is still one of the major fossil fuel (coal and oil) producers in the world. Even in the developing economies like the ASEAN-4, the potentials for alternative renewable energy (bio-mass, geothermal, solar, water and wind) are yet much under-exploited (Lidula, et.al. 2007).

Following the inter-connected flowing of energy sourcing of the developed economies in the West, majority of Asia-Pacific economies have been dependent upon global supplies of energy: with IGOs' policy narrative that they are mutually inter-dependent, but in the worst form, there is neither sustainability (for eco-system as a whole) nor self-sufficiency (for individual nation state and community). For this, below we bring back in a special, if not exceptional, primitive energy user-actor, namely, the Kingdom of Bhutan.

3.2 Buddhist Green Praxis in Shangri-La: Self-Sufficiency in Bhutan?

Contrasting the hegemonic development model, as agenda set by IGOs and/or following the modernization trajectory of pro-growth development, like Japan, *Asia Miracle* and ASEAN-4. The Bhutan's (alternative) development approach, attempting to mediate human wishes for (moral-religious pursuit of) happiness, spiritual eternity and the preservation of natural environment, deserves our special attention. In spite of its under-development in terms of the traditional, pro-economic growth criteria (contrasting the export-let economic miracle in the region), it has been endowed with much not just natural resources of hydropower and forest-based assets, but also the specific gifts of cultural-ethics of Buddhism, in pursuing the "Middle Path" development strategy (the so-called Gross National Happiness, GNH), and so far resulting in progress for the alternative developmental regime towards the betterment of (well being of) the people, poverty alleviation and sustainable development (Uddin et al. 2007; Zurick 2006).

For Bhutan's exceptionalism, the most important aspects are ethics and norms (embedded with Buddhism and local ethos) for development. The developmental ethics within the realm of GNH are articulated in terms of the shared needs, and the wellbeing, of Homo sapiens, and the locals they are in: the socio-economics as well as the emotion-spirituality of the individuals, within a wider ecological milieu. This in turn, translates into policy for socio-ecologically sounded development towards sustainability and self-sufficiency. More importantly, one distinct ethic-normative aspect of this experimentation should be noted, which is rightly noted by Uddin, (et al., 2007) that:

> In the context of Bhutan, there are a number of conditions conducive to the development of GNH. These include: geographic setting as discussed earlier, size of the economy, the influence of Buddhism on the national culture, and support from the King and the Government. While Buddhism as a path of self transformation has to be taken on consciously by each individual concerned, historically it has played a significant role in developing conditions that have had a very positive impact on local culture and society.
> GNH is rooted in the Buddhist philosophy and religion, which interprets nature as a living system rather than just a resource base to be exploited for material gain. In fact, the expression of GNH in Bhutan is essentially a summarization of the basic tenents of Vajrayana Buddhism, which encourages a culture of harmony and compassion. GNH also bridges the gap between values and development. Therefore, the ideals of GNH place Bhutan on a footing, where it can exercise options and obtain judicious benefits from the process of liberalization and globalization taking environmental, social and cultural impacts into account. It is seen as the overarching philosophical underpinning and the ultimate guideline for the nation's future (Uddin, et al. 2007: 2088).

Embarrassed other development models, and enjoying some emerging celebrity status

in the global search for alternative development paradigm(s), Bhutan's experimentation is yet far from conclusive; and in some instances, is highly questionable not just about its transferability beyond the Himalayan localities, but also the very specificity of Bhutan that it is not a homogeneous society. Hence the singular Buddhist and socio-cultural appeals have the limits to convincing the non-or-less materialistic, pro-happiness approach for development; this is particularly the case when Bhutanese society has to confronted with globalization challenge, eco-and cultural tourism for instance (Zurick 2006: 663).

Thanks to geo-territorial specificity for self-sufficiency (that is fundamental for bio-regionalism, in a geo-territorial closed system, following the metaphoric life-cycle-analysis): Bhutan is a landlocked country, geo-politically enclosed by regional nuclear giants of China and India. Its bio-diversity is much protected, if not isolated, by its unique geo-historic-political position. More importantly, three key eco-human development ethics stand out as alternative paradigm(s) for sustainability (self-sufficiency within the bio-regionalism), enshrining Bhutanese praxis:

(1) The practice of spiritual teachings of folklore and/or religion(s), in the Bhutan case, it is the specific 'framing' of Buddhism unto daily (socio-cultural-driven) praxis. Bhutanese unique integration of folklore, quasi-religious-informed, daily practices with specific geo-cultural objects, like river and forest-wood assets, synergizes survival needs (towards happiness) to ecological-sound energy use.

(2) Ethical sourcing of alternative renewable energy has a geo-local dimension, mostly within the transportation network (e.g., electricity power grid) of certain locality; in this sense, the search for local energy self-sufficiency is a twin condition for sustainable strategy. The locality-fix (sense of localness) and geo-spatial attachment are intertwining with liveable and sustainable socio-ecological system.

(3) Most important of all: the Bhutan experience highlights one of the forgotten dimensions of the feasibility to coping and adapting differential energy sources, with particular reference to the (micro social level of) individual's household choices for energy, as expressed in terms of the specific ethic-normative nexus.

In addition, there are two more different yet inter-related domains of synergy, for enhancing individual's experiential preference for certain renewable sources. First, it is a form social praxis with individual experience: people have been in contacts with most renewable yet natural energy resources, say, water, wind and sun. This sense of familiarity and co-inter-dependency (particularly water and wind – pressurized air in motion) conditions the sense of belongings, which under right circumstances, helping or beneficial to coping with one's energy need – then the likely synergy-bondage between users and the energy anchorage

evolves. Second, it is the socio-cultural-religious and/or the pre-modern folklore 'framing' of the form and essence of renewal energies. Unlike fossil fuel (coal and petroleum) and nuclear (risk-ridden), most of the renewable energies (like geothermal, water, wind, sun and biomass) are somewhat experiential for the users, that users have been in direct contacts with them in daily life experience; and in some cases, their familiarity with renewable sources of energy is also spiritually reinforced by legends, mythology and folklore, God and Goddess like figurative / symbols for most natural resources (sun, wind and thunder alike).

The Bhutanese experimentation has many implications for agenda setting for human development: self-sufficiency is not just in terms of physical energy supply and demand, but a core concern for spiritual energy re-sourcing as well. First, recent initiatives for the remaking of a post-GDP measurement on social wellbeing reflect the coming of a new paradigm: Nobel Prize of Economics Laureates Amartya Sen and George E. Stiglitz, and the French government's *Commission on the Measurement of Economic Performance and Social Progress* concluded that the time is ripe for the measurement system to shift emphasis from measuring economic production to measurement of people's wellbeing (CMEPSP 2009). In short, there is a new concerted endeavour to reassert the importance of social wellbeing and human happiness, and bringing social norms and virtue and human values back to social development goal setting. Hence, the local's self-sufficiency in terms of energy-sourcing for human development is a proxy for sustainable development.

Second, the interfacing between social praxis and modern form of policy governance is utmost important: people's specific socio-cultural attachments to the nature and its assets, in exploiting natural resource, in daily praxis on the one hand; the (derivatives of) policy learning, like the Clean Development Mechanism (CDM) from IGOs and donors in shaping national policy for natural resources exploitation and preservation, on the other.

Last but not least, it is the rejuvenated interests on, or for the search of, alternative energy, juxtaposing the new public policy (learning aided by new media of IGOs and iNGOs) narratives on global climate change energy crises, in global risk society of this modernity. By the re-orientation of energy sources from fossil (eco-unsound) fuels to the new (age! but also the old) one, the greening of cultural meanings in/for exploiting natural resources, like river and forest in a sustainable way becomes the norms.

To recapitulate the new visions: the re-presentations of healthiness of the nature and its re-attachment with human beings are once again intertwined with other cultural-spiritual figurative for the natural phenomena, like sun (solar energy), wind (monsoonal typhoon) and wave, thundering....In short, eco-ethics is structurally and historically embedded with indigenous cultures; yet they are also derivatives from modern international policy learning discourses, to articulate eco-ethics for sustainable future. We need to take history and cultures seriously.

4. The New Geo-Politics of Bio-Regionalism: Greening Energy Sourcing?

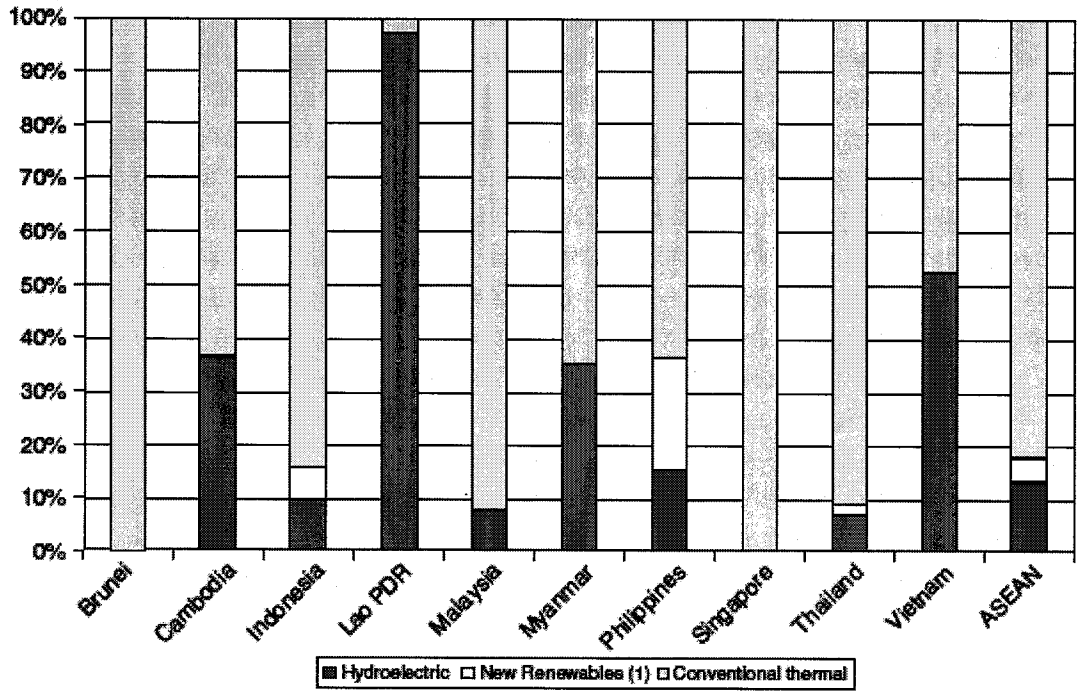
The economic dynamism-driven global sourcing of, or hungry for, energy for newly industrializing economies' hyper-development is more than obvious, as represented by China and India. And most of the super-regional states or regional alliance, like the EU, ASEAN and APEC, have been increasingly energy dependency on the imported or global sources, and have not much policy initiatives at regional or local level for energy self-sufficiency. Yet all that (since Fall 2006) European energy crisis in regional-global sourcing of energy has now changed: Europe found itself from a troublesome source, in addition to new geo-political dynamics and rivalries: the Russia's Gazprom is more than obvious. Such dependency has been manifest in Ukraine's dispute with Russia in January 2006 and Belarus in January 2007. In each case - gas and oil respectively - Russia cut off suppliers, albeit briefly, and in both cases the "price" of agreement included ceding control of pipelines. Geo-politically, Russia's foreign policy towards its former allies around the oil- and gas-resourceful Caspian Sea has become more confrontational, the Georgia's energy independence attempt with the Western world is the flash point (Helm 2007).

Critically, the ethical interfaces, as well as the interfacing process, between the eco-praxis and its bio-regional(ism) local-spatiality, in searching for energy in-dependence, highlight the role of policy learning, within the web of geo-politics, at transnational (inter-state, IGOs system) and corporate business levels: between local wisdom and foreign knowledge.

At this historical conjuncture, Bhutan has some success: renewable energy resources have a substitution role for the fossil fuel ones, for better environmental consequences. In Bhutan, there is beneficial effect of rural electrification for the environment, as villages under the hydro-electrification schemes tend to use less fuel wood and kerosene; this is particularly the case for the so-called min/micro hydropower (<1MW) and the run-of-the-river hydro-projects, which are of low environmental and social impact in comparison with the large one. For the environment, the reduction of fuel wood consumption by 25-25% in rural area by the electrification scheme (Uddin, et.al. 2007).The partially successful lesson of Bhutan has some implications for the rejuvenation of renewable energy development-trend in Asia-Pacific.

In the context of climate change mitigation strategies (like CDM, and the apocalyptic narratives of IPCC), the challenge of greening energy supply security is not just local and national, but also global issues, which will re-define and re-shape alternative energy sourcing in Asia-Pacific: a rejuvenation of exploration for renewable energy is the policy norms in the region, as the present state of renewable resources is far from minimally utilization, though it is well endowed natural resources hence strong potentials for enlarging its energy market (Lidula, et.al.2007; Fig.6).

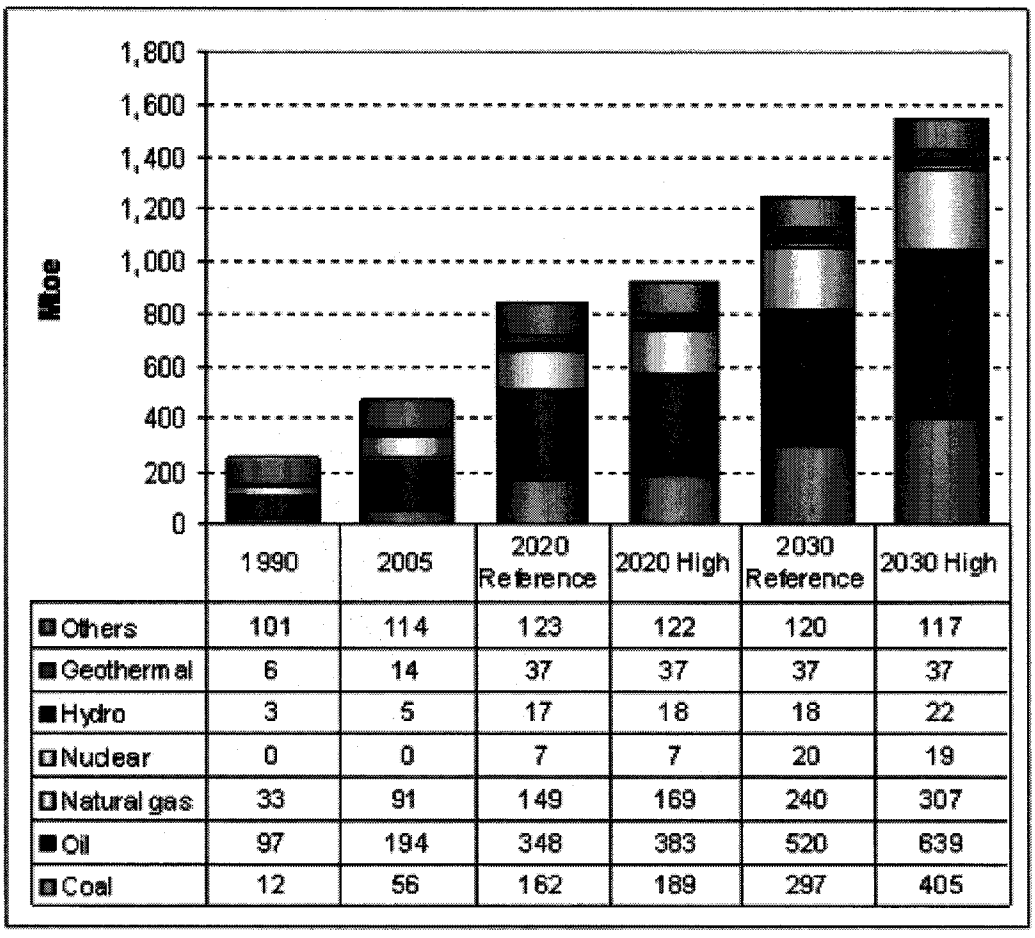
Fig.6: Energy Utilization in ASEAN Countries 2005



(Source : Lidula et.al. 2007, p.1443).

The scenario for Asia-Pacific' energy re-sourcing is optimistic. Coupling the dynamism for alternative energy sourcing and regional growth-driven demand for new energy, primary energy supply in ASEAN region will grow at annual rate of 4% to 4.8%; whilst, coal will have the highest growth rate of 6.9% per annum from 56Mtoe to 297Mte in the period 2005 to 2030 (ACE 2009). More importantly, alternative energy supplies though will contribute less than 10% of the totally energy capacity, their respective growth rates are significant: 2.5 times for geothermal power, three-folds for hydropower, and 20-folds for the nuclear one. (Fig.7). Thanks to new techno-innovation, thermal efficiency for power generation will likely be boosted from 38% to 44%, in the period 2005 to 2030.

Fig.7: Primary Energy Supply in ASEAN Countries 1990-2030



	1990	2005	2020 Reference	2020 High	2030 Reference	2030 High
Others	101	114	123	122	120	117
Geothermal	6	14	37	37	37	37
Hydro	3	5	17	18	18	22
Nuclear	0	0	7	7	20	19
Natural gas	33	91	149	169	240	307
Oil	97	194	348	383	520	639
Coal	12	56	162	189	297	405

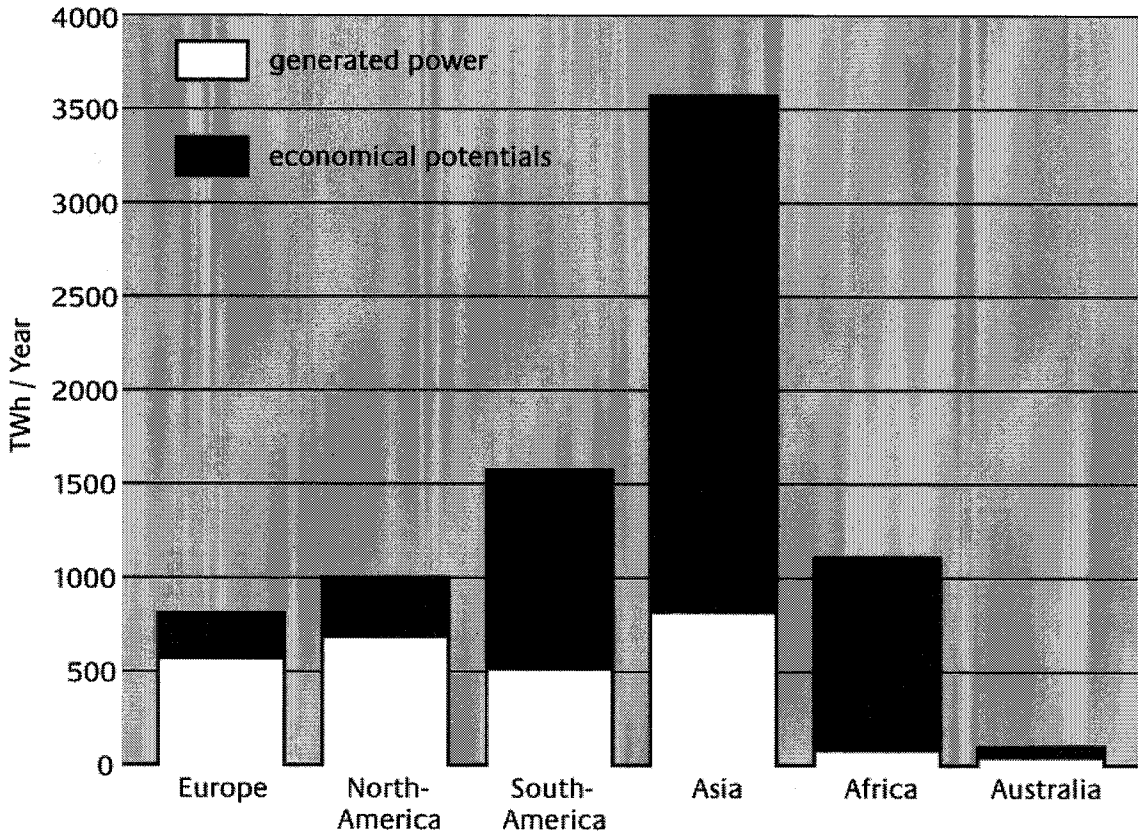
(Source: ASEAN Centre for Energy 2009)

Recently, there is some progress of adopting renewable energy in the region, even for the developing countries, like India (the second largest population in the world), its solar energy generation capacity ranks to the 4th in the world league, following Japan, Germany, and the United States. With more fiscal incentives, enhanced regulatory policy guidance and technological transfers, Indian government aims to increase the renewable energy share in the total energy supplies from 7% (in 2007) to 10% by 2012. But the critical question is: should fiscal incentive (reflecting certain externalized values) per se be the policy to re-direct human orientation towards a sustainable one?

Compared with other regions in the world, Asia-Pacific has the highest potential for hydropower (DENA 2007), say the least is the Mekong River Basin and monsoon climate in the region. Hydropower will have quantum-jump development in the region, as hydroelectric

power is highly efficient that the plants convert over 90% of the water energy into electricity, and their long service life between 60 and 90 years (DENA 2007; Fig.8).

Fig.8: Global Hydro-Power Analysis



(Source : DENA 2007)

To remedy the problem of the under-utilization (mostly less than 10% of the energy sourcing) of renewable energy, some countries in the region (– following their counterparts in Europe), like Sri Lanka, Thailand, Indonesia and South Korea, have introduced price incentives for electricity from renewable sources. Whilst in urban sector, municipal solid waste (MSW)-to-energy regime for renewable energy sourcing is experimenting in Asia major cities, like Bangkok (Chaya and ,Gheewala 2007). Again, is the pricing (or the use market mechanism) per se facilitates a new paradigm shift towards eco-modernity?

For China's hyper-modernization project with 1.3 billion populations to feed, despite its three-decades of economic miracle, rural sector in China is still much under-developed, particularly in terms of electricity supplies. The government is now promoting multiple

sourcing of renewable energy driven electrification for remote villages – it is aimed that by 2010, none in China will have any electricity at home. For sure, this policy initiative will be welcome by most people.

The geo-politics of bio-regionalism will prevail: at regional and global level, the prospects of Asia-Pacific's renewable energy regime will be led by the political economy of (the struggle for) global energy, within and beyond the historical rivalry between/among developing and developed economies in different geo-political regions: the Chinese energy diplomacy, Australian natural resource-based engagements, the energy-empowered Russian supremacy in Europe and Asia, USA-Japan-Western economies differential engagements in the Middle East development, and the rise of African resource-export economies.

In Asia-Pacific region, the emergence of Islamic economic alliance led by Indonesia and Malaysia deserved our special attention: both have recently re-appropriation of the great potential of palm oil production for bio-fuels, and the former also endowed with the world's largest potential in the geothermal power. The religious-cultural embedded economic alliance for / with energy sourcing will be instrumental in re-defined which countries / societies get what.... This is also the mirror imaging of (or in contrast to) the belated calling from, or the underdevelopment of human (economic, social and cultural) rights and democracy regimes in the region.... Hence, the calling and mobilization for securing alternative renewable energy is geo-spatially local; the sense of indigenous energy resources (the very essence of local eco-ethics) is very crucial in shaping the developmental trajectory of renewal energy consumption in communal life.

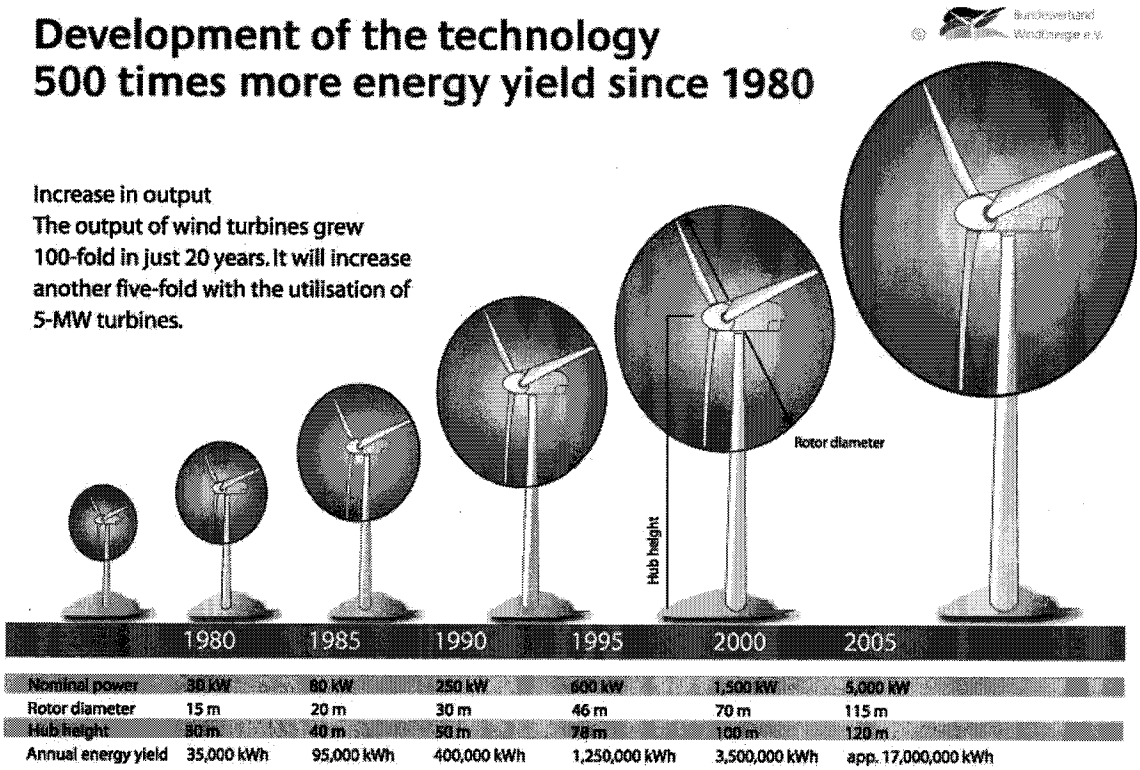
5. The COP16 Project for Eco-Modernity: Re-Sourcing Clean-Renewable Energy?

The impasses against the formulation of global strategy, in the form of legal binding treaty, for COP15 and COP16 reflect the contradictions in global uneven socio-economic development: developing nations have long been holding the view that the developed economies need to do more to cut their greenhouse gas emissions, while letting the developing ones to catch up with economic development, then share their ecological commitments with funding and technical know-how assistance from the developed nations. The highly contrasting, and sometimes confrontational, case is between USA and China, the world's two largest emitters – accounting for more than 40% of global production of greenhouse gas: each wants the other makes more reduction but both of them want economic growth with the existing energy sourcing and technological inputs, which make more greenhouse gas emissions!

For COP 16, the differential emissions reduction pledges for the target year of 2020 reflect the conundrum of the present Climate Change regime: USA pledges to minus 17% from 2005 level, China asserts 40 to 45% cut of emission unit per capita GDP from 2005 level, and the EU 20-2020 will minus 20% of greenhouse gas emissions from the base year of 1990.

More importantly, the quantum jump of the capacity for alternative energy is more than obvious. The use of new, renewable energy is a global trend, taking the case of wind energy: it is mostly under-exploitable not until recently, thanks to global advancement of technology to harness wind energy (100-fold increase of the output of wind turbine, up to 5MW turbine, Fig.9). The total wind energy capacity has been gown significantly from 24,332MW to 159,213MW from 2001 to 2009, and the annual growth of the newly installed wind energy capacity has been from single-digit to double-digit (Fig.10).

Fig.9: Advance of Wind Energy Technology



(Source: DENA 2007)

Fig.10: World Newly and Total installed Wind Energy Capacity in MW, 2009

Year	Newly Installed (MW)	Total Capacity (MW)
2001	6,282	24,332
2002	6,859	31,181
2003	8,114	39,295
2004	8,386	47,693
2005	11,331	59,024
2006	15,111	74,122
2007	19,808	93,930
2008	26,972	120,903
2009	38,312	159,213
2010 (projection)	44,000	203,500

(Source: WWEA 2010)

For the development of alternative, clean and green energy and the sourcing of it, the COP15 though was a disappointment; it has timely initiated discussion for exploring global climate change for COP16, with the maximal participation of the stakeholders, represented by 193 countries.

Like other global summits, the COP15 should have provided the venue where new directions for sustainable clean energy development are explored – the energy industry worldwide looked for signals, and new regulatory framework to follow. But the COP15 has not provided a blue print or roadmap for cutting greenhouse gas emissions, nor making concrete policy measures and mechanism (say, carbon trading regime) for stakeholders to follow in the future COP16. Perhaps more controversial was the infighting over the inter-nation-states' coordination mechanism and procedural details, in addition to the strong rhetoric between the developing and developed countries – for instance, China has led the advocacies for a non-binding "accord" for any international consensual agreement on climate change (Crooks 2010).

In spite of the problematic diplomatic consensus on Climate Change at COP15, and the next series of climate change meeting for Bonn in May 2010 and Tianjin in October 2010 producing no immediate policy nor emission-reduction targets, the only hope is for Cancun, Mexico in 29.November to 10.December 2010: aiming for some forms of "directives" or "accord" that codified the limited commitment for the treaty-like signatory countries in the coming decade.

To recapitulate our discussion: the adoption of global and national policy on climate change, against the trend of the fossil fuel economics (say, the increasing price trend for petroleum), will encourage the development of alternative clean energy to be used in our daily life. Hence, the decisive factors for sustainable development are at three arenas, the international politics for the climate negotiation, the recognition of the climate change threats by national governments, and above all the eco-ethics driven green practices of local communities.

A green energy vision is crucial for sustainable future, particularly in realizing the potential of energy innovations to overcome energy poverty, with a mix of wind, solar, small hydro, biomass power, or technology such as LED lighting. More specifically,

> These can empower the poor to develop productive small and medium enterprises, to gain autonomy and independence in the generation of energy. Off-grid projects are increasingly seen in areas where publicly regulated electricity grids have found it unviable to reach. These initiatives can deliver real change on the ground, enabling citizens to access refrigerated medicines, light schoolrooms, power water pumps and use mobile telecommunications - but only if they are tailored to local needs and delivered in sustainable ways (Litovsky 2007).

Following the exponential increase of (at 5% annual increase in) energy consumption in Northeast Asia, Southeast Asia in the coming decade will experience another explosion of energy demands, as shown in the case of Indonesia and Thailand. For the former, despite of its strong energy resource base, Indonesia still (path-dependently) relies on fossils fuels (coal, gas and oil), as well as the rejuvenated interests on nuclear energy, which in the long run is questionably risky for sustainable self-sufficiency (Nazif 2007,). Whilst for Thailand, the project(s) for energy sourcing diversification seemingly are progressing well, at least in terms of experimentation of different renewable energies (Charojrochkul 2007, Jai-in 2007), but the pro-development economic strategies and mass consumerism have substantially put up the demands for all forms of energy. Hence, according from Dr Kurujit Nakornthap (2007), Deputy Permanent Secretary of the Ministry of Energy, Thailand, it has to looking for sourcing from neighbouring countries, all possible forms of energy, the non-renewable as well as renewable, and nuclear power (currently the subject of an infrastructure planning committee) with the intention of operating reactors by 2020. All these will challenge the project for clean, renewable, sustainable, self-sufficiency, energy sourcing in the region.

In searching for green energy sourcing, the market forces undoubtedly will absorb such demands, at the inter-regional and global geo-scales, but with increasing sensitivity for ecological business practice, in terms corporate social (and ecological) responsibility (Epstein 2008).

Confronting the uncertain course for the emerging alternative-clean energy regime of COP

16, this paper ends with remarks on eco-modernity are as follows.

Modernization in the West(ernization) has been enabling a secularization process, regarding (forgetting or neglecting) the symbiosis, mutually-dependent relationship between human beings and the natural milieu they are in; this is somewhat the emergence of the post-religious regime of comprehension of the universe but not post-spiritual. Yet and lately, the spirituality of the nature (animals, plants and their micro-biological living systems – the bio-diversity in short) is more than ever being re-discovering and re-articulating in the public sphere....This is self-evident in the greening of public policies and global governances championed by mostly inter-governmental organizations (IGOs: like the UN, the World Bank, the EU and APEC), and international non-governmental organizations (iNGOs), like Greenpeace and PeTA (People for the Ethnical Treatment of Animals, http://www.PeTA.org/).

The EU for the first time (in 2007) of its history, has set its energy policy goal for the reduction of greenhouse gas emissions to at least 20% less than 1990 level by 2020, to increase energy efficiency by 20%, and more importantly: promoting renewable energies to 20% of the total usage. Whilst in Asia, Lidula et al. (2006) rightly articulate that the (under-) utilization of renewable energy resources in the region is far from anywhere near to the potential, therefore making feasibility to follow the EU case, by reducing carbon burden, with alternative clean energy sourcing.

For comparison purpose: how about the Asia-Pacific regional initiatives towards sustainable development? The only indicative gesture (someone might coin it as 'milestone', as it is the 1st climate declaration in APEC 19-year history) is from the APEC Sydney (9.September 2007) Declaration on Climate Change, which set the unbinding targets – the "aspirational goal":

- Increase energy efficiency to reduce energy intensity by at least 25% by 2030 (base year: 2005),
- Increase forest coverage in APEC region by at least 20 million ha. by 2020.
- Foster low emissions technology and innovations
- Enhance alternative and low carbon energy uses

In response to the nominal (lip-service) advocacy for containing energy security, many critics challenge the "aspirational goal" of APEC (representing 21 economies, housing 41% of the world population, which contribute to 60% of greenhouse gas emission globally) as merely a lip service to cope with the global climate crisis – in actuality, say the least: the ecological footprints of APEC activities (in Sydney alone) have been ecologically unsound!

Obviously, there are many questions have to be raised: why isn't similar regional initiatives (as in EU) developed in/from Asia-Pacific societies? Can Asia-Pacific unique differential (ecological un-reflexive) modernization processes (or economic miracle) still be robust, without risking the others? Yet, there are four major arenas to contest for a

sustainable, self-sufficient energy sourcing in Asia-Pacific.

First and foremost: far from missing out the opportunities to have alternative sustainable development, and with the exception of the controversial nuclear energy, geo-spatial advantages of East and Southeast Asia are self-evident: mostly in the Sunbelt (exploitable for solar energy), plenty of geothermal, wind, water and ocean resources though untapped yet. There are financial, institutional and technological barriers to overcome prior to a smooth transfer to a new regime of energy sourcing. For example, it can be highlighted by the example of Pakistan's under-utilization of wind energy due to a mix of human and institutional barriers, in terms of policy guidance, institutional structure, regulatory and financial incentives, and information and technology (Mirza, et.al. 2007).

Second, the developmental path of eco-friendly, renewable energy, technologies highlights the derivatives of ethical challenges for the project for energy self-sufficiency within the bio-regional geo-spatial scales: they can be called as ethics of cultural specific and defined know-how and technologies transfer. The control and access to know-how and technologies (transfers) condition the potentials of new form of clean energy are critical that most of the renewable technologies are still very much within, or protected by, the intellectual property regime of governance, mostly held by the developed economies. For instance, Germany, Japan and USA control over three-quarters of global market for solar cells, over 70% of wind turbines worldwide are produced by Germany and its European partners. For obvious normative appeal: without technology and intellectual property transfers and financial incentive for promoting the use of renewable energy, the prospect for self-sufficient (self-reliance), in terms of renewable and sustainable energy sourcing, in the developing localities in Asia-Pacific is not good nor sustainable, in spite of the small-scale locality based attempts to be more eco-friendly.

Third, renewable energy resources are eco-friendly and hence becoming global norms. Yet, people's values -(changed)- driven behavioural repertoires will shape the developmental course of the emerging alternative renewable energy regime(s) on the one hand; the market forces (supplies of clean technologies) and governmental regulation and/or subsidies will have imminent impact as well. In other words, as many of the alternative and renewable energy resources have been utilized for some years, but not until recently, they are being re-discovered to have the potentials for sustainable development.

Last but not least, the re-sourcing for renewable energy has differential manifestation: not just a local dimension but also a cosmopolitan, trans-national, domain. Hence, there is an emergence of cosmopolitanism and the dialogues at various geo-scales, between and among various state, IGOs, and iNGOs and social agencies, and reflections (or the apocalyptic view) towards the (un-) sustainable future – the coexistence of different ways of life experience? All these highlight the critical reflective learning on the vulnerability and fragility of human species and eco-system sustainability (Beck 2006, IPCC 2007). Hence, the key strategies for human agencies to realize a cosmopolitan responsibility for sustainable development with

bio-diversity is to engaging global progressive forces and green technologies for renewable energy sourcing, echoing and respecting local socio-cultural ecological ethics and norms.

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