

CONTESTED WATERSCAPES

in the
Mekong Region

HYDROPOWER, LIVELIHOODS AND GOVERNANCE



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Hydropower, Livelihoods and Governance

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Damming the Salween River

Darrin Magee and Shawn Kelley

INTRODUCTION

The Nu-Salween River¹ is one of Asia's principal rivers, the source of livelihood for an estimated 6 million people in China, Myanmar/Burma and Thailand (IUCN et al, 2003). The mountains and valleys of the watershed are home to some of the most culturally and biologically diverse areas of the world. Over its 2800km course the river drops some 5000m, much of that in steep gorges, making the Nu-Salween extremely attractive from a hydropower development perspective (Magee, 2006b). Until recently, the remoteness and lack of basic infrastructure throughout much of its watershed made such development technically and economically infeasible.

All of this has changed, though, as regional economies have grown and electric power shortages have become acute, especially since 2003. China's plans to construct hydropower installations on the Yunnan portion of the Nu originally emerged during the early 1990s. Proponents of large hydropower development on the Nu argue that such development would ease the country's energy crunch while providing revenues to areas highly dependent upon central government subsidies for local governmental operations. Yet, whereas the dams on the neighbouring Lancang seem largely unalterable, the Nu cascade has seen a much greater tide of international and domestic criticism, which doubtless played a role in the central government's decision to suspend the projects in early 2004.

Further downstream, Thailand's plans to build dams in neighbouring countries were first proposed 30 years ago, but gained renewed momentum amid Thailand's foreign investment and liquidity boom of the late 1980s, when the then government of Prime Minister Chatichai Choonhaven first aired the idea to turn the Mekong region 'battlefields into marketplaces'. As Thai capital moved abroad seeking opportunities in Cambodia, Laos and Myanmar, opposition movements within

Thailand demanding greater accountability and transparency in infrastructure development became a serious force posing a nuisance for developers at home. By the late 1990s, demonstrators had successfully blocked the construction of various dams and other industrial projects across the country, even as Thailand's neighbours were showing greater enthusiasm for foreign hydropower development.

Like their counterparts in Thailand, but only later, Chinese dam development companies are now poised to export not only electricity, but also dam-building expertise and capital throughout mainland Southeast Asia and even further afield to Africa and the Middle East. The most influential of these companies, once part of the Chinese government's Ministry of Electric Power, now raise capital on foreign financial markets and bring 'made in China' technologies to projects over which other lenders may balk for technical, political or economic reasons. Myanmar, as we discuss below, is home to several of those projects, and Chinese companies are making inroads there and throughout the Lower Mekong watershed.

We begin with an overview of the Nu-Salween watershed and then provide details of the projects planned for the Chinese and Myanmar stretches of the river, as well as of the principal actors in the three countries involved in surveying, designing, financing, constructing and operating the dams. We then sketch the decision-making contexts in which the dams are situated. Finally, we conclude with an assessment of leverage points in decision-making processes and modest recommendations for reducing ecological and socio-economic impacts while striving to meet regional energy needs.

OVERVIEW OF THE NU-SALWEEN WATERSHED

In China, where the river has its source, the Salween is known as the Nu Jiang, or the 'Angry River'. From its headwaters on the Qinghai-Tibet Plateau at an elevation of nearly 5000m, the river tumbles southward between steep gorges through Yunnan Province before entering Myanmar, where it forms the border with Thailand for some 800km and finally empties into the Andaman Sea. Having begun its journey as a trickle of glacial melt 2800km upstream, the Nu-Salween swells to a muddy brown river several kilometres wide at its mouth, discharging an annual average of 1650m³/s into the sea. Along the way, it drains a basin of approximately 271,914km² in area (IUCN et al, 2003).

Given its remoteness and limited infrastructure, the socio-economic situation of much of the Nu-Salween Basin is rather poor. In China, both the Tibet Autonomous Region (TAR) and Yunnan Province have been targeted since 1999 by the state's Western Development Campaign, which seeks to address gaps in economic development between China's western interior and its eastern seaboard. Many of the campaign's initiatives involve basic infrastructure construction, so-called ecological construction to re-engineer previously engineered environmental degradation, education and social development. All four counties of Nujiang

prefecture in north-western Yunnan are designated as national-level poverty counties, the governments of which derive the bulk of their revenues from central government subsidies. Aside from sporadic non-ferrous mining operations in the region, most economic activity is agricultural. Principal crops include maize, rice, wheat, buckwheat, sorghum and beans, as well as rapeseed (canola) and Tibetan barley.

The Nu Valley is one of the most ethnically diverse areas of China. Yunnan, as a whole, is home to significant populations of Yi, Naxi, Bai, Zang (Tibetan), Dai and a number of other ethnic groups (Magee, 2006a; McDonald, 2007). In 2003, the United Nations Educational, Scientific and Cultural Organization (UNESCO) added the Three Parallel Rivers area (including portions of the Nu watershed) to its World Heritage list (UNESCO, 1992–2008). Within Yunnan, the watershed is home to approximately 5 million people, many of whom are subsistence farmers. The area is also extremely rich in biodiversity, with an estimated more than 12,000 species of plants alone, some 3500 of which are endemic. Conservation International includes the entire Nu Valley as a part of its Mountains of Southwest China Biodiversity Hotspot (Conservation International, 2007). One study (Xu and Wilkes, 2004) identified livelihood activities such as fuelwood collection, agriculture and livestock grazing as primary threats to biodiversity in the area.

For the first 1400km of its journey, the shallow and braided Nu winds its way through high mountains and plateaus, with wide valleys in southern Qinghai and eastern Tibet, narrowing and deepening as it approaches north-western Yunnan. Over its 621km course in Yunnan, the Nu drops 1116m, making it extremely attractive for hydropower development.

Exiting Yunnan, the Nu (now Salween) enters the Shan State of Myanmar before continuing on through Karen (Kayan) and Mon. Here, as in China, the river traverses remote regions populated principally by ethnic minorities, many of whom are subsistence farmers who depend for a large portion of their livelihoods upon the Salween River and its related ecosystems. As detailed below, armed militias in many of these areas are openly hostile to Myanmar's ruling military junta, a situation that further strengthens the junta's resolve to pacify (at least partially) the region through large hydropower projects that will flood much of the bottomland areas and disrupt the lives and livelihoods of ethnic communities.

DEVELOPMENT PLANS

Upstream (China)

Construction of large hydropower in western China is a central component of national-scale discourses of development, most importantly the Great Western Development Campaign. Supportive policies such as Send Western Electricity East (*xidian dongsong*) and Send Yunnan Electricity Out (*Yundian waisong*), as well

as the creation of entirely new regional constructions such as the Pan Pearl River Delta (stretching from Shanghai to Yunnan) help to legitimize and even *naturalize* large-scale power generation and transmission infrastructure. Discourses of power – and the power of those discourses – resonate loudly internationally as well. The Greater Mekong Sub-Region (GMS), which did not exist as a geographic entity before the Asian Development Bank (ADB) created it in 1992, has now become the backdrop for Mekong region-wide infrastructure development, such as highways and power grids.

Initial calls for a hydropower cascade on the Nu came as early as 1995 (Wei, 2005); yet serious planning and surveying did not begin until 2001. As plans began to coalesce, construction on a similar hydropower cascade on the neighbouring Lancang (Upper Mekong) was already under way. Hydrolancang, the Lancang developer, negotiated an agreement in 1998 for Thai co-financing on the Jinghong Dam, at the time planned as a 1500MW project.² In exchange for a 70 per cent stake, Thailand would receive all electricity produced for the first two years of the dam's operation, then projected to be 2013 to 2015. Interviews with officials in China in 2005, however, revealed that the dam is now being built without Thai financing due to an accelerated development timeline; the first turbine of Jinghong, now designed for a total 1750MW, came online in June 2008.

Thus far, the joint venture model has not been openly discussed as an option for the Nu dams within China. On the Lancang, the developer's model of 'rolling development', where power and revenue generated by one dam are used to build the next, has been supplemented heavily by Chinese central bank loans, which provide up to 75 to 80 per cent of the capital. It is likely that the controversial nature of the Nu dams will make foreign investors, already deterred by long construction periods, high start-up costs and delayed returns on investment, even less interested in investing. Moreover, given the Nu's distance from key load centres such as Guangdong, significant start-up costs and delays will probably result from solidifying grid infrastructure to efficiently and safely transmit power over such long distances. To this end, China has become a world leader in ultra-high voltage (800kV) direct current (DC) transmission lines.

Central authorities delegated survey and design work for the Nu cascade to the Beijing Institute of Hydropower Survey and Design and the East China Institute of Hydropower Survey and Design. Plans were submitted in July 2003 as the *Middle and Lower Nu River Hydropower Planning Report*. Supporters cited practical advantages of developing large-scale hydropower on the Nu, including the river's steepness and the relatively small number of people who would have to be resettled, estimated at some 50,000 (He and Feng, 2004). Development costs are also expected to be low relative to other large hydropower projects, which will presumably result in low prices for electricity sold to the grid and, in turn, to end users.

Environmentalists and cultural preservationists have criticized the dam plans as threatening to the cultural and biological diversity of the area, and have repeatedly

made appeals to save one of China's last 'undammed' or 'virgin' rivers (even though there are already two completed dams and a third under way on the upper reaches in Tibet). Semantic questions notwithstanding, the most substantive critiques of the projects have questioned the decision-making processes leading to their apparent initial approval, as well as the gaps in those processes that seem to allow developers to skirt laws regarding environmental impact assessments and public input, and to avoid oversight from relevant watershed authorities.

In response to domestic and international outcry, the Nu projects were suspended by Premier Wen Jiabao in 2004, officially for failure to comply with environmental reporting requirements. Over two years later, then Minister of Water Resources Wang Shucheng referred to the 13-dam cascade as a case of 'predatory development'³ in a speech in Hong Kong (Xiang Gang Shangbao, 2006). Due to their controversial nature, there is limited publicly available information regarding the Nu dams. We provide here only a preliminary sketch of the projects, based on close examination of Chinese and Western sources, recognizing that details such as capacity, location and timelines may change. Figure 5.1 indicates the approximate locations of the Nu-Salween hydropower projects; Table 5.1 provides basic information about each dam, including map abbreviations. The final status of the cascade is still uncertain, so our grouping of certain dams as more or less likely may be inaccurate or premature.

The original two-reservoir, 13-step (*liang ku shisan ji*) plan called for two dams with major reservoirs in a cascade totalling 13 dams. Large reservoirs provide multi-seasonal regulation (storage capacity), enabling more consistent power generation even in the dry season. Two of the Nu dams, Songta and Maji, were designed with reservoirs of 6.3 and 4.7 billion cubic metres in capacity, respectively. Preliminary work has already begun at the two sites. A report in late 2004 claimed that Songta would probably be one of the projects approved in a 'slimmed-down version' of the Nu development plan (Cheung, 2004). Once Songta and Maji are built, the economic logic of filling in the gaps by building the smaller projects downstream becomes more compelling.

Yabiluo (1800 MW) and Maji (4200 MW) made early headway toward central government approval. According to the 2003 plan, those projects, along with Bijiang, Lushui and Yangsangshu, were to be completed between 2015 and 2020 (He and Feng, 2004). Such expectations were later scaled back; in 2005, Minister of Water Resources Wang Shucheng suggested one or two dams were likely to be approved in the short term (Ma, 2005). Most observers understood that to include the cascade's smallest dam, Liuku, work on which has been under way in conditions of questionable legality since 2006. At 180MW of installed capacity, Liuku ranks as a medium-sized dam in China, and will almost certainly supply power locally. According to recent media reports, the resettlement sites for housing villages moved from near the dam site are already constructed. The same source reported that many villagers protested the terms of resettlement (Shi, 2008). Meanwhile, the Yunnan subsidiary charged with developing the Nu met in 2006 with the Beijing-based

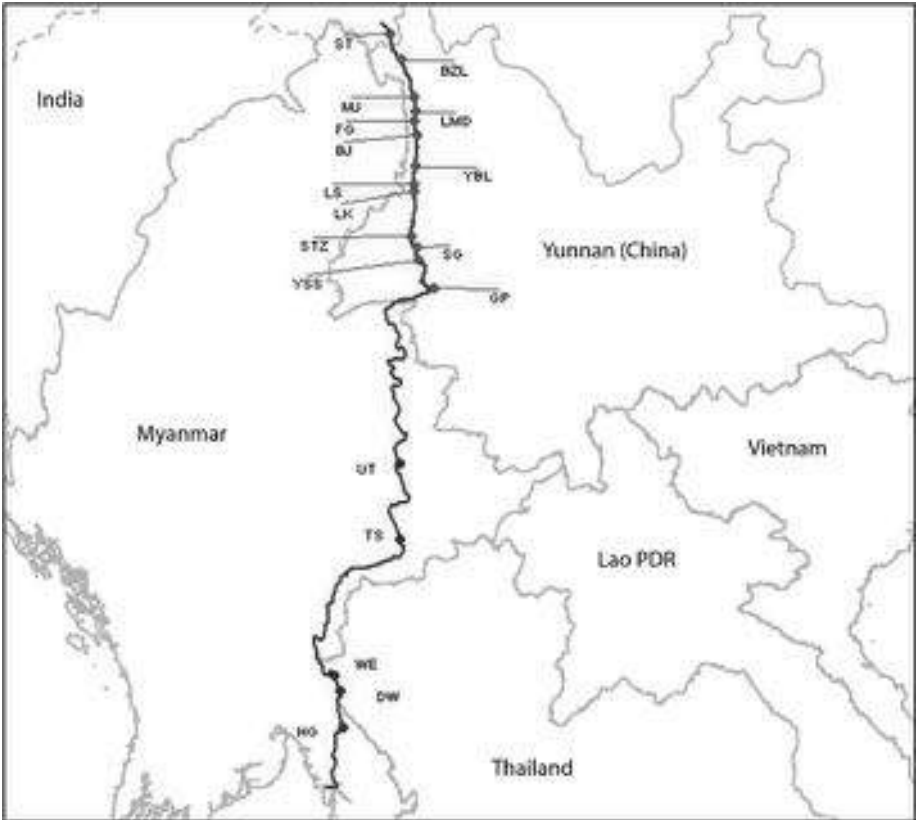


Figure 5.1 *Approximate locations of the Nu-Salween hydropower projects (including proposed and ongoing projects)*

Source: chapter authors, based on Magee (2006b)

Institute for Water Resources and Hydropower Research to discuss turbine design for the 1000MW Saige Dam (IWRH Office, 2006). Saige and Liuku were both cited in the *11th Five-Year Plan (2006–2010)* for renewable energy development as key projects to be pushed forward by 2010 (Yundian Xinwen, 2008).

Given the controversy surrounding the original design, a smaller one-reservoir/four-step design (*yiku siji*) has been suggested as a compromise. This would comprise Liuku, Yabiluo, Saige and Maji, with Maji the major upstream reservoir for the other three dams. Aside from the four projects that seem most likely to proceed in the near term, and with the possible exception of Songta on the Tibetan side of the Yunnan–Tibet border, nine dams remain on the drawing board. Of those, all but three have planned installed capacities greater than 1000MW, meaning they will play an important role in electricity transfers out of Yunnan over the coming

Table 5.1 *Basic information about the Nu-Salween projects (including map abbreviations)*

Dam name	Map abbreviation	Projected installed capacity (MW)
Songta	ST	4200
Bingzhongluo	BZL	1600
Maji	MJ	4200
Lumadeng	LMD	2000
Fugong	FG	400
Bijiang	BJ	1500
Yabiluo	YBL	1800
Lushui	LS	2400
Liuku	LK	180
Shitouzhai	STZ	440
Saige	SG	1000
Yangsangshu	YSS	100
Guangpo	GP	600
Upper Thanlwin	UT	2400–3000
Tasang	TS	7000
Weigyi	WE	4540–5600
Dagwin	DW	500–900
Hutgyi	HG	1190

Source: Nujiang Lisu Autonomous Prefecture Government (2005)

decades. In an interview, one development executive noted that he expected a small number of dams would first be approved, with the others probably following.

One of the principal arguments against Nu hydropower development is that a number of the dams lie adjacent to the Three Parallel Rivers UNESCO World Cultural Heritage preserve. Activists and academics are concerned that some of the reservoirs would threaten the preserve, suspected to be one of the greatest concentrations of biodiversity in the world (Fan, 2005). Others, however, counter that the elevation of the reservoirs lies below that of the preserve and therefore the impact will be limited (He and Feng, 2004).

Downstream (Myanmar, Thailand)

As early as 1981, the Electricity Generating Authority of Thailand (EGAT) had studied potential hydropower development on the Salween (EGAT, 1981; TERRA, 2006), and Thailand's economic boom that followed a few years later gave the idea stronger impetus. Preliminary studies commissioned by Thailand and Myanmar and conducted by Japan's Electric Power Development Company during the early 1990s identified about ten potential dam sites on the Salween. But the economic crisis in 1997 sidetracked those plans by bankrupting Thai developers

and raising new questions about the viability of investing massive amounts of public and private funds in foreign megaprojects (Greacen and Palettu, 2007). At that time, Thailand's relations with Myanmar's State Peace and Development Council (SPDC) government were growing increasingly strained over a number of security issues: the SPDC's alleged complicity in the production and distribution of the methamphetamines and heroin that enters Thailand, boundary disputes, the ethnic insurgencies and refugees. The resulting tensions led to occasional armed clashes on the border, and at least one Thai military offensive well inside Myanmar (Pathan, 2005).

While some Thai-built dams in Laos are already in operation, building on the Salween is proving more problematic. One reason is that the sites will be in outlying areas that the central Myanmar government has never fully controlled. Myanmar's key load centres are concentrated in the central and lower parts of the country; thus, hydropower development has mainly been in these regions close to the national grid (Myanmar Department of Hydropower Planning, 2006). But an estimated 60 per cent of Myanmar's hydropower potential, including the Salween dams, lies in the more remote central and eastern hills region, mostly in the Karen and Shan states (Bartle, 2005), home to an array of organized ethnic insurgents, pro-government militias and smaller private guerrilla units. As Myanmar's army gradually asserts control over its hinterland and weakens its political opponents, however, and as its ambitious hydropower development programme gathers pace, plans to dam the Salween River look more realistic. Political stability remains a concern; but construction of the dams and the resulting flooding and dislocation of people around them would probably deliver a crushing blow to the ethnic insurgencies.

Myanmar's limited financial and technical capacity has also hampered progress and underlines the necessity of foreign assistance. Japanese war reparations financed construction in 1960 of Myanmar's first major hydropower station in Karen State on the Baluchaung River, a tributary of the Salween (Japan Ministry of Foreign Affairs, 2002). Japanese loans and emergency assistance have since covered critical repairs and maintenance costs. During Myanmar's socialist period and self-imposed isolation beginning in 1962, the government did not build another major dam until it completed the Kinda Dam in 1985, with Japanese public funding, and the Sedawgyi Dam, completed in 1989 with ADB loans (ADB, 1989; Myanmar Department of Hydropower Planning 2006), both in Mandalay Division. According to one member of a survey team from MDX Group, a privately owned Thai developer, MDX was among the first callers to explore potential large-scale hydropower development opportunities in Myanmar following the Myanmar government's decision to open its door to foreign investment in 1988.

Financing large dams, however, proved problematic. Thai firms lacked the funds and access to capital required for these big-ticket projects. And unlike in Laos, where the World Bank and ADB have backed various dam projects with grants, loans and technical assistance (ADB, 2008a), Myanmar is not eligible for

similar assistance (World Bank, 2008). The ADB has not extended loans to the country since 1986, and bilateral technical assistance ended in 1987 (ADB, 2008b). Similarly, the World Bank has approved no new lending for Myanmar since 1987, citing defaulted payments and lack of reforms (World Bank, 2008).

Moreover, as part of its economic sanctions package against Myanmar's military rulers and their associates in response to the large-scale repression and violence directed against their political opponents, the US government is required to 'vote against the extension of any financial assistance to Burma by international financial institutions' (US Government, 2003; Niksch and Weiss, 2008). First imposed in 1997 and tightened in subsequent years, restrictions also include a ban on imports from Myanmar and the prohibition of investment by US companies there, as well as a freeze on assets of companies and individuals linked to the junta. Fearful of a backlash from US equity markets, some banks in Singapore and China have recently ceased dealing with some firms and banks linked to the military (Lwin, 2006; Levett, 2007). Additionally, the European Union has adopted similar, if weaker, restrictions against Myanmar (Council of the European Union, 2007).

Given these legal complexities and political sensitivities for Western firms and lending institutions, the entry of Thai and Chinese developers and financiers has given Myanmar's hydropower regime a needed boost. Thai energy planners, for instance, recently identified the Salween as the 'most favourable' location for transboundary hydropower development, notwithstanding security and political concerns (EGAT, 2003). In August 2003, China approved a US\$200 million loan for the 790MW Yeywa Dam project (Myanmar Ministry of Foreign Affairs, 2003; Bosshard, 2004), currently Myanmar's largest hydropower facility. Yeywa is being built by a consortium of Chinese companies that includes China's Gezhouba, which also reportedly is contracted for part of the construction work at Tasang (*International Water Power and Dam Construction*, 2007a).

The Salween dams will generate electricity for export and for the domestic market, where the country's notoriously unreliable power supply causes daily power outages even in its largest cities. The regime estimates that it has so far tapped only 1 per cent of its total hydropower potential (Myanmar Department of Hydropower Planning, 2006), which currently produces roughly one third of the country's entire electricity output.

In order to tap the country's hydropower potential, the Myanmar regime, in 2002, restructured its Ministry of Electric Power and its Department of Hydropower (see 'Principal actors' section below), and also signed the Inter-Government Agreement on Regional Power Trade in the Greater Mekong Sub-Region Countries,⁴ which the regime hoped could allow it to export power generated from the Tasang Dam and other planned projects to other GMS countries through the Asia Power Grid (Bartle, 2005). National development strategies, meanwhile, have placed hydropower at their centre. The country's first two five-year development plans (2001–2005 and 2006–2010) focus on hydropower growth to feed the domestic market. Its third five-year plan (2011–2015) outlines strategies

to ramp up power trade with neighbouring GMS countries to the east and with India and Bangladesh (Myanmar Department of Hydropower Planning, 2006). Foreign companies are being invited in to form joint ventures with local partners to help finance and construct dams, typically with the condition that Myanmar is entitled to '10 to 15 per cent of annual electricity generation from the power stations free of charge' (Myanmar Department of Hydropower Planning, 2006). In December 2007, the completion of 13 hydropower projects in Myanmar was given priority over all other projects, including those in the increasingly significant oil and gas sector (Thu, 2007).

The Salween dams, however, were not included in that list as they are Chinese- and Thai-led projects, the output of which will be diverted abroad. But the dams are included in the roster of more than 40 projects that the regime hopes to commission in the coming years (Myanmar Department of Hydropower Planning, 2006). Owing to their political sensitivity, the five dams planned for the Salween have proceeded under a high degree of secrecy. The lack of a clear regulatory framework for hydropower development on the river, allegations of human rights violations conducted in preparation for the dams, and the potential environmental destruction that may result from their construction all raise further questions about the viability of the Salween projects.

Hutgyi

The first dam on the Salween targeted for construction is the Hutgyi Dam (sometimes also spelled Hatgyi, Hutgi or Hatkyi), a US\$1 billion run-of-river power plant located in Karen State, some 33km downstream from the confluence of the Moei River at the Thai border. It is a joint venture project between Myanmar's Ministry of Electric Power No 1, the Electricity Generating Authority of Thailand and China's Sinohydro Corp (Thu, 2006). An initial feasibility study in 1999 conducted by NEWJEC (formerly known as New Japan Engineering Consultants, Inc.), a Japanese development consultant, recommended a low-height, run-of-river dam with a capacity of 300MW (Vatcharasinthu and Babel, 1999); but Thai official figures list the dam at 1190 MW, with some 75 per cent of the output to be delivered to Thailand starting in 2019 (EGAT, 2008).

In December 2007, Russian manufacturer Power Machines Company, which makes equipment for thermal, nuclear, hydraulic and gas-turbine power plants (Power Machines Company, 2006), entered the picture when it announced that its joint venture with Chinese firm Zhejiang Fuchunjiang Hydropower Equipment would deliver eight turbine units – seven at 170MW and one at 132MW – to the Hutgyi plant (*International Water Power and Dam Construction*, 2007b).

Thailand and Myanmar signed a memorandum of agreement in December 2005, which stated that EGAT would begin construction of Hutgyi in late 2007, and Sinohydro signed a memorandum of understanding (MoU) with EGAT and Myanmar's Hydropower Implementation Department (HPID) in 2006 for joint investment in the project (SHAN, 2006; Thu, 2006). But the parties hadn't

worked out an investment model at that point and no other details were made public according to the terms of an earlier 2005 MoU, which states that ‘each party shall strictly keep confidential any and all technical, legal and commercial data and information’. An environmental impact assessment (EIA) was conducted by the Environment Research Institute at Chulalongkorn University in Bangkok. The EIA, not required by Thai law, was criticized for downplaying the environmental and human impact and for making dubious claims about the extent of the opposition to the project by the local ethnic Karen. The institute was preparing a revised EIA before EGAT halted all work on the project in late 2007, after two of its staff were killed in just over a year. The deaths, allegedly by a landmine explosion and artillery ambush near the project site (*Bangkok Post*, 2007), prompted EGAT Governor Kraisi Karnasuta to shelve the project ‘indefinitely’ and then Energy Minister Piyasavasti Amaranand to urge Thai officials to expedite power development plans in Laos instead (Energy for Environment Foundation, 2006). The Myanmar government blamed the Karen National Union (KNU) for the attack, which it denied, pointing out that the Hutgyi site is located in territory controlled by its rival, the pro-junta Democratic Karen Buddhist Army (DKBA). In February 2008, KNU Secretary-General Mahn Sha, a staunch opponent of the dam, was gunned down in his home by unidentified assailants (Associated Press, 2008). The motives and the culprits behind these killings remain publicly unknown, while the episodes highlight the security concerns associated with the Salween projects.

Tasang

Tasang (sometimes spelled Tarhsan, or Tar-hsan) would be the largest dam in Southeast Asia, with a total capacity of 7000MW (EGAT, 2008) and annual generation of 35,446 million kilowatt hours (Xinhua News Agency, 2007). At a cost of US\$6 billion, it would be the single largest investment ever in Myanmar. The dam site is located in southern Shan State some 130km northwest of the Thai border pass at Baan Arunothai/Nong Ook. Thailand is expected to purchase at least 85 per cent of the annual production generated by the plant; but no power purchasing agreement has been signed thus far.

Construction works on the project will include an 876m long, 230m high concrete dam, and two 8m diameter tunnels, the longest of which will stretch 1.2km (Bartle, 2005). The project’s initial investors were Myanmar’s Department of Hydropower Planning (DHP) and MDX Group at 15 per cent and 85 per cent, respectively (MDX PCL, 2007b). Myanmar’s semi-official state press reported recently that China Gezhouba Water and Power Group bought a controlling 51 per cent stake in Tasang (Thu, 2007). But according to a senior executive of MDX Group and the company’s filings to the Thai Stock Exchange, MDX still holds an 82.88 per cent stake, while DHP holds the remaining 17.12 per cent in the Tasang Hydropower Company Ltd, the operating company for the project.⁵

After several early studies of Tasang in April 2006, the Myanmar Ministry of Electric Power signed a development agreement for the project with MDX, with completion scheduled around 2020. A year later the official Myanmar media reported that implementation was under way for Tasang, now listed at 7110MW (Xinhua News Agency, 2007). Tasang was officially inaugurated on 30 March 2007, when officials from MDX and other involved parties cut the ribbon at the groundbreaking ceremony (New Light of Myanmar, 2007b); but heavy rains halted construction soon thereafter (Thu, 2007).

Tasang has also been constantly surrounded by accusations of human rights abuses and widespread environmental damage. A Shan advocacy group has said that over the past ten years, the Myanmar army has relocated more than 60,000 villagers from areas adjoining the dam site and the projected flood zone (SSEO, 2006). Other human rights groups have said the project would displace tens of thousands more from their homes in the Shan, Karenni and Karen states in Myanmar, as well as from Mae Hong Son Province in Thailand, and that others have been press-ganged into forced labour, raped and killed in preparations for construction of the dam. Preliminary feasibility studies required an increased military presence near the dam site (EarthRights International, 2005).

In 2002, the ADB studied the Tasang Dam as part of a master plan for a regional power grid, but backed away, citing 'serious socio-environmental concerns'. Rajat Nag, who heads the ADB's Mekong Department, told the Associated Press:

It didn't pass our first filter. The dam would have a profound impact on the Salween River. The project would fragment a fragile river ecosystem, reduce the flow of nutrients and water downstream and reduce the biodiversity. Deforestation is likely and would lead to soil erosion in the rainy season, which would exacerbate flood damage. (Gray, 2006)

Upper Thanlwin

Myanmar's Hydropower Implementation Department signed an MoU in 2007 with Farsighted Investment Group Co Ltd, now Hanergy Holdings Group Company Ltd, and Gold Water Resources Co Ltd of China to develop the Upper Thanlwin Dam in northern Shan State, which will reportedly have an installed capacity of between 2400MW and 3000MW (New light of Myanmar, 2007a; Siripol, 2007). Its precise location is undisclosed. Also signatory to the agreement was Tun Myint Naing, managing director of Asia World; both the company and Tun Myint Naing have been barred from doing business with individuals or business from the US (US Department of the Treasury, 2008).

Weigyi

The Weigyi Dam will be located on the border in Papun district in Karen State, on the Myanmar side, and in the Salween Wildlife Sanctuary on the Thai side,

with the access road cutting through the adjacent Salween National Park. The dam has a proposed height of 168m, an estimated power capacity of between 4540 and 5600MW (KDRG, 2006) and a price tag of US\$3 billion to US\$6 billion (Foundation for Ecological Recovery, 2003). The dam could create a reservoir, mostly in Karenni State, of between 640km² to 1000km² of forest, river and farmland, roughly the size of Singapore, affecting an estimated 30,250 people living in flood zones (Foundation for Ecological Recovery, 2003; KDRG, 2006). The status of this dam is unknown; but it is likely to be the third construction project, after Tasang and Hutgyi.

Dagwin

The Dagwin Dam site is also located on the border, just south of the Weigyi site, near Tha Ta Fang village, Mae Hong Son Province. The dam's projected capacity is variously given as 500, 792 or 900MW (Foundation for Ecological Recovery, 2003); but its main purpose would be to trap and regulate large amounts of water released by the Weigyi Dam during peak hours. It would use off-peak power to pump water back up into the upper dam. The estimated US\$900 million cost and the fact that it has no practical water diversion route make this dam exceptionally impractical. Both the Dagwin and Weigyi dams appeared in EGAT's 2004 *Power Development Plan* (PDP) (EGAT, 2005) but not in its 2007 PDP (EGAT, 2008).

PRINCIPAL ACTORS

China

China's principal developers and exporters of hydropower expertise, capital and technologies were carved off the former Ministry of Electric Power (MEP). Some have referred to the 'privatization' of the former ministry and its subsequent state-owned enterprise; yet since most of the stock in these companies is still controlled by the central government's State Assets Supervision and Administration Commission, referring to the companies as 'private' seems premature. The power sector has seen extensive reforms since the mid 1990s, aimed at promoting better governance, increased competition, improved technologies and lowered tariffs (Xu, 2002; Yeh and Lewis, 2004; Magee, 2006a). One specific objective was the separation of generation and transmission facilities, all of which had, before 2002, been part of the State Power Corporation of China and its predecessor, the MEP. The 2002 reforms divided the generation assets of the State Power Corporation among five national-level generation companies. The National Development and Reform Commission (NDRC) then apportioned development rights on the country's rivers to those companies. Rights to the Nu went to Huadian. Yunnan Huadian Nujiang Hydropower Development Company Ltd, Huadian's subsidiary responsible for the Nu cascade, was established in June 2003 through joint investment from China

Huadian (51 per cent), Yunnan Development Investment Corporation (20 per cent), Yunnan Electric Power Group (19 per cent) and Yunnan Nujiang Electric Power Group (10 per cent) (Zhou, 2003).

Sub-national grid infrastructure was divided between two national-level grid companies, State Grid Corporation of China and China Southern Grid Corporation. Finally, four other national-level companies devoted to design, technological development, consulting and construction were created out of the restructuring. Sinohydro, a construction company, traces its lineage to the China National Water Resources and Hydropower Development Authority, founded after the establishment of the People's Republic of China (PRC) in 1949. The company has led the development and construction of some 80 per cent of the large- and medium-scale hydropower projects in China built since then, and is involved in an increasing number of international projects, including several in Myanmar. China Gezhouba Group, a design and construction company, derives its name and reputation from the first dam on the Yangtze and plays a significant role in building dams overseas. The corporation has spearheaded projects in over 30 countries in Asia and Africa, including the Tekeze Dam in Ethiopia and the Yeywa Dam in central Burma.

Thailand

The Electricity Generating Authority of Thailand (EGAT) was established in 1969 when three regional state-owned generating enterprises were consolidated as a single state enterprise under the Office of the Prime Minister, and is now under the Ministry of Energy (EGAT, undated). Responsible for electricity generation and transmission, EGAT builds, owns and operates thermal, hydropower and alternative energy power plants and operates the national grid. It also purchases electricity from private power companies and from neighbouring countries (EGAT, 2008), including two dams in Laos. Plans to privatize EGAT faltered in 2005; but some subsidiary companies have been spun off to the private sector, such as the Ratchaburi Electricity Generating Holding Company Ltd, although EGAT retains an approximately 45 per cent interest in the company (EGAT, undated). EGAT would be the main purchaser of electricity generated at Hutgyi and Tasang; but in the absence of power purchasing agreements for the two dams, its role in Myanmar is not clearly determined (EGAT, 2008).

Unlike at Hutgyi, where EGAT may act as the lead investor, the lead entity at Tasang is Thai developer MDX, established in 1988 'to invest in hydropower generating dam projects in the Greater Mekong Sub-Region' (MDX PCL, 2007b). It also expanded into public infrastructure works, industrial development parks and extensive real estate holdings, and was listed on the Stock Exchange of Thailand in March 1992.

The company is steered by its honorary adviser, Subin Pinkayan (pers comm, 23 January 2007), former minister of foreign affairs and minister of commerce,

and a key architect of plans to open neighbouring markets to Thai companies. In 1989, as commerce minister, he was part of the government that announced it wanted to turn the Southeast Asian mainland into Suwarnabhumi, or a 'golden land', with Thailand as the regional centre of trade and finance. In 1997, he was ordered by the Supreme Court to pay US\$10 million in back taxes on income that the court deemed he earned unlawfully as a minister between 1988 and 1990 (Boonlom, 1997). An engineer by training, he now promotes his regional vision as a private construction consultant and university lecturer. Other notable directors and shareholders of MDX-controlled companies include Subin's relatives, the editor of a major Thai daily newspaper, the relatives of the former head of the Royal Thai Third Army, which is responsible for northern Thailand, including a large portion of its border with Myanmar, and the relatives of a former Thai ambassador to Myanmar (MDX PCL, 2007b). Some American and European banks and investment funds also hold shares.

The company's troubled financial past set back its Tasang plans several years and raised questions about its ability to raise the necessary capital for the project through debt or equity financing. In 1996, the company defaulted in payment on US\$100 million worth of dollar-denominated convertible debentures (MDX PCL, 2007a). By the end of 1997, amid the economic slowdown, the Stock Exchange of Thailand suspended trading of MDX. In 2004, the Central Bankruptcy Court ordered the company into rehabilitation. MDX then restructured its capital and debt and resumed trading on the exchange in August 2007, with the explicit aim of building the Tasang Dam (MDX PCL, 2007a).⁶

Myanmar

Myanmar's military regime established the Ministry of Electric Power in November 1997 and in May 2006 split the agency into two parts: the Ministry of Electric Power No 1, responsible for generation of electricity and hydroelectric power implementation, and the Ministry of Electric Power No 2, responsible primarily for transmission and distribution and gas-fired power implementation (Myanmar Department of Hydropower Planning, 2006). MEP No 2 is also tasked with restoring the national power grid and preparing it for the opening of the 790MW Yeywa plant, perhaps as early as 2010 (New Light of Myanmar, 2007a).

Under the MEP No 1, the former Department of Hydroelectric Power was renamed the Hydropower Implementation Department (HPID), and is tasked with planning, designing and constructing hydropower projects (Myanmar Department of Hydropower Planning, 2006). It also signs memoranda of understanding and of agreement, and joint venture agreements with foreign companies to develop new hydropower projects (New Light of Myanmar, 2007a). A second new unit, the Department of Hydropower Planning (DHP), manages the internal affairs of the ministry. A third unit, the Hydropower Generation Enterprise, has taken over operation of the existing network of larger hydro plants from the Myanmar Electric

Power Enterprise and is responsible for the installation and maintenance of power-generating equipment at hydropower stations (New Light of Myanmar, 2007a).

It is the Electric Power Development Project Lead Committee (or the Leading Committee on National Electricity Development), however, which has the ultimate authority over hydropower development. Under the direction of junta chief General Than Shwe and staffed with other high-level authorities, the committee coordinates dam construction with the line agencies and, importantly, controls the allotment of state funds (IED, 2007; Myanmar Department of Hydropower Planning, 2006). Strong centralized control has been a hallmark of the military regime and government contracts are often awarded to firms close to the country's ruling generals (Lintner, 2007; *The Economist*, 2008), including Asia World and Hongpang, which have both expressed interest in the Salween projects.

Myanmar's largest construction company, Asia World Co, was founded in 1992 by Lo Hsing Han, a Kokang Chinese from the opium-producing region of Myanmar's Golden Triangle who controls one of the largest armed drug trafficking gangs in Southeast Asia. The company has received numerous government construction concessions and was one of the two major contractors to build the new capital at Naypyidaw (Lintner, 2007). In April 2007, its managing director and Lo's son, Tun Myint Naing, signed an MoU on the implementation of the 2400 MW Upper Thanlwin Project with Farsighted Investment (now Hanergy Group), Gold Water Resources of China, and the HPID director general (New Light of Myanmar, 2007a). Washington has accused both Lo and Tun of 'having a history of illicit activities that supported Myanmar's junta' and banned Americans from doing business with Asia World and ten Singapore-based companies owned by Tun's wife (US Department of the Treasury, 2008).

Hongpang General Trading Co Ltd is similarly blacklisted by Washington for its close association with a United Wa State Army commander, Wei Hseuhkang, the reputed founder of the company, who was indicted, along with seven other Wa leaders, by a US court in 2005 on heroin and methamphetamine trafficking charges (US Drug Enforcement Agency, 2005). Founded in 1998, Hongpang is involved in a range of activities, including manufacturing, agriculture, gem mining and highway construction (SHAN, 2005).

Civil society

In addition to state and business actors, a number of what might be called civil society actors within China and Thailand have also become involved in the Nu and Salween dams debates. These include several 'civil society' organizations, segments of the media, and a number of academics. Public discussion of the projects barely exists in Myanmar, so most civil society actors from there work on the Salween with local and international organizations in Thailand. Broadly speaking, these individuals and groups seek to raise public awareness of river conservation, cultural and biological diversity protection, and socially and environmentally responsible

energy development, aiming to affect the direction, magnitude and pace of energy resources development on the Nu-Salween.

Perhaps the greatest hurdle that these actors face lies in promoting their messages of conservation, preservation and socio-environmental responsibility without being seen as opposed to economic development in areas where conditions of extreme poverty frequently prevail. Hydropower developers in China have made a rock-solid connection, through media and governmental channels, between large dam development and poverty alleviation. For the Salween, the correlation has been less clearly or strenuously expressed. The river for most Thais invokes notions of a remote and dangerous frontier and few pay it any heed. Thus far, civil society organizations have failed to successfully (or convincingly) articulate compelling alternatives, with the exception, perhaps, of ecotourism, that would provide comparable economic development benefits without compromising environmental integrity or biological or cultural diversity. In a 2005 interview conducted by Magee, a Chinese hydropower development official argued that the infrastructure improvement required for ecotourism development – namely, in roads, bridges, water, electricity, waste management and lodging – would be greater than those required for dam development, with financial returns far lower.

GOVERNANCE

China

The history of hydropower development leaves little reason to believe that decision-making processes about dams are always (or even usually) rules based. Yet, understanding how decision-making processes have shaped the trajectory of hydropower development on the Nu River, in a context of enterprise restructuring, industry reforms, loosening of political controls, and increasing engagement of China with its neighbours on resource development projects, paves the way for identifying leverage points in those processes. In this section we outline the overall contours of decision processes, recognizing that we have surely overlooked numerous subtleties and cannot hope to capture all the nuances, personal relations and backdoor deals that help to move projects from the drawing board to the river.

The Nu case has been characterized by sustained debate, influenced by past experiences with the Three Gorges Dam and, more recently, the Lancang River hydropower cascade and the Dujiangyan–Zipingpu–Yangliuhu case in Sichuan (see Mertha and Lowry, 2006). Several dynamics have complicated decision-making processes. First, recent changes in the Chinese legal system have given greater voice to social organizations to challenge development projects. Such challenges increasingly rely on new Chinese laws regarding environmental impact assessments, pollution, resource extraction or resettlement compensation. At the same time,

these apparent gains in transparency and pluralism have been offset by the Chinese government's sporadic tightening of restrictions for reasons of social stability and national security. Thus, despite new regulations in 2003 calling for public input on EIAs, authorities insist that the Nu's status as a transboundary river means that detailed hydrological data on the river are a national security concern, and therefore that the EIA cannot be made public.

National security arguments notwithstanding, major river development projects in China should theoretically be subject to a fairly straightforward approval process that begins with one of seven river basin commissions and ends either with the same commission or, in the case of 'major' or transboundary rivers, with the NDRC and the State Council. In the case of the Nu, the Changjiang (Yangtze River) Water Resources Commission (CWRC), which holds authority over all rivers in south-western China, would first develop a comprehensive plan for the basin, covering everything from shipping and transportation to hydropower and forestry. Next, the developer, in conjunction with design institutes, conducts a pre-feasibility study and submits the results to the basin commission to check for compliance with basin-wide priorities. The plan then proceeds to the design stage, with the resulting full feasibility study and detailed design report submitted to the basin commission. Final approval from other authorities, including the provincial government and even the NDRC and State Council, may be necessary in certain cases.

In interviews, CWRC officials lamented that for rivers such as the Nu, hydropower planning often leads comprehensive planning, rather than the opposite. Moreover, the commissions lack oversight on projects outside China, even those on rivers that have part of their watersheds in China. Instead, relevant foreign affairs bureaucracies (such as the Ministry of Commerce and the Ministry of Foreign Affairs) and the NDRC take the lead in approving or denying projects, based primarily on political and economic considerations. The practice by which Chinese companies form consortia expressly for bidding on specific foreign projects reinforces this since the transactions would have to be approved by a number of central government departments, especially since companies such as Sinohydro and Gezhouba still have a majority of their stock owned by the central government's State-owned Assets Supervision and Administration Commission.

Thailand

The Salween projects were planned during the period of Thailand's rapid economic growth to meet EGAT's forecasts of rising energy demand and to diversify energy sources away from imported natural gas. But given EGAT's status as a self-regulating monopoly utility, it has an incentive to overestimate demand, while its planning process is susceptible to political intervention and other conflicts of interest (Greacen and Palettu, 2007). Critics of EGAT's decision processes also say that it is highly centralized and lacking public participation, and that it neglects

alternative energy investment in favour of unnecessary and inefficient mega-power plants (Greacen, 2006).

Thai energy officials have already signed various agreements with their Myanmar counterparts for the Salween projects, and have conducted feasibility studies and discussed transmission systems between the two countries. The dams are included in EGAT's PDP for 2003–2016, which plans for Hutgyi to come online in 2012. But the dams continue to encounter financial and political setbacks. Work sites and roads are being built at Tasang and Hutgyi, although further construction is unlikely in the absence of a power purchase agreement.

Adequate impact studies are also lacking. Although the Thai Ministry of Natural Resources and Environment requires environmental impact studies for domestic hydropower development, cross-border projects are subject to the laws of the host country. Environmental regulations in Myanmar are undefined, and the lead agency for impact studies, the National Commission for Environmental Affairs, lacks a clear institutional framework or the political muscle for environmental management (Habito and Antonio, 2007). Formal regulation of hydropower through the GMS initiatives is similarly absent.

Opponents of the dam say that Thailand's laws require public disclosure of project details and stakeholder input at public hearings, and call for work on the Salween to cease until these conditions are met. Further development on the Salween, say military officials interviewed on the border, could inflict insuperable ecological and population pressures on large swathes of northern Thailand. Until the questions surrounding the viability of the projects are addressed publicly, the Salween dams will continue to be dogged by harsh criticism and sustained debate.

CONCLUSION: LEVERAGE POINTS

Following the Asian financial crisis during the late 1990s, and with increased public outcry about hydropower externalities and performance versus predictions, large hydropower came under intense international scrutiny. Major international investors and risk insurance providers such as the World Bank were accused of prioritizing macro-economic development goals over more targeted projects that were sensitive to local socio-economic, cultural and ecological conditions. The World Commission on Dams (WCD) report in 2000 provided a harsh indictment of many of the world's large dams, indicating that most fell far short of their power and revenue generation targets, including the Pak Mun Dam in northeast Thailand (see Chapter 3). In Southeast Asia, the ADB openly refrained from investing in large hydropower projects due to their controversial nature (although ADB did provide funding for several related projects, such as transmission lines and feasibility studies). More recently, both multilateral banks have signalled their intention to re-engage in hydropower.

Now, however, with demand for electric power in China and throughout the GMS on the rise, and increasing concern about fossil fuel-based generation systems, large hydropower is enjoying a comeback with or without the traditional lenders. This is partly eased by the perception of hydropower as a clean and renewable energy source that stands to be reinforced as global prices for fossil fuels rise. Chinese developers equipped with technology, expertise and growing clout within China and abroad are spearheading hydropower developments in Africa, Asia and the Middle East. Hydropower deals are often part and parcel of 'development packages' that guarantee Chinese access to natural resources vital to China's continued economic development. Much of this is similar to the zeal with which the United States promoted large dams around the world following World War II. To be sure, consultants, developers and funders from Europe and elsewhere in Asia are involved in hydropower development in the GMS region; but China is emerging as the major player.

Understanding processes is the first step in influencing them. This is the primary motivation for our research into the Nu and Salween dams. While ours is but a preliminary sketch about the projects, major actors involved and processes through which the projects are designed, funded and approved, we conclude with several observations about potential leverage points in those processes.

Ironically, the greatest potential for exerting constructive influence may lie in China. The majority of the Nu projects are currently stalled, and while it is likely that some will go forward, there is also a chance that others will be shelved. Significant efforts are currently under way to rethink development and operation of large dams on China's major rivers, especially since many of the flood control objectives can be met through wetland preservation/rehabilitation and spillway management. Similarly, many of the power provision objectives may be alternatively met through end-use conservation. For those projects that do go forward, new laws (e.g. the EIA law and its public participation requirements, resettlement laws, etc.), greater sophistication in the legal profession, and gradually increasing transparency in decision processes, may help to maximize benefits and reduce the negative social and ecological impacts of the dams. Additionally, the past four years of debate have opened the door for increased consideration of scientifically informed development alternatives for western Yunnan, as well as for sustained public pressure for procedural justice (i.e. adherence to EIA processes and public participation requirements).

In our estimation, two things are crucial to the success of any alternative proposal for development in south-western China. First, the notions of 'sustainable' (*kechixu de*) and 'scientific' (*kexue de*) must be decoupled. These terms are frequently conflated in China; yet the latter in no way implies the former. 'Scientific development' figures prominently in China's *11th Five-Year Plan* (2006–2010), and projects deemed 'scientifically' (technically) sound are frequently assumed to be sustainable as well; this is especially true given hydropower's 'green' reputation. Second, evidence must be provided showing that alternative development projects

will match or exceed hydropower projects' ability to achieve poverty alleviation goals. Admittedly, amassing such evidence from experience elsewhere is difficult. As noted above, though, the link between large hydropower development and poverty alleviation has been cemented in development discourse in China, and any alternative proposal must clearly demonstrate the frailty of that link.

In Thailand, civil society groups have long called on EGAT and other major power producers to improve standards of transparency and accountability, but with limited success. For instance, while public pressure forced EGAT to shelve its privatization efforts in 2006, it has failed to compel the company to decommission controversial dams and undertake other reforms. As for the Salween dams, Thai energy planners have been urged to reconsider large-scale hydropower development, in general, and to open the energy sector to more small and independent power producers. Decoupling generation from transmission and improving the regulatory environment would also help to depoliticize energy planning and encourage greater efficiency and conservation, thus rendering the output from the Salween dams unnecessary. Improving standards of public disclosure and stakeholder input must first be improved to foster informed dialogue among concerned parties. The Chinese government, for its part, has long been one of the few allies of the Myanmar junta, and arguably wields the greatest degree of influence with the reclusive military regime. Yet, trade and development practice, along with sovereignty concerns, make it unlikely that the Chinese government would require, or that Myanmar would accept, environmental impact assessments based on Chinese standards for projects on foreign soil. That said, most of the dams discussed here are in areas where even the Myanmar government lacks firm control; indeed, its hydropower pursuits are part of its broader nation-building programme. If the political and economic costs become too high, however, it is conceivable that the Chinese developers might pack their bags and head for friendlier sites in Africa or the Middle East.

NOTES

- 1 In the Burmese language, the river is known as the Thanlwin. Here we refer to the Chinese (including the Tibetan) portion of the river as the Nu, and the Myanmar/Thai section as the Salween.
- 2 For more on the Lancang cascade, see Magee (2006a, 2006b).
- 3 Technically, Wang was speaking in his personal (not official) capacity; but his comments probably evince some frustration about the Ministry of Water Resources' relative lack of influence on the direction of large-scale hydropower development (vis-à-vis the National Development and Reform Commission and the development companies).
- 4 The GMS includes Cambodia, China, Laos, Myanmar, Thailand and Vietnam.
- 5 Myanmar's Hongpang General Trading Company Ltd has also expressed interest in participating in the project (Thu, 2007), presumably to build roads leading to the site.

- 6 According to a company filing to the Stock Exchange of Thailand, MDX shall first invest in 'the Tasang Hydro-Power Project in the Union of Myanmar, which shall be run by a joint-venture company under establishing [sic] in the Union of Myanmar, with registered capital of US\$250 million, comprising 2.5 million ordinary shares at the price of US\$100 each.' As of 23 June 2008, the Stock Exchange of Thailand listed MDX's registered capital at US\$44 million (1407 million baht) (Stock Exchange of Thailand, 2008).

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