Small hydro frameworks: the case of Vietnam and the Philippines

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It is estimated that there is small hydro potential equivalent to about 6700 MW across South East Asia, and small schemes could thus play a significant role in the region, particularly in remote rural areas. Taking the examples of Vietnam and The Philippines, this paper looks at some of the opportunities, incentives and challenges for small hydro developers.

The inauguration of the ASEAN Economic Community (AEC) in January 2016 represents a ceremonial landmark of an ongoing process of policy harmonization across the region. The so called 'ASEAN Way', quintessential of the association since 1967, limiting erosion to national sovereignty through non-binding agreements reached only through consensus, has progressively given way to more binding policies following the ASEAN Free Trade Agreement (AFTA) in 1992 and accession to the WTO by all member states. A proliferation of binding agreements formalized since have ultimately culminated in the AEC Blueprint of 2007, of which ASEAN claims 92.7 per cent of 506 measures have so-far been implemented by member states [ASEAN, 2015[1]].

In support of the AEC Blueprint 2015, the ASEAN Plan of Action for Energy Cooperation (APAEC) 2010-2015 consists of a number of binding as well as aspirational measures. The 33rd ASEAN Ministers on Energy Meeting held in October 2015 declared that member states had exceeded the aspirational target of 15 per cent for renewable energy capacity and set a new target of 23 per cent by 2025 [AMEM, 2015[2]]. While such a target may seem ambitious, it has likely been determined through consensus as an aggregate of pre-existing national power development plans. In any case, the rapid increase in renewable energy capacity is viewed as a necessity for both energy security and to reduce CO_2 emissions.

Given its vast water resources, hydropower will continue to be a key priority for Southeast Asia, with capacity expected to more than double by 2040, up to 90 GW. It should be noted, however, that its proportion of the overall energy mix is actually forecast to drop slightly, down to 16 per cent, while dependency on coal-power increases to a formidable 37 per cent over the same period, as it displaces oil and gas-powered capacity [IEA, 2015[3]].

It is difficult to determine exactly how much small hydropower (SHP) might contribute to this projected total. First, there is wide variation in how SHP is defined across the region: in Vietnam it applies to plants that are less than 30 MW, in Thailand and Laos less than 15 MW, and most others use the below 10 MW standard. Several countries also separate capacities into mini, micro and pico. For the purpose of comparison, this study will generally refer to SHP as those projects that are less than 10 MW.

International financial institutions (IFIs), governments, industry and consumers are increasingly acknowledging the importance of SHP projects. Not only do they have the potential to contribute to overall national power generation, but their small scale means they are ideal for remote village electrification, providing clean cooking, lighting and even a source of income. SHP projects potentially have shorter and simpler development, finance and construction phases than larger projects, partly as a result of reduced regulatory hurdles. Conversely, the relatively high initial capital, distance from the grid and regulatory uncertainty can make SHP less attractive for financiers.

Small hydro in South East Asia (up to 10 MW)*

Country	Potential (MW)	Installed capacity (MW)
Cambodia	300	1.9
Indonesia	1267	99.4
Laos	50.2	10.5
Malaysia	116.6	87.7
Myanmar	167.4	36
Philippines	1876	248
Thailand	700	146.3
Vietnam	2205	621.7

* According to the World Small Hydropower Development Report (2013), UNIDO and the International Centre on Small Hydro Power, China.

Unlike the large hydropower projects constructed in Southeast Asia in recent decades that have been predominantly developed through project finance (with and without IFI backing) or direct state funding, SHP projects have proceeded under a broader range of funding models, as is the case elsewhere. While also benefitting from IFI loans and state funding, a large proportion of SHP projects have proceeded with either corporate finance and/or with the developer's own capital. Project finance models are generally not considered viable for SHP plants less than 5 MW because of the high pre-investment costs [Jenssen and Gjerdmundsen, 2000[4]].

Based on 2013 figures, the total SHP installed capacity in Southeast Asia is already quite substantial, at 1251.8 MW. However, it is the vast potential of approximately 6682.5 MW that is of most interest to development agencies and investors. Given that Vietnam and The Philippines have the largest potential for SHP generation in the region, it seems appropriate to examine further the opportunities and challenges for small hydro development in these countries. That said, the untapped SHP potential in all ASEAN member states is certainly noteworthy.

Vietnam

Following the Doi Moi economic reforms since 1986, the Socialist Republic of Vietnam has managed to lift its population to lower middle income status only relatively recently, reducing poverty to just 3 per cent (according to the poverty headcount ratio in 2012 of US$1.90/day). A large part of this success has been through the harnessing of its vast hydropower poten-

tial, mostly through direct state funding. The current hydropower capacity of more than 9400 MW is a substantial contributor in providing electricity access to 97.6 per cent of Vietnam's 91.5 million, largely rural, population. The 2011 Master Plan for Power Development (MPDD) seeks to increase this capacity to 17 400 MW by 2020 [Government of Vietnam 2011[5]].

However, Vietnam's large hydro potential will by then become largely exploited and the overall proportion of hydro is planned to drop substantially, from an estimated 37.1 per cent in 2008 down to just 11.8 per cent by 2030. Future energy security is pegged to coal power and the establishment of a nuclear sector, which will account for 56.4 per cent and 10 per cent of the energy mix by 2030, respectively [Government of Vietnam 2011[5]].

As outlined in the Table, Vietnam has by far the largest installed capacity of SHP (627.1 MW) in Southeast Asia, as well as the largest total potential (2205 MW). The Government plans to exploit this SHP potential fully by 2030 as part of its renewable energy target. SHP is also highlighted in the MPDD as part of the strategy to provide electricity to remaining off-grid rural and remote villages. In addition, there are recommendations to establish a SHP Development Authority to stimulate investment in the sector.

Historically, the power sector in Vietnam has been controlled through a state-owned monopoly by Electricity of Vietnam (EVN). A restructuring process was implemented under the Electricity Law 2005, outlining three phases of deregulation and privatization through the introduction of competitive generation, wholesale and retail markets in 2006, 2014 and 2021, respectively. EVN has since been converted into a holding company and state-owned enterprises PetroVietnam and Vinacomin have entered the electricity generation market. By 2010, 25 per cent of installed capacity was owned by private investors [Nguyen, 2012[6]].

Development of SHP in Vietnam follows a similar trajectory. Since the 1960s, SHP plants have been almost completely government funded, although some flexibility was afforded by the late 1980s to allow direct oversight and funding from the central government and provincial authorities. The early 2000s saw increasing investment from the private sector as the power market was liberalized, particularly through the UN Clean Development Mechanism (CDM) programme that facilitates funding through carbon offsets from corporations based in developed nations.

Large projects are currently administered by the Ministry of Industry and Trade (MOIT), while approvals for small to medium hydro schemes are provided by the relevant Provincial Peoples' Committee. In addition, projects with reservoirs of less than 300 000 m^3 capacity can avoid feasibility assessment reports and environmental impact assessments (EIAs), simply requiring a signed commitment to environmental protection [Linh, 2010[7]]. Such allowances simplify the approval process for SHP projects, but are also less transparent and are potentially more open to corrupt practice. While this simplified process enabled approval of hundreds of SHP projects in the early 2000s, concern over procedural matters forced the MOIT to step in and either overturn or amend provincial approvals for 73 SHP projects in 2009. Such action indicates that provincial approvals for SHP projects are not necessarily immune from central government oversight.

An avoided cost tariff (ACT) for on-grid powerplants up to 30 MW and standardized power purchase agreements (PPAs) were introduced in 2009, replacing project-specific tariffs based on a 12 per cent return used prior. Developers of on-grid projects must negotiate a PPA directly with EVN. However, the ACT of around US$ 0.05/kWh has raised concerns that it is not sufficient to cover the actual cost of SHP generation.

Further to the ACT, a range of laws have been introduced to increase investment in the renewable energy sector, including SHP projects. The Electricity Law, for example, has provisions for the Vietnam Development Bank to provide up to 70 per cent of low-interest financing for renewable projects in mountainous areas. In addition, the Law on Investment provides a range of exemptions for corporate taxes (over a certain period) and customs excise for plant equipment, while the Law on Environment Protection includes exemptions on certain taxes and land-use fees [Ministry of Economy, Trade and Industry, 2014[8]]. There is currently no foreign ownership restriction for the Vietnam energy sector.

The Philippines

An archipelago of more than 7000 islands, the Philippines has an electrification rate of approximately 86 per cent for a population of more than 100 million. Hydropower makes up 19.75 per cent of its total installed capacity as at 2014. As of 2013, the country was the second largest in ASEAN for both SHP installed capacity (248 MW) and potential (1876 MW), after Vietnam [UNIDO and ICSHP, 2013[9]]. Power sector reforms in the Philippines have been ongoing since the passage into law of the 2001 Electric Power Industry Reform Act (EPIRA). The EPIRA established the Energy Regulatory Commission (ERC), privatized the National Power Corporation (NPC) assets, and deregulated the generation and transmission sectors. The introduction of the Retail Competition and Open Access (RCOA) programme in late 2012 has led to deregulation in the retail sector and the end of single-buyer PPAs [KPMG, 2013[10]].

The 2008 Renewable Energy Act (RE Law, Republic Act No. 9513) provides the framework for the renewables sector. It promotes the purchase and transmission of renewable energy, provides fiscal and non-fiscal incentives, mandates the introduction of FITs, and establishes the Renewable Energy Trust Fund. Among the fiscal incentives provided to renewable energy developers are: a 7 year income tax holiday (extendible through additional investments), a 10 year import duty exemption on plant equipment, extended net operating loss (NOL) carry-over periods (NOLs of the first three years can be carried over for seven years) and a preferential corporate tax rate of 10 per cent once the tax holiday expires. The RE Law also outlines non-fiscal incentives, such as requirements for suppliers to source a certain proportion of renewable energy, as well as priority connection to the grid and priority purchase from grid system operators.

In 2010, the ERC released Resolution No. 16 (2010) which promulgated the rules for renewable energy FITs. This resolution provides that run-of-river hydro plants are entitled to a predetermined FIT, which is indexed annually, for a 20 year period. It also allows for further review of the FIT under various conditions, including when a capacity quota is reached [ERC, 2010[11]] (presumably to deter oversubscription).

However, it was not until 2012 that the FIT rates were announced. Specific FITs for renewable energy sources were released under ERC Resolution No. 10 (2012). For hydropower plants, this resolution provided a FIT of PhP 5.90/kWh (approximately US$ 0.12 /kWh) with a 0.5 per cent degression after two years, and a 250 MW installation target potentially to trigger a review.

It is worth noting that while foreign entities are generally permitted to own 100 per cent of power generation businesses, the Philippine Constitution limits foreign ownership of entities engaged in the exploration, development and utilization of natural resources to 40 per cent. This limit applies to the development of the renewable energy sector.

Numerous studies by government, international development agencies and NGOs have been carried out over several decades to identify SHP sites in The Philippines. The resulting data is publicly available and maintained by the Department of Energy (DOE). More recently, the DOE has carried out a number of auctions for the exploration and development of SHP sites which were identified largely through feasibility studies carried out by the Japan International Cooperation Agency (JICA). Candidates for SHP auctions are selected on their technical and financial programmes.

Assessing investment opportunities

There is certainly large potential for SHP development across most of the ASEAN region, and the two countries highlighted are selected merely because of their particularly vast water resources. The establishment of the AEC adds to this potential, with various policies in place to facilitate cross-border trade. A dedicated policy for SHP development, and an established rule of law more generally, are critical for attracting investment in the sector, as long as the policy has sufficient incentives in place.

The Philippines has perhaps the most generous programme for SHP development of the two. Not only does it have a higher FIT rate, but it also adopts a package of policies (tax incentives, tariff indexation, and off-take prioritization) that are of considerable benefit to SHP generators. The availability of feasibility studies on sites prior to auction also removes significant pre-development costs and provides increased certainty on the feasibility of potential projects. On the downside, capacity quotas and the lower proportion of foreign ownership permitted may limit opportunities to enter the market.

Conversely, the lack of restrictions on foreign ownership on power projects in Vietnam allows greater flexibility for sourcing offshore capital. SHP investors can also take advantage of generous incentives on offer, such as tax exemptions and reduced procedural hurdles for smaller projects. However, there is some precedent for the overturning of approvals unexpectedly, as outlined above.

In short, the policies in place applicable to SHP in Vietnam and the Philippines are unique to each country, offering a wide variety of incentives for certain classes of investors in each. ◊

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