# How Sustainable are Small-Scale Biomass Factories? A Case Study from Thailand\*

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Tell me which industry you can call clean, I have never seen one. (Sunthorn Yensook, Nam Song resident)

#### Introduction

Carbon offsets are not reductions. For each project that is developed in the South, an equivalent level of pollution from fossil-fuel power stations or heavy industry is permitted to continue in the global North. In addition, the system typically funds the expansion and building of new industrial and power projects which are insensitive to the needs of local communities. The implications of such projects on health, land use and water resources are rarely addressed. In this respect offset projects reinforce an unsustainable development paradigm.

The majority of CDM projects are predominantly run by large, highlycapitalized firms or agencies, since they are the companies best placed to hire expensive carbon consultants and accountants, liaise with officials and pay the fees needed for UN registration. The result is a system that subsidizes some of the most polluting companies in the world.

The CDM is presented as a system that helps the spread of renewable energy. However, the definition of 'renewable' projects does not automatically indicate environmentally sustainable or socially just.

This photo essay is a story of two Thai communities fighting for their livelihoods. It aims to highlight the experiences of two communities that fought for rights to their lands and health and to demonstrate that even small-scale biomass energy projects – which are often seen as among the 'better' offset projects – can be detrimental to the lives and livelihoods of local residents.

### A.T. Biopower and the CDM<sup>1</sup>

There are currently 24 registered CDM projects in Thailand and close to 100 projects in various stages of the pipeline. In 2007, the Thai government established the Thailand Greenhouse Gas Organization in order to fast-track CDM projects after investors complained that the Office of Environmental Policy and Planning (the original Designated National Authority (DNA) was too slow, and could thus jeopardize Thailand's opportunity to sell profitable CDM credits.

In 2001, A.T. Biopower put forward a plan to build five rice husk-burning biomass power stations with the objective to bundle them and acquire CDM financing. The A.T. Biopower project was the first CDM project registered in Thailand, and among the first five for which baseline methodologies were approved by the CDM Executive Board.<sup>2</sup> The first power station was built in Pichit near the fertile banks of the Nan River in north-central Thailand. The Pichit station is a 22 megawatt capacity thermal power plant located next to the community of Sa Luang in Hor Krai subdistrict in the province of Pichit, about 200 kilometres north of Bangkok. The plant is located 1 kilometre from the Nan River and has a daily fuel requirement of 500 metric tons and a daily water requirement of approximately 2,200 cubic metres. The station burns in its entirety rice husks. The power station is surrounded by a 12 metre high fence comprised of newly planted eucalyptus and pine trees.<sup>3</sup>

The credits generated by the project are bought by Japan Mitsubishi UFJ Securities, a financial services group, and Chubu Electric, a Japanese power company which is registered in The Netherlands to minimize its corporate tax obligations. Chubu interestingly owns a 34 per cent stake in A.T. Biopower, allowing the company to use the Thai project to avoid its domestic emissions reduction obligations in Japan.



### What 'Waste'?

Biomass is often touted as a renewable resource which provides benefits for local communities and reduces the demand on fossil fuels. Defining what a waste product is can be very complicated for local communities because often resources and 'waste' are used and reused in a continual cycle with benefits to the environment. Far too often the waste in question already has a purpose within a local economy. The staple crop grown in the region is rice which depending on the season and rains will produce two or three crops per year in the fertile soils. The rice is then brought to a de-husking facility to separate the kernels from the husk. The kernels are sold on to vendors or stored by the community. The husks have been used for centuries to absorb animal droppings, mostly from chickens. The resultant product is used as an agricultural fertilizer as well as for brick manufacturing. The rice husk and manure mixture is a natural fertilizer that releases minerals into the soil and builds soil content. Rice husks therefore play a vital role in agriculture.

Local farmers in the region commented that they will have to replace this natural fertilizer with chemical fertilizers now because demand from the power plant has driven up the price of rice husks, meaning they are no longer affordable.<sup>4</sup> Local chicken farms and brick factories have to go further away to source rice husks, destroying a once self-sufficient system.



A truck piled with bags of rice husks on its way to the Pichit power station.

The A.T. Biopower project claims to be replacing power generation which would otherwise require oil, coal and natural gas. It also claims that the resulting ash by-product will be used for cement production, further reducing the environmental impact. No mention is made of existing uses for rice husks, which are presented merely as waste products. This fiction is elaborated on by the project validator, Det Norske Veritas (DNV), which claims that uncontrolled burning or dumping of rice husk, without utilizing it for energy purposes, is the predominant current practice.<sup>5</sup> No supporting evidence is

offered to back this up, and the wording is simply copied from a standardized text that DNV applies to all such projects.<sup>6</sup>

By assuming that the burning of rice husks is climate neutral, talking up the 'sustainability' of the project and talking down the local environmental impacts, the project developers are able to maximize the number of Certified Emissions Reductions (CER, the carbon credits issued as part of the CDM) issued to A.T. Biopower. Over a period of seven years, it is projected that 495,405 CER will be issued. When sold on the market, these might plausibly fetch between \$10 and \$30 each, with each CER claimed to represent a metric ton of carbon emissions.



### Heath Risks

The residents near the Pichit power station have complained about respiratory problems and aggravation felt in their skin and lungs. 'While my harvest has nearly returned to normal, health problems from the dust have persisted. Residents, especially children, have developed skin rashes and breathing difficulties, which is why we've closed up our windows and doors', a local resident explains.<sup>7</sup>

Silica (SiO2) is the main mineral component of RHA (85-90 per cent). It carries serious health risks, particularly to the respiratory system.<sup>8</sup> Silicosis is an irreversible lung disease which is normally found in workers at mining operations or rock quarries, but it can also be caused by inhaling RHA.<sup>9</sup> A few years ago certain villages in Northern Thailand were dubbed 'villages of widows' because of the large number of pestle-and-mortar-making workers who died from silicosis. China reports 24,000 deaths per year due to silicosis.<sup>10</sup> Villagers living next to the Pichit plant keep their doors and windows closed or the ash

piles up on everything. These health risks have not been addressed by the company and like most villagers living next to a factory or power station, they fear complaining.



The villagers complained of noise pollution when the power station was being built. The engine was so loud in the first month of operation that residents living opposite the power station complained of having to shout in order to be heard by each other. Instead of slowing operations or modifying the engine, the company responded by offering the villagers ear plugs. Each time the villagers have complained about the station, the standard response has been to offer them gifts to stay quiet. (Local residents asked to remain anonymous.)

### Resistance to the A.T. Biopower Station

In 2001, A.T. Biopower was still in planning stages and the company was considering sites in which to build its five factories. One of the sites being considered was located in Nam Song, a river-dependent community in the Phayuha Khiri district, Nakhon Sawan province of Thailand. This community is located about 50 kilometres from the now functioning Pichit plant. It is located on the fertile flood plain of the Chao Phraya River, just downstream from where two tributaries merge at Nakhon Sawah (Heavenly City).

After six years of struggle against the site proposal the Nam Song community successfully deterred the developers from building on their lands.



Across the road from the Pichit plant the company has started dumping the biomass waste next to homes of local residents. According to a local resident near the Pichit plant, they were offered 'as much ash as they wanted for free because the company does not want it.'



Suraphol Pan-ngam shows his neighbor's aquaculture operation located on the banks of the Chao Phraya River. The fish are raised for community consumption and for sale in the local market.

The main source of livelihoods is agriculture, which has been developed in a way that turns the seasonal floods into a resource. When the water subsides in the dry season, the fertile banks are planted with cabbage, broccoli and other seasonal vegetables. When the water is high in the rainy season, it is used to flood rice paddies and aquaculture facilities are assembled on the river's edge.

Nam Song residents were immediately concerned about the impacts a new power plant could have and visited a community impacted by a similar rice-husk burning station in Wat Sing district, Chainat province, about 40 kilometres southwest of Nakhon Sawan, owned by another company. One community leader reasoned that 'The developers only told us positive sides about the power station and we are uneducated so we needed to find out about the negative sides too.' Residents of Nam Song then travelled to Wat Sing, where the local community was living with the affects of a biomass power station. After talking to the residents in Wat Sing the residents and understanding the levels of pollution they live with the residents from Nam Song were committed to form their own opposition.



The community forests are also an important resource, providing food, building materials, high ground for livestock, traditional practices and medicines.

# Moving Forward

After months of information gathering, the Nam Song residents experienced a major setback when the local tambon (subdistrict) government illegally agreed to install the power station in Nam Song. The Thai government requires developers to have a public hearing process with residents before proceeding. At the public meeting the local government officials and the company consultants met with the community and asked them to sign their names on a piece of paper labelled 'consultant meeting'. The consultants and local government officials added names of villagers who were not in attendance. The company showed the list of names to the local authority, stating that 88% of the 528 villagers who attended the meeting agreed to the power plant being built. In the meantime, A.T. Biopower placed a deposit on the plot of land they planned to develop in Nam Song.

This incident provoked the villagers to send a grievance letter to the local government. Initially, they were divided over whether the power station should be built, which caused strife in daily life as well as between family members. Eventually, they resolved to end their divisions. The entire community of Nam Song agreed to sign the letter stating their objections to the meeting and to the proposed station. The villagers then created the Nam Song Conservation Club to co-ordinate a full-scale campaign against the project.



Banner reads, 'Stop the Electricity Plant A.T.B'.

# **Reaching Out**

The Nam Song Coservation Club then began gathering research with the aid of other movements and organizations. The villagers sought to show that the rice field was on a flood plain and an inappropriate power plant site, and that building it so close to where they lived constituted a threat to the health of the people and the river. The campaign grew over time including several rallies of over 700 people outside the provincial government headquarters, door-to-door organizing and on-going meetings.

The developers used several tactics that are common in such situations in their attempts to stop the protests. Members of a community in the nearby Pichit province, who were also facing the possibility of a new biomass power station, were sent by the company to bribe the village leaders, offering them compensation to stop protesting. All of the village leaders were told by developers and local government they could be in danger if they continued the campaign. Various threats were made, large bribes were offered, and the villagers were repeatedly lied to in attempts to destroy their unity.



Site of proposed A.T. Biopower plant near Nam Song during the seasonal floods.

# **Bribery and Coercion**

The project developers invested a lot of time and energy in their attempts to persuade the Nam Song community that the project was beneficial, but they were not convinced. 'We do not need factories or development, we live with nature and we like the way things are', stated Jongkol Kerdboonma, a member of the club. Another resident stated 'We knew the power plant was bad because it involved money'. The company promised the community a development fund and a new health fund in an attempt to smooth over relations, but the local leaders remained sceptical. 'Which doctor will tell us that we are sick from the pollution if the doctor is hired by the company?', they asked.<sup>11</sup>

Interestingly, the Nam Song community was never offered any electricity from the power plant, not even at a subsidized rate. Each household pays 300 baht per month to the national grid. The Nam Song Conservation Club states three main reasons for their opposition to the rice husk power plant:

- We have lived self-sufficiently on this river for generations, so why would we want to destroy the land with pollution that would be bad for the people and the environment?
- We already knew they would dump the ash into our river, and that it would pollute the river and the fish.
- Rice husks are not an agricultural waste product to begin with. We use them for the chicken pens, and after they have absorbed the chicken waste we use this as a fertilizer. If the station was built here rice husks would be too expensive to use as a fertilizer, and we would have to switch to other fertilizers.

# **Essential Roles of Women**

The women in the village played an essential role in fundraising, organizing and maintaining trust within the community. The women made handicrafts and sweets to fundraise for the campaign. They sold t-shirts and sweets at meetings, which provided an opportunity to talk with others about the struggle and build trust. They canvassed an area of 10 km<sup>2</sup> and gathered 4,000 signatures for one of the rallies at the government headquarters.



Women from Nam Song creating handicrafts for fundraising for the campaign.

The success of the women's work was such that they too were targeted and harassed by the project developers. The developers lied to the women, telling them that the men in the village were receiving bribes from the company. They were then further questioned about why they would want to keep supporting the men if they themselves were not receiving money as well. The women's awareness that this tactic was being used in an attempt to derail their organizing confirmed to them the importance of their work for continuing their struggle.



Jongkol Kerdboonma in her garden collecting vegetables for cooking.

# **Organizing Together**

An open and democratic organizing process helped the community maintain its stamina. One resident stated, 'We made all of our decisions together at meetings, which prevented internal conflicts from arising.' The residents acknowledged that there were disagreements and tensions during the difficult phases of the struggle. 'We would scrutinize each other, even watch each other and everyone was very tense'. However, the community continued to organize, reach out for support and demonstrate. They received solidarity and help from other community movements, NGOs and the Assembly of the Poor, the largest grassroots movement in Thailand involving tens of thousands villagers who are affected by unjust policy and development. The Nam Song residents said they 'learned a lot from each others' struggles' and maintained their unity so that no one accepted the bribes or backed down from the threats.

After six years of struggle, and with the help of several outside solidarity organizations, they were able to approach the National Human Rights Commission (NHRC) to request an official investigation. In 2007, the NHRC recommended that the power plant should not be built on the grounds that it

was inappropriate to build on the flood plain, and that it would violate human rights by polluting the river and damaging the villagers' livelihoods.

We can not rely on any laws to protect us, which are no better than a piece of paper, so we had better protect ourselves, stated Soontan Yentosuk.

And while for the moment Nam Song residents are protected from developers they still fear that other power plants will try to build on this particular site. The Nam Song Conservation Club remains committed to protecting their community from development projects because they are aware they may need to build another campaign at any moment.



The Nam Song Conservation Club kept very good records of its campaign, including photos and notes from meetings.

# Conclusions

Carbon offset projects follow pre-packaged designs that do not deal with the real complexities and intricacies of communities and livelihoods. In the case of A.T. Biopower, rice husks that were used for agricultural purposes are now burnt, showing a considerable insensitivity to the context in which the project has been developed. In both villages, in fact, the proposed biomass power plants threatened to undermine local struggles and low-carbon livelihoods, and subvert existing practices that have potential to be applied elsewhere as everyday solutions to tackling climate change. This was compounded by bribery and threats on the part of the company, as is so often an accompaniment of infrastructure projects conducted in the name of 'development'. The bribery and coercion perpetuated mistrust and division between the two communities. In the case of Nam Song, a strong and concerted campaign of local organizing was

able to resist the advances of the company – benefiting too from solidarity with other local organizations.

In the case of Sa Luang, however, the station was developed – with A.T. Biopower now brushing aside the concerns and health of local residents. CDM project designs are based on the principle of 'additionality', which means that they should prove that they provide a saving in relation to current 'business-asusual'. As Lambert Schneider of Germany's Öko Institute puts it, 'If you are a good storyteller you get your project approved. If you are not a good storyteller you don't get your project through'.<sup>12</sup>



Members of the Nam Song Environmental Conservation Club

The local population loses considerably. The increased reliance on synthetic fertilizers carries with it increased health risks, as does the production of rice husk ash at the site, which can cause silicosis – a fatal respiratory condition. Despite A.T. Biopower's claim that this ash would be recycled for use in cement production, there is clear evidence at the site that it has been dumped next to the residents' houses. Further health and environmental risks could result from the combustion of the rice husks within the power plant itself, since this process also generates sulphur dioxide, nitrogen oxide, carbon monoxide and other dust particles. There is also a significant risk of local water pollution – along similar lines to those documented in the NHRC recommendation not to build a rice husk biomass power station in Nam Song.

More generally, the legacy of such development projects is that they pit communities against each other, and encourage divides within them too. When encountering local protest, the common response of the company has been to resort to a range of bullying tactics – including threats, lies and bribery. Further, what was deemed as a Human Rights Violation in one village is ignored and not applied to another village 50 kilometres away.

The experience of Nam Song, however, shows that local resistance can be effective when there is a strong basis for unity. An open decision making process, and the central involvement of women in the campaign, were important conditions for this.

### Notes

- \* Field visit conducted in November 2008 by Nantiya Tangwisutijit, Tamra Gilbertson and Ricardo Santos. Additional Research by Nantiya Tangwisutijit and Tamra Gilbertson. Special thanks to Larry Lohmann for contact and editorial support and of course to The Nam Song Conservation Club for their generosity, kindness and inspiration.
- A.T. Biopower is owned by the following companies: The Netherlands 34%: Chubu Electric 1 Power Company International B.V. ('CEPCOI') registered in the Netherlands, the subsidiary of Chubu Electric Power Company Incorporated (CEPCO), which is the third largest electric company is Japan having generating capacity of 31,735 MW (as of 31 March 2004); Channel Islands 32%: Al Tayyar Energy Ltd. ('ATE') registered in Jersey, Channel Islands, United Kingdom, an Abu Dhabi-based development and investment company that focuses on renewable energy and energy efficiency projects; Finland 27.55%: Private Energy Market Fund L.P. ('PEMF'), registered in Finland, a Helsinki-based million private equity fund that targets opportunities being created by the deregulation and restructuring of the energy sector Worldwide, including renewable energy and energy efficiency projects. Finnish Fund for Industrial Cooperation Ltd. ('Finnfund'), registered in Finland, and 80% Finnish government-owned development finance company the provides long-term risk capital for private projects in developing countries; Malaysia 5%: Flagship Asia Corporation ('FAC'), registered in Labuan Federal Territory, Malaysia, a sustainable infrastructure project development company and the founding sponsor of ATB; England 1.45%: Rolls-Royce Power Ventures headquartered in London, England, has been ranked by a leading industry survey as the top developer in the market between 5 to 150 MW, with experience in developing cost-effective, environmentally aware power solutions.
- 2 Saner, R. and A. Arquit (2005) 'Exploring the relationship between FDI flows and CDM potential,' *Transnational Corporations*.
- 3 http://www.atbiopower.co.th/power\_plant/power\_plant\_e.htm.
- 4 Personal Interview with Nantiya Tangwisutijit and Tamra Gilbertson, 11 November 2008.
- 5 See 'A.T. Biopower Rice Husk Power Project in Pichit, Thailand' Validation Report, p.10, 27, http://cdm.unfccc.int/UserManagement/FileStorage/OUR7L1SX25WD2 DXB1BHNCAGCR7PPW1.
- 6 The 'baseline methodology' used by the project is ACM0006 (version 04) 'Consolidated baseline methodology for grid-connected electricity generation from biomass residues'.
- 7 Tangwisutijit, N. (2009) 'THAILAND: Renewable energy not so clean and green after all?', *IPS*, 23 October.
- 8 www.ricehuskash.com: This RHA in turn contains around 85% 90% amorphous silica. Copyright © 2001 Elsevier Science Ltd and Techna S.r.l. All rights reserved. Studies on silica obtained from rice husk. N. Yalçin and V. Sevinç, Sakarya University, Arts and Sciences Faculty, Chemistry Department, Serdivan, 54180 Sakarya, Turkey. Received 14 February 2000; revised 14 March 2000; accepted 19 April 2000. Available online 13 February 2001. Abstract:

The potential and limits of rice husk to prepare relatively pure activated silica were investigated. For the activated silica, rice husk samples were submitted to a chemical pre-and post-treatment using HCl, H<sub>2</sub>SO<sub>4</sub> and NaOH solutions. Samples were incinerated at 600°C under static air and flowing atmospheres (air, argon and oxygen). The product was characterized in terms of silica content, particle size distribution and morphology, specific surface area and porosity. The particle size distribution range from 0.030 to 100  $\square$  m. The structure is amorphous. The specific surface area reaches value of 321 m<sup>2</sup>/g, porosity diameter is 0.0045  $\square$  m, specific pore volume is 4.7297 cm<sup>3</sup>/g. Purity is 99.66% SiO<sub>2</sub>.

- Liu, S. et al. (1996) 'Silicosis Caused by Rice Husk Ashes', *Journal of Occupational Health*, 38, 257:
  62.
- 10 http://www.who.int/mediacentre/factsheets/fs238/en.
- 11 '1) Environmental Impact Protection Guarantee Fund which will pay compensation for the damages the power plant has caused to the environment of the community such as excessively over-standard smog emitted from the plant's smokestack 2) Community Development and Environment Fund which will support and develop the education, heath care, occupation for a better standard of living of people in community' (http://www.atbiopower.co.th/ power\_plant/power\_plant\_e).
- 12 Presentation at conference on Review of the EU ETS, Brussels, 15 June 2007, cited in Lohmann, L. (2008) 'Carbon Trading: Solution or Obstacle', *The Impact of Climate Change on India*: 16.