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## The process of turning a “green” renewable energy into “non-green” for the local people: an observation-driven study from Southern Chile

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**Abstract:** This paper describes an observation-driven research journey to explore the process of how a so-called “green” renewable energy technology could turn into “non-green” for the local communities. The study is conducted in Southern Chile that has been receiving a number of hydroelectricity-based renewable energy projects in recent years and most of those projects have been receiving strong social resistance from the local communities. Qualitative methods are availed in the study to explore local realities about the community people’s attitude and action-building towards these projects. The research results that a “green” project could be “economically green” to the local people who are concerned of their individual lives and livelihoods, however, “less green” to the group of community people emotionally attached to their lands and territory-based culture.

Keywords: emotional attachment, green technology, hydroelectricity, local knowledge, trust.

### 1. Introduction

On the very first day (29<sup>th</sup> August 2014) I arrived at Valdivia- the Capita of the Los Ríos Region of Chile, I saw a group of almost 200 people gathering together putting fancy (indigenous) dresses on in front of the Regional Government Office for protesting for something. They were carrying some placards with “No a Las Hidroelectricas (Say ‘No’ to Hydro-electricity)” and “Patagonia Sin Represas (Patagonia without Dams)” written on them as put in Figure 1. I was wondering why green energy projects like hydroelectricity receive such resistance from the communities? Over the next six months, I had been intrigued by my ardour for studying different newspaper articles and journal papers to gain more insights on the issue.



Figure 1. People protesting against hydroelectricity projects in Southern Chile (Viveros, 2014).

Unfortunately, I found very insufficient studies in the context of Chile or other developing countries to suffice my question. Most of the local social acceptance/resistance-oriented researches had been conducted in the developed countries’ contexts and moreover, for wind, bio, geothermal and solar energy technologies with noticeable laxity to the hydroelectricity projects.

More importantly, the existing researches have been oriented to the technical knowledge rather than being open to the local realities. The research conducted within the similar thematic scope has mostly been biased by some pre-meditated ideology(ies) to explore scientific knowledge rather than learning from the people. For instance, researches have been focusing on explaining the impacts of governance (Bout, 2019; Breukers and Wolsink, 2007; Nadaï, 2007; Oteman et al., 2014; Susskind et al., 2014; Wolsink, 2000), planning processes (Alvial-Palavicino et al., 2011; Gross, 2007; Nadaï, 2007; Owens, 2004; Tabi and Wüstenhagen, 2017; Zoellner et al., 2008), economic dimension (Breukers and Wolsink, 2007; Jobert et al., 2007; Maruyama et al., 2007; Warren and McFadyen, 2010; Wolsink, 2007; Zoellner et al., 2008), spatial dimension/siting (Devine-Wright, 2005; Fournis and Fortin, 2017; Gipe, 1995; Huijts et al., 2007; Jobert et al., 2007; Kumar and Katoch, 2014; Schweizer-Ries, 2008; Warren and McFadyen, 2010; Wolsink, 2007; Wolsink, 2010), temporal dimension (Devine-Wright, 2005; Wolsink, 2007; Zoellner et al., 2008), technology dimension (Mallett, 2007; Painuly, 2001; Rogers, 2003), and social dimension (Bout, 2019; Cousse, et al., 2019; Van der Horst, 2007; Wolsink 2000) on developing peoples' attitudes towards renewable energy projects; but explaining the local realities of how those projects could end up turning into "non-green" to the local community people has rarely been the centre of interest in those researches.

This noticeable lack of scientific researches on hydroelectricity in the developing countries' contexts as well as the lack of efforts on exploring local realities have been playing a vital role for me to come up with this research. This research has been designed with qualitative methods with an objective to explain how a so-called "green" energy technology turns into "non-green" for the local communities hence receives extreme social resistance from them in Chile.

## 2. Methodology

### 2.1 Research concepts

In order to fulfil the stated objective, the research is designed as a social situation analysis based qualitative research. As defined by Mitchell (2006), social situation analysis refers to the collection of social events that could be construed as connected with one another and that occur in relatively shorter period of time. I spent around three months living in the affected communities, talking to the community people, observing their social events, participating in some of those events, and thus understanding their culture and action-building process towards the hydroelectricity project.

Having said that the research aims at learning from the local people, it is embedded into the *constructivist paradigm* that acknowledges the validity of social construction of realities as well as multiplicity of realities (Guba and Lincoln, 1994; Mertens, 2014; Olesen, 2005; Rodwell, 1998). Actor oriented approach (Long, 2001) is availed as the main strategy for accomplishing the research. The approach, as conceptualized from Long (2001, 2002), tries to explain the multiple social perspectives from different actors' viewpoints as well as the process of building those social perspectives thus helps in exploring local community people's (varying) perceptions and attitudes towards an event/action.

The research, moreover, is driven by the local knowledge of the people. During the three months long empathic field-work, I was listening to the local people's perspectives rather than judging their knowledge and perceptions in the light of scientific/technical knowledge. It is true that local people's understanding could be contextualized with spiritual and obsolete beliefs with minimal scientific validity sometimes (Blaikie et al., 1997); however, that's their knowledge which drives them in developing perception and action towards a project (Noë, 2004). Therefore, acknowledging the validity of their knowledge is a key in exploring local realities which has been the case for this research.

### 2.2 Research methods

The research data are collected mostly from *observation* on the concerned communities as well as some in-depth interviews with the local community people and relevant stakeholders. A three month's long empathic observation took place in four rural settlements in the Futrono Municipality of the *Los Rios* Region in Southern Chile. The observation aimed at understanding the local cultures and social process of integrating the hydroelectricity projects into the communities.

Apart from the observation, in total 44 in-depth interviews are conducted- mostly with the local community people, and few with the relevant energy company and public service officials. The interview

did not have any pre-defined questionnaires per se, rather it tried to elucidate the data or impression acquired from the observation.

Purposive sampling is availed to conduct the in-depth interviews. Under this sampling, the individuals with a “revealed” interest or attitude towards the hydroelectricity project are interviewed to ensure the effective utilization of minimum time and resources. Snowball approach, moreover, is availed in selecting interviewees from the ranges of relevant government agencies and community people. For example, *Servicio de Evaluación Ambiental- SEA*<sup>1</sup> (in English: Environmental Impact Assessment Service) was approached first for an in-depth interview on the selected hydroelectricity projects. This agency provided the list of other relevant government agencies that took part in the assessment and decision making for the projects. Also, an interviewee from a community led me to the next interviewee(s) who had a revealed interest and knowledge on the project.

Grounded Theory (Glaser and Strauss, 1967) is availed as the analytical framework for the research. This is an inductive method of discovering theory from the qualitative data, through summarizing the field data into conceptual categories, re-evaluating them in the research setting, and gradually refining and linking them to broader conceptual categories in the upper level of abstraction (Birks and Mills, 2015; Glaser and Strauss, 1967; Schutt, 2011). Under this framework, the observation and interview scripts are reviewed on *atlas.ti* software and put codes to the texts following the *coding and categorization* techniques by Saldaña (2015). Each piece of scripts is reviewed a maximum of seven times and a minimum of four times. During this multiple reviews, a number of codes are refined/re-coded and then merged to form conceptual categories that serve the purpose of explaining the process of turning a renewable “green” project into “non-green” for the local communities.

### 2.3 Study case selection

In selecting study cases, replication logics are maintained to facilitate the conceptual generalization of the study outcomes (Yin, 2009). For instance, two projects from similar geographical, social and cultural contexts are chosen to make sure the same level of territorial and cultural influences over the cases. In addition, both cases with technical similarities received extreme social resistance from the local communities.

For the research, two small-scaled Non-conventional Renewable Energy (NCRE)-based hydroelectricity<sup>2</sup> projects are chosen as cases. It is obvious that a big hydroelectricity project requiring bulk of infrastructural setups would get resistance from the local communities due to its creation of irrevocable pollutions and disturbances to the local community people. Researcher’s, therefore, have pressed on choosing small-scaled projects with minimum impacts on the nature and settlement (Chala et al., 2019; Owusu and Asumadu-Sarkodie, 2016). Interestingly, even such small-scaled projects with less detrimental impacts receive extreme social resistance in Chile as well as around the world that makes this type of project more appealing for investigation.

The NCRE hydroelectricity projects selected for the study are the EIA Pequeñas Centrales Hidroeléctricas de Pasada Florín II y Florín III (in short, Florin II and Florin III) and Mini Central de Pasada Huenteleufu (in short, Mini Central Huenteleufu). Both projects are designed with the installed electricity generation capacity of less than 20 MWs and located within the Futrono Municipality of the Los Rios Region of Chile, which has been a longstanding habitat for the indigenous Mapuche<sup>3</sup> people. Location of the study cases are put in Figure 2 below.

## 3. Results and discussion

### 3.1 Actors’ perspectives

As pictured in Figure 2, the hydroelectricity project- Florin II and Florin III is located in the *Los Cerillos* community which consists of 206 farming-based people; 77.7% of the people belongs to the *Juntas de*

<sup>1</sup> SEA is a regional government agency in Chile that evaluates the impacts of any project undertaken within the region and accordingly, accepts or rejects the implementation of the project.

<sup>2</sup> An NCRE-hydroelectricity is designed as a small-scaled low-impact project with electricity generation capacity of less than 20 MegaWatts (LAP, 2020; Sohr, 2012).

<sup>3</sup> The dominant indigenous group of people living in the southeast border of Chile and Argentina alongside the Andes

*Vecinos* (Neighborhood Association)<sup>4</sup>, and the remaining 22.3% are indigenous people belonging to the state-registered Mapuche communities. *Mini Central Huenteleufu*, on the other hand, concerns two communities- *Curriñe* and *Chabranco*. Around 800 farmers live in *Curriñe*; 25% of them are indigenous people. Around 350 farming people live in *Chabranco* with 43% belonging to the indigenous communities.

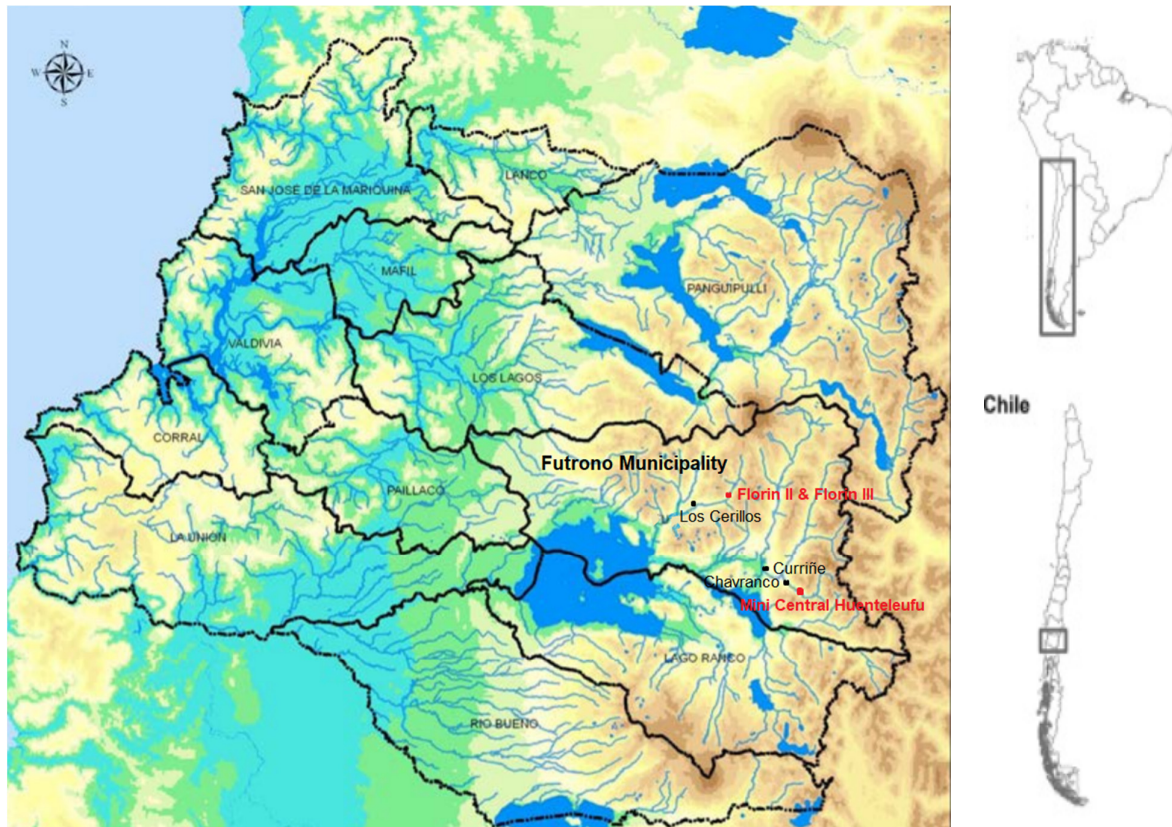


Figure 2. Location of the study cases and concerned local communities. Image Source: Weil et al. (2017), Reyes et al. (2018). (Note: The map is slightly re-constructed by the authors).

The empathic observation on the respective local communities and in-depth interviews with relevant stakeholders resulted in the identification of four broad actors with their differential interests in the projects and mutual relationships that are presented in Table 1 and Figure 3.

The energy company came up with the project for generating commercial profits for themselves; to them, the project is a source of profit. The Ministry of Energy (government agency), on the other hand, supported the energy companies for generating cheap and sufficient electricity for meeting the energy demand of the country (national demand meeting perspective).

Local community people are divided into two- *Juntas de Vecinos* (Neighborhood Association) and Indigenous (Mapuche) Communities. When the projects were proposed in 2011-13, both parts of the community stood against these projects due to their perception of the project's impacts on their lives, livelihoods, natural environments and cultural identities. Over time, most of the neighbourhood association members started resolving their hesitations and assenting to the projects since they received series of consultations with the energy companies, and more importantly, they were offered with direct (or indirect) monetary benefits from the projects that offset their perception of the project's impacts on their individual livelihoods. This group of the community people viewed the projects as economic opportunities for themselves. However, a mere fraction of the neighbourhood association and the whole indigenous communities viewed the project as a direct threat to their emotional attachment to the territory and their cultural identities, which compelled them to resist strongly to the projects. Thus, this group of indigenous communities had been put to a conflicting relationship both with the energy companies and neighborhood association.

<sup>4</sup> Neighborhood Association is formed of the inhabiting members of a community/village in rural Chile; the association is empowered by the Government of Chile under the Chilean law no 19.418.

Table 1. Concerned actors and their interests into the projects.

Categories of Actors	Actors	Interest †	
Govt. Agencies	National Government. Represented Regionally by <i>SEREMI<sup>5</sup>- Energía</i> (Regional Ministerial Secretariat of Energy).	Promoting (renewable) energy generation in the country to meet its growing national demand; attracting investors in the renewable energy sector.	
	<i>Servicio de Evaluacion Ambiental- SEA</i> (Environmental Assessment Service).	Ensuring the socio-economic and environmental soundness of any projects within the region; Accepting or rejecting the projects based on the assessment.	
	Other Public Service Organizations: <i>SEREMI- Agricultura</i> (Agriculture), <i>SEREMI- Obras Públicas</i> (Public Works), <i>SEREMI- Salud</i> (Health), <i>SEREMI- Transportes y Telecomunicaciones</i> (Transports and Telecommunications), <i>SEREMI- Vivienda y Urbanismo</i> (Housing and Urban Development), <i>SEREMI- Medio Ambiente</i> (Environment), <i>CONADI</i> (National Corporation of Indigenous Development), <i>Servicio Agrícola y Ganadero</i> (Agriculture and Livestock Service), <i>Servicio Nacional de Turismo</i> (National Tourism Service), <i>SuperIntendencia de Electricidad y Combustibles</i> (Superintendent of Electricity and Fuel), <i>Ilustre Municipalidad de Futrono</i> (Municipality of Futrono), <i>Subsecretaría de Pesca y Acuicultura</i> (Sub-secretary of Fisheries and Agriculture).	Observing and assessing the project according to their own interests. For instance, <i>SEREMI- Agricultura</i> evaluates whether the project is going to affect the local agriculture negatively; <i>CONADI</i> evaluates whether the project has any conflict with the indigenous communities living on site; <i>SEREMI- Vivienda y Urbanismo</i> analyses whether the project is going to create any ‘urban nuclei’ etc. Based on the evaluation, the organizations send their assessment reports to the commission headed by SEA.	
(Private) Energy Company Actors	Energy Generator Companies (owner of the projects).	Implementation of the hydroelectricity generation project; Own monetary profit.	
	Energy Transmission & Distribution Companies (collaborator).	Transmission and distribution of the generated electricity into the main grid lines; Own monetary profit.	
Local Community Actors	Juntas de Vecinos (Neighbourhood Association) consisting of the local Chilean living in the villages..	Overall territorial development; Personal economic gain.	Serene living, protection of the natural environment and traditional livelihoods.
	Indigenous Communities (Mapuche)	Protection of the territory and cultural identities.	

† Several actors have multiple interests. However, their major interest(s) in relation to the selected case is portrayed here.

<sup>5</sup> SEREMI- *Secretaría Regional Ministerial* (in English- Regional Ministerial Secretariat).

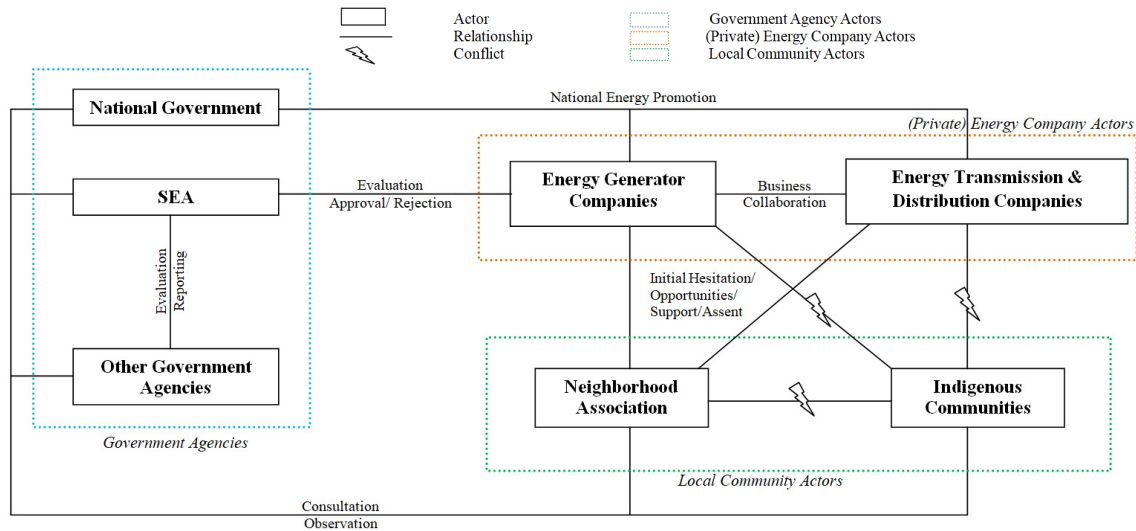


Figure 3. Actors' relationship map.

### 3.2 “Naturally green” should be “economically green” as well

The neighbourhood association members perceived the risks of the projects on their individual livelihoods directly. They believed, for instance, that the hydroelectricity plant would contaminate the river water in the process of producing electricity. Therefore, local community people engaged in livestock, as for an example, stood against the implementation of the project perceiving that their herds of cattle that drink water from the same river would be harmed. Also, they perceived that the implementation of the project would create noise and pollution thus affect their serene living.

The energy companies, however, conducted series of consultations with this group of people to share the technical knowledge around hydroelectricity generation process showing that the plant does not process the water in any manner. In addition, many of the neighbourhood association members were offered with economic opportunities. A farmer, for instance, rented a piece of his lands for installing electricity transmission lines on it at a price more than the annual return from his/her traditional farming on that land. Some other members were offered with monetary compensations and employment opportunities at the hydroelectricity plant. These interventions gave them a feeling of *trust* into the energy company that made them accepting the project.

A number of studies found that public participation and consultation could achieve acceptance for such renewable energy projects (Boyle et al., 2019; Schweizer-Ries, 2011; Schwenkenbecher, 2017; Sun et al., 2016; Zhang et al., 2018; Zheng and Liu, 2018). I, however, found a little conceptual difference between achieving acceptance and reducing resistance; they are not the two sides of a coin. The so-called consultation and public participation may offset resistance attitude, but may not achieve acceptance. In addition to the consultation and public participation, offering economic opportunities can play a vital role in achieving acceptance especially for the group of community people who are interested in their individual lives and livelihoods. For instance, as found in this research, a fraction of the neighbourhood association members kept neutral attitude towards the projects although they took part in the consultations but not offered with any economic opportunities.

### 3.3 How a “green” technology turns into “non-green”

The indigenous Mapuche communities, however, had a different perspective to the project already mentioned above. This group of people has been living in the Southern Chile for over 2000 years (Trovall, 2017), which made them emotionally attached to this land over generations. Their cultural identities are very much embedded into this territory. This group of people, with their lived experiences and knowledge, view the hydroelectricity projects conflicting with their culture and identity, which fuel their resistance attitudes towards these projects.

The river water, which is normal water to the energy companies, has spiritual values to the indigenous group of people. They believe, for instance, that there are several types of indigenous medicinal herbs that grow only with pure (untouched) water from the river. Installing hydroelectricity plants in the upstream would destroy the purity and spirituality of the river water and so their thousands years of cultural values

and practices. The energy companies consider such indigenous beliefs as “obsolete” with no “modern implications”. Moreover, as a negotiation mechanism, the companies offered some monetary compensation to the indigenous communities since this approach worked sufficiently in dealing with the neighbourhood association. This approach fuelled the indigenous communities’ resistance attitudes even stronger. This is because the community has never valued money or any other materialistic benefits over their cultural identities in one hand, and the energy companies did not really want to acknowledge the validity of the local Mapuche people’s knowledge and beliefs on the other.

So, how could the energy companies achieve acceptance (or at least reduce resistance) attitudes from this group of people? The process of integrating the project into the community has to be right. For instance, incorporating the local people into designing the projects could have been an effective option. As opined by Tabi and Wüstenhagen (2017), Hofman (2015), Skitka et al. (2003), and Lind and Tyler (1988), ensuring procedural justice for the community people could make the project and company trustworthy to them. Procedural justice, however, could not be achieved until and unless the community people are given with fair participation in decision-making, not just mere public consultation after the decision-making. When a community trusts in a project, they are more likely to support it actively. This is because they are convinced of the distributive justice believing that the project would produce positive results for them since they were involved into the decision-making and implementation process (Tabi and Wüstenhagen, 2017; Wüstenhagen et al., 2007; Lind and Tyler, 1988).

As found from this study, if the indigenous communities were involved in the decision-making for the projects, they might come up with a less-conflicting location for the hydroelectricity plants. Or at least, a fair participation could give them an impression of trust to the projects and companies. Instead, the companies came up with a pre-meditated design and plan, which triggered suspicion and distrust among the indigenous people about the company and projects.

So, distrust and conflict with emotional attachment are found valid for generating resistance attitudes towards the so-called green hydroelectricity technologies irrespective of its size. In addition, deployment of any inappropriate (e.g. financial tools) to negotiate this emotional attachment might not help but backfire. Maintaining proper procedural justice (i.e. fair participation of the local community people into the design decision-making) is important especially if the community people have stronger cultural attachment to their lands, and this is very much true for the mapuche habitated regions in Southern Chile.

#### 4. Conclusion and policy implications

The social situation analysis has been an effective approach to explore local realities about the NCRE hydroelectricity in the context of rural Chile, and the actor-oriented approach helped to detail those realities from different actor’s perspectives. The empathic observation method allowed a meticulous understanding of the local social culture and decision-making process around the hydroelectricity projects, and the in-depth interviews helped deepening the understanding. The local realities explored in the research could be abridged as follows:

- A renewable hydroelectricity project could be “green” to the nature, “economically green” to the community people who have more materialistic interests, but “less green” to the people who are emotionally attached to their lands and culture;
- Absence of procedural justice could seriously hamper the “green” picture of the project to the local community people. Local communities should be engaged in the design decision-making rather than just mere public consultation after finalizing the design;
- Local people’s knowledge should be acknowledged and internalized during the design decision-making to achieve their *trust*;
- Negotiation mechanisms have to be contextualized to the local communities. Emotional attachment, for instance, should not be approached to negotiate with financial tools. Improper negotiation tools are found as a vital factor for making these projects “less green” to the local people.

The overall “green” image of a renewable energy project should not be taken as granted. A project which is green to the nature may not be green for the hosting local communities because of its possible conflicts with their lives, emotions and cultures. The policy and decision makers, therefore, should not be misled by the so-called green picture of the technologies. It is, rather, paramountly important to understand the local socio-cultural system before undertaking a project, and engage the local communities from the very beginning in design decision-making. The study would like to conclude by stating that a “green” energy project does not turn itself into “non-green”, rather, the process of social integration of the project

into the local communities may give it a “non-green” image leading to a strong social resistance from the local communities.

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