

Power to the People

An integrated approach for governance innovation through local energy initiatives for urban coastal communities in Indonesia.
Case studies Semarang and Balikpapan

Final Project Report



Contents

1. COMPOSITION OF THE TEAM	1
2. REPORTS OF ACTIVITIES	2
2.1. PROJECT OVERVIEW	2
2.2. Adjusted and Shifting Activities	3
2.3. Online Meetings	4
2.4. SURVEYS AND FIELD OBSERVATION	5
A. Karimunjawa Islands	5
B. Balikpapan	8
2.5. Focus Group Discussions	10
A. Karimunjawa Islands	10
B. Balikpapan	12
2.6. Workshop and Discussion in the Netherlands	13
3. RESULTING INSIGHTS	17
4. FOLLOW-UP PLANS	18
APPENDIX I: FINANCIAL REPORT	19
APPENDIX II: DRAFT PROPOSAL FOR FOLLOW-UP RESEARCH	22
APPROVAL PAGE	29

1. COMPOSITION OF THE TEAM

a. The main applicant in the Netherlands

Name/ Title (s) : Dr. ir. D.A.A. Samsura (Ary)

University/ Institute : *Department of Geography, Planning, and Environment, Radboud University*

Email address : ary.samsura@ru.nl

Visiting Address : Elinor Ostrom Building, Heyendaalseweg 141, 6525 AJ, Nijmegen

Phone number : +31 24 3612721

Project team members in the Netherlands:

1. Dr. Lothar Smith
Department of Geography, Planning, and Environment, Radboud University
lothar.smith@ru.nl
2. Dr. Maria Kaufmann
Department of Geography, Planning, and Environment, Radboud University
maria.kaufmann@ru.nl
3. Dr. ir. Linda Carton
Department of Geography, Planning, and Environment, Radboud University
linda.carton@ru.nl
4. Dr. ir. Onno van Bekkum
De Coöperatieve Samenleving B.A
vanbekkum@gmail.com

b. Project Team members in Indonesia

1. Dr. Nurul Widyastuti
Institut Teknologi Kalimantan, Balikpapan
wr1@itl.ac.id; nurul.widiastuti71@gmail.com
2. Vicky Andria Kusuma
Institut Teknologi Kalimantan, Balikpapan
vickyandria@lecturer.itk.ac.id
3. Hotmauli Sidabalok
Soegijapranata Catholic University, Semarang
oely.sidabalok@unika.ac.id
4. Moh. Nurhadi
BINTARI Foundation, Semarang
masinunk@gmail.com

2. REPORTS OF ACTIVITIES

2.1. PROJECT OVERVIEW

The main focus of the ANGIN – Power to the People project is on identifying the possibility to develop an idea for local energy initiative development in Indonesia. Due to Covid-19 restricting the mobilities of the involved researchers, the implementation of the original proposal for the project submitted in 2019 has been amended in 2020. However, the budget-neutral extension of the project by KNAW has made it possible to achieve a realistic project goal.

Community resilience, especially related to energy, is the key issue highlighted in our project. Research has shown that community involvement is essential for supporting, creating and implementing resilience initiatives as well as ensuring sustainable development of local communities, including the introduction of new and renewable energy (NRE) initiatives. In addition, there are of course also environmental and societal benefits from generating NRE in small scale-local projects, as it can be an effective means through which sustainable development outcomes can be achieved. At this scale, people can also engage as individuals and as larger social units leading to a new level of awareness and sense of responsibility in terms of how to protect the local environment and population without this being at the loss of necessary income prospects.

Although the introduction of local energy initiatives might offer interesting opportunities for the local community and added benefits in Indonesia, their implementation and applicability might still be questioned. The involvement of the local community in NRE development might produce complex questions of governance mechanism that, in part, require collective action among stakeholders at different scales – in geographic and governance terms.

In this project, we tried to observe how do the local community and also the public authority especially at the local level perceive the idea of local energy initiatives together with their perceptions on climate change and renewable energy in general. Initially, apart from conducting semi-structured interviews and focus groups discussions with stakeholders, we would also like to develop and introduce game simulation in a stakeholders-workshop setting, to facilitate more efficient decision-making processes in urban planning and developments, here applied particularly to the introduction of local energy initiatives. This plan has been slightly adjusted due to the Covid-19 restrictions. But we managed to achieve the goal of the project with those adjustments through online meetings via zoom to exchange ideas among the Dutch and Indonesian researchers, writing via google drive to share the information and a lot of discussions, conversation via WhatsApp group to coordinate the activities and also to develop the sense of connection among the partners even though we are thousands of kilometres apart.

2.2. Adjusted and Shifting Activities

During the project implementation, we made some adjustments because of some changing circumstances due to Covid-19. The first adjustment was related to the timeline of the project. The other aspect that was adjusted is the case area for the project. Apart from those, we also experience a change in the composition of a team member of the project. Below, we will explain in more detail those changes and adjustments.

a. Shifting timeline

In our research proposal, we develop the timeframe and planning for the ten months of activities from June 2020-March 2021. This timeframe and activities had to be changed since there was a strict restriction to travel due to the pandemic. As the result, we had to adjust the activities to mostly online and focus on desk research based on secondary data but with the hope that we still would be able to travel to the case study areas. However, even though the project had been extended for a year by KNAW, the travel restriction especially in Indonesia still take place and made it impractical for the Dutch partners to go to Indonesia. Below, we included the shifts that we took to show how we have implemented the project (table 1)

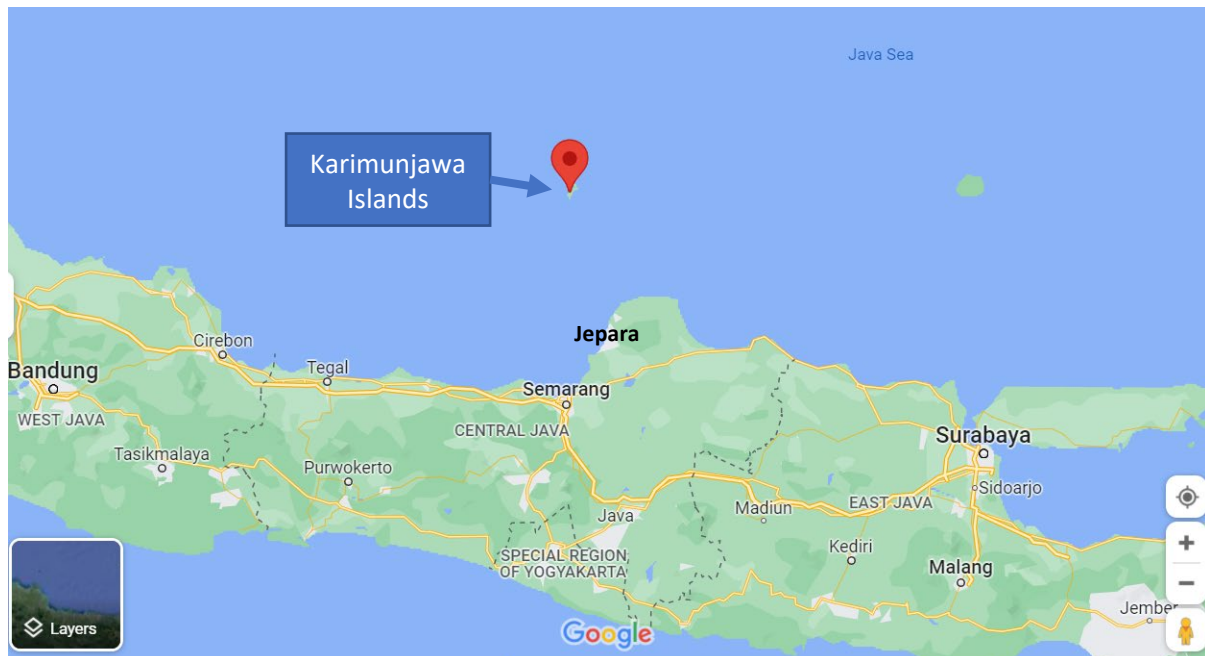
Table 1. The shifting timelines and plans

Time Planned	Activity Planned	Time Realized	Activity Implemented
November 2020	Visit by the Dutch partner's partners to Semarang and Balikpapan.		Online meetings
November 2020	Workshop in Semarang and Balikpapan	December – January 2022	Survey and Focus Group Discussions in Balikpapan, Karimunjawa and Semarang conducted by the Indonesian partners.
December 2020	Visit by Indonesian partners to the Netherlands.	February 2022	Field visit and Workshop with Local Energy Initiatives in the Netherlands and preparing the final report of the project

b. Adjusted case areas

Initially, we would like to focus on Semarang City, in Java island (the most populous and dense island in Indonesia) and Balikpapan, in Kalimantan as the case areas for the project to allow us in making a comparison for the possibility to develop an idea for local energy initiative in Indonesia. Both areas could represent different institutional, cultural, and geographical settings. Due to the high case of Covid-19 and its related strict measures in Semarang City at the beginning of our project, we tried to find another case study area close to Semarang City that could be accessible but still would allow us to make a meaningful comparison with Balikpapan. After studying and analysing policies and secondary data related to energy

production, distribution, and consumption in Indonesia, we decided to focus on Karimunjawa Islands (see Map 1). Using Karimunjawa Islands as a study case (beside Balikpapan) has given us a better understanding of the issues concerning energy provision for the coastal community of Indonesia (more to the insights from the case study areas will be explained in chapter 3 of this report).



Picture 01. Map of Karimunjawa Island relative to Semarang and Java island

c. Changing Team Member

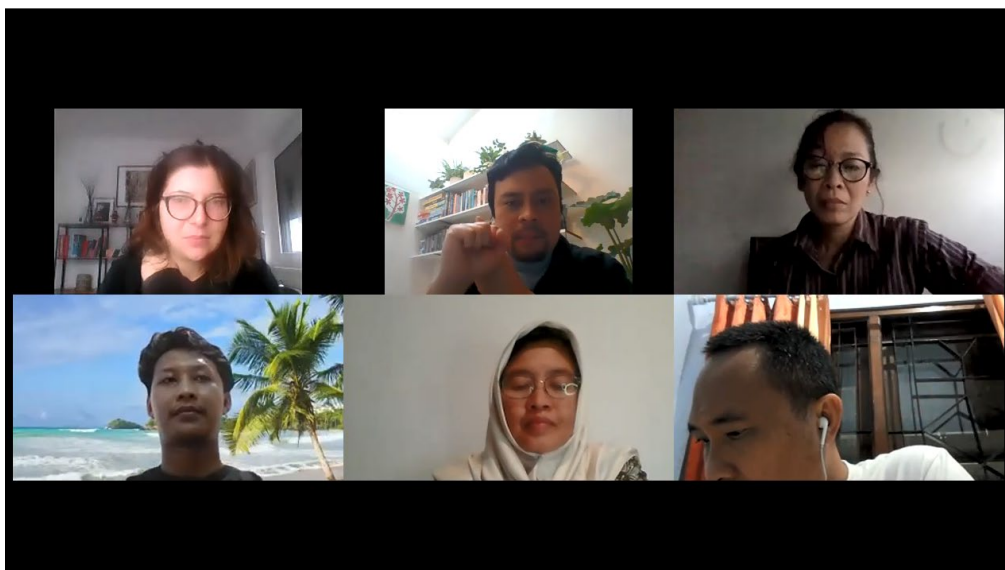
The other change that we experienced during the project was related to the structure of the team member. One of the partners from Soegijapranata Catholic University in Semarang, Indonesia quits her position at the university to work with another institution in another city in Indonesia. Initially, with her expertise in economic development, she would contribute to the project by observing the potential of the case study area to develop new and renewable sources from an economic perspective. Fortunately, there are already some reports by the national government and also the local governments of the case study areas for this research that give us information on the potential to develop new and renewable energy in the areas.

2.3. Online Meetings

The goal of the online meetings are two folds: first is to forge a relationship and network building between the project team member in Indonesia and the Netherlands and second, to prepare the activities for the project.

The first meeting was held via zoom on 19 June 2020 with the main agenda to get to know all the team members from both countries and discuss the possibility to carry out the project concerning the restrictions due to the pandemic. During the first meeting, two main agreements were reached. First, it was agreed to compile the necessary secondary data which include policies, regulations, law, and also some previous studies concerning energy issues in Indonesia and second, it was also agreed to have a frequent online meeting with all team members to discuss the progress of the project every three or four weeks. During the

subsequent meetings, we were able to exchange information and also improve our understanding and insights into the energy issue in Indonesia. More about those insights will be explained in chapter 3 of this report.



Picture 02. One of the zoom meetings between the Dutch and Indonesian team members.

2.4. SURVEYS AND FIELD OBSERVATION

Although it was doubtful at the beginning of the project that we would be able to conduct the surveys and field observation in both case study areas due to the pandemic, thanks to the hard work of our Indonesian partners, we eventually could realise our plan. As explained earlier, for the case study area in Java, we focused on the Karimunjawa Islands and for the case study in Kalimantan, we focused on Balikpapan City as we initially planned in our research proposal.

The survey and field observation for those two areas are explained below

A. Karimunjawa Islands

Karimunjawa Islands is an archipelago of 27 islands in the Java Sea, Indonesia, approximately 150 kilometres northeast of Semarang, the capital city of Central Java Province. It is part of the Jepara Regency (In Indonesian: *Kabupaten Jepara*) and it can mainly be reached by boat from Jepara City, the capital of the regency which is located in Java island (see the map in Picture 01 before). Travel to the islands from Jepara takes about three hours but sometimes it can be limited during the rainy season around the January–March period during bad weather which can bring large waves to the area. Based on the statistical data from 2019, the population of the island group was about 9,784, who lived on five of the islands. The main source of income for the local population is fishing, followed by services and commerce.

Our Indonesian partners from Semarang had used this area as their case study in some of their previous works. Therefore, they already had good relationships not only with the local authority but also the communities on those islands. The survey and fieldwork exploration on

the islands were conducted from November 2021 till January 2022. To conduct a proper survey and field observation, our partners employed local people who were trained and organized professionally using a third party.



Picture 03. Map of Karimunjawa Islands

The researchers divided the observation area into two clusters to study the energy issues from the perspectives of the local communities in the area. The first cluster is the Karimun island which is the main island in the area. The second cluster consists of three smaller islands surrounding the main island: Parang island, Nyamuk island, and Genting island (see Picture 03). Those three islands were selected because they have the least access to electricity compared to other islands in the area, especially to the main island.



Picture 04. Images of Karimunjawa Island

From our surveys and observation, we found that the people of the Karimunjawa islands are already quite aware of the risk of climate change and also of the renewable energy issue. Some people also already use new and renewable energy sources, although still on a rather small scale, to fulfil their energy demand. For instance, some of the fishermen already use PV panels to power their boats and also GPS systems to locate and find fish (see Picture 05).

However, the source of energy of the local community in the area is still dominated by fossil fuel especially the LPG (*Liquid Petroleum Gas*) for cooking and diesel for electricity which is transported from the Java island by boat (see Picture 06).



Picture 05. Local Fishermen in Karmunjawa use small PV panels on their fishing boats
(Source: Antara)



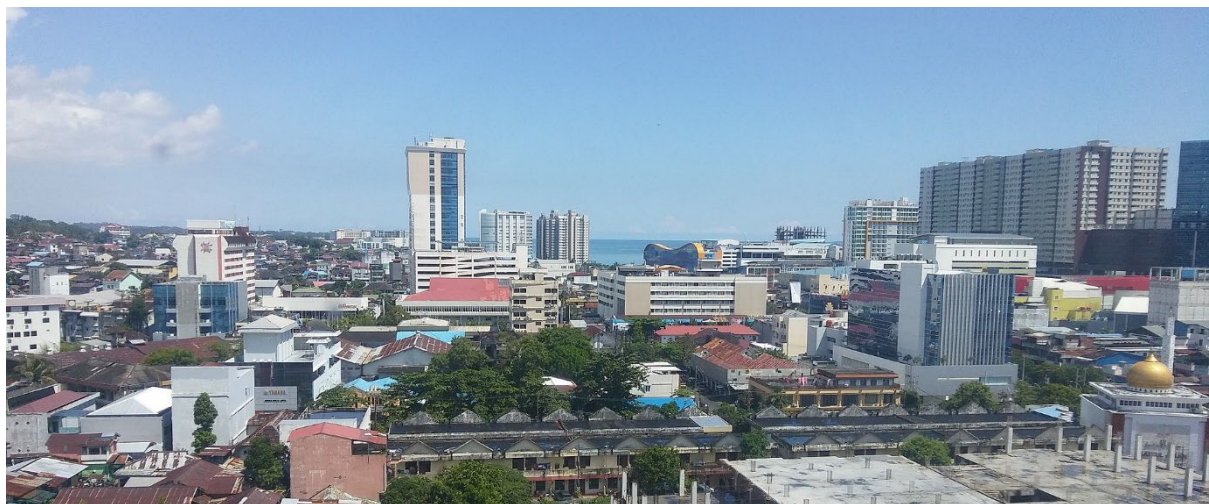
Picture 06. Left: Transporting Diesel to Karimunjawa by boat (source: Antara); **Right: Transporting LPG tanks to Karimunjawa by boat** (source: own pictures)

B. Balikpapan

Balikpapan is a seaport city in East Kalimantan Province, Indonesia. The city is the financial centre of the province although it is not served as the capital of the province. Nowadays it is also the main gateway to Nusantara, the future capital of Indonesia. Balikpapan is the city with the largest economy in Kalimantan. With a population of 688,318 according to the 2020 census, Balikpapan is the second-most populous city in East Kalimantan, after Samarinda, the capital of the province. The city is served by an international airport, the Sultan Aji Muhammad Sulaiman Sepinggan Airport.



Picture 07. Map of Balikpapan within East Kalimantan Province and Indonesia



Picture 08. Images of Balikpapan City (Source: flickr by Consigliere Ivan)

Our survey and field observations in Balikpapan were focused on the area with methane gas distributions also its surroundings (without methane gas distribution) that are produced from the final waste disposal located in the Manggar District in the Balikpapan City. The final waste disposal (in Bahasa Indonesia: TPA) in Manggar has been operating since 2012. In 2016, the Indonesian central government through the Ministry of Public Works and also the Balikpapan city government developed a facility to convert the methane gas produced from waste in the TPA into an energy source that has been distributed to around 100 houses located near the TPA.



Picture 09. Manggar Final Waste Disposal Site in Balikpapan City (Source: Tribun Kaltim)



Picture 10. Facilities for methane gas energy in Manggar Final Waste Disposal Site
(Source: own picture)

From our survey and observation in Maggar District and its surrounding areas, we found that most of the local community are aware of the importance of energy transition toward new and renewable sources and would like to support any initiative for that purpose. Concerning the methane gas from the TPA, the local community are mostly happy with the initiative and they would like it to be expanded if possible. However, based on our observation, the safety of the current distribution system of the methane gas to the household should be improved although until now there has been no accident caused by the methane gas in the area. Currently, the distribution of the methane gas in the area is carried out by using simple PVC pipelines and most of the pipelines are still exposed on the ground (see Picture 10).

2.5. Focus Group Discussions

Apart from the surveys and field observation, we also conducted several Focus Group Discussions (FGD) in both case areas. The discussion with local communities and local authorities were separated into different events to get a better response from each of those two groups. And to ensure that the events would go as planned, we employed professional organizers to organize the FGDs. The list of the FGDs that were conducted in this project is provided in table 2.

Table 2. List of FGDs

No	Location	Date	Participants
1	Karimunjawa	17 January 2022	The Local Community of Karimun island
2	Karimunjawa	18 January 2022	The Local Community of Parang, Nyamuk, and Genting islands
3	Balikpapan	25 January 2022	The local authority of Balikpapan City and East-Kalimantan Province, and also experts
4	Balikpapan	26 January 2022	The local community in Manggar and its surrounding areas
5	Semarang	8 February 2022	The local authority of Jepara District and Central Java Province, and also experts

The FGD in for local authority of Jepara District and Central Java Province was held in Semarang because it was much easier for the local authority to come to Semarang instead of to Karimunjawa especially because the travel to Karimunjawa can be difficult due to the bad weather that often happens in January till March.

The summary of the results of the FGDs for each case is provided below:

A. Karimunjawa Islands

From the FGD in Karimunjawa we have learned that the local community in the smaller islands (in our case, these include Parang, Nyamuk and Genting islands) has to pay a higher price for the electricity than the main island of Karimunjawa which has the price of electricity relatively similar to the price in the Java island and also most of the other places in Indonesia. Although the local community mentioned their concern about climate change and also new and renewable energy, they are, understandably, more concerned about the price of electricity. At the moment, there are already PV panels installed on the islands by the local government as a pilot project using foreign grants. However, they are still very limited to fulfilling the electricity demand.

During the FGD in Semarang with the local authorities, it was revealed that the local government has prepared a budget to improve the electricity service in the Karimunjawa islands. However, since all policies related to energy policy and their implementations in Indonesia are still highly centralized, it is still difficult for the local authority to make any plan to improve electricity and energy services in the islands.



Picture 11. FGD in Karimunjawa with Local Communities



Picture 12. FGD in Semarang with Local Authorities and Experts

B. Balikpapan

During the FGD with local authorities and experts in Balikpapan, we also learned about the intention of the municipal government to expand the use of new and renewable energy sources in the area. The technological problems and the issue of economy of scales seem to be the main barrier at the moment to do it. Apart from that, the local authorities and the experts also reveal that the technological issue might not be a big issue as long as the central government has a strong commitment to implement the energy transition program. The case of energy from methane gas produced by the final waste disposal have shown that actually, the central government can delegate some of the authorities and responsibility related to energy services to the local government. At the moment, the methane gas produced in TPA Manggar is only used for cooking but the local authority has a plan to expand it for electricity. However, the technology to convert the methane gas to electricity is still rather expensive and there is still some issue concerning the distribution of the electricity since all the electricity distribution networks are still owned and regulated by PLN (the State Electricity Company).



Picture 13. FGD in Balikpapan with Local Authorities and Experts

For the FGD with the local communities in Balikpapan, we invited a group of people who receive the methane gas from the TPA in Manggar and also a group of people who do not receive it but also live in the neighbouring area. We have learned that in general, both groups of people are quite content and satisfied with the current energy service in their area. However, since the methane gas from the TPA is still free of charge, those who receive it are very happy with the service. At the moment, the local community who receive the methane gas do not only use the gas for domestic use but also enables them to open small food businesses and gives them extra income. It is also interesting to learn that the local communities who receive the methane gas have started to create public funding by saving part of their extra income from their new businesses to expand the distribution of the methane gas so more people would get benefits from it.



Picture 14. FGD in Balikpapan with Local Communities

2.6. Workshop and Discussion in the Netherlands

As part of the initial project plan, the Indonesian partners were able to visit the Netherlands not only to discuss further the follow-up of the project with the Dutch partners but also to see first-hand the current practices of local energy initiatives in the Netherlands. The visit was taken place from 16 – 28 February 2022. One of the Indonesian partners could join the visit because of Covid19. During this visit, the Indonesian and the Dutch partners went to two local energy initiatives: the Windpark Nijmegen-Betuwe energy cooperative in Nijmegen and the sustainable neighbourhood initiative of EVA-Lanxmeer in Culemborg. Before the visit, a hybrid project meeting was held at Radboud University to discuss the results of the activities in Indonesia.



Picture 15. Project Meeting at Radboud University in Nijmegen

During the visit to the Energy Cooperative Windpark Nijmegen-Betuwe, both the Indonesian and the Dutch partners learned about the history of the energy cooperative. The contact person in the Energy Cooperative Windpark Nijmegen-Betuwe who received the project team also explained the benefits and the limitation of energy cooperatives in supporting the energy transition programs in the Netherlands.



Picture 16. Visit to Energy Cooperative Windpark Nijmegen-Betuwe

The visit to EVA-Lanxmeer, Culemborg also provide some interesting results. A bit different from the Energy Cooperative Windpark Nijmegen-Betuwe that was initiated mainly to provide clean energy, in EVA-Lanxmeer, several energy cooperatives have emerged as a consequence of the original initiative in the area to create a sustainable community. The project team members specifically received information about two energy cooperatives in EVA-Lanxmeer, one of them is focusing on the car-sharing business and the other one focuses on providing heat to the houses in the area.



Picture 16. Field-visit to Energy Cooperative Car Sharing in Culemborg



Picture 16. Field-visit to the Sustainable Community EVA-Lanxmeer, Culemborg

Using the results of the survey and FGDs in Indonesia and also the visits to some of the Dutch local energy initiatives, all the team members formulated the follow-up plan of the project during the second offline project meeting by conducting a mini-workshop only among the project teams.



Picture 17. Project Meeting and Workshop in Culemborg

The more detailed explanations of the resulting insights of the project are provided in the next chapter of this report.

3. RESULTING INSIGHTS

- Based on the results of the surveys, field observations and Focus Groups Discussion in both case areas in Indonesia, it is revealed that problems related to the issue of energy justice in Indonesia, especially in coastal areas and small islands still quite apparent. With the 'co-design' of future strategies or scenarios for organising a renewable energy system in a sustainable and socially just manner, it is important to achieve equal access to energy which also that everybody can afford that energy
- Clearly, the transition from fossil fuel to NRE is an important issue in Indonesia and local people seems to be aware of that.
- A transition to a new renewable energy regime should be non-extractive, it should serve the local community and local economy, it should not impose new harm on ecology, and it should be fair and just.
- A transition gives room for approaches that rely on local community leadership and community organisation because we see that on the higher governance levels, the energy transition gets stuck as the problems do not fit with the existing centralised energy system and top-down governed policies.
- The energy transition is not a stand-alone event. We live in a world of dynamic change. New technologies increasingly affect our daily lives
- We started in the proposal by assuming that the local community-based energy cooperative might be an alternative strategy for the energy transition in the coastal areas of Indonesia.
- The current governance mechanism related to energy services in Indonesia that is still highly centralized is proven to be ineffective especially to ensure a just energy provision to all areas, especially in the coastal and small island area.
- Realities in Indonesia obviously differ strongly from locality to locality, both in terms of social and economic development, resources and culture; it would be an oversimplification of that reality to suggest one route to move forward.
- It is important to develop a living lab to observe and create demonstrator areas of community-based energy initiatives to promote energy justice and energy transition in Indonesia. These living labs will benefit from pilot programs and subsidies (including an annual 'envelope' for local/regional development) offered by the state of Indonesia through municipal collaborative schemes, sometimes also including PLN.

4. FOLLOW-UP PLANS

Based on the resulting insights as explained before, we have come up with three main ideas to follow up the project which includes:

1. *Developing a new research project to further observe various forms of collaborative energy approaches, assessing their merit at local but also larger scales, to establish whether such decentralised, bottom-up forms of sustainable energy enterprising can be applied not only to more remote and marginal sites but also applied to scalar levels beyond closed communities in Indonesian coastal areas.*

This follow-up plan is part of the initial idea in the proposal of the project. We have prepared the draft proposal for the research project (see Appendix II). Several calls are considered for the submission of the proposal for instance:

- a. Science and technology joint call for proposals EU and Sout-East Asian countries for sustainable food production and climate change, resilience and adaptation. Deadline submission: 15 October 2022
- b. Horizon Europe Framework Programme to support the implementation of the Climate-Neutral. Deadline submission: 26 April 2022

Apart from those calls, other potential funding will be sought from

- a. Indonesia Endowment Fund for Education (*Lembaga Pengelola Dana Pendidikan, LPDP*) that provides scholarship and independent scientific research funding.
<http://www.lpdp.kemenkeu.go.id/>
 - b. Asian Development Bank Urban Climate Change Resilience Trust Fund,
<https://www.livablecities.info/urban-resilience-fund>
 - c. Adaptation Fund (<https://www.adaptation-fund.org/>) through the Indonesian National Implementing Entity: Partnership for Governance Reform in Indonesia, Jakarta (www.kemitraan.or.id)
 - d. Climate Resilience Fund, <https://www.climateresiliencefund.org/grants/>
2. *Developing a knowledge or learning hub to support and promote energy justice and also energy transition in Indonesia especially by using the community-based solution.*

As explained previously, it is important to develop a knowledge hub that enables different stakeholders and/or anybody who has a concern in the issue of energy justice and energy transition in Indonesia to exchange their knowledge and improve the common understanding of the issue. This common understanding would be the basis for formulating further actions to improve energy justice and energy transition in Indonesia. To initiate this knowledge hub, we have created a simple free online website where we can store the insights we have obtained from this project which can be expanded in the future. The website address is: <https://officialeura.wixsite.com/aura>

3. *Developing working papers based on the results of the surveys, Focus Group Discussion and also field-visit both in Indonesia and the Netherlands*

APPENDIX I: FINANCIAL REPORT

Project number KNAW	ANGIN 2020-09
Project Name	Power to the People
Project number internal RU	27000969

Activity	Unit	Quantity	Volume/duration	Accepted budget	Realized costs
				Costs	
Preparation					
Preliminary survey (IND)	pers/day	4	10	7.500	1.500
Secondary data collection (IND)	pers/day	2	10	5.000	
Scientific visit					
Meeting in NL (for IND experts)	pers/day	5	5	9.500	10.014
Field visit					
Flight Amsterdam-Jakarta (NL experts)	ticket	4	1	4.400	
Flight Jakarta-Semarang (NL experts)	ticket	4	1	260	222
Flight Semarang-Balikpapan (All)	ticket	9	1	765	254
Accommodation NL experts	night/pers	4	6	1.200	
Accommodation IND experts	night/pers	5	6	1.500	31
Food	pers/day	9	6	540	59
Local transport	car/day	1	6	720	522
Workshops					
in Semarang	pers/day	25	2	7.500	9.198
in Balikpapan	pers/day	25	2	7.500	11.594
Report production and dissemination	exemplar	1	50	1.000	186
Grand total				44.885	33.580

Akkoord Project control

José Thijssen

1-3-2022



Project nr.	Datum	Toelichting	Bedrag	Boekstuknr	Leverancier naam	Leverancier nr.	declaratie nr
27000969	24-2-2022	1075327.00_1075327.00_Bezorgkosten _Stuk(s)_a 7,50 _17022022_Y.E.J. Cremers _koffie en thee voor bij vergadering	7,50		RU INTERFACES FB	16409	6
27000969	24-2-2022	1075327.00_1075327.00_Vergaderarrangement met pastry _10 _Stuk(s)_a 4,85 _17022022_Y.E.J. Cremers _koffie en thee voor bij vergadering	48,50		RU INTERFACES FB	16409	6
27000969	24-2-2022	Boodschappen 22 feb 2022	26,29	27220405	Sidabalok, Hotmauli	89011	13
27000969	17-2-2022	27 jan 2022 Notes & Translation Fee	186,00	27220341	Kamilina Rhodiyah LD	106786	5
27000969	24-2-2022	Fees, Facilitator, Trainer & Translator	9.852,50	27220406	Amalia Wulansari	106912	17
27000969	18-1-2022	expenses for ANGIN Project	1.934,40	27220097	Rahmat Aris Pratomo	84233	1
27000969	20-1-2022	16-20 jan 2022, Semarang, Indonesia Focus group Discussion Power to the people	135,06	27220138	Vicky Andria Kusuma	106392	2
27000969	8-2-2022	Balikpapan 25, 26-jan-2022 Focus Group	6.379,42	27220258	Vicky Andria Kusuma	106392	3
27000969	10-2-2022	Balikpapan 6-feb 8-feb-2022 Visa Administration	378,41	27220272	Vicky Andria Kusuma	106392	4
27000969	23-2-2022	14-2-2022 Amsterdam Flight Semarang - Amsterdam	1.577,34	27220394	Sidabalok, Hotmauli	89011	7
27000969	23-2-2022	Reiskosten en boodschappen feb. 2022	264,45	27220395	Sidabalok, Hotmauli	89011	8
27000969	24-2-2022	15 feb 2022 t/m 28 feb 2022, Jakarta Field visit	222,11	27220403	Moh Nurhadi	106884	16
27000969	24-2-2022	25-1 t/m 29-1-2022 Balikpapan	4.559,87	27220401	Moh Nurhadi	106884	15
27000969	24-2-2022	2 feb 2022 Surabaya Visa	628,34	27220402	Moh Nurhadi	106884	11
27000969	25-2-2022	Bezoek en rondleiding Windpark Nijmegen 21 feb. 2022.	150,00	27220407	Windpark Nijmegen-Betuwe BV	84035	10
27000969	28-2-2022	declaratie 9 verblijf Indonesische gasten Nijmegen	2.952,00		Guesthouse Verhoef	80529	9
27000969	23-4-2022	declaratie 12 Workshop Culemborg	2.164,12		CO OP champions		12
27000969	26-2-2022	declaratie 14 Quarantaine hotel Indonesia	1.463,01				14
27000969	26-2-2022	declaratie 18 travel Indonesian project medewerkers	431,54				18
27000969	28-2-2022	declaratie 19 Food Meeting NL	219,20		Ary Samsura	9668	19

33.580,06

APPENDIX II: DRAFT PROPOSAL FOR FOLLOW-UP RESEARCH

Power to the People:
Governance Innovation for Energy Justice and Energy Transition
in Indonesian Coastal Communities

A draft research proposal

Background and Problem statement

As a recurring concern around the globe, the quest for renewable energy has taken real momentum over the last decade and can be considered a question not only of environmental concern but also one of major geopolitical and societal value, as dwindling natural resources and increasing inequality at global and local levels call for urgent action. As such ensuring access to affordable, reliable, sustainable and modern energy is also a Sustainable Development Goal.

Thus the quest to reduce global warming is not limited to introducing governance instruments to reduce the waste of the largest global polluters, located mainly in the global north, but also present a quest to governments in the global south as they develop increasingly sophisticated national agendas on sustainability issues, in recognition of the complexities at hand. This sustainability agenda is further hastened not only by increasing geopolitical concerns of access to remaining fossil fuels, or the pollution these cause, but also by the impact of climate change, concerns which present themselves as seemingly separate issues, but are actually strongly intertwined, and thus also the solutions that can be sought to mitigate or even off-set their impact. This can be discerned in densely populated coastal zones, such as in south-east Asia, where the combination of a steadily rising sea level, more instances of extreme weather and subsidence of the land (especially due to water extraction), is resulting in an increased vulnerability, and this applies all the more to those who are already struggling to micro-manage their livelihoods in the face of many other insecurities they face – be these economic, societal or otherwise in nature. This illustrates the reciprocal relationship between climate mitigation (reducing greenhouse gas emissions) and climate adaptation: climate change endangers energy supply but a lack of energy supply also increases vulnerability to climate change. Hence, providing access to energy is climate adaptation.

For populations living locally constituted lives, premised on limited income sources that hold little potential for expansion, continued access to (affordable) energy is a rising concern. Even though more than 90% of Indonesia ‘population’ apparently has access to energy, these numbers need to be critically considered as (1) energy access is measured on a district level and not on a household level, (2) having technically access does not mean one can afford it; and (3) it does not mean that households have 24h access in the most unpopulated areas, coastal and islands. This relates not only to the energy transition envisaged by states and how a changing price will affect the livelihood disposition of people, but also the very access people have to energy, and this at a time when global processes affect the scale at which many people need to organize their lives, their income-generating activities, their sense of identity, etc. Therein traditional state-centric approaches towards energy provision for all citizens of a given country may increasingly not suffice, not only because these lag behind the real demand of people (around the world we observe an increasing concern with grid capacity, maximal energy provision, and resultant partial power cuts, but also increased complexities with energy delivery in instances of severe weather patterns), but also fail to meet the flux in income disposition which calls for decentralised energy provision formats that build on community-led arrangements which allow for more on-point, and flexible needs-based energy provision.

The transition to energy decarbonization in Indonesia faces several challenges including the lack of capacity of NRE technology and the readiness of the domestic industry. It is resulting in the economic price of NRE production and becomes less competitive compared to fossil energy. Characteristics of

NRE tend to be intermittent, small-scale, and based on local resources pose a high risk of instability and supply shortages, especially for areas that require large amounts of energy with high reliability, such as in Java, Madura, and Bali. The limited capacity of the energy actors, network of actors, as well as policies and regulations in managing NRE, can lead to reduced reliability of energy supply. This creates great resistance to a more democratic energy transition.

Research objective and research questions

To that end a tapestry of energy-sourcing regions can be imagined, developed in a manner that is emancipative, democratic, autonomous, prosperity- and needs-oriented, societally inclusive and dynamic, and principally oriented towards local reusable energy resources. There are various models located between such a decentralised approach and one that is far more centric, and this is something we acknowledge in researching relevant initiatives for transformation. These might be oriented towards the development of regional cooperatives, which may primarily orient themselves on energy needs, but be far more inclusive of other needs and opportunities – societal and economic. These may also be rooted in existing institutional practices of a collective kind, adapted to relevant scale in recognition of the needs identified.

This brings us to our **objective**, which is to observe *various forms of collaborative energy approaches, assessing their merit at local but also larger scales, to establish whether such decentralised, bottom-up forms of sustainable energy enterprising can be applied not only to more remote and marginal sites but also applied to scalar levels beyond closed communities.*

The project will focus on three main research questions, which will be analysed in different work packages:

1. To what extent has injustice taken place in Indonesia's energy sector?
2. How does the existing governance arrangement for energy reproduce injustices in Indonesia's coastal communities?
3. What is the suitable model of governance innovation for energy justice and energy transition in Indonesia coastal communities?.

Methodology

The research strategy to answer those three questions is to focus the research on the areas with a lack of energy access such as isolated, less populated, small islands, and coastal areas as living labs. The living lab methodology allows wider participation of all relevant stakeholders to formulate and test their solutions in the real-life environment. This approach will benefit the local community in terms of additional energy supply that suit their needs and at the same time give opportunities to energy supply stakeholders to develop their capacity, tools/instruments, and strategies to manage NRE with lower risks. This approach allows the co-creation principle where energy users can act as energy producers at the same time that strengthens the democratisation of energy actors.

As it is a living lab, the research areas and issues grow according to the findings during the research. It will start in small areas and transfer to bigger areas where the challenge is higher. The overall target of the research is how the formulated and tested solutions implemented in the smaller areas can be transferred to wider areas including intensive energy demand and high energy reliability with fewer risks.

Work Packages

WP1: Mapping existing injustice in the Indonesian energy sector

To what extent has injustice taken place in Indonesia's energy sector?

This WP will employ an environmental justice (EJ) lens to identify the various (in)justices aligned with energy in Indonesia. An EJ-perspective comprises the following elements: (1) distributive justice, i.e., how are burdens/benefits of climate change and energy distributed among different stakeholders and across different scales (national local, regional); (2) recognition justice is concerned with whose identities, needs, interests and knowledge are considered in the realm of energy; and (3) procedural justice is concerned with the fairness and inclusiveness of the design and decision-making process in the field of energy.

Both qualitative and quantitative methods will be applied in answering the question in this work package. The survey with semi-structured questions is employed to figure out the number of different stakeholders and different scales who receive burdens and benefits of energy provision in Indonesia. The survey also inserts the question of the kinds of burdens and benefits of climate change and energy distribution that they experience. Data related to the recognition and procedural justice will be gathered by in depth-interviews with relevant actors. All data collected is used to map the existing injustice in Indonesia's energy sector.

WP2: Mapping the energy governance arrangement and its role in (re)producing injustices

This WP will focus on the second research question: how does the existing governance arrangement reproduce injustices in Indonesia's energy sector? The WP takes a two-step approach.

1. The existing governance arrangements for energy in Indonesia will be mapped using the Arrangement Approach as a conceptual basis (Arts et al. 2000; Liefferink, 2006), which has already been applied to energy governance (Oteman et al., 2014). According to this approach, the energy governance arrangement will be analysed based on the following dimensions (Kaufmann and Wiering, 2021): (a) the actor dimension, i.e. the configuration of the state, market and civil society actors and their roles, responsibilities, relationships, and interests across various levels (international, national, regional and local), (b) the rules dimension, i.e. analysing the informal and formal rules, regulations and procedures, (c) the resource dimension, i.e., the division of resources and power in terms of financial, knowledge, societal network, and legal competences. Apart from these organisational dimensions, the PAA also focuses on analysing a substantive dimension, namely (d) discourses, i.e., categorisations and concepts that give meaning to physical phenomena and social realities related to energy supply. Of course, particular attention will be paid to discourses on justice; we will analyse what different actors consider to be 'just' in the context of energy in terms of distribution of burdens and benefits, as well as, recognition and participation in the energy transition. We will also identify mismatches/trade-offs and synergies between justice and efficiency and how these trade-offs could be compensated.
2. Second, the previous analysis will be the basis for (a) identifying the institutional factors (re)producing the existing injustices mapped in WP1, as well as (b) identifying the mechanisms that stabilise these factors (e.g., path dependencies in the actor, resource, rule or discourse dimension based on Wiering et al. (2017)). In other words, we will analyse the barriers for change towards a more just energy sector and the opportunities for initiating changes.

Qualitative methods will be employed in this work package. Mapping the governance arrangement and its role in (re)producing injustices will be done through the analysis of policy documents and semi-structured interviews with policymakers involved in the energy sector or related to it on the international, national, regional and local level; as well as market parties and representatives of civil

society interest groups. The findings will be discussed and valorised in a limited number of focus group discussions with representatives from different realms.

WP3 - Developing interventions for just governance arrangements

What model intervention, exploring the alternative governance structure. playing the games of different scenarios (e.g., energy cooperative scenario)

- trade-offs between justices and justice and effectiveness
1. Based on the mapped injustices of WP1, what injustices should be mitigated or dealt with in a future way of organising a local, societal energy system, and what possible solutions (social strategies) can ensure that the energy transition will mitigate injustices?
 - a. What injustices can be aggregated in terms of distributive justice, procedural justice, and recognition justice, based on WP1?
 - b. What are the trade-offs between justice and other societal principles and values?
 - c. In what ways are injustices aggravated by the energy and climate transition?
 - d. In what ways can injustices be mitigated while pursuing the energy and climate transition?
 2. Based on the mapped governance structures of WP2, how could existing governance structures be adapted so that to enable opportunities for institutional and social change and to accelerate/make progress with the energy transition?
 - a. Despite existing stabilising factors and barriers that currently hinder the progress of climate action, what are the seeds for possible changes of the existing regime into a post-fossil energy society?
 - b. Could a bottom-up approach add to the current policies, where top-down technology transfer dominates the transition, with a better 'fit' with local situations of energy needs and justice needs in terms of energy access?
 - c. How would such a bottom-up approach be developed, what are options to change parts of the current energy system, in terms of rules of the game, existing policy arrangements, existing resources distributions, actor-networks? Would it be a solution for the local energy landscape to empower local communities, local government, other actors, or new actors?
 - d. Who is currently leading in the energy transition, and *what roles, responsibilities, rights, and actors* are currently missing that theoretically could accelerate the transition process?
 - e. What leadership is diagnosed as missing, and which actors, or people, could work together to form, establish, or organise such new leadership?
 3. What can we design in terms of a societal change or new governance-business model, to meet the current double aim of (1) ensuring everybody should have equal access to energy, so every citizen can get it, and can afford it, and (2) we can make the energy transition and meet climate policy objectives?
 - a. What future scenario, or what rule change, change in the allocation of resources or change of values/discourses could help in overcoming the existing institutional barriers that currently stand in the way of accelerated energy transition and climate action/policy?
 - b. What can a new governance-business model look like and what agreements could be made in such models that would be feasible, acceptable, affordable, just, and practically workable in practice?
 - c. What governance-business model would local actors co-create among each other, in a future scenario where they would be enabled to take a leading role? (note: this could

be simulated in a gaming experiment, such as done in the current course Urban Future Lab)

- d. How well do such governance-business models 'fit' to the existing local culture?
- e. How are these new governance-business models evaluated by the local actors? (in an ex-ante scenario simulation) - How would the trade-offs between justices, practical feasibility, affordability, effectiveness and environment-friendliness be assessed, by the people who are involved in the gaming simulation?
- f. How would other actors, based on the outcomes of gaming results when disseminated to them, evaluate these trade-offs, further 'up' in the Multi-Level Governance system? (For instance, if a local community comes to the conclusion that founding a new actor, a new local energy cooperative, with help of the municipality, would be a good solution, then how would the provincial government think about this? Especially when the local community and the municipality were both involved in the gaming experiment, and they decided that some regulation on province-level would need to be changed: how would the provincial government, if they were not involved in the project, respond to the proposed ideas?) (=> recommendations, perhaps not a research question)

Methods: Multi-actor gaming - simulation, with strategy co-creation, and possibly supported with various scenarios developed as aid (where multi-level governance changes are simulated as if these have happened, to 'play' with such changed rules, regulations, subsidies etc).

With a multi-actor gaming simulation, we can play the scenarios with real actors and see how they both fill in the design of an institutional or organisational governance-business model that alters the relations between citizens, the community, the local government and the local market. After each game, the actors would themselves evaluate each particular scenario and their and others' roles, responsibilities, and rights in it.

The game could be played multiple times, each time with a different scenario. Elements of multi-actor co-creation, game theory, strategic niche management, collaborative learning/sense-making (group model building), and organisational learning, can be used to explicate and internalise the various mental models of people in each scenario.

WP4 Dissemination and knowledge exchange

The fourth work package brings together the research and knowledge utilisation activities throughout the project. During the induction phase, this WP includes co-creative activities with stakeholders to fine-tune research questions and identify the research needs of various stakeholders. During the project, this WP will be used to validate and communicate research findings. Activities include developing innovative and tailor-made communication strategies to regularly inform stakeholders about the project progress; designing and conducting stakeholder workshops; and developing tailor-made dissemination strategies to communicate the project output (e.g., online platform, policy briefs, etc.).

WP5 Project management, monitoring and evaluation

This includes all administrative and personnel aspects of the project, as well as reporting activities (annual progress reports, mid-term evaluation and final reporting towards the funding organisations and supervisory committee), and coordination of the institutional design for monitoring and evaluation. Activities performed within this WP include management meetings among the (co-) applicants to foster cross-fertilisation between the various WPs.

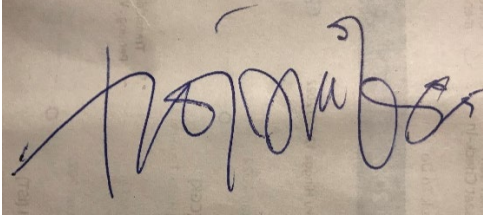
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APPROVAL PAGE

This report has been approved by all the members of the project team who signed this report as shown below:

Project team member	Signature
Dr. ir. D. Ary A. Samsura <i>Department of Geography, Planning, and Environment, Radboud University, the Netherlands</i>	
Dr. Lothar Smith <i>Department of Geography, Planning, and Environment, Radboud University, the Netherlands</i>	
Dr. Maria Kaufmann <i>Department of Geography, Planning, and Environment, Radboud University, the Netherlands</i>	
Dr. ir. Linda Carton <i>Department of Geography, Planning, and Environment, Radboud University, the Netherlands</i>	
Dr. ir. Onno van Bekkum <i>De Coöperatieve Samenleving B.A., the Netherlands</i>	
Dr. Nurul Widyastuti <i>Institut Teknologi Kalimantan, Balikpapan, Indonesia</i>	
Vicky Andria Kusuma <i>Institut Teknologi Kalimantan, Balikpapan, Indonesia</i>	

<p>Hotmauli Sidabalok <i>Soegijapranata Catholic University, Semarang, Indonesia</i></p>	
<p>Moh. Nurhadi <i>BINTARI Foundation, Semarang, Indonesia</i></p>	