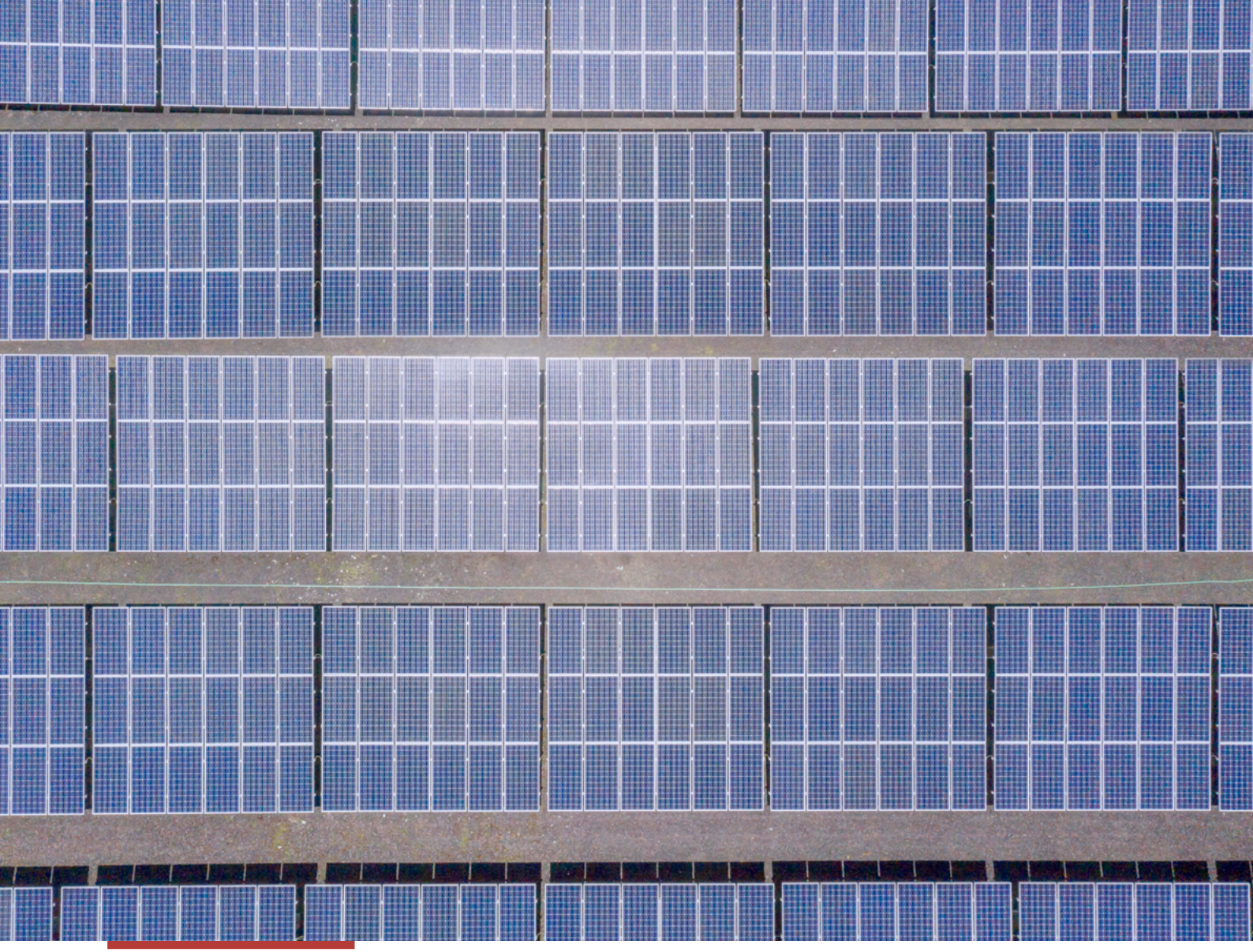

Operationalizing JETP Just Transition Standard 9 in Maluku

Case Studies from Air Buaya and Pasir Putih

December 2025

CLIMATE POLICY INITIATIVE

ACKNOWLEDGMENTS

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AUTHORS

Harry Gembira and Luthfyana Larasati

CONTACT

Harry Gembira
harry.gembira@cpiglobal.org

MEDIA CONTACT

Rindo Saio
rindo.saio@cpiglobal.org

ABOUT CLIMATE POLICY INITIATIVE

CPI is an analysis and advisory organization with deep expertise in finance and policy. Our mission is to help governments, businesses, and financial institutions drive economic growth while addressing climate change. CPI has offices in Brazil, India, Indonesia, South Africa, the United Kingdom, and the United States.

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1. INTRODUCTION AND CONTEXT

Indonesia's *Program Dedieselisasi* (De-Dieselization Program), which aims to transition remote regions from diesel to renewable energy, offers a critical opportunity to align climate goals with equitable economic development. This report explores how the Just Energy Transition Partnership (JETP) Standard 9 can guide this shift toward sustainable livelihoods and resilient communities in Eastern Indonesia's Maluku Islands, demonstrating practical strategies to ensure no one is left behind.

As of 2025, Indonesia operates approximately 6 GW of diesel power plants to supply electricity across the country. To strengthen energy security and reduce emissions, the Government of Indonesia plans to replace about 5,200 diesel power plants, equivalent to 2.37 GW of capacity, with renewable energy technologies. This initiative, known as the de-dieselization program, will be implemented through the national electricity company, PT PLN. The initial completion target was 2024 (ESDM 2024), but technical and geographical constraints caused delays, and the project remains listed in PT PLN's Electricity Business Plan (RUPTL) 2025–2034. Maluku and North Maluku provinces are designated as priority regions in this program. Phase 1 is targeting approximately 66 MW of diesel power plants. The program is expected to demonstrate that cleaner energy can bring local socioeconomic benefits, not just environmental gains.

However, ensuring a just transition requires more than a technology swap; it demands attention to people and livelihoods. The Indonesia Just Energy Transition Partnership (JETP) initiative sets important guidelines, but on-the-ground operationalization is critical because each community has unique economic structures, social needs, and development constraints. A one-size-fits-all approach could overlook local workers, small businesses, and vulnerable groups. Understanding these unique challenges, the JETP initiative introduces the Just Transition (JT) Framework, which builds upon existing environmental and social safeguards (i.e., Standards 1-8)[1]. Various efforts, including the De-Dieselization Program, have been undertaken to move away from fossil fuels and accelerate renewable energy initiatives, with the De-Dieselization Program listed as one of Indonesia's JETP Investment Focus Areas.

The JT Framework lays out social and economic safeguards to ensure climate actions also advance equitable development. The new addition to this framework's nine pillars, **Standard 9: Economic Diversification and Transformation,** serves as a guiding concept to promote inclusive economic outcomes during energy transitions.

Standard 9 encourages activities that diversify and transform local economies—particularly those reliant on a single sector, such as fossil fuels—by advocating for targeted interventions like reskilling programs for affected workers, financial support for low-carbon industries, and infrastructure investments that enhance local resilience and sustainable development. In practice, Standard 9 calls for tailored strategies to channel these benefits to communities, ensuring that clean energy projects create jobs, improve incomes, and address local vulnerabilities. This report showcases how Standard 9 can be operationalized in Air Buaya and Pasir Putih, two remote communities in Maluku selected by Climate Policy Initiative (CPI) for

1 Standards 1-8 are safeguards mandated by the GoI (e.g., AMDAL for environmental impact analysis, Land Acquisition and Resettlement Plan) and those adopted by financiers e.g. MDBs, DFIs, private lenders, see Indonesia JETP CIPP Chapter 6 for more detail.

their inclusion in Indonesia's De-Dieselization Program and their significant contributions to the tuna fishery sector, which faces economic constraints due to unreliable energy access.

Adopting CPI's Just Transition Framework, this study aims to showcase the application of the Standard 9 lens to two remote, diesel-dependent communities in Maluku that are poised for change:

- **Air Buaya,** a subdistrict on Buru Island, is part of the De-dieselization Program, and is slated to replace its diesel generators with solar power and batteries.
- **Pasir Putih,** a coastal village in South Buru, exemplifies the challenges of limited electricity in a fishing-based economy.

2. BASELINE ENERGY AND EMPLOYMENT CONDITIONS IN AIR BUAYA AND PASIR PUTIH

Baseline conditions were assessed in both case study locations using qualitative and quantitative surveys conducted over one week in November 2024, covering a sample of 240 households representing approximately 4,200 people across each location to understand their demographics, socioeconomic activities, and energy access prior to any just transition interventions. The two communities represent typical off-grid or edge-of-grid settings in Maluku, but with different economic profiles. Below, each village's baseline conditions are described in turn to identify needs and opportunities that a Standard 9 approach would need to address.

AIR BUAYA: DEMOGRAPHICS, ECONOMY, AND DIESEL-BASED ELECTRICITY

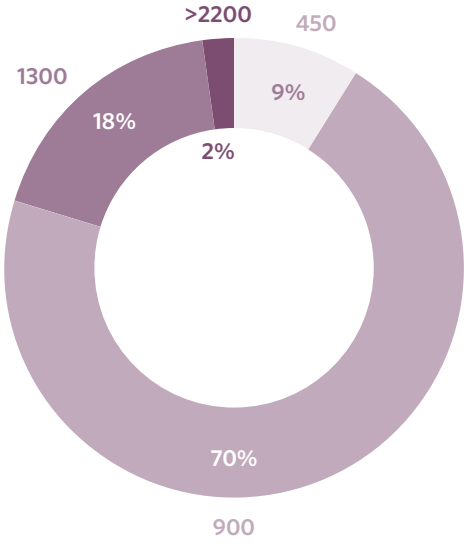
DEMOGRAPHY AND LIVELIHOODS

Air Buaya is a subdistrict in northern Buru Island, Maluku Province, that serves as a local center for surrounding rural villages. It is home to approximately 1,900 people across an area of about 23 km^2. The community's economy is relatively diversified for a remote area: residents engage in small-scale farming, fishing, and trading, and a significant portion of adults are involved in household domestic work. A socioeconomic survey shows that about 22.5% of residents are farmers and 15.8% run small businesses or trade. Only 1.7% work as fishermen, and just 0.8% are employed at the local diesel power plant, indicating that few people work directly in the energy sector. The average monthly income of those engaged in small business activities is approximately IDR 1,250,000 (≈USD 80).

ENERGY ACCESS AND DIESEL POWER SYSTEM

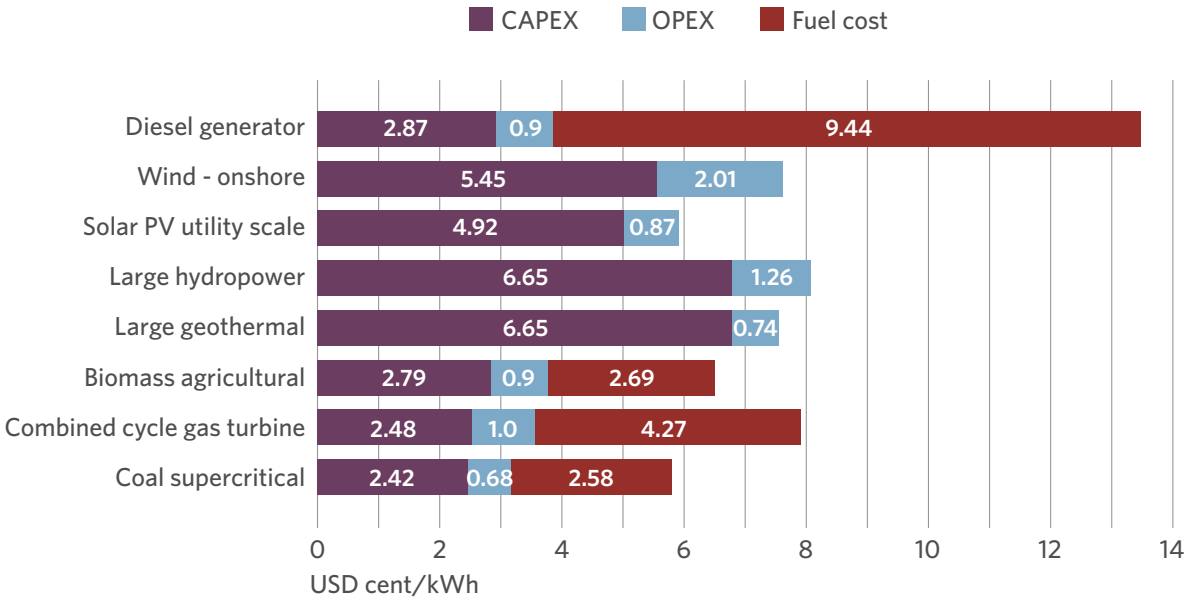
Most families in Air Buaya have access to electricity, but at a basic level. About 70% of Air Buaya households are customers of the state utility, PLN, each typically with a small 900-volt ampere (VA) connection. Air Buaya's electricity is supplied entirely by diesel generators, which comprise a cluster of around ten diesel gensets rated at 250–500 kW each, for a total installed capacity of roughly 2 MW. In 2020, the area achieved 24-hour electricity service—a milestone in reliability—after a new 500 kW diesel unit was added in 2021 to meet growing demand.

Figure 1. PLN consumers' connections by installed capacity (VA)



Prior to that, electricity supply was likely restricted to certain hours (as is common for island grids), and many households experienced frequent outages. With continuous power now available, Air Buaya's consumption has risen. For instance, Buru Island's peak load reached around 16 MW in 2024 (a 20% increase over the previous year), and Air Buaya's local demand grew by about 14% alongside the move to a 24-hour supply. However, this amplifies high opportunity costs for the fishery sector, which requires a stable and continuous power supply, as it forces a dependence on costly and polluting diesel generators.

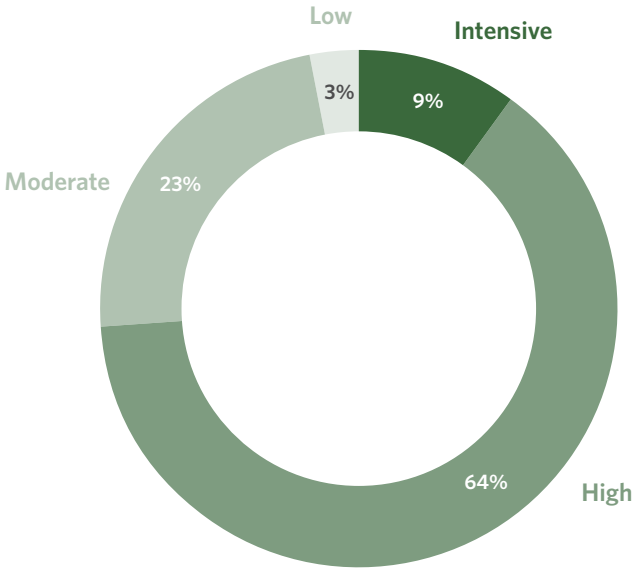
Figure 2. Levelized Cost of Energy (LCOE) of Diesel Generator as compared to other technologies



PRODUCTIVE USES AND CHALLENGES

Despite improved service, the diesel-reliant system comes with high operating costs and vulnerabilities. Large volumes of fuel must be regularly shipped to this remote area to keep the generators running, and the national utility subsidizes the fuel and transport costs for such isolated grids. Meanwhile, reliable electricity is an important enabler of livelihoods in Air Buaya. Field surveys show that power in the village is heavily used for economic activities: roughly 10% of local electricity consumption is for high-intensity productive uses (e.g., ice-making, refrigeration, or other cooling needs), about 64% for moderate productive uses (food processing, cottage industries, operating small kiosks), and the remainder for household lighting and appliances. In other words, a significant share of the community's electricity is applied to income-generating activities—from cold storage for fish to running rice mills and woodworking tools.

Figure 3. PLN consumers' level of electricity use[2]



This reflects both existing demand and unrealized opportunity: reliable energy access is central to livelihoods in Air Buaya, and further improvements in supply or cost could directly boost local economic activity. At the same time, the heavy reliance on diesel means Air Buaya's energy supply is neither secure nor sustainable—any major generator breakdown or fuel supply disruption could cause costly blackouts for homes and businesses.

2 Levels of electricity use can be defined as follows:
- Very High Usage: Use related to businesses that require advanced electricity consumption (e.g., ice-making, refrigeration, or grinders).
- High Usage (Scale 4: 64%): Productive use but less intensive (e.g., for mixers, rice cookers).
- Moderate Usage (Scale 3: 23%): Covering basic needs, including leisure (e.g., television).
- Low Usage (Scale 2 and Scale 1: 3%): Covering basic needs (e.g., lighting).

PASIR PUTIH: DEMOGRAPHICS AND LIVELIHOOD ECONOMY, AND ENERGY ACCESS GAPS

DEMOGRAPHIC AND SOCIAL PROFILE

Pasir Putih Village, located in a remote part of Buru Island in Maluku Province, is home to approximately 2,468 residents across 655 households. The population is predominantly middle-aged or older, as many younger individuals migrate to urban areas in pursuit of education and employment opportunities. The educational level in the village is generally low, with most adults having completed only primary school. This limited access to education impacts the local skill base and restricts workforce diversity. As a result, approximately 90% of the working-age population works as fishermen.

As one of the largest tuna-producing villages in Maluku Province, Pasir Putih has a higher average monthly income than other districts in the region, typically ranging from IDR 3,000,000 to IDR 6,000,000 (USD 180 – USD 370). However, income levels are affected by the limited availability of ice blocks, which are essential for preserving tuna and sustaining the fishing industry.

ECONOMIC ACTIVITIES

Pasir Putih's economy is anchored in small-scale fisheries using traditional fishing methods and basic equipment. However, economic activities are severely constrained by insufficient cold-chain infrastructure, particularly inadequate ice production facilities.

The current ice-making capacity is roughly 2 tons per day, well below the estimated requirement of approximately 9 tons, resulting in substantial operational inefficiencies. Survey data reveals that only about 20% of fishermen can consistently secure sufficient ice for daily fishing trips, leaving a substantial majority idle and creating opportunity costs. Estimated daily revenue losses for the village from these constraints amount to approximately IDR 282 million (±USD 17,000). Furthermore, the lack of robust cold storage capabilities often forces the sale of fish at lower quality and price, substantially reducing potential income from around IDR 50,000 (USD 3) per kg (export quality) to IDR 20,000 (USD 1.5) per kg (local market quality).

Secondary economic activities include small-scale farming and micro-enterprises primarily run by women, who produce dried fish, seafood-based snacks, and handicrafts. These enterprises, while modest, represent important supplementary income sources for households but remain limited by infrastructure and market access.

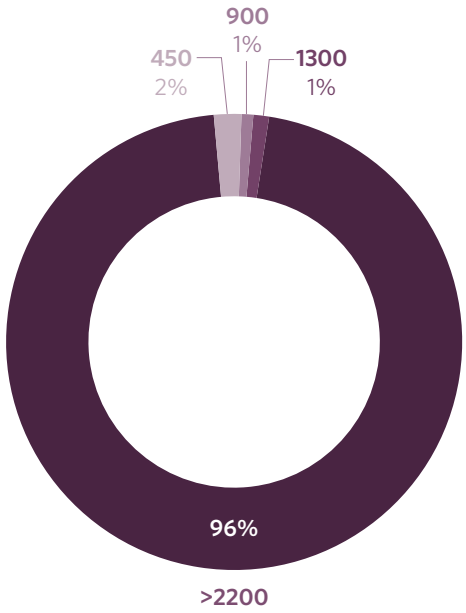
ENERGY SUPPLY PROFILE AND CHALLENGES

Electricity access in Pasir Putih remains limited and unreliable. The village was connected to the PLN grid in March 2024; however, service is intermittent, averaging fewer than 12 hours of electricity supply per day. Voltage fluctuations and frequent outages continue to disrupt household activities and critical public services, including education and healthcare. Many households continue to rely on costly backup sources, such as gasoline generators and kerosene lamps, particularly during daytime hours, when grid supply is unavailable.

Survey data shows that most PLN consumers in the village have only small-scale electricity connections. Approximately 96% of respondents are in the 900 VA customer group, indicating

limited capacity to run high-power appliances. Smaller proportions are connected at 450 VA (2%), 1300 VA (1%), and 2200–5500 VA (1%).

Figure 4. PLN consumers' connections by installed capacity (VA)



This distribution further highlights the restricted nature of electricity usage, primarily for lighting and small devices. The constrained household capacity limits not only domestic convenience but also economic productivity—particularly for activities that require continuous or high-wattage appliances, such as refrigeration or electric processing equipment.

The energy supply deficit has direct implications for the fisheries cold chain, limiting ice production and the availability of cold storage. This exacerbates operational constraints and results in high opportunity costs for the village's main livelihood sector. Some fishermen are forced to purchase ice from neighboring islands, incurring additional fuel and transport costs of USD 16 - 40 per trip.

3. WHY STANDARD 9 MATTERS—CHALLENGES AND OPPORTUNITIES

The cases of Air Buaya and Pasir Putih demonstrate how a narrow approach to energy transition (focusing only on technology and not on people) could leave significant social and economic challenges unaddressed. In their current state, these communities face a range of risks and unrealized opportunities that illustrate why Standard 9's principles of economic diversification, resilience, and decent work are crucial.

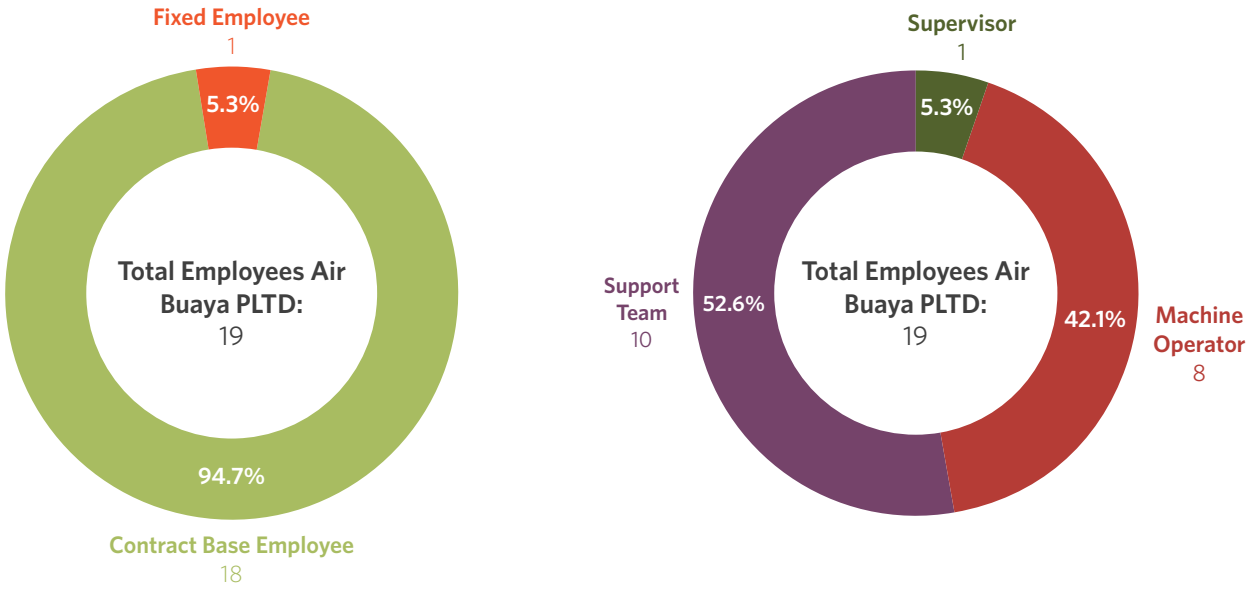
Without deliberate efforts to plan for workers and local businesses, the shift away from diesel power could exacerbate inequalities or simply fail to improve livelihoods. Below, we highlight the key challenges and missed opportunities observed in the two case studies—factors that any just transition initiative must tackle to truly succeed.

JOB TRANSITION RISKS FOR ENERGY WORKERS

In Air Buaya, the local diesel power plant (PLTD) operates under a contract by PT Nusa Daya and PT Almira. The plant employs 18 workers, a small but critical part of the local economy. Survey data shows that 17 of these workers are contract-based employees, while only 1 holds a permanent position. This points to a significant vulnerability to transition-related displacement, especially as Indonesia's De-dieselization Program moves toward renewable energy replacements.

Functionally, the workforce comprises 10 support staff, 8 machine operators, and 1 supervisor. These individuals perform essential daily operations, including generator maintenance, fuel logistics, and emergency system troubleshooting. Most are local residents and possess hands-on technical experience with diesel systems, albeit with limited formal training credentials.

Figure 5. Employee profile of Air Buaya PLTD Facility



The Government of Indonesia's De-Dieselization Program places these workers at a crossroads. Without clear transition mechanisms, contract-based employees face higher risks of job loss. Stakeholder interviews indicate staff concern about their future roles and the absence of a formal redeployment plan. Workers voiced uncertainty about their contractual status and whether they would be retained under new operational models.

At the same time, many expressed a willingness to reskill and adapt to new technologies. Interviews and a primary survey confirmed their openness to training in renewable energy technologies, including photovoltaic system operation, battery storage maintenance, and basic digital monitoring systems. This presents an opportunity to retain and redeploy existing human capital into the new energy system in Air Buaya, where diesel plant workers face transition risks, unlike in Pasir Putih, which has no direct energy sector employment but focuses on fishery-related challenges.

ENERGY RELIABILITY AND PUBLIC SERVICE GAPS

Air Buaya's electricity service is nominally 24/7, but power outages occur 2–3 times per week, typically lasting 3 to 5 hours per day. These disruptions stem from reliance on aging diesel generators and the logistical challenges of fuel supply in a remote setting, underscoring the need for a more resilient energy system. The situation illustrates vulnerabilities that a transition to renewable energy could address.

In Pasir Putih, the electricity supply remains highly unreliable despite having been connected to the grid since 2024. Survey findings and field observations confirm that evening grid electricity is frequently unavailable, with most households relying solely on limited solar PV-based battery storage during these hours. This intermittent access restricts essential community functions, including evening education, health services, and productive economic activities. Cold-chain operations are severely constrained, reducing the quality and marketability of fish catches.

Across both villages, the limited installed household capacity exacerbates the challenge: in Pasir Putih, 96% of households are in the 900 VA group, constraining their ability to power refrigeration or productive equipment. Similarly, in Air Buaya, most homes also fall within the lower-capacity groups, indicating a consistent pattern of limited energy access.

Energy reliability issues also directly undermine public services. In both locations, schools and clinics cannot depend on electricity during critical hours, limiting the use of electronic learning tools and refrigeration for medicines and vaccines. Households continue to rely on expensive, polluting kerosene lamps or gasoline generators, further burdening family finances.

PRODUCTIVE-USE LIMITATIONS AND LOST ECONOMIC VALUE

Air Buaya's economy is less reliant on fishing but faces other constraints on productive use due to its historical reliance on diesel power. The De-dieselization Program provides a platform to enhance productivity across sectors by providing a reliable energy supply through renewable energy technologies. Survey findings indicate that 64% of households frequently use electricity for productive activities, such as operating kiosks, food preparation, or small workshops. However, many are constrained by the cost and reliability of power. A small segment (10%)

already uses electricity intensively for business, particularly in refrigeration and food vending, while 23% report moderate use.

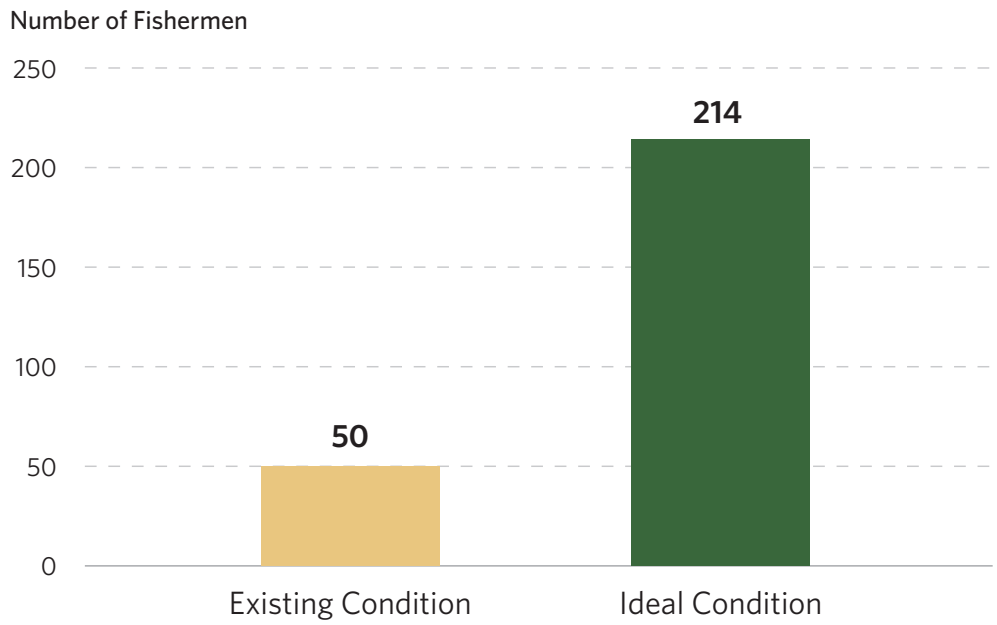
The transition to renewable energy is expected to provide an opportunity to scale these efforts. For example:

- Refrigerators, currently present in only 11.3% of households, could become more widespread and support cold beverage sales, preserved foods, or local seafood processing.
- Phones and TVs, making up 23.1% and 11.7% of appliance ownership, respectively, suggest potential for digital connectivity, local entertainment services, or small-scale e-commerce platforms.
- Nighttime lighting, used in nearly all households, enables evening operations, security, and education—expanding both working hours and social utility.

Both communities demonstrate unrealized economic potential due to energy constraints. In Pasir Putih, the impact of reduced fisheries productivity is visible and quantifiable. In Air Buaya, energy-sensitive enterprises exist but remain small in scale. Neither village is capturing value through downstream processing or integration into broader value chains. Diversifying into fish processing, solar-powered agri-processing, or digital micro-enterprises could unlock new livelihood opportunities.

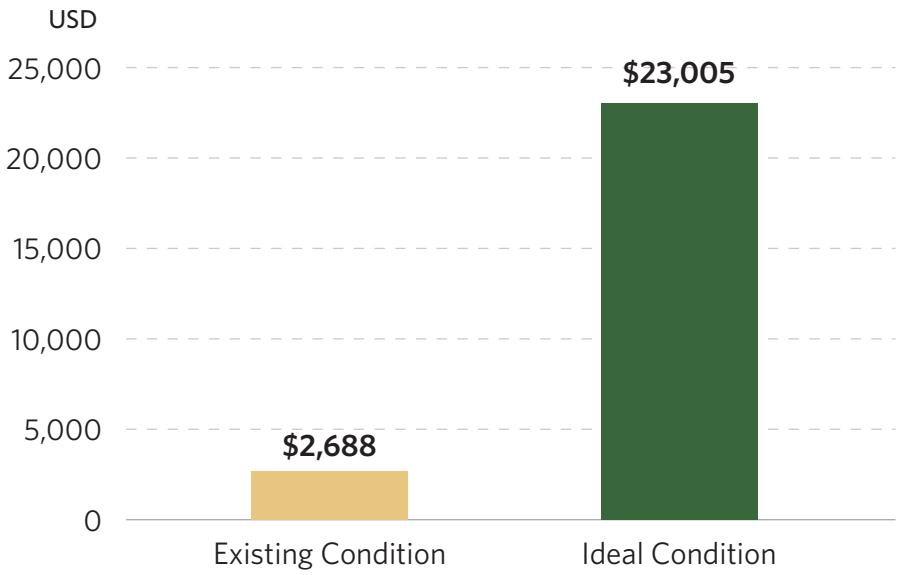
In Pasir Putih, the performance of the fisheries sector is severely constrained by insufficient cold-chain capacity, due to an unreliable energy supply. The deficit of ice blocks limits the number of active fishermen to just 50 individuals, a fraction of the estimated 214 who could work daily if ice supply were adequate.

Figure 6. Engaged fishermen comparison under existing and ideal conditions of ice block supply



Meeting the ice demand through cold-chain systems powered by reliable renewable energy could increase the daily income of active fishers from USD 2,688 to USD 23,005, enabling 214 fishermen to work daily and access higher-value export markets. This opportunity aligns with Standard 9's goals of economic diversification by unlocking the full potential of Pasir Putih's tuna fishery, enhancing labor productivity, and integrating the community into broader value chains.

Figure 7. Income comparison under existing and ideal conditions of ice block supply



SOCIAL INCLUSION AND GENDER CONSIDERATIONS

The baseline surveys in both Air Buaya and Pasir Putih reveal limited formal involvement of women in the local economy, despite their significant informal contributions.

In Air Buaya, over 25% of adult women are recorded as housewives without formal income. While a small portion of households reports using electricity for productive purposes, women's activities are primarily centered around informal work such as food preparation and small-scale vending. Survey data also highlights that the workforce is predominantly male, with negligible female participation in technical roles, such as at the diesel power plant.

In Pasir Putih, the disparity is even more pronounced. The community's fishing sector is male dominated (90% of the workforce), with women contributing mainly through fish processing, household financial management, and micro-enterprises (UMKM). However, these roles are often informal and under-recognized, with limited access to infrastructure, financial services, or decision-making spaces. Traditional gender norms further constrain women's ability to engage in higher-value economic activities or formal employment.

From a youth perspective, both villages exhibit signs of generational out-migration, with younger people leaving in search of educational and employment opportunities elsewhere. This reflects the lack of diversified economic pathways and vocational training at the village level.

Despite these gaps, there is an opportunity. PLN's de-dieselization program and the energy transition agenda provide an opening to design inclusive models. For instance, vocational training for solar PV operation and maintenance or battery management systems could be tailored for women and youth. Community-based renewable energy enterprises, such as cooperatives for fish processing or solar-powered ice production, can also increase participation across demographics.

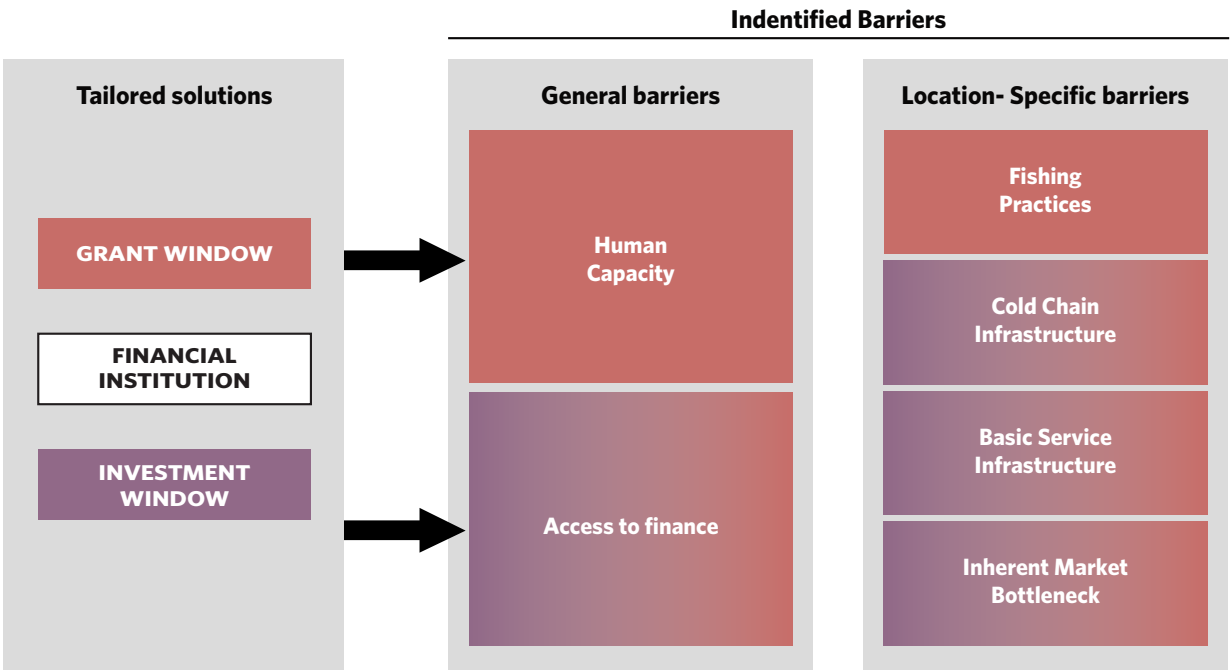
4. OPERATIONALIZING STANDARD 9 OF THE JETP JUST TRANSITION FRAMEWORK—CASE STUDIES FROM MALUKU

This chapter outlines strategies proposed for energy transition stakeholders, including government, philanthropies, and development partners, to operationalize Standard 9 of the JETP Just Transition Framework, focusing specifically on Air Buaya and Pasir Putih villages in Maluku. Operationalization goes beyond simply replacing diesel with renewable energy; it ensures economic diversification, workforce resilience, and community empowerment.

CRUCIAL ROLE OF FINANCIAL INSTITUTIONS IN THE JUST TRANSITION

Financing is a crucial element in energy transitions, significantly influencing the success of just transition initiatives. Particularly in de-dieselization programs like those implemented in Air Buaya and productive-use-of-energy initiatives in Pasir Putih, financial institutions (FIs) play a central role in providing resources and reducing economic barriers. FIs not only provide essential funding but also create enabling financial frameworks that enable vulnerable communities to transition effectively and sustainably toward renewable energy and diversified economic opportunities. The figure below outlines specific roles that financial institutions can undertake in supporting a just transition tailored to the Maluku context.

Figure 8. Summary of potential support that can be provided by financial institutions to support just transition—Air Buaya and Pasir Putih Village cases



To effectively operationalize their role, FIs can:

- **Bridge Financial Gaps**: Introduce risk-sharing financial instruments and collateral waivers to enable affordable and accessible financing for renewable energy and productive-use projects.
- **Support Critical Infrastructure:** Allocate targeted funding toward key infrastructure such as solar-powered ice makers, cold storage facilities, and fishing equipment, thus enhancing operational efficiency and market competitiveness.
- **Build Human Capacity:** Provide technical assistance and structured training programs for fishermen, fisheries MSMEs, and local cooperatives, empowering them with the skills needed to sustain and optimize new technologies and economic activities.

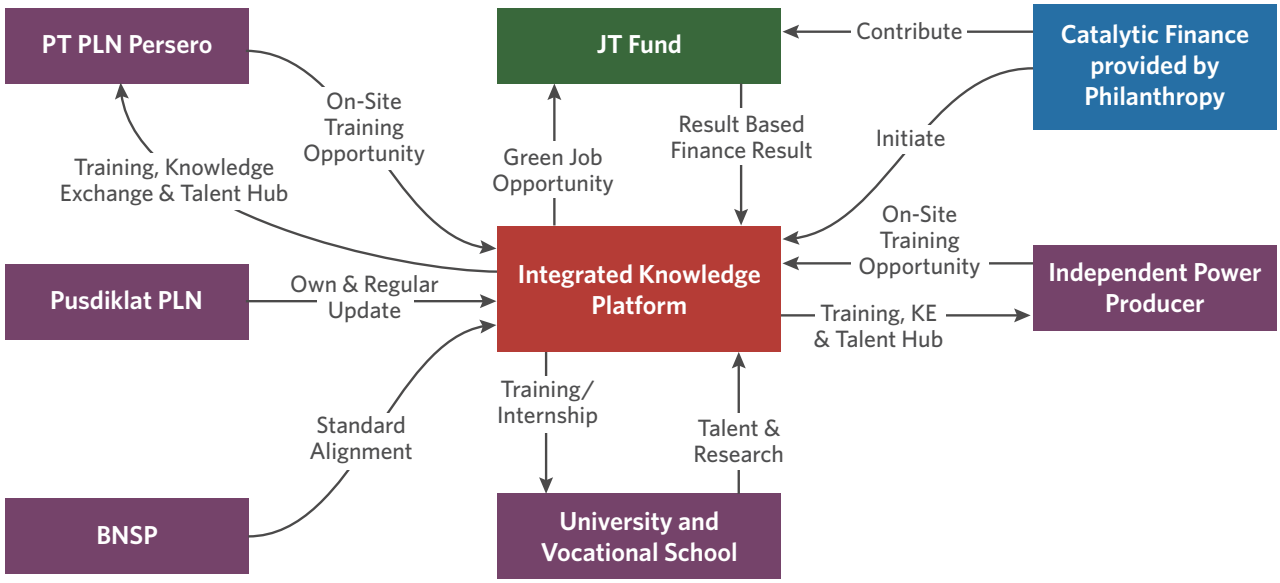
In the next subsections, we propose an operational arrangement demonstrating how Standard 9 can be realized, in the case of the de-dieselization of PLTD Air Buaya and Pasir Putih Village, outlining roles for financial institutions, including philanthropic entities.

AIR BUAYA: A JUST TRANSITION FOR THE WORKFORCE

The transition from diesel-based power generation in Air Buaya to renewable energy sources, particularly solar PV systems, presents both significant challenges and opportunities—especially in workforce management. Currently, the diesel power plant employs approximately 18 residents, primarily on a contractual basis in roles such as machinery operation and general support. While the shift to renewable energy may lead to job displacement, it also creates opportunities for upskilling, re-employment, and long-term workforce resilience.

To address these dynamics and promote a scalable employment strategy, we propose the development of a Self-Sustaining Workforce Transition Model. This initiative would leverage and expand existing training and certification platforms to create an integrated, accessible, and adaptive knowledge ecosystem.

Figure 9. Envisioned arrangement of a self-sustaining knowledge platform for workforce transition



The proposed Integrated Knowledge Platform is designed as a centralized, long-term mechanism to support the development of a skilled labor force for renewable energy deployment. Aligned with national certification standards set by BNSP (*Badan Nasional Sertifikasi Profesi/ National Professional Certification Agency*), the platform would ensure that professionals are formally recognized for their competencies. The platform would be administered primarily by PLN, with participation from Independent Power Producers (IPPs) through structured collaboration agreements. Under these arrangements, IPPs could open their facilities for training purposes, benefiting both their own personnel and external trainees, such as vocational school students and university interns.

Beyond workforce development, the proposed platform is also intended to serve as a hub for applied research and academic-industry collaboration. Universities and vocational institutions could conduct research using real-world data and scenarios provided through the platform. This collaboration could identify technical gaps, improve system performance, and innovate training approaches. In return, PLN and IPPs gain access to practical insights and advanced methodologies that enhance operational efficiency.

To ensure the platform's long-term viability, a Just Transition (JT) Fund is proposed. This fund would employ performance-based financing mechanisms, linking financial support to clearly defined outcomes, such as job creation, skills development, and increased renewable energy penetration. As the platform demonstrates measurable impacts, funding could be progressively allocated to expand research infrastructure, refine training content, and improve stakeholder engagement. Over time, this model is expected to evolve from donor dependence to an industry-led, results-based financing framework, ensuring institutional sustainability and alignment with national energy transition goals.

The following figure outlines the proposed step-by-step process for developing the Self-Sustaining Workforce Transition Model.

Figure 10. Step by step to the self-sustain model

	PHASE 1 **Pilot Implementation (Year 1)**	PHASE 2 **Expansion & Institutional Integration (Year 2 – 3)**	PHASE 3 **Institutionalized & Self-Sustaining Model (Year 4 – 5)**
OBJECTIVE	**Launch the knowledge platform, conduct pilot training, and test feasibility**	**Expand training, integrate with universities, and involve Independent Power Producers (IPPs)**	**Achieve full institutionalization of the platform with sustainable funding and industry adoption**
ACTIVITIES	• Align and refine PLN's hybrid lower plant training modules with BNSP standards • Conduct pilot training • Develop and test a prototype knowledge platform • Initiate research collaborations with universities	• Scale training beyond Air Buaya to other PLN training centers • Formalize university partnerships for joint research and curriculum integration • Enable IPP collaboration to provide on-site internships • Establish impact monitoring & evaluation	• Establish a Just Transition Fund (JT Fund) for performance-based financing • Scale nationwide integration of the knowledge platform in PLN's workforce training • Strengthen research collaboration between universities and PLN • Define a structured engagement model for IPPs to access trained personnel
FUNDING SOURCE	• Catalytic Support/ philanthropy (Grant) • PLN (In-Kind Contribution)	• PLN (Corporate Budget) • Catalytic Support/ Philanthropy (Catalytic Grant) – Platform scaling support • IPPs (Private Contribution)	• PLN (Corporate Budget) • JT Fund (Performance-Based Financing) • IPPs (Industry Contribution)
NEW STAKEHOLDER	• PLN Air Buaya staff • BNSP (certification) • Selected universities/ vocational schools (knowledge-sharing)	• Independent Power Producers (IPPs) (workforce pipeline) • Universities (applied research & curriculum support)	• International donors, foundations and other financing institution (commercials and non-commercials)

PASIR PUTIH: CATALYZING LOCAL ECONOMIC TRANSFORMATION THROUGH RENEWABLE ENERGY

The primary economic challenge in Pasir Putih is an inadequate power supply and cold-chain infrastructure, which severely limit the productivity and profitability of the local fisheries sector. Addressing this constraint through renewable energy-driven solutions, specifically solar-powered cold-chain systems, presents both socioeconomic and investment opportunities. To unlock these opportunities sustainably, we propose a phased operationalization strategy, beginning with philanthropic catalytic grants and gradually transitioning to market-driven financial mechanisms.

The approach for Pasir Putih is structured into three clearly defined phases—catalytic grants, derisking instruments for high-risk areas, and those for moderate-risk areas—designed to progressively transition the local fisheries economy from donor dependence toward market-oriented financial sustainability.

Figure 11. Resource mobilization plan to create market attractiveness in the fishery sector

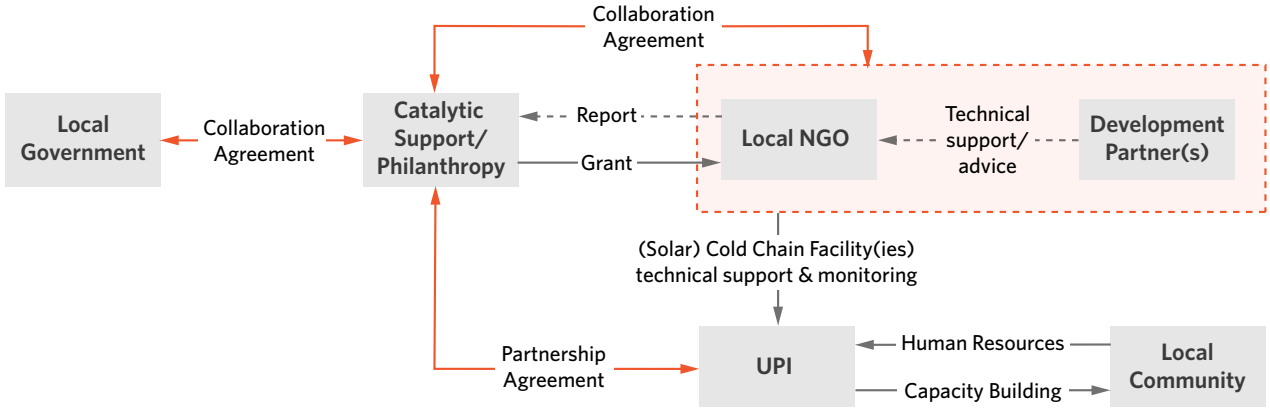
	Phase 1: Grant Implementation period: 2025-2026	**Phase 2: High Derisking** Implementation period: 2027-2028	**Phase 3: Moderate Derisking** Implementation period: 2029
OBJECTIVE	Assessing the economic and social value, scalability of cold chain facilities and builds a foundation for future private sector involvement and further financing support	Mobilize private sector and financial institutions (FIs) to invest in cold chain infrastructure by sharing financial risks.	Establish a self-sustaining model where financial institutions finance cold chain infrastructure with minimal Catalytic Support/Philanthropy support on financial de-risking.
KEY STAKEHOLDER	**Local NGO**: Acts as the anchor, channeling Catalytic Support/ Philanthropy's grant to UPIs/ cooperatives and overseeing implementation standards and reporting. **Development Partner(s)**: Provides technical support and helps set up infrastructure standards. **UPI**: Receives infrastructure and is responsible for providing land, operation, maintenance, and engaging the local community for training.	**Local NGO**: Monitors UPI compliance with operational and community standards (non-financial oversight). **FI/Banks**: Provide loans to UPI for cold chain infrastructure, supported by Catalytic Support/ Philanthropy's financial risk instruments. **Development Partner(s)**: Offers technical support, conducting feasibility studies and ensuring infrastructure quality. **UPI**: Primary borrower, responsible for infrastructure operation and community engagement*.	**Local NGO**: Monitors UPI compliance with operational and community standards (non-financial oversight). **FI/Banks**: Provide loans to UPI for cold chain infrastructure, supported by Catalytic Support/ Philanthropy's financial risk instruments. **Development Partner(s)**: Offers technical support, conducting feasibility studies and ensuring infrastructure quality. **UPI**: Primary borrower, responsible for infrastructure operation and community engagement*.
BUSINESS MODEL	Catalytic Support/ Philanthropy provides a 100% grant through the NGO, which then channels funds to UPIs/cooperatives. The NGO and Development Partner(s) ensure infrastructure standards are met, while UPIs/cooperatives provide land for the granted facilities, manage operations, gradually involving the community in maintenance.	Catalytic Support/ Philanthropy provides higher-risk instruments (e.g., first loss guarantee, cash collateral waiver) to reduce lender risk and incentivize financing. The UPI/ cooperative borrows from FIs, operates the infrastructure, and trains community members. The NGO supports oversight and community alignment, while Development Partner(s) maintains a technical advisory role to ensure quality	Catalytic Support/ Philanthropy introduces moderate-risk instruments (e.g., interest subsidy) to maintain bank confidence while reducing its own exposure. The NGO's role reduces to an advisory function if needed, while Development Partner(s) support is on an as-needed basis. UPIs manage full operational and financial responsibilities, engaging the community for capacity development aspect.

Note: UPI = Unit Pengolahan Ikan/Fish Processing Unit

Phase 1: Grant (2025-2026)

The initial phase focuses on **grant-based support** to demonstrate the economic and social value of cold-chain infrastructure in the fisheries sector. This approach showcases the sector's potential and builds confidence among private sector actors and financial institutions. A two-year implementation period is considered appropriate not only for executing the intervention but also for demonstrating measurable progress and results that can serve as proof of concept for subsequent financing phases.

Figure 12. Grant window arrangement in Phase 1



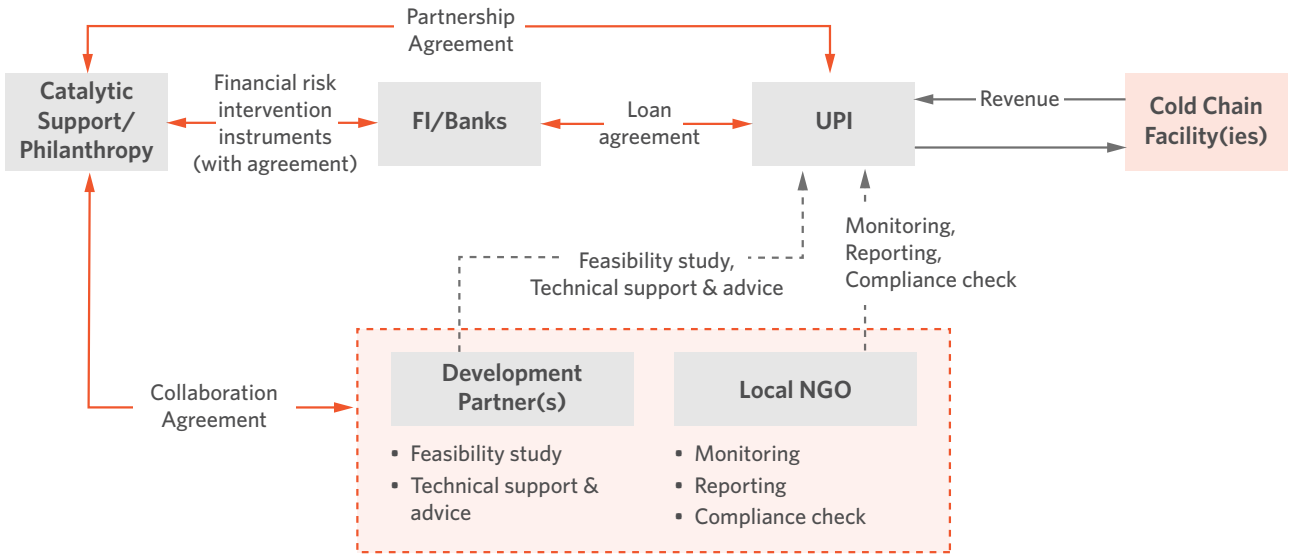
Phase 2: High Derisking (2027-2028)

In Phase 2, leveraging the results of Phase 1, CATALYTIC SUPPORT/PHILANTHROPY will introduce derisking instruments for higher risks, such as first-loss guarantees and cash-collateral **waivers, to incentivize banks to finance cold-chain** facilities. This phase is designed to **mobilize private capital** and establish initial lending models, bridging the gap between grant reliance and market-based financing. The two-year duration provides sufficient time to validate the risk-sharing approach and demonstrate financial viability to stakeholders.

Phase 3: Moderate Derisking (2029)

The final phase transitions toward a **self-sustaining model** with reduced financial exposure for catalytic support that may be sourced from the philanthropies. **Moderate-risk instruments**, such as **interest subsidies** and **partial credit guarantees**, will be introduced to maintain lender confidence while minimizing catalytic support/philanthropy's role. Financial institutions are expected to independently finance cold-chain infrastructure, with catalytic support/ philanthropy's involvement limited to advisory or on-demand technical support. This phase marks the gradual reduction of catalytic support/ philanthropy's risk-bearing role while ensuring long-term financing sustainability.

Figure 13. Phase 2 and 3 investment arrangement

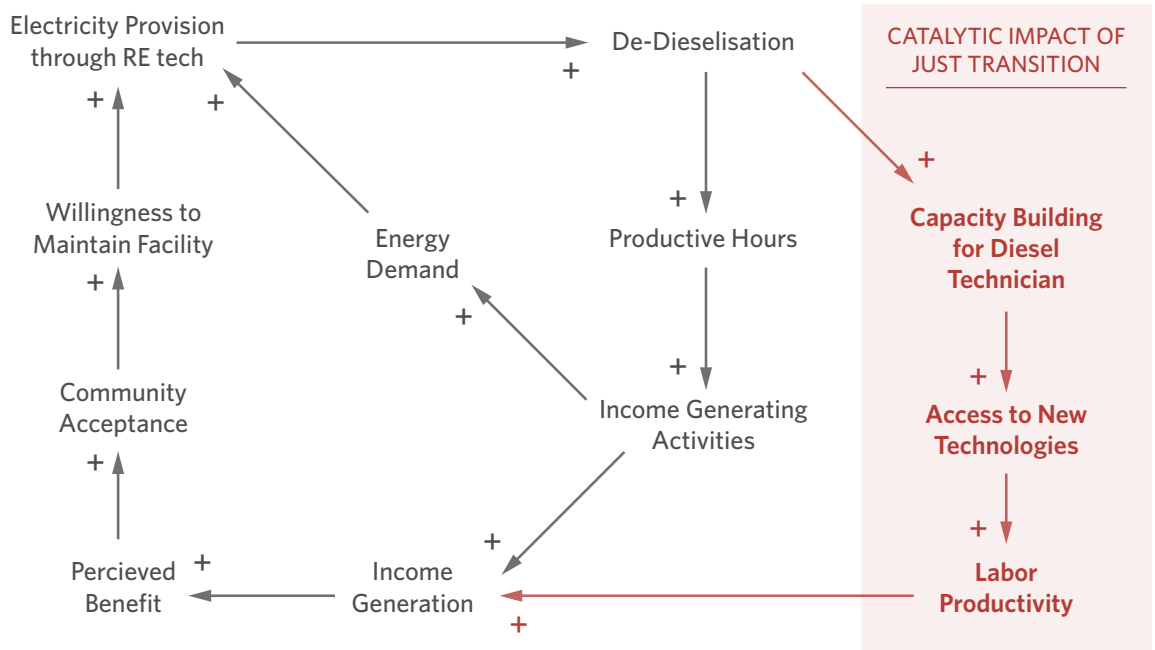


5. CONCLUSION: UNLOCKING INCLUSIVE GROWTH THROUGH JUST TRANSITION OPERATIONALIZATION

The Air Buaya and Pasir Putih case studies illustrate how Standard 9 can be translated into structured operational arrangements that address both workforce resilience and local economic revitalization. By aligning workforce retraining with renewable energy deployment in Air Buaya and mobilizing phased financing for productive-use infrastructure in Pasir Putih, the proposed approaches demonstrate measurable pathways to mitigate transition risks and unlock economic potential.

These arrangements also catalyze broader renewable energy adoption. By improving labor productivity, enabling access to new technologies, and fostering perceived local benefit, just transition interventions create the socioeconomic conditions necessary for long-term renewable energy investment and sustainability.

Figure 14. Catalytic impact of just transition (red variables). How just transition can foster community acceptance and create an enabling environment for re-adoption through skilled labor



Over time, these interlinked effects can build community acceptance, reduce system-level resistance, and strengthen demand for decentralized energy services—key preconditions for renewable energy market expansion. The strategic use of grant-based de-risking, integrated training platforms, and performance-linked financing offers a scalable model that aligns economic inclusion with energy transition goals.

These findings highlight the importance of embedding just transition (JT) as an enabling pillar—not only to protect livelihoods, but to accelerate the viability and diffusion of clean energy solutions across Indonesia's de-dieselization landscape. This leads to redefining the JT investment needs to account for both costs and the opportunities unlocked through economic diversification and the productive use of energy, making it a key factor in future economic transformation.

When mainstreamed, JT brings catalytic impact, including enhanced community acceptance, enabled access to new technologies, and increased labor productivity. Over time, this interconnected system facilitates the broader adoption and sustainability of renewable energy technologies. Facilitating transactions that internalize future opportunities, such as bundling the transaction with capacity building or reinvesting proceeds to empower the affected community, can present a compelling investment case. Tailoring these approaches to the local context is paramount to ensuring their success.

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