

Solar panels and wind turbines generating renewable energy for green and sustainable future. @ WWF US

JUNE 2025

ACKNOWLEDGEMENTS

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Climate Solutions Partnership

Climate Solutions Partnership (CSP) is a five-year philanthropic collaboration between HSBC, WWF, and WRI, which aims to scale up climate innovation ventures and nature-based solutions, remove deforestation from palm oil supply chains, and increase sustainable production and consumption, while helping the energy sector transition towards renewables in Asia.





CONTENTS

TABLE OF FIGURES	04
ACRONYMS	05
INTRODUCTION	08
INDIA CASE STUDY 1: ENERGY TRANSITION IN THE DAIRY COLD CHAIN • PROBLEM STATEMENT • THE INITIATIVE • IMPACT CREATED • FEEDBACK FROM THE BENEFICIARIES • KEY LEARNINGS AND WAY FORWARD	10 12 12 12 13 14 15
CASE STUDY 2: DECARBONIZING WATER TRANSPORT • PROBLEM STATEMENT • THE INITIATIVE • IMPACT CREATED • FEEDBACK FROM THE BENEFICIARIES • KEY LEARNINGS AND WAY FORWARD	16 16 16 17 18 18
INDONESIA Case Study 1: Biodiversity safeguard training Program with state electricity company	20 22
 PROBLEM STATEMENT THE INITIATIVE IMPACT CREATED FEEDBACK FROM THE BENEFICIARIES 	22 22 23 23
CASE STUDY 2: CAPACITY BUILDING WITH THE INDONESIA CHAMBER of commerce (kadin) and world resource institute and training with the financial service authority (ojk) • problem statement • The initiative	24 24 24
IMPACT CREATED FEEDBACK EDOM THE DENERICIADIES	26 26
FEEDBACK FROM THE BENEFICIARIES KEY LEARNINGS AND WAY FORWARD	20 27
VIET NAM Case Study 1: An energy transition for a 1.5-degree World: Accel Frating progress in Asia	28 30
 PROBLEM STATEMENT THE INITIATIVE IMPACT CREATED FEEDBACK FROM THE BENEFICIARIES KEY LEARNINGS AND WAY FORWARD 	30 30 31 32 32
OVERALL LEARNINGS	34
WAY FORWARD	35

TABLE OF FIGURES

Figure 1:Pillars of JET	07
Figure 2: Impacts created by the project.	12
Figure 3: women's self-help groups	13
Figure 4: Dairy Farmers	13
Figure 5: Statistics of states with the highest cold storage facilities in India	14
Figure 6: E-ferry boat driver and commuters	16
Figure 7: Impacts created by the initiative	16
Figure 8: Commuters on e-ferry	17
Figure 9: Training session for PT PLN	22
Figure 10: Participants in the PT-PLN training	22
Figure 11: Key learnings of the project	22
Figure 12: Training session with kadin	24
Figure 13: Training session at OJK	24
Figure 14: Learnings imparted to financial institutions	25
Figure 15: Survey of the training – Meeting the expectation	26
Figure 16: Survey of the training – relevance of the course	26
Figure 17: Feedback from OJK-WWF Capacity building participants	26
Figure 18: Training provided in Tay Ninh Province	30
Figure 19: Participants in energy management training	30
Figure 20: Impacts of the initiative	30
Figure 21: Key Learnings	33





ACRONYMS

AJET: Alliance for a Just Energy Transformation BMC: Bulk Milk Chiller CAP: Corporate Assistance Program CSP: Climate Solution Partnership CSP ET: Climate Solutions Partnership Energy Transition DOIT: Department of Industry and Trade DRE: Distributed Renewable Energy ET: Energy Transition EMS: Energy Management System ESMS: Environmental and Social Management System **FIs: Financial Institutions** GHG: Greenhouse Gas HP: Horsepower HSBC: Hongkong and Shanghai Banking Corporation IEA: International Energy Agency IMC: Instant Milk Chiller IBCSD: Indonesia Business Council for Sustainable Development JET: Just Energy Transformation KADIN:Kamar Dagang dan Industri Indonesia MoU: Memorandum of Understanding MOIT: Ministry of Industry and Trade NPSDE: National Policy on Skill Development and Entrepreneurship NDC: Nationally Determined Contributions OJK: Otoritas Jasa Keuangan PT PLN: PT Perusahaan Listrik Negara PMKVY: Pradhan Mantri Kaushal Vikas Yojana PLI: Production Linked Incentive SBT: Science-based Targets SHGs: Self-Help Groups **TESDA:** Technical Education and Skills Development Authority **UNDP: United Nations Development Program** WRI: World Resources Institute WWF: World Wide Fund for Nature

FOREWORD

Burning coal, oil, and gas for energy leads to 90% of global carbon dioxide emissions. These fossil fuels are the main drivers of global warming and the negative impacts of climate change that are increasingly felt every day in every corner of the world. The urgency for rapid energy transitions across the globe to minimize emissions and associated climate change, and the destruction of nature, is undeniable. This is why WWF works with regional, national, and global partners to accelerate energy transitions to contribute to the 1.5°C goal of the Paris Agreement.

WWF's Global Energy Framework outlines the path to achieving 100% renewables through faster, greener, and fairer action. WWF is uniquely positioned to help motivate the global energy transformation (consisting of many local transitions worldwide) that we need, by prioritizing the reversal of biodiversity loss while achieving just and resilient development for all.

Alliance for a Just Energy Transformation (AJET) is an inclusive, voluntary initiative launched by WWF, UNDP, and KPMG that aims to catalyze a shared understanding, and drive action to transform the energy system. The Alliance helps advance inclusive, people-centered dialogue with communities, civil society, policymakers, and the private sector to find common ground and to ensure this critical energy transformation is just and sustainable.

One focus for the AJET is the skilling and re-skilling of workers currently involved with the extraction of fossil fuels and associated supply chains so that the energy transition is an opportunity rather than a threat to their livelihoods.

Climate Solutions Partnership Energy Transition, a programme implemented by WWF together with HSBC and WRI, includes influential projects with an energy transition focus in Asia that help to scale up the use of renewable energy whilst ensuring a just transition for those involved. Affordability is a key constraint; the energy solutions demonstrated must not impose disproportionate costs on those least able to bear them. On this basis, the WWF offices in India, Indonesia, and Viet Nam have worked with communities, corporates, suppliers, financial institutions, and government bodies to facilitate energy transition and build awareness of the need to adopt clean energy solutions.

This report highlights the efforts of WWF teams and partners devoted to skilling, capacity building, and awareness creation that motivate the adoption of clean energy alternatives. The practical case studies in this report demonstrate potential solutions that can lead to significant emissions reductions and a just transition for those involved.

Dean Cooper Global Energy Lead, WWF

INTRODUCTION

The global energy system needs to urgently transition The global energy system needs to transition from fossil fuels (coal, oil, and gas) to clean energy solutions to reduce carbon emissions. Sustainable energy transitions offer a massive opportunity for social justice and for achieving climate development goals. But this shift requires energy transitions to be people-centered, renewable, nature-based, equitable, and inclusive, contributing to a global, just energy system transformation. WWF defines Just Energy Transformation as systemic changes - delivered through energy transitions - needed in the energy sector to simultaneously deliver on climate targets and sustainable development goals to achieve a more equitable, sustainable, and climate-safe world¹.

The International Renewable Energy Agency's World Energy Transitions Outlook 2024 report reveals that to achieve the crucial 1.5°C climate target established at COP21, the world needs over 11,000+ gigawatts of renewable energy capacity and an investment of USD 31.5 trillion between 2024 and 2030². This estimate presents the urgent need to work towards a multi-dimensional effort, including enhancing infrastructure, creating robust legal frameworks, ensuring access to finance, and developing a skilled workforce.

The current energy transition across diverse sectors and decarbonization efforts are leading to significant changes in employment. (The global demand for workers with green skills, or green talent, rose by 11.6% over the last year, whereas the supply of such workers only rose by 5.6%³). Many traditional jobs will experience a substantial decline, and the demand for energy technicians, energy auditors, sustainability specialists, specialized energy experts, circularity experts, and more skilled laborers working for climate change will grow.

To address the current energy transition needs, the world requires a paradigm shift in the current workforce and the development of specialized skill sets. According to the International Energy Agency (IEA), clean energy employs over 50% of the total energy workforce, with half of this employment concentrated in the Asia Pacific region. The IEA's pathway to net-zero emissions estimates that the energy transition will create an estimated 30 million⁴ jobs by 2050. Scaling energy transition needs the right skill sets, like technical understanding of operating new technologies and expertise in the installation and implementation

- 1. https://wwfeu.awsassets.panda.org/downloads/wwf_discussion_paper__just_energy_ transformation.pdf
- 2. World Energy Transitions Outlook 2024
- 3. How Many Jobs Are Being Created in the Green Economy? LinkedIn's New Report Has The Answers Earth Day
- 4. wwf_discussion_paper___just_energy_transformation.pdf
- 5. wwf_discussion_paper__just_energy_transformation.pdf

of high-value renewable and energy-efficient projects. Additionally, industrial requirements are also rapidly changing, and it is important to build the capacities of staff, labor forces, and senior professionals on topics ranging from Energy Management Systems (EMS), Green Technologies, to sustainability practices and more. Energy Transition is built on three important pillars, namely:⁵

Economic and Social Policy: Policies have a foundational role to play; they incentivize and prioritize sustainable energy transitions by setting up a favorable environment for socially fair investments in renewables, energy efficiency, and sustainable development support, independent of GDP and growth concerns

Biodiversity and conservation: Protecting natural biodiversity and wildlife is vital for JET; it also ensures that local and Indigenous communities are integrated into the energy transition decision and investments.

International corporation and finance: Collaborations among countries and institutions play an important role in ET, as they foster great growth and development over time. This also helps in achieving energy goals and obligations and provides a bigger and better platform for resource pools like human capital, technology, finances, infrastructure, etc.



The future growth in energy transition is closely correlated with skill development. Many governments are in the process of redefining their renewable energy goals, aligning it with required skills and training programs.

To drive the change and mobilize stakeholders worldwide towards Just Energy Transformation policies, WWF, UNDP, and KPMG launched The Alliance for a Just Energy Transformation (AJET), a voluntary initiative that aims to identify and address the gaps in the ET framework through policy and regulatory measures, considering national and sectoral contexts. AJET aims to ensure energy transitions are successfully implemented by putting nature, communities, workers, and all people at the center, leaving no one behind. This involves understanding the needs of the stakeholders currently engaged in fossil fuel supply chains and guiding them to transition to renewable energy alternatives. These local transitions will together form a global transformation, with common principles including climate justice, international cooperation, equitable social and economic policies, community and environmental resilience, and access to finance. It helps to advance inclusive, people-centered dialogue with key stakeholders and ensure the transformation is just and sustainable.

Just Transition is relevant across all sectors. However, its application in the context of the energy transition has the potential to facilitate a rapid transition to sustainable climate neutrality. It impacts people differently, varying from region to region, country to country, and community to community. Hence, just transitions must contribute to a broader, nature-positive transformation of society based on a fairer and sustainable system that is applied at all levels, from local to global. The Climate Solutions Partnership, a five-year philanthropy collaboration between WWF, HSBC, and WRI, along with a global network of local partners, aims to scale up innovative climate solutions. The Energy Transition pillar of the Climate Solutions Partnership (CSP-ET) aims to accelerate a fair and affordable transition to a resilient, net-zero economy in China, India, Indonesia, and Viet Nam by removing barriers and incentivizing renewables and energy efficiency technologies.

WWF has engaged KPMG to support the development of case studies from Climate Solutions Partnership Energy Transition Asia offices to highlight the role of skills training and capacity building in driving Just Energy Transformation. The project involves developing a roadmap for skills development essential to accelerating the energy transformation in Asia, with a focus on the dairy and water transport sector in India, the textile sector in Viet Nam and Indonesia, and Government stakeholders, including PLN in Indonesia.

This case study report highlights the impact of the skill and capacity development programs from CSP-ET to enhance knowledge and awareness about clean energy adoption and its transformative impact on communities and corporations. The case studies highlight the impact on the environment and social and economic status of the beneficiaries through these capacity building and technical skill trainings. This report also analyzes feedback and consultations from the beneficiary groups to assess the advantages and gaps of the capacity-building sessions and identify areas for improvement. Lastly, this report also covers the way forward to enhance and amplify these projects on a larger level with the help of multiple stakeholders in government, the public, and society and serves as the basis for the roadmap strategy document for skills development in the respective countries.



INDIA

India is one of the world's largest and fastest-growing economies and requires a massive inflow of energy to meet the growing demand. Coal and oil have so far served as the bedrock of India's industrial growth and modernization, offering access to modern energy services to Indian citizens. Light consite

However, with growing awareness of energy efficiency and a reduction in reliance on fossil fuels, the country is moving towards a greener economy, and the transition to clean energy presents a significant economic opportunity. As of 2023, India's 176 gigawatts⁶ Installed renewable energy capacity makes it the fourth-leading nation in renewable power capacity worldwide. It is well-placed to become a global leader in renewable energy, particularly green batteries and green hydrogen. These and other low-carbon approaches can potentially create a market worth up to \$80 billion⁷. To meet climate change goals, the country announced its aim to achieve net zero emissions by 2070 and meet 50% of its energy requirement from renewable sources by 2030, installing 500 GW of renewable energy capacity, reducing the emissions intensity of its economy by 45%, and reducing a billion tons of CO2⁸.

6. Renewable energy in India - statistics & facts | Statista

India's clean energy transition is rapidly underway, benefiting the entire world – Analysis - IEA
 India's clean energy transition is rapidly underway, benefiting the entire world – Analysis - IEA

Trends in energy transition

India aims to achieve 500 GW of renewable capacity by 2030 with solar, wind, and hydroelectric power. As of 2024, the installed capacity is 203 GW of energy based on nonfossil fuel, including 92 GW from solar, 47 GW from wind, and 51 GW from hydropower. India is focusing on largescale renewable energy parks, offshore wind installations, and hybrid projects to meet the climate target goals. Programs like the National Solar Mission, Production Linked Incentive (PLI) Scheme, Green Energy Corridor, National Electricity Plan, and Pradhanmantri Suryodaya Yojana⁹, Distributed Renewable Energy (DRE), such as mini solar grids, offer great potential for clean energy in rural areas. The government has initiated several notable initiatives to promote green energy.

Despite all these initiatives, numerous challenges hinder the progress of transition. These include lack of investments, grid integration and transmission infrastructure limitations, land acquisition, heavy reliance on fossils, and other infrastructural challenges¹⁰. However, India's climate change commitment has been a great motivation for reducing the consumption of fossil fuels and adopting green energy in the long run.

Skill development for green jobs

In recent years, India has demonstrated a strong commitment to skills development and increasing the number of women in the workforce, especially in the energy transition sector. In the Union budget of FY 2024-25, a comprehensive strategy to achieve 'Viksit Bharat' has been outlined¹¹. The country has launched various schemes and policies, such as the National Policy on Skill Development and Entrepreneurship (NPSDE), Pradhan Mantri Kaushal Vikas Yojana (PMKVY), PM Surya Ghar, PLI schemes for solar PV modules, and Green Energy Corridors Focus on Green Hydrogen and PM Vishwakarma, to upskill current and upcoming generations. However, there is still a need for better outreach of these programs, especially in rural areas, and initiatives that can better align the required skills for green jobs in the country.

Climate Solutions Partnership- Energy Transition in India

The Climate Solutions Partnership Energy Transition in India demonstrates a portfolio of renewable energy solutions to decarbonize the dairy value chain across states (Gujarat, Karnataka, Maharashtra, Rajasthan, and Uttar Pradesh) and improve mobility in the islands of Sundarbans (West Bengal). The initiatives have created a positive impact on rural livelihoods in Indian states and have empowered women in these sectors. The section below briefly presents two programs in India under CSP.

 National Portal for Rooftop Solar - Ministry of New and Renewable Energy 10.Energy transition_India's journey to net zero 11.Press Release: Press Information Bureau

JUST ENERGY TRANSITION IN ASIA: CASE STUDIES FROM INDIA, INDONESIA AND VIET NAM'



CASE STUDY 1

Energy Transition in the Dairy Cold Chain



PROBLEM STATEMENT

India is the largest milk producer globally¹². In the FY 2023-24, the milk produced was 239.3 million tons¹³. For milk collection, there are milk collection centers in districts that collect quantities of milk in a 20-40 liters tin container from small dairy farmers and villagers and store it in a bulk milk chiller (BMC) of larger capacity, typically 1,000-2,000 liters, for 3-4 hours to chill the raw milk. Once the milk's temperature is cooled down to up to 4 degrees, it is further transferred to the milk processing centers in trucks with a higher capacity of ~10,000 liters. Ninety-five percent of the total milk comes from small dairy farms with a herd size of 1-5 cows or buffaloes¹⁴.

However, one of the most common challenges this sector faces is that most dairy farmers do not possess adequate financial stability to install the chilling capacity at their dairy farms. They rely on conventional methods to store and preserve the milk, which increases the usage of electricity, resulting in high operating costs. This problem further leads to inconsistent milk supply and irregular income for dairy farmers. Additionally, due to the erratic power supply and high electricity demand for running chillers, collection centers heavily rely on diesel generator sets (DGs), which increase their operating costs and also release emissions into the environment.

THE INITIATIVE

WWF India, under its Climate Solutions Partnerships (CSP) initiative for Energy Transformation, aims to reduce reliance on non-renewable sources and facilitate energy transformation in the rural dairy cold chain sector of India. The project aims to provide productive clean energy solutions to rural communities in India by decarbonizing the milk value chain. This initiative began in 2021 with 100% sponsorship from HSBC India, and by early 2025, it is expected to be successfully ongoing in five Indian states: Gujarat, Karnataka, Maharashtra, Rajasthan, and Uttar Pradesh.

Initially, the project started in Uttar Pradesh and Rajasthan; however, with its initial success and positive impact, it has now expanded to Gujarat, Karnataka, and Maharashtra. WWF-India is collaborating closely with Farmer-Producer Organizations (FPOs), dairy cooperatives, local rural milk collection centers, and dairy farmers (14 Dairies/Dairy cooperatives/FPO across five states) to build capacity and generate awareness about reliable renewable (solar) energy

13. Milk Production in India | nddb.coop

^{12.} Accelerating the Dairy Cold Chain's Transition to Renewable Energy

^{14.} Accelerating the Dairy Cold Chain's Transition to Renewable Energy

that can be utilized to run milk chillers in place of diesel. In addition to theoretical knowledge, the dairy farmers and workers at collection centers were also provided with technical know-how to operate solar-induced milk chillers. Under this initiative, a total of 50 IMCs were installed in these states.

These IMCs (Instant Milk Chillers) come in different capacities, each tailored to the chiller's specific solar power requirements. These are installed at selected milk centers in the respective districts. These collection centers operate under dairy cooperatives/FPOs and are responsible for collecting milk from nearby dairy farmers and storing it at the required temperature until it is further transported further up the supply chain. These chillers operate through solar power and rapidly cool the milk using a thermal converter (from 35 to 7 degrees). It is connected with the Bulk Milk Chillers through a pipe, where milk is stored and collected, and further, it is cooled down from 7 to 4 degrees to reduce bacterial growth and preserve the quality. Additionally, IMC comes with 24-hour backup, which reduces the heavy usage of diesel during times of electricity shortage. In addition to theoretical knowledge, the dairy farmers and workers at collection centers were also provided with:

- Understanding of the process involved in the new technology.
- Understanding of the technical know-how to operate solar-induced milk chillers.
- Awareness of the cost savings with the help of solar energy.
- Awareness to improve the quality of the milk.
- Ease of operations for women to run collection centers.

IMPACT CREATED

This project has created a threefold positive impact on the environment, economic, and social status in the rural areas of the respective states.

Skill enhancement: This initiative includes in-person training sessions and awareness campaigns that have empowered dairy farmers and workers to learn about the latest clean energy technologies in dairy farming. These technologies eliminate the need for diesel consumption and reduce carbon emissions. The training also empowered women and made them self-reliant in the dairy business. The learning module also covered the operation and maintenance of the machines. The workers in the collection units are adequately trained and provided with technical skills to operate the IMCs. However, one of the most significant advantages of this technology is that it is very easy to operate. This solution has multiple benefits, which were highlighted by the dairy farmers.

This initiative has helped around 10,000 beneficiaries who benefitted through capacity development programs and technology enhancement in the dairy cold chain business and livestock management. One of the most important objectives fulfilled through this initiative was that energy transformation in solar energy was made accessible to the rural population, and the locals benefitted through capacity development, which resulted in more (50¹⁵ new dairy farmers joined the Chota Udaipur milk collection center) employment and income opportunities.

Environment: Under this initiative, a total of 50 chillers are installed, out of which 49 are solarized (840 kW). The newly introduced IMCs in this program run on solar power, thereby saving large amounts of electricity and reducing emissions released into the atmosphere. In one of the dairy cooperatives of Vadodara (Gujarat), diesel consumption was reduced by 90-95%, which resulted in the reduction of approximately ten tons¹⁶ of carbon emissions per year. The cooperatives, with the support of IMCs, have also witnessed a reduction of more than 50% of their monthly electricity bills. As shown in the figure below, the potential savings have been calculated from the initiation of this project.



15.Data from field visit 16.Data from field visit

JUST ENERGY TRANSITION IN ASIA: CASE STUDIES FROM INDIA, INDONESIA AND VIET NAM'

Socio-economic: Most of these milk collection centers are run by women's self-help groups (SHGs), and this initiative has improved the income and livelihood of dairy farmers and supported women's empowerment. Previously, Bulk Milk Chillers used to take 4-6 hours to bring down the temperature of milk from 35 to 4 degrees; however, with instant milk chillers, the time is reduced to 2-3 hours, which helps in less bacteria formation, resulting in a reduction of milk spoilage and improving the quality of milk. In one of the collection centers in Vadodara, it was observed that before the IMC installation, there was spoilage of 1,000 liters of milk per month; however, post-IMC installation, the spoilage was almost zero due to efficient cooling. It has been observed that additional small dairy farmers, numbering approximately 50,000 in the Chota Udaipur center of Gujarat, have expressed interest in being included in the milk collection centers. The collection centers were able to save INR 24,000-25,000 (USD 280-290) per month of the operational cost through electricity bills.



Figure 3: women's self-help groups



Figure 4: Dairy Farmers

FEEDBACK FROM THE Beneficiaries

The project has positively impacted almost 10,000 beneficiaries, and the transition from non-renewable to renewable energy sources can be witnessed in these locations. Additionally, it has improved the operations of dairy farming in the rural areas.

In the section below, some testimonials are presented by the beneficiaries from the site visit in Chota Udaipur, Vadodara.

Dairy Cooperative Manager Chota Udaipur- Vadodara

"It has been five months since the instant milk chiller (IMC) was installed in this facility, and it has helped us to maintain the milk quality and reduce the energy bills. Now, we can save up to 24,000-25,000 INR (USD 280-292) per month on the electricity bill. It has also reduced the usage of diesel and grid electricity. Additionally, there has been no milk spoilage since the installation of IMC, which previously was 1,000-1,500 liters monthly. Post this installation, fifty new farmers have joined this cooperative. This unit serves 5,000 liters of milk daily.

One of the best parts of this initiative is that it does not require any specific skill or technical expertise to operate the machine; it is easy and simple to operate."

Dairy farmer one

"Previously, when there was no IMC installed, milk used to get spoiled very quickly, especially in the summer season, but now, that is not the case. The quality of the milk is much better than before, and we also get better rates than before."

Dairy farmer two

"There are more than four hundred farmers who all come and deposit their milk in this dairy cooperative. We all have benefitted from this initiative. The milk collection in this unit is professionally managed and preserved. We have also experienced that now we get better prices for the milk we deliver."

13

KEY LEARNINGS AND WAY Forward

Approximately eighty million people are currently employed directly in the Indian dairy sector. The top five states with the highest cold storage capacity are Uttar Pradesh (13.6 million MT), West Bengal (5.9 million MT), Gujarat (2.3 million MT), Punjab (2.0 million MT), and Andhra Pradesh (1.6 million MT)¹⁷. This initiative has enormous potential to expand and decarbonize the dairy farming experience in rural India. This CSP initiative can be scaled up in other states to enhance its impact on energy transition. However, from this initiative, it was observed that three major levers need to be explored to achieve the maximum potential of this project.



Figure 5: Statistics of states with the highest cold storage facilities in India

Infrastructure Development: To upscale this project, solarizing all the milk chillers currently operated through grid electricity/diesel is essential. The dairy sector is crucial to the Indian economic growth, contributing twenty-four%¹⁸ of total global milk production, and with over seventy-five million farms scattered across the country. In the overall energy consumption, thirty%¹⁹ of energy is consumed in the refrigeration and storage process in the dairy sector, which can be eliminated with the use of solar-induced energy-efficient cooling solutions. Hence, it is vital to decarbonize this sector.

17. India records 58% increase in Milk Production since 2013-14: Country accounts for 24% global milk production - IndiaTracker

18. doc202361208001.pdf

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Skill Development and regulatory frameworks:

Developing respective capacities and skills across the workforce is vital to accelerate decarbonization in this sector. The Indian power sector workforce is expected to reach 3.5 million²⁰ by 2050. As per the NDC plus scenario, the country is required to have 1,43,000 skilled experts and approximately 410,000 semi- and low-skilled technicians in the solar sector, and as per the Renewable Map Roadmap scenario the workforce required will be 2,50,000 skilled jobs and more than 850,000²¹ semi- and low-skilled technicians. Currently, the workforce in the dairy sector is not aware of the sustainable solutions and energy transformation opportunities in the sector. However, initiatives like CSP are designed and built to enhance awareness and knowledge in the dairy sector. The legal framework plays a crucial role in facilitating nationwide initiatives. To successfully scale up these efforts, it is essential for laws and policies to be aligned and to provide subsidies and incentives that encourage the private sector to integrate renewable energy into their operations. Currently, India is actively promoting schemes and policies to promote skill development in the energy sector, National Solar Mission, Green Hydrogen Mission, and Green Credit programs, like al-Urjamitra Skill Development Programme, Solar PV technician (Suryamita), PM-KUSUM, and (Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahaabhiyan) scheme. Additionally, the Skill Council for Green Jobs (SCGJ) was established in October 2015 to address skilled manpower requirements for emerging climate-resilient technologies. An autonomous institution, the Centre of Excellence for Dairy Skills in India, has also been established to upskill dairy farmers in technical skills, supply chain management, storage and maintenance, inventory management, and other essential areas, thereby upgrading their knowledge and enhancing their experience.

Multiple collaborations: Collaboration is essential for scaling up projects. Some key benefits of working together are resource sharing, extended reach, knowledge exchange, and increased impact. To advance this initiative, partnering with organizations focusing on energy transformation, such as other donor agencies, start-ups, communities, government agencies, etc., is essential. Such collaborations will extend the initiative's reach nationwide and significantly enhance its impact. Like in the above initiative, WWF collaborated with multiple stakeholders (dairy cooperatives, farmers, and women self-help groups) involved in the milk dairy to enhance the knowledge and technology upgrade for the locals, this also helps society to create new opportunities and raise their living standards. Additionally, it brings government support to amplify the program.

19. Energy and dairy in India: Opportunities in the context of demand | PPT 20. future.pdf

20. future.pdf

CASE STUDY 2

Decarbonizing Water Transport



PROBLEM STATEMENT

Sundarbans is known for its unique surroundings, which are formed by the confluence of the Ganga, Brahmaputra, and Meghna rivers. It is home to numerous species, rich biodiversity, and the world's largest mangrove delta. The tides and rivers greatly influence the inhabitants who live there, and they are dependent on the complex network of water sources to fulfill inter-island transport, as the formal public transport system does not connect to the remote islands Hence, they use non-standard and unsafe means of transport, such as ferry boats. These boats serve as lifelines for residents in the Sundarbans. However, the region's isolation, as well as its rough terrain, makes lastmile connectivity a huge challenge. Currently, ferry boats run on inefficient diesel engines, and due to unavailability and high costs, boat operators use a mix of diesel and kerosene to operate the boat's engines. This practice leads to the incomplete combustion of fossil fuels, resulting in air pollution. Additionally, there are leaks and spills of fuels leading to water pollution that further damages the entire ecosystem of the rivers and the species surrounding them.

THE INITIATIVE

WWF India, under the Climate Solutions Partnerships (CSP) initiative for Energy Transition, aims to create a portfolio of renewable energy solutions for mitigating carbon emissions as well as securing livelihood opportunities for vulnerable communities in the Sundarbans (West Bengal), reducing pollution and emissions caused by diesel and kerosene used for operating ferry boats and rickshaws.

To decarbonize the existing ferry boat systems, WWF initiated a pilot project to retrofit the existing motor with an electric propulsion unit and energy-efficient lithiumion battery pack, chargeable by solar energy. The engine comes with an 8Hp (6kW) electric outboard motor and a 96V-5.76kWh lithium-ion battery pack, making it feasible to run 10-14 hours a day. Additionally, it comes with a Bluetooth-enabled monitoring tool that displays the battery status, distance traveled, and route covered, among other information. The initiative began in 2023 with the retrofitting of one boat in West Bengal, with HSBC India covering the costs of the batteries and the construction of the charging station at Khetramohanpur in 2024.



Figure 6: E-ferry boat driver and commuters

IMPACT CREATED

This initiative has the potential to save 143.5 tons²² of carbon emissions annually if all forty-one boats across five forest blocks (Hingalganj, Gosaba, Basanti, Kultali, and Patharpratima) are retrofitted accordingly.

The first boat of 8.7 Horsepower (Hp) was retrofitted with a single cylinder in September 2023, and based on the positive results and impact, two more ferry boats of 15 Hp were converted in 2024, and in 2025, two patrol boats and one fishing boat were converted, respectively. The first three boats collectively reduced 21.14 tons (1.14 tons from the first ferry boat and twenty tons from the other two ferry boats) of carbon emissions annually²¹. The impact from patrol and fishing boats is still under consideration and will be made available after 6-8 months of the ongoing operation. Moreover, these battery engines help save up to 90-100% of diesel usage, daily savings of approximately INR 450 (resulting in daily savings of approximately USD 5). The initiative has been further supported in the following areas:

Capacity Development: This initiative collaborated with Multiple government stakeholders, including the Sundarbans Development Authority and the Environment Department, as well as Non-conventional Renewable Energy Sources (NRES), to adopt battery-operated ferries and support the community in their energy transition. This program reached out to several , encouraging them to adopt sustainable solutions rather than relying on fossil fuels.

Socio-economic: The initiative has supported the technological upgradation of the ferries, and with the retrofitted engines, it has helped in reducing the operational cost than the traditional engines, which used to run on diesel and kerosene; this eventually saves up to 7-10 liters of diesel daily. Additionally, with excessive

22. Electric Ferry Boat: WWF

JUST ENERGY TRANSITION IN ASIA: CASE STUDIES FROM INDIA, INDONESIA AND VIET NAM'

vibration of diesel pipes and wearing off wood, it needed constant maintenace of INR 30,000 to INR 50,000 (USD 351-585) annually. There were other miscellaneous charges of INR 1,000 (approximately USD 11.5) per day for the diesel engine, which has since been reduced to INR 200 (approximately USD 2) per day, resulting in an 80% savings. In the case of e-ferry, a commercial meter costs INR 54-60 per day (USD 0.63-0.70) for three batteries (two operating and one backup). Hence, the approximate current monthly operating cost for an electric ferry is 74% less than the earlier diesel engines.

The introduction of e-ferries has helped ferry owners save money and improve their day-to-day operations. Additionally, under this initiative, locals were trained to operate the respective technology and made aware of the potential benefits of the technology upgrade.

For local commuters, this initiative has overall improved their experiences by reducing smoke, noise, and heat from diesel motors. Previously, traditional engines generated excessive noise and smoke, which was disturbing to passengers. There have been instances where children were hurt due to overheated engines, and the previous installation of diesel pipes had limited the seating capacity on the ferries.

Environment: This initiative also has a profound impact on the environment; there is a substantial decrease in carbon emissions. The first three boats collectively reduced 21.14 tons (1.14 tons from the first ferry boat and 20 tons collectively from the other two ferry boats) of carbon emissions annually. Previously, due to diesel spillage in the water bodies and the gas emissions from burning diesel, the nearby flora and fauna were hugely impacted due to pollution; however, with the use of e-ferry engines, the adverse impact on the water bodies has been reduced.



FEEDBACK FROM THE Beneficiaries

This initiative has a three-fold (social, economic, and environmental) positive impact on residents, providing a better riding experience, low operational costs for ferry drivers, and improvements for the marine and aquatic life of the Sundarbans. Additionally, it a positive influence on the nearby ferry drivers, encouraging them to have their ferries converted.

The section below presents testimonials from the beneficiaries of the initiative:



Commuter 1:

"The experience of traveling has been improved, Previously, there used to be excessive noise and air pollution due to diesel engines, which caused lots of disturbances; now people can have better rides."

Commuter 2 :

"The e-ferry is a nice initiative and has a better seating capacity than previous diesel engines, where diesel pipes used to occupy lots of space."

Ferry driver:

"There has been a reduction in the operating cost of diesel and batteryoperated engines. On average, I can save 70-75% of the operating cost in a month. Additionally, it is easy to operate and manage, due to potential savings in the operating cost, there is an inclination in some other ferry drivers to get their boats retrofitted".



KEY LEARNINGS AND WAY Forward

As of January 23, 2025, there are a total of 1,915 ferry services in India, 1,878 (98.07%) being single-owner operations, while the remaining 37 (1.93%) are part of larger, more prominent brands²³. The top three states with the most ferry services are West Bengal (978), Kerala (327), and Assam (156). This CSP initiative can potentially reach all these operators, enhancing awareness and capacity regarding solar-based solutions in water transport. The initial target is to scale up this initiative and decarbonize the small ferry boats; however, after recording a successful impact, more ferries, patrol boats, and fishing boats were retrofitted with electric engines. WWF India is collaborating and aligning itself with various government organizations, including the West Bengal Forest Department, West Bengal Pollution Control Board, Sundarbans Development Board, Department of Non-conventional and Renewable Energy Sources, and WBREDA, to further expand its efforts in other areas.



Figure 8: Commuters on e-ferry

Increase in awareness and knowledge: Moving forward with this initiative, there is a requirement for enhanced awareness and knowledge sessions. Currently, local commuters and villagers have mixed reviews about e-ferries, as there is no difference in fare prices or speed between diesel and e-ferries. Additionally, local people are not very aware of the technology upgrade and its benefits and are reluctant to retrofit their ferries. However, WWF India has conducted campaigns and awareness sessions, mobilized the plan for subsidies with the government agencies, and brought in more local partners that manufacture boats/ engines/ and other parts that will help enhance the local business, technology partners, and markets for e-propulsion engines, spare parts, maintenance, and repairs. The initiative, if scaled up properly, will not only be useful for inland water transport but also can support growth in other services like battery rickshaws (800 per million)²⁴, EV-vehicles, and other batteryinduced products.

Increase financial support: As a pilot project, this was funded by HSBC; however, moving forward, there is a need for funding partners, subsidies from the government, and other funding sources, etc. Currently, the WWF team is in talks with the government of Bengal and the West Bengal Pollution Department to roll out schemes and subsidies. Moving forward, the Sundarbans Development Authority and Environment Department, Nonconventional (NRES), Sundarbans Development Authority, and the Environment Department, Govt. of India have shown interest and are in the process of coming up with feasible solutions (policies, regulatory frameworks or subsidies etc.) to amplify this initiative in major service providing services involving inland water transport.

Potential collaborations: To upscale this initiative, it is important to collaborate with multiple partners and organizations to upskill people and initiate the demand for less carbon-intensive solutions across sectors. These projects require heavy investments in the execution, and hence, it is favorable to work with different organizations and pool resources. Additionally, government support is vital to amplify the efforts with the help of policies and regulatory frameworks that subsidize the cost of the technology, support businesses, and create a healthy ecosystem for electric batteries.

INDONESIA

Indonesia is one of the largest economies in Southeast Asia; it stands as the fourth largest in terms of population and the 10th largest economy²⁵ in terms of purchasing power parity worldwide.

The industry sector accounts for the largest share (46.5%)²⁶ of the GDP, which includes manufacturing, mining, and guarrying. With an almost 77% increase in coal production since 2015, it has become one of the largest coal consumers in Southeast Asia. However, with the latest developments in renewable energy and the growing demand for sustainable solutions, the country is transitioning towards a new energy paradigm. The country has set a target to reduce carbon emissions and reach net zero by 2050²⁷ and phase out coal consumption by 2040. It aims to install 23% renewable energy sources by 2025 and 31% by 2050²⁸. Focusing on climate adaptation and mitigation, Indonesia aims to balance environmental sustainability with economic growth. The country has prioritized key areas, including energy security, fiscal sustainability, climate action for emission reduction, achieving the Sustainable Development Goals, and promoting low-carbon development within a circular economy framework.

25. Indonesia Overview: Development news, research, data | World Bank

26. Indonesia GDP Annual Growth Rate 27. Indonesia phasing out coal by 2040 requires ramping up renewables | Embe

28. PowerPoint Presentation

Trends in energy transition

Indonesia has set a target to achieve 17-19% renewable energy in the energy mix by 2025, gradually increasing to 30% by 2030. To achieve this target, the country has come up with a power sector plan for 2021-2030, developing 50% new capacity for renewable energy with 65% taken by independent power producers²⁹. The government is also considering introducing policies such as carbon pricing, mandatory carbon capture and storage (CCS), tax incentives for plants that install clean technologies, and phased-out selective closure of the oldest and most polluting plants. The country also plans to expand grid lines and improve electricity connections between different islands. Projects like the Java–Sumatra 3 GW interconnection project (planned for inclusion in Indonesia's 2024-34 long-term electricity plan, RUPTL) and the establishment of a power cable plant by LS Cable & System and Artha Graha Network are some of the key initiatives taken towards adopting renewable energy.

Skill Development for Green Jobs

With the growing need to shift towards a greener economy, it is essential to develop the required skills in the current and upcoming workforce. However, the country lacks the required awareness and knowledge about green jobs³⁰, and due to a decentralized education system, the current curriculum does not align with green jobs and sustainable solutions across sectors. However, to promote upskilling in the country, the government has collaborated with multiple partners to define green jobs and develop a roadmap strategy to enhance skill development.

CSP-ET's contribution in Indonesia

To support the roadmap strategy, WWF Indonesia, together with HSBC Indonesia and WRI, launched a comprehensive five-year program to accelerate the adoption of renewable energy in the country and mobilize private funds to support energy transformation. The Climate Solutions Partnership – Energy Transition (CSP-ET) program has been conducting practical exercises to develop new relevant policies and demonstrate business cases that support the transition. In addition, under the CSP Initiative, various capacity and skill development programs have been launched to mentor companies towards energy efficiency, net-zero strategies, GHG inventory, supply chain management, risk management, and other topics, supporting the development of the necessary skill sets.

29. Indonesia's green powerhouse promise: Ten bold moves | McKinsey 30.wcms_898135.pdf



CASE STUDY 2

Training for PLN staff. @WWF Ind

Biodiversity Safeguard Training Program with state electricity company



PROBLEM STATEMENT

As Indonesia accelerates its energy transition and expands its renewable energy infrastructure, ensuring strong environmental and social safeguards is critical. Perusahaan Listrik Negara (PLN), a state-owned second largest company by assets that is responsible for distributing electricity in the city³¹. It has developed an Environmental and Social Management System (ESMS) at the corporate level, including topics on biodiversity. This topic is crucial for PLN, as most of the renewable power plants are located close to high biodiversity value areas and conservation areas. To support the implementation of ESMS across operational sites and to develop biodiversityequitable renewable energy infrastructure, WWF Indonesia collaborated with PT PLN, focusing on integrating best practices in biodiversity safeguards into PLN's renewable energy infrastructure projects. With robust biodiversity safeguards, it is expected to attract much-needed investment in accelerating renewable energy infrastructure projects in Indonesia.

THE INITIATIVE

WWF Indonesia supported PT PLN by creating a comprehensive Biodiversity Safeguard Technical Guideline. This guideline is a practical document that outlines the identification of project locations, methods for collecting biodiversity data, and the creation of action plans for biodiversity conservation. Synthesizing from the guideline, a module was also developed to ensure the body of knowledge could be widely implemented by PLN's staff. Additionally, training of trainers was held for PLN staff, including representatives from sub-holdings and subsidiaries, to enhance their understanding and application of biodiversity safeguards in their day-to-day roles.

The training modules and syllabus developed for biodiversity safeguards are adopted by PLN's Corporate University, ensuring regular training sessions. Trained PLN staff are now expected to serve as resource persons for the implementation of biodiversity safeguards in their respective units. With the knowledge gained, biodiversity aspects are now integrated into every stage of project development, from planning to operation, inching closer towards biodiversity mainstream in the national utility company.

31. Perusahaan Listrik Negara - PLN | Indonesia Investments



Figure 9: Training session for PT PLN workers



Figure 10: Participants in the PT-PLN training

IMPACT CREATED

The training program was an inclusive exercise for the workforce working at PT PLN to gain knowledge and awareness about initial introduction to biodiversity, project site screening, scoping, biodiversity baseline study, critical habitat analysis, impact, and risk analysis, along with mitigation and action plan development and, finally, monitoring and evaluation. Many PLN projects are in locations that are biodiversity hotspots. Hence, this initiative safeguards the interests related to biodiversity and will indirectly improve PLN's ESG rating, thereby having a positive impact on funding for renewable energy infrastructure projects, reducing the risk of project delays, and supporting the achievement of Indonesia's net-zero targets. Some of the key learnings from this program are:

Improved Environment Safegaurds	The trainings help PLN to integrate more comprehensive environmental protection measures into their operations and implement environment- friendly measures.
Better Implementation of Biodiversity Management Plans (BMP)	With the new BMP guidelines, PLN can now better assess and mitigate environmental impacts from energy infrastructure projects, ensuring that they meet both national and international environmental standards.
Stronger Local Ecosystem Protection	The focus on biodiversity safeguards helps ensure that renewable energy projects, such as geothermal plants, are developed in a way that minimizes negative environmental impacts.

FEEDBACK FROM Beneficiaries

The training course and overall session were perfectly managed and delivered by the trainers. Some of the testimonials below present feedback from the participants.



PT PLN Trainee 1

"The training was very helpful in preparing a Biodiversity Assessment to provide an overview of the biodiversity in a location that will be affected by the project so that it can be ensured that the project implemented maintains the balance of the ecosystem and supports the principles of sustainable development".

PT PLN Trainee 2

"The training was very helpful in my job. It provided me with new skills and insights that I have been able to apply directly to my tasks, improving my efficiency and effectiveness. The practical examples and hands-on exercises were particularly valuable as they allowed me to implement immediately what I learned. Overall, it has positively impacted my performance and confidence in my role."

PT PLN Trainee 3

"The content was well-structured, relevant, and delivered engagingly. The trainers were knowledgeable and supportive, making it easy to follow along and ask questions. I appreciated the practical focus, as it allowed me to apply what I learned directly to my job. If I were to suggest an improvement, it would be to include more real-world case studies or examples to further enhance the learning experience. Overall, it was a valuable and impactful program."



Figure 11: Key learnings of the project

CASE STUDY 2

Capacity Building with the Indonesia Chamber of Commerce (KADIN) and Training with the Financial Service Authority (OJK)



PROBLEM STATEMENT

Indonesia's manufacturing sector, particularly companies supplying multinational corporations, faces growing pressure to decarbonize in line with global climate commitments. Multinational buyers increasingly require their suppliers to conduct greenhouse gas (GHG) inventories and set science-based climate targets (SBTs) to align with international sustainability standards. However, many Indonesian manufacturers lack the technical expertise, resources, and standardized methodologies to accurately measure emissions and develop credible emission reduction targets. The absence of robust GHG accounting frameworks and capacity-building initiatives creates challenges in meeting corporate sustainability expectations. Without significant improvements in GHG inventory practices and science-based target setting, Indonesian manufacturers risk losing business opportunities, facing supply chain exclusions, and struggling to access green financing. Indonesia's financial services sector is central to the country's economy, but it is also a major indirect driver of climate change. Through investments, loans, and insurance, the sector finances a wide array of activities, making it a significant contributor to overall greenhouse gas (GHG) emissions. Financial institutions (FIs) must be equipped to finance green projects and transition to lower-carbon operations, given the critical role they play in financing industrial decarbonization. Going forward, goals would be impossible to achieve without transforming both the industrial and financial sectors. To achieve the goal, businesses will need the required skilled labor and expertise, which currently is in a very limited capacity.

THE INITIATIVE

Capacity Building with the Indonesia Chamber of Commerce (KADIN)

WWF Indonesia partnered with the Chamber of Commerce, Kamar Dagang dan Industri Indonesia (Kadin), and WRI to launch the Corporate Assistance Program (CAP) for Adidas suppliers. This partnership aims to assist companies and Financial Institutions to prepare and strengthen their capabilities to achieve net-zero emissions. Under a signed MoU with Kadin Net Zero Hub, WWF assisted companies in the Corporate Assistance Program (CAP) to become SBTi-committed, together with WRI, Carbon Disclosure Project Indonesia (CDP), and Indonesia Business Council for Sustainable Development (IBCSD). In this cycle of CAP, select Adidas suppliers participated and were assisted in developing GHG inventory Scope 1, 2, and 3, calculating science-based targets, and committing to SBTi.



Figure 12: Training session with kadin

Training with the Financial Service Authority (OJK)

WWF Indonesia collaborated with OJK to provide a series of capacity-building and technical assistance, focusing on climate transition plans and aligning with OJK's Climate Risk Management and Scenario Analysis (CRMS) guidance. The first training covered Scope 1 and Scope 2 GHG emissions and was attended by 48 OJK staff and 124 staff from 66 banks. The second training focused on Scope 3 emissions, particularly financed emissions, and was conducted in two formats: a full material day and an exercise day. This training was attended by 100 OJK staff and 325 staff from 94 banks.



Figure 13: Training session at OJK

IMPACT CREATED

Capacity Building with the Indonesia Chamber of Commerce (KADIN)

WWF was responsible for mentoring two organizations, namely PT Bintang Indokarya Gemilang and PT Panarub (PT PBB). The sessions for these companies elaborated on the importance of the supply chain map and inventory management plan as the first steps of the GHG inventory. This was followed up with a site visit by WWF to PT PBB to understand the industry's process. After 8 months of conducting the training sessions, PT Bintang Indokarya Gemilang and PT Panarub committed to both nearterm and net-zero emissions targets under their holding company, Star Asia Trading Pte.

Training with the Financial Service Authority (OJK)

The participants were able to understand and gain technical insights on five significant aspects of climate change and identify the levers to reduce their operational emissions over the respective course of time.

- 1. Implement GHG Calculations: Understand the basic concepts and skills to apply in banks for finance emissions, scope 1, 2, and 3, credit analysis, and reporting on significant climate change parameters.
- 2. Understand Methodologies: Gained insights and clarity on different GHG calculation methods (PCAF, South Pole) and skills to use tools to calculate emissions.

- **3. Technical Skills:** Gain hands-on experience and learn the data collection necessary to calculate emissions and apply them to business decisions.
- 4. Regulatory & Risk Insight: Understand regulations (e.g., OJK CRMS), understand the tools and learn skills to do climate risk stress testing.



FEEDBACK FROM THE BENEFICIARIES

Capacity Building with the Indonesia Chamber of Commerce (KADIN)

Following the capacity building with KADIN, one participant stated, "The companies not only had the first intensive greenhouse gas (GHG) inventories but also managed to set science-based targets. This is crucial as there are still very limited Indonesian companies that have set sciencebased targets. Technical skills and an understanding of the transition to net zero are also expected outcomes that will be internalized in every company. Noting a positive impact felt by beneficiaries.

Training with the Financial Service Authority (OJK)

A survey was conducted after the training with OJK to evaluate its overall impact and gather feedback from the participants. We received responses from seventy-nine individuals, and the majority expressed satisfaction with the course material as well as the expertise and skills of the trainers. The additional feedback from participants on the course delivery is as follows:

- **Training Delivery:** Participants felt more time should be allocated for exercises and participation in real-time scenarios.
- **Content and structure:** Participants felt the need to include more practical case studies and projects to gain a deeper understanding of the ground realities related to the topics.
- **Resources:** There was feedback to include resources such toolkits and apps to provide hands-on training and practice the technical skills covered in the course. The course material, as well as the expertise and skills of the trainers.



Figure 17: Feedback from OJK-WWF Capacity building participants

KEY LEARNINGS AND WAY FORWARD

As of 2023, approximately 18.83 million people aged fifteen and above were employed in Indonesia's manufacturing sector³², making it the country's third-largest sector for employment. WWF's initiative has the potential to train and build the capacity of these workers, equipping them with knowledge and skills in energy efficiency, green solutions, and climate change. This WWF initiative can be scaled up in other organizations to enhance its impact on energy transition. However, from the case study, it was observed that five major levers need to be explored to achieve the maximum impact. They are as follows:

- **1. Skill Mapping:** To enhance skill development, it is vital to recognize the key sectors and organizations that are most emission-intensive and require skill sets and technical experts to align the operational and organizational structure toward green energy solutions. Skill mapping will help identify gaps in the current workforce capacity to enhance their technical expertise.
- 2. Align the course structure with climate change: It is vital to include practical and technical skills in the course structure to give the participants in-depth knowledge of carbon-intensive operations, identify tools and technologies to estimate GHG emissions, and develop solutions to reduce them. As observed in the feedback received from a few participants, it was seen that they expect more in-depth training and practical skills to be taught in these vocational trainings.

- 3. Climate awareness courses in the education system: To create more technical skills and expertise, this course should be integrated and aligned at the elementary level in the education system; this will help students get insights on the course and give them more options to explore their career later in the environment and climate change domain.
- 4. Collaborate with vocational training institutes: Vocational institutes are recognized for providing shortterm training and courses in specific skills and technical expertise for a particular job, thereby preparing the workforce to enhance their understanding and capacity. This training shall be provided in such institutions to enable the workforce to undertake respective courses.
- **5. Collaborate with multiple stakeholders:** To enhance skills, create a full-fledged course on green skills, and create green employment opportunities, it is essential to understand the key demands and requirements of each stakeholder such as private, government, NGOs, educational institutions, and vocational centers, and industries who are willing to work towards energy transition. This will enhance the result and create more skill sets among the workforce who are willing to learn and work in this field.

32. https://www.statista.com/topics/9307/manufacturing-industry-in-indonesia/#topicOverview

VIET NAM

Viet Nam is one of the fastest-growing economies among Asian countries. The country has recorded a GDP of 6.4%³² in FY 2024.

Its fast-growing economy and population have resulted in increasing demand for power and energy in the last decade, projected to increase at least six times by 2050 from 2020.³³ Some of the significant energy-consuming sectors (textile eight%, electricity 48%). Currently, coal is the leading source of power, accounting for over 40 percent.³⁴ of the power supply, hydropower and other renewables are responsible for over a third of the energy mix. The country is one of the fastest-growing per capita GHG emitters worldwide, with emissions quadrupling from 2000-2015.³⁵ Hence, the country needs to take steps to minimize coal usage. With a rapidly growing economy and population, the country faces the dual challenge of meeting rising energy demands while mitigating environmental impacts. Renewable energy has emerged as a crucial solution to this growing challenge.



AND GHG INVENTORIES HANGE IN INDUSTRIAL AY NINH PROVINCE

Tay Ninh, 06 October 7022

32.Vietnam's Economic Milestones in 2024
33. Vietnam-JETP-Report-English.pdf
34. Energy sector in Vietnam - statistics & facts | Statista
35. Vietnam-JETP-Report-English.pdf

Trends in energy transition

To move towards a greener economy, the country has set the target to include 32.3%³⁶ Renewable energy should comprise 15.8% of the total energy mix by 2030, be phased out by 2040, and achieve a 15.8% reduction in GHG emissions by 2030. It has also issued the National Power Development Plan VIII (PDP 8)³⁷, which aims to successfully carry out a just transition in conjunction with the modernization of electricity generation, establishing a smart electricity grid, managing advanced power systems toward green transition, and formulating an energy industry ecosystem based on renewable energy, additionally issuing 'National energy master plan for 2021-2030."³⁸ Which aims to establish and develop several clean energy centers (solar, wind, and hydro) in the northern, central, and southern regions. renewable energy.

Skill Development for Green Jobs

Currently, the country is in a phase of developing a methodology for measuring green jobs and establishing a system to monitor indicators for this purpose. It is also in the process of developing a database of job requirements based on sectoral requirements. The government is also seeking to collaborate with various organizations, including educational institutions, vocational institutes, and private partners, to upskill the workforce in the relevant field. With the growing demands of the country to adopt green energy across sectors, it is estimated that there is a need to upskill almost 60% of the population by 2030³⁹ for a smooth transition toward a greener economy. The country needs to map the current areas and services that will require urgent skill development and also needs to analyze the kind of skills that are required in the industries.

Climate Solutions Partnership Energy Transition in Viet Nam

To fill this gap, the Climate Solution Partnership launched the energy transition program in southern Tay Ninh province to shift Viet Nam's private sector towards sustainable energy adoption. This project, 'An Energy Transition for a 1.5-Degree World: Accelerating Progress in Asia,' brought together corporate, sectoral, and subnational levels to help accelerate the adoption and scaling up of energy efficiency and renewable energy solutions in Tay Ninh. The project is implemented by WWF-Viet Nam in cooperation with TayNinh's Department of Industry and Trade. Other key project activities under CSP-ET include capacity building on energy efficiency and renewable energy solutions, developing a roadmap for energy efficiency and renewable energy solutions for subnational actors, and building guidebooks and tools for commercial and industrial energy users to increase energy efficiency in Tay Ninh province.

36. Energy Transition in Viet Nam: Strategic considerations for businesses 37. Power Development Plan 8 | VnTPA

JUST ENERGY TRANSITION IN ASIA: CASE STUDIES FROM INDIA, INDONESIA AND VIET NAM'



CASE STUDY 1

An energy transition for a 1.5-Degree world: Accelerating Progress in Asia



PROBLEM STATEMENT

The country faces a huge challenge in fulfilling current energy demands with decarbonization and net zero targets in place. To achieve these targets, it is vital to transform the current energy sector from fossil fuels to renewables and simultaneously build capacity among people to adopt energy-efficient solutions in their operations. Tay Ninh province is strongly developing its manufacturing industry. It has many large industrial parks, and its key sectors include agricultural processing, textiles, footwear, and electronics, which attract many projects and create jobs for the local population. Additionally, the Provincial People's Committee issued Decision No. 1726/QD-UBND aims to achieve a 5.0% - 7.0% energy savings of the total energy consumption in the entire Tay Ninh province by 2025. Specifically, the annual electricity consumption should achieve a minimum energy savings of 2% of the total electricity consumption. By 2030, the plan targets an energy savings of 9.6% of the total energy consumption in Tay Ninh province. However, the industries lack an expert workforce and skilled laborers to work toward green energy in industrial operations.

THE INITIATIVE

To achieve the above targets, WWF led the project to bring together champions at the corporate, sectoral, and sub-national levels to help accelerate the adoption and scale-up of energy efficiency and renewable energy (EE & RE) solutions in Tay Ninh province. WWF-Viet Nam worked in cooperation with Tay Ninh's Department of Industry and Trade (DOIT) to conduct energy and emission audits for 38 factories and training provinces, created roadmaps for 2,92,000 tons of emission mitigation potential, and worked with local government to develop energy transition to help textile and garment factories adopt low-carbon business models and enable a new generation of certified energy managers.

It also developed podcasts and video series to create awareness of corporate sustainability practices. Under this project, WWF primarily collaborated with textile and garment companies in Tay Ninh to identify their existing problems and challenges in adopting renewable energy and energy efficiency solutions. The project also aimed to develop bankable projects with at least two major textile and garment companies or industrial parks that applied energy efficiency and renewable energy solutions. Certified Training on energy management systems was conducted over two years between 2023-2024, and the section below describes the impact created on different stakeholders.



Figure 18: Training provided in Tay Ninh Province



Figure 19: Participants in energy management training

IMPACT CREATED

The training program was an inclusive course on energy management and climate change themes, which included energy efficiency and minimizing energy usage costs for designated energy users (DEUs) among factory and business employees in Tay Ninh province. It was held in three phases for five days each. It included nine modules discussing issues related to energy systems in office buildings and manufacturing plants. In all three phases conducted in 2023 and 2024, a total of 115 people participated in these trainings. Upon completion, the participants had to take an evaluation exam to obtain a MOIT completion certificate . This course has helped the participants to:

- 1. Understand the real-time concepts to be applied in factories and companies: The training made it easy for participants to understand and comprehend the concepts of green and sustainable solutions to be applied in the day-to-day operations of organizations, which will simultaneously boost energy efficiency and reduce emissions.
- 2. Gain knowledge about the current laws and regulations regarding legal provisions on energy management and ensuring compliance: The training module also covered laws and regulations about the energy transformations in the country, which has enabled participants to gain better insight into the
- 3. Reduction in the energy bills/cost in their organization: During the stakeholder consultation

process, it was known that after these training sessions, the management noticed a potential decrease in the energy bills, and more energy-efficient solutions were being implemented during operations. Additionally, the management also started to include major intervention plans into their operational strategy to promote low carbon emission solutions.

- 4. Identify the issues causing the energy losses in their organization and were able to propose solutions for the same: These training sessions were very impactful for participants to help them recognize the issues in operational management regarding energy losses and the levers where energy efficiency solutions can be applied.
- 5. Identify optimum energy appliances for the organization/factories: The participants gained knowledge to identify the optimum appliances to use in the organizations.
- 6. Advise top management on business and legal compliance related to energy management and other issues: Following this training, energy managers were better equipped to advise management on sustainable solutions to be implemented across departments and factory outlets, identifying gaps in the installation of energy-efficient solutions.
- Review and assess the energy-intensive equipment to plan for replacements / improvements: The energy manager training enabled participants to gain technical know-how of the energy equipment and its functioning and monitoring across departments.
- 8. Boost renewable market: These training sessions have helped people understanding the importance of using energy-efficient equipment in the long run, which provides both economic and environmental advantages. This has helped them recognize the market for energy-efficient products and boost demand accordingly.
- **9. Support government objectives:** This capacitybuilding initiative has also and contributed to the national target of upskilling individuals for green jobs.



JUST ENERGY TRANSITION IN ASIA: CASE STUDIES FROM INDIA, INDONESIA AND VIET NAM'

Following this training, the workforce in the respective organizations has experienced a reduction in energy consumption in their operations. Additionally, this has also provided them certification by MOIT for the course, which gives them better credibility in their career. This initiative has also been socially and economically beneficial for the people. It has been and excellent platform for knowledge providers and trainers to provide their insights and technical knowledge to the current workforce. This also has the potential to create new employment opportunities in the energy transformation sector.

FEEDBACK FROM THE BENEFICIARIES

The majority of the trainees rated the amount of knowledge provided in the course as moderate, but highly practical and necessary. The teaching team consisted of experts with extensive knowledge and experience in the field of energy efficiency and conservation. The instructors' teaching style and speed were considered adequate, with many real-life examples provided during the instruction. Additionally, all trainees expressed their interest in participating in the next level of the advanced training course on energy management with more hands-on experience and a practical approach. The organizing committee has also acknowledged the feedback and suggestions from the trainees to improve and enhance the quality of the training course.



Beneficiary 1:

"This is an extremely meaningful and practical course. It not only delivers comprehensive knowledge about energy efficiency and energy management but also provides real-world examples and practical methods that can be easily applied in factory operations. Following the course, our company reviewed the equipment currently in use at the factory to assess, evaluate, and develop plans to reduce unnecessary energy waste."

Beneficiary 2:

"The course helped in gaining essential knowledge to advise business leaders on compliance with legal regulations regarding energy management. Understanding and adhering to legal requirements for better enterprise management."

Trainer 1:

"The training course has a positive impact on all the participants, and it helped in enhancing their skill sets."

Trainer 2:

"We have received good responses from the participants, and they have shown interest in attending these kinds of training in the future."

DOIT:

"The program has helped achieve energy efficiency in local areas."



KEY LEARNINGS AND WAY Forward

In 2023, approximately 11.96 million⁴⁰ people were employed in Viet Nam's manufacturing sector, marking an increase from the previo us year. This sector had the second-largest employed population among all industries in Viet Nam. As one of the most carbon-emitting sectors, it requires significant energy transformation in its operations. CSP's initiative can reach millions of these workers, building their capacity. A few areas where focus is needed are:

- 1. Enhance skill development programs: To achieve the country's energy transformation goal, it is vital to enhance skill development training in all energyintensive sectors. The Department of Industry and Trade (DOIT) plans to enhance this initiative and upskill the workforce beyond the industrial sectors for certain projects that will provide carbon credits in the future, additionally, the department also intends to upskill the workforce at the Industrial parks and other units for waste management. Initiatives like CSP are the necessity to upskill the current workforce and raise awareness about the green transition.
- 2. Frequent training sessions: The upskilling program has been an excellent success for the participants; however, the duration of the training sessions was brief

and covered the topics only briefly. In the stakeholder consultation with the participants, it was found that they were willing to take long sessions and gain insightful knowledge on energy management. Hence, more frequent sessions will help the employees to be technologically updated and support the management in energy efficiency.

- 3. Collaborations with organizations: To upscale this initiative, it is essential to collaborate and partner with multiple organizations, NGOs, and technical assistance firms working toward skill development in the energy sector. This will amplify the initiative across diverse sectors in ,more significant parts of the country. It will also support a large number of beneficiaries in a short duration of time and will fill the current knowledge gap among the workforces.
- Government Policies: For holistic skill development, 4. it is vital to include it in the national policies and strategy roadmap; the country has developed the Human Resources Development Strategy 2011-2020 (HR Development 2030 still in draft version), which emphasizes the need for training and education to meet the demand of the industry. Additionally, the government has for the Development of High-Quality Vocational and Training Colleges. However, the policies are not adequately implemented, particularly in rural areas that are not able to take advantage of such vocational training. Hence, it is essential to introduce new and redefined policies that ensure the proper implementation and monitoring of skill development programs across all sectors.

JUST ENERGY TRANSITION IN ASIAN CASE STUDIES FROM INDIA, INDONESIA AND VIET NAM

OVERALL LEARNINGS

The case studies analyze the current status of project implementation, challenges, and potential improvements for scaling up skills and reskilling initiatives in the future. Key takeaways include:



Introducing Energy-Efficient Solutions and Adopting

Renewable Energy: The initiative has introduced energy-efficient devices to decarbonize sectors heavily dependent on fossil fuels and emissions. This has enabled the workforce across various sectors to adopt sustainable solutions, reduce their carbon footprints, and promote the use of renewable energy in day-to-day operations. Additionally, this prepares the current workforce to work towards energy transformation in the coming years.

Capacity-Building Sessions for Corporates and

Society: The initiative has raised awareness and knowledge about energy-efficient products and their long-term socioeconomic and environmental benefits. These sessions have promoted skilled labor and accelerated green job opportunities. One of the vital advantages of the CSP initiative is that it collaborated with private companies and corporations and supported their team to gain a better understanding of reducing carbon emissions across their operations, aligning their organizational targets with climate change and environmental protection standards and preparing their workforce to work with new sustainable technological solutions.

Social Inclusion and Women Empowerment: The initiative empowers rural workers and women with energy-efficient solutions, aligning the workforce with green job targets. These initiatives have provided better income opportunities and improved livelihoods.

Employment Opportunities: The initiative has helped workers discovering new employment opportunities beyond traditional roles, raising awareness about green jobs and enabling them to utilize their skills effectively.

Government Incentives: The initiative has demonstrated the potential of green energy solutions, prompting governments to consider new schemes and incentives to promote solar energy and related products.

Collaborations: Through this initiative, multiple organizations have collaborated and brought their resources together, bringing their expertise to achieve the initiative's goals.

WAY Forward

CSP has demonstrated cases across Asian countries as models for Just Energy Transformation by creating financially viable opportunities for communities and corporations to adopt clean energy solutions.

This initiative supported the collaboration and participation of stakeholders, including government, private, and NGO sectors, as well as technical experts, educational institutions, and local and municipal bodies, to leverage their resources and amplify green skills development in society. Additionally, this initiative targets the major industries (textile supply chain, water transport, dairy chain, financial institutions) and areas (rural, tribal) where people have limited information and resources to help them move toward energy transition and adapt to green solutions. The capacity-building and training initiatives have not only positively impacted the environment but also generated new employment opportunities in the green energy sector. The CSP-ET has been successful in raising ambition to reduce carbon emissions, demonstrating efficient and renewable energy solutions, and growing low-carbon business and financial opportunities. The case studies in this report highlight the need to build capacity and awareness among communities, corporations, and supply chains and offer them tailored skills training to adopt clean energy solutions. Stakeholders and beneficiaries should consider the following steps to scale up these learnings and interventions and create a more significant impact beyond the project phase.

Given the increasing reliance on electric vehicles (e-rickshaws and electric scooters) in India for short distances, the battery charging stations in Sundarbans have the potential to be replicated across the state. For instance, in the Financial Year 2024-25, 1,149,334 electric two-wheelers (e-2W) were sold, reflecting a 21% increase compared to 948,561 units sold in FY 2023-24. Similarly, the sales of electric three-wheelers (e-3W) reached 159,235 units in FY 2024-25, marking a 57% growth over the 101,581 units sold in the previous financial year. All these electric vehicles still depend on the conventional power supply or battery swap systems. Considering the West Bengal Government's interest in exploring the solar power sector, this battery charging system presents a significant opportunity. Technological advancements, skills, business models, and experience can lead to spillover benefits.

Additionally, the other case study on using solar-powered chillers demonstrates significant potential for entering the refrigeration market. India in 2023 has 8,653 cold stores in the country with a capacity of 394.17 lakh MT⁴¹ unevenly distributed across the country, with an installed capacity of. Furthermore, supermarkets, food processing units, logistics, hospitality, and medical sectors have daily refrigeration needs, and these interventions can be highly beneficial. Green skilling is a global agenda, with countries actively working on it worldwide. For instance, India has established the Skill Council for Green Jobs (SCGJ), while the Philippines has developed the Technical Education and Skills Development Authority (TESDA). Turkey has introduced the Model Factory Concept. Additionally, donor organizations such as UNESCO have launched the Greening Education Partnership. The private sector is also contributing, with companies like EY introducing the Green Skills Passport, which aims to train professionals and students to prepare them for the future.

In conclusion, achieving a just energy transition is crucial for creating a sustainable and equitable future. This transition must prioritize not only the shift to renewable energy sources but also the fair distribution of its benefits and opportunities. We can foster social equity and economic resilience by ensuring that all communities, especially the most vulnerable, are included and supported. Collaborative efforts among governments, industries, and civil society are essential to address the challenges and harness the potential of this transition. Together, we can build an energy system that is not only environmentally sustainable but also just and inclusive, paving the way for a brighter future for all.

^{41.} The Rise of Indian Cold Storage Infrastructure - All details inside - Infrastructure News | The Financial Express



