



# Powering Profits: Unlocking New Revenue Streams Through Renewable Energy Certificates

*Globally and in Vietnam*

Adrian Joachims  
Adrien Paul  
Jamie Kohchet-Chua  
Satine Villard  
Verlin You



# From Insight to Impact: Our Team

Blending Diverse Expertise from St. Gallen and SMU

---

**Adrien Paul**

Exchange Student  
*University of St. Gallen*

- Key Players in the REC Value Chain
- Stride Business Model

**Verlin You**

Full-time Student  
*Singapore Management University*

- Alternative Monetisation Mechanisms
- D-REC Analysis

**Satine Villard**

Exchange Student  
*University of St. Gallen*

- Comparative Market Analysis
- Potential Buyers
- RECs Beyond Customers Repayment

**Jamie Kohchet-Chua**

Full-time Student  
*Singapore Management University*

- Role of RECs in Global Decarbonization
- REC Lifecycle and Market Processes
- PowerTrust Business Model
- Potential Buyers

**Adrian Joachims**

Exchange Student  
*University of St. Gallen*

- Regulatory Trends
- REC Revenue Reinvestment Opportunities

# Table of Content

## Topic Overview

---

1	<b>Project Introduction</b>	4
	I. Problem Statement II. Research Methodology	
2	<b>Overall Global Decarbonisation Efforts</b>	8
	I. Overall Climate Landscape II. 3 Scopes of Emissions III. Different Types of Sustainable Instruments IV. Sustainable Instrument suitable for Stride	
3	<b>Role of RECs in Global Decarbonisation</b>	15
	I. Overview of RECs Globally II. Value Chain of RECs III. Overview of RECs in ASEAN and Vietnam	
4	<b>REC Key Players</b>	19
	I. Solar Panel Financing Platforms II. REC Registries and Issuers III. REC Trading Platforms IV. REC Lifecycle V. REC Current World Developments	
5	<b>Overview of D-RECs</b>	26
	I. Overview of D-RECs Globally II. Worldwide D-REC Developments III. Relevance of D-RECs to Stride	
6	<b>Business Model Analysis</b>	30
	I. Stride Business Model Analysis II. PowerTrust Business Model Analysis	
7	<b>Strategic Recommendations</b>	40

# Problem Statement



# Overview of Business Consulting Project

## Summary of Client Background and Objectives

### Project Background



Double Delta is an impact investing advisory firm, partnering with clients that can provide impact to investors and to society as a whole.



Stride, one of the portfolio companies in the funds advised by Double Delta, is a clean-tech company based in Ho Chi Minh City, Vietnam. They provide solar panel funding for households, paying 80% of fees upfront, with 20% being covered by the customer.

### Project Objectives

With Stride owning these solar panels for an average of the first 2 years, how can they maximise REC revenue opportunities, reassess their credit risk management, and expand REC revenue options beyond 2 years?

- 1** Map out the entire **Energy and REC landscape** and **assess supply and demand** worldwide and in Vietnam
- 2** Understand **Stride and PowerTrust's current business model**, whether it can be improved or entirely change
- 3** Identify **potential buyers beyond PowerTrust**, reassess **current credit risk management** and **best use of REC revenue**, and expand REC revenue beyond 2 years

### Our Approach



#### Interviews with Industry Professionals

- Individuals with experience trading, selling, retiring, and mediating REC sales



#### Extensive Secondary Research

- Individuals with experience trading, selling, retiring, and mediating REC sales



#### Weekly Meetings with Double Delta

- Understanding of project scope, expectations, brainstorming, and Stride coordination

### Formulation of Hypotheses

The team formulated multiple hypotheses that guided our research and interviews, either disproving or strengthening the solution.

- 1** The **contract between Stride and PowerTrust can be improved** to reduce dependence, with potential room to change brokers
- 2** Use REC revenues to expand Stride's **core solar-financing operations**, build a **REC-based credit buffer**, and prepare for **future regional growth**.
- 3** Stride can consider **purchasing the RECs back from the households after the 2 years** and resell it at a higher price to willing buyers

# Research Methodology



# Utilization of Primary and Secondary Research

Gaining a Clearer Understanding of the REC Market Through Interviews and Market Research

## Primary Research



**Keppel DC Representative**  
*Hitting sustainability requirements for DC*



**Climate Impact X Director**  
*Handling buyer, trader and seller sales*



**ESR DC Sustainability Lead**  
*Hitting sustainability requirements for DC*

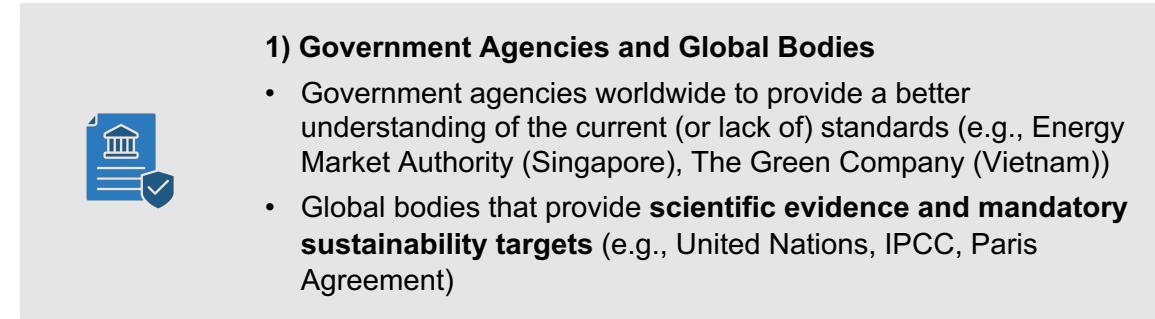


**Energy Market Company (SGX) Representative**  
*Finding leads and research on new REC platform*

## Interviews' Main Insights

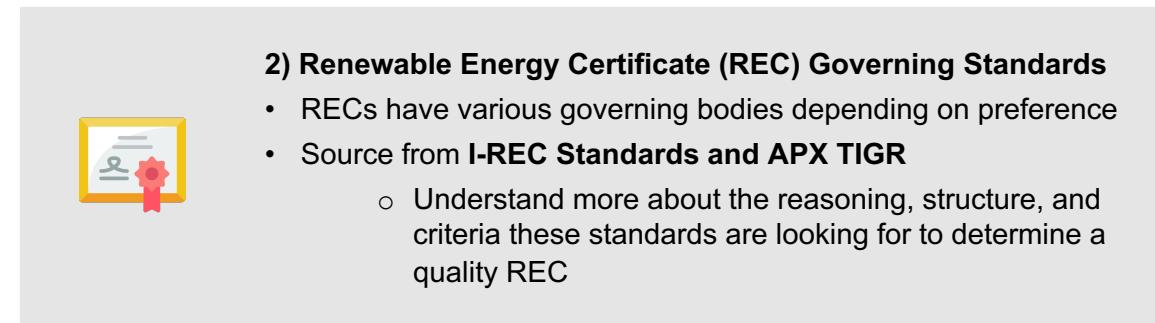
- 1** Advantages and disadvantages between direct selling of RECs through PPAs, brokers, and exchange platforms
- 2** Understanding of pricing mechanisms and fluctuating market prices worldwide (e.g. difference of RECs and D-RECs pricing)
- 3** REC preferences of large corporate buyers and current REC demand and supply market
- 4** Discussions on future plans to develop the ASEAN REC Market, in relation to the development of the ASEAN Power Grid

## Secondary Research



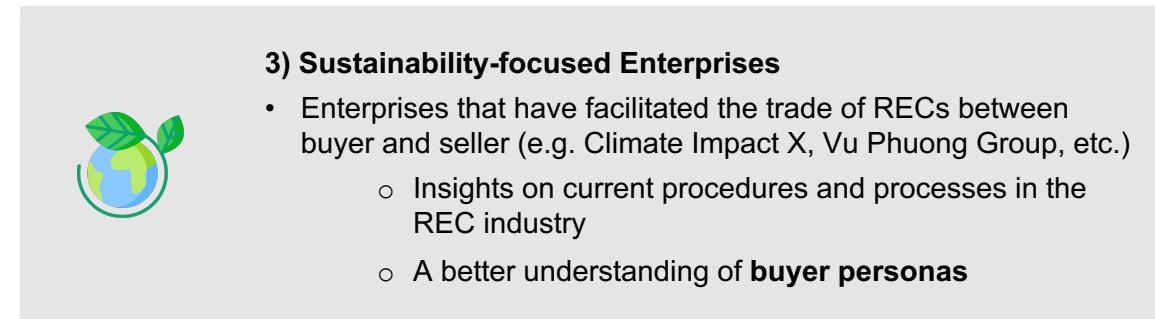
### 1) Government Agencies and Global Bodies

- Government agencies worldwide to provide a better understanding of the current (or lack of) standards (e.g., Energy Market Authority (Singapore), The Green Company (Vietnam))
- Global bodies that provide **scientific evidence and mandatory sustainability targets** (e.g., United Nations, IPCC, Paris Agreement)



### 2) Renewable Energy Certificate (REC) Governing Standards

- RECs have various governing bodies depending on preference
- Source from **I-REC Standards and APX TIGR**
  - Understand more about the reasoning, structure, and criteria these standards are looking for to determine a quality REC



### 3) Sustainability-focused Enterprises

- Enterprises that have facilitated the trade of RECs between buyer and seller (e.g. Climate Impact X, Vu Phuong Group, etc.)
  - Insights on current procedures and processes in the REC industry
  - A better understanding of **buyer personas**

# Overall Global Decarbonization Efforts



# Overview of Global Climate Landscape

Call for Action on the Current Sustainability Problems and Government Goals

## IPCC Assessment Report (Intergovernmental Panel on Climate Change) – Chapter 6

- Roadmap for transforming global energy systems to limit global warming – not mandatory for governments to follow
- A scientific report showcasing the implications of using non-renewable energy sources

## Relevance to Article 6 of the Paris Agreement

- IPCC Report supports the Paris Agreement by providing scientific reports, turning this into a global policy and structure for governments across the world to follow
- Provides a framework for countries to cooperate on climate action, enabling them to use market-based and non-market-based mechanisms to achieve climate targets

### Key Findings



Urgent shift away from fossil fuels → carbon budget is shrinking



Renewables are slowly becoming more affordable in long run → lifecycle and infrastructure changes can drastically change emissions



Integration of carbon capture storage, grids and clean fuels is essential → needed to reach global net zero by 2050

### Key Findings



**Article 6.2**  
Provide accounting & reporting guidance for countries to use international carbon instruments through bilateral or multilateral agreements



**Article 6.4**  
Establishes a new UN Framework Convention on Climate Change (UNFCCC) mechanism which can be used to trade CCs



**Article 6.8**  
Provide opportunities for non-market-based cooperation for enhancing climate action

### Relevance to the Project

Governments worldwide are called to invest more into renewable projects due to the increasing effects of climate change with Article 6 of the Paris Agreement requires countries to have structured plans regarding sustainability. Understanding this relevance provides clarity on why carbon instruments have been growing over the past few years and why it is a growing space with plenty of profitable opportunities.

# Overview of Global Climate Landscape

Call for Action on the Current Sustainability Problems and Government Goals

## Relevance to Science-Based Targets Initiative (SBTi)

The SBTi includes science-based targets that show companies and financial institutions how much and how quickly they need to reduce their greenhouse gas (GHG) emissions to prevent the worst effects of climate change

It defines:

- Best practices in emissions reductions and net-zero targets
- Standards and tools to help companies align with climate science goals

## UN Environment Programme

- Regulatory environment developments worldwide are focused on global standardisation and alignment of climate-related disclosure frameworks – providing incentives for businesses to include sustainability reports that are recognised worldwide
- More sustainability efforts are required to be reported in countries such as UK, SG, Brazil, etc.

## Key Findings



### Preference of Geographic Relevance

Buyer close to the supplier can reap more benefits, including the actual electricity



### Importance of Temporal Relevance

REC should match the time period during which the company consumed the electricity



### Climate Action Gap

Global emissions must fall at a faster rate to limit global warming to 1.5°C



### Effects on Vulnerable Population

Climate change, biodiversity loss, and waste pollution have all been increasing and affecting vulnerable populations



### Increase in Financial Support

Achieving climate goals must require an increase in financial support from governments and private firms

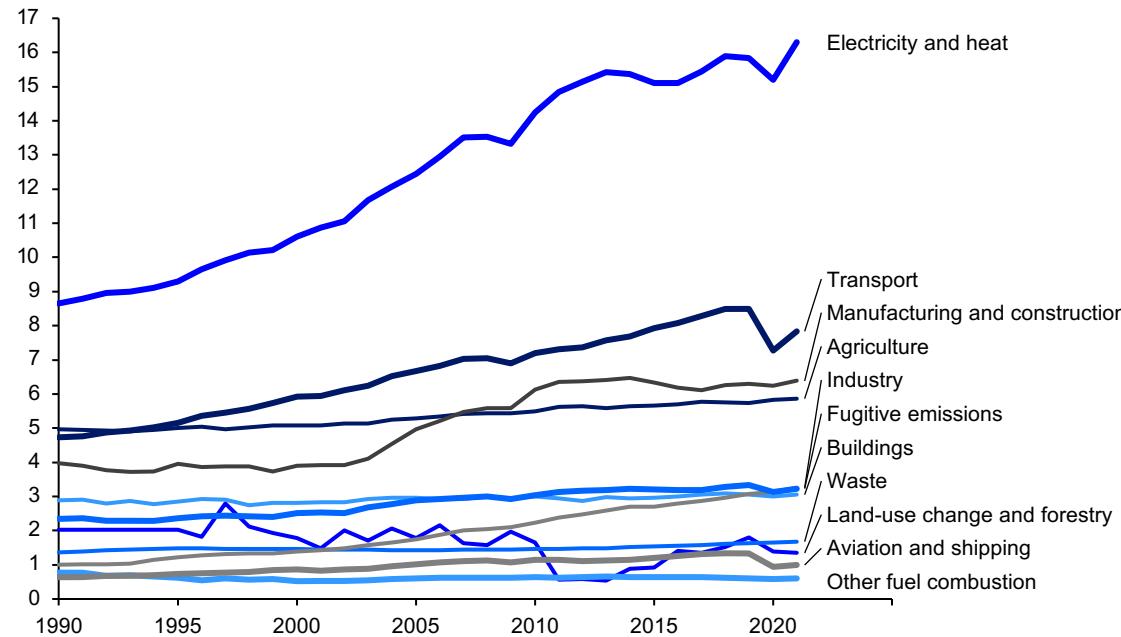
## Relevance to the Project

Preferences for geographic and temporal relevance can guide carbon instrument buyers to make more suitable decisions while contributing to achieving climate change goals to benefit vulnerable populations, such as ethnic and racial minorities.

# Overview of Global Climate Landscape

Current Energy Landscape and Initiatives

## Greenhouse Gas Emissions by Sector<sup>1</sup>



### Interpretation

Electricity and heat contribute the most to GHG in the world. This can be due to the following industries:

- Industrial (manufacturing, construction, mining, processing)
- Households
- Services (commercial buildings, transport, public utilities)
- Agriculture (forestry operations, fisheries, crop farming)

## Global Developments on Sustainable Energy Sources



### Natural Gas

Cleanest fossil fuel that produces the least amount of carbon emissions, however, still releases GHG.



### Solar

Solar energy is dependent on solar panels, which require more land space.



### Wind

Natural source not producing GHG gases, reliant on kinetic energy located on land and in water.



### Hydropower

Popular in China, producing 50% of the world's hydroelectricity due to the large river system across the country.



### Regional Power Grids

Import green energy from regional countries with the abundance of renewable sources, improving with the ASEAN Power Grid



### Solar

R&D on hydrogen, geothermal, nuclear, carbon capture, and storage.

# 3 Scopes of Emissions

Different Types of Emissions, Different Carbon Instruments

	Scope 1	Scope 2	Scope 3
Type of Emissions	Direct	Indirect	Indirect
Phase of Production Cycle	During Production	Upstream	Upstream & Downstream
Activities	Manufacturing, Direct Services	Off-site energy (electricity, heating, cooling) when a company makes a purchase from a 3 <sup>rd</sup> party	Activities prior to production / disposal of products or services
Estimated Share Worldwide	5-20%	5-20%	60%-90%
Examples	Fuel combustion in company owned vehicles, boilers, furnaces	Emissions from off-site power plants generating electricity for the company	Transportation, leased assets, distribution, processing of sold products
Mandatory to Report Worldwide?	Dependent on national regulations – encouraged to report all except Scope 3		
Common Carbon Instrument	Carbon Credits	RECs	Carbon Credits
 <b>Relevance Worldwide</b>	<p>Universally recognized and <b>most consistently reported across multiple countries</b>, including the EU, the USA, and SG</p> <p>Typically, mandatory for large corporations listed under GHG programs in home countries (e.g., countries filing for SG carbon tax)</p>	<p>Relevant to report for countries with <b>grid carbonization policies</b> and <b>renewable energy markets</b></p> <p>For instance, Malaysia and Hong Kong require corporations to disclose ESG efforts but do not specifically mention Scope 2 emissions</p>	<p>Least consistently reported due to <b>difficulty tracking before and after</b> production of the product or service</p> <p>Nevertheless, <b>increasing need to disclose a range of emissions consumed</b> due to investor and regulatory pressure</p>

# Sustainability Instruments for the 3 Scopes of Emissions

Carbon Instruments Are Market-Based Tools Used to Measure, Price, or Trade Greenhouse Gas (GHG) Emissions

Instruments	Instrument Types	Purpose	Description	Market Type
Carbon Pricing Instruments  <b>(Scope 1,2,3)</b>	Carbon taxes, Emissions Trading Systems (ETS)	Put a direct or market-based price on carbon	Carbon Tax: A fixed price per ton of CO <sub>2</sub> e emitted. Firms pay for their emissions directly.  ETS / Cap-and-Trade: Government sets a cap on total emissions and issues tradable allowances. Companies can buy/sell allowances.	Compliance
Carbon Credit Instruments  <b>(Scope 1, 3)</b>	Carbon offsets (Verified Carbon Credit), removal credits, transition credits	Reward emission reductions or removals via verified projects	Carbon Offsets: 1 carbon credit = 1 tonne of CO <sub>2</sub> reduced or avoided  Carbon Removal: Credits issued for actively removing CO <sub>2</sub> (reforestation etc.)  Transition: Credits for emission reductions in hard-to-abate sectors; Recognize transitional improvements	Voluntary/ Compliance
Energy Attribute Certificates  <b>(Scope 2)</b>	Renewable Energy Certificates (RECs, I-RECs, D-RECs, TIGRs)	Track and verify renewable electricity generation	Each REC represents 1 MWh of renewable electricity generated and fed into the grid.	Voluntary/ Compliance
International Mechanisms  <b>(Scope 1,3)</b>	ITMOs (Article 6.2), Article 6.4 credits	Facilitate cross-border carbon trading under the Paris Agreement to meet NDC	Bilateral agreements: A <i>mitigation outcome*</i> transferred between countries (can be carbon or non-carbon)  *Actual emission reduction or removal	Compliance
Hybrid/Emerging Instruments  <b>(Scope 1,2,3)</b>	Transition credits, climate performance credits, Tokenized	Support partial decarbonization or verified reductions in hard-to-abate sectors / Make trading more transparent	Transition Credit: Early retirement of a coal-fired power plant and replacing it with lower-emission gas or solar etc.  Tokenized Credit: Blockchain-based version of carbon/RECs	Emerging Voluntary

# Sustainable Instruments Relevant to Stride

Carbon Instruments Are Market-Based Tools Used to Measure, Price, or Trade Greenhouse Gas (GHG) Emissions

## Energy Attribute Certificate (EAC) - RECs, I-RECs, D-RECs, TIGRs, GOs

To reduce market-based Scope 2 emissions, a company can procure EACs and retire them

**RECs** Common in US, Canada, and Australia. Most widely traded EAC globally

**GOs** Used in Europe

**I-REC** Standardized for use in developing markets across Asia, Latin America, Africa, and the Middle East where they are no domestic system

They serve the same purpose, but are named differently due to **different regulatory frameworks, tracking systems, and standardization** in their respective regions.

→ RECs' average prices differ from regions, projects, and markets



**USD 23.2-28 billion** in 2025, with projections of growth to **USD 45-64 billion by 2030-2035, CAGR 10.2%** (*MarketsandMarkets, 2025*)

**Asia-Pacific** is the fastest-growing regional market, with a **CAGR close to 10%** (*MarketsandMarkets, 2025*)

**Vietnam** market is projected to expand from **USD 9.11 million** in 2024 to **USD 50.61 million** by 2032 at a 20.7% CAGR (*datamintelligence, 2025*)

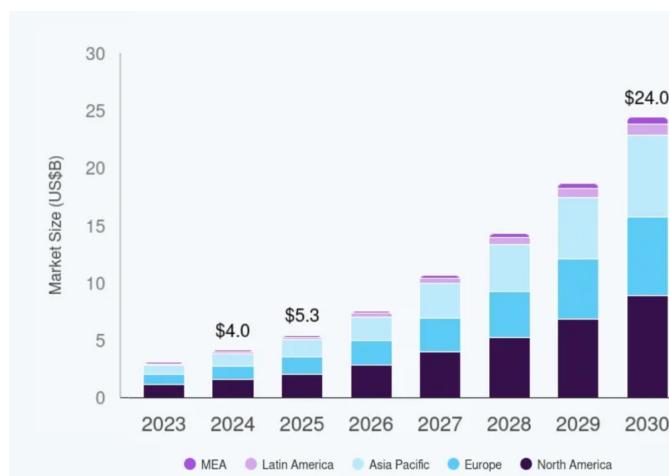
## Carbon Credit Instruments

### Verified Carbon Credits (VCCs)

- Each credit is uniquely numbered and recorded in a public registry for transparency, certified by standards like Verra/Gold Standard
- Satisfy only Scope 1 and 3 renewable electricity requirements
- Not applicable for companies participating in RE100
- Strict additionality requirements

### Global Voluntary Market

- Market Size (2025): USD 5.32 billion
- Growth Rate: Projected CAGR of 35.1% (2025–2030), reaching nearly USD 24 billion by 2030
- Fastest Growing Market: Asia Pacific
- Price Range: USD 0.25 - 30 per ton, average USD 6.5



VCC is a **good complement but not a replacement for REC**. Providing both VCCs and RECs could be part of a mid- to long-term plan if Stride is exploring larger projects. However, it is **currently unfavourable due to high MRV costs** and low per-project CO<sub>2</sub>.

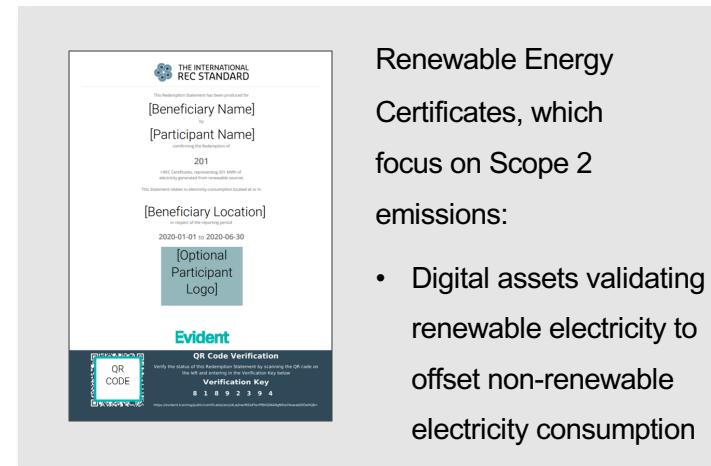


# Role of RECs in Global Decarbonization

# Overview of RECs Globally and in Vietnam

Definition, Characteristics, Types, and Benefits of RECs

## Definition & Characteristics of RECs



Renewable Energy Certificates, which focus on Scope 2 emissions:

- Digital assets validating renewable electricity to offset non-renewable electricity consumption



### Unique

Each REC comes with a unique serial number



### Tradable

Companies can buy and sell RECs for profit



### Vintage

The year the REC was created, with older RECs being less favoured



### Tangible

A certificate showing evidence that the REC was produced through renewables



### Financially-Motivating

Companies can sell these RECs at market price

## Motivations to Procure/Generate RECs

- Corporate sustainability commitments
- Regulatory requirements
- Green building standards
- Government support
- Government incentives
- Sustainable investments
- Additional profits

1 REC = 1MWh

## Types of RECs

1

### Bundled RECs

Certificate with the physical electricity transferred via subsea cables

2

### Unbundled RECs

REC certificates without the physical electricity

## Contribution to Emissions

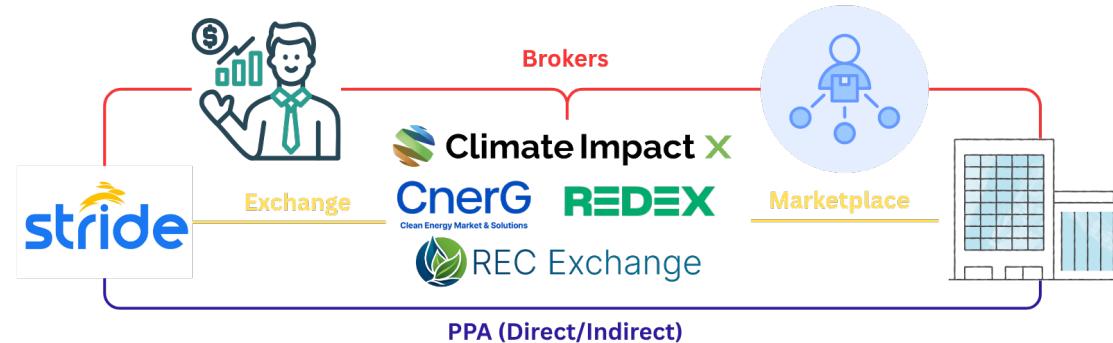
- **Market signal:** RECs create demand for renewable energy, which **incentivises further investment** and development of **clean power projects**
- They allow companies to **offset their Scope 2 emissions** (from purchased electricity), showing **progress toward net-zero** or renewable energy targets
- As **renewable generation increases through REC-driven demand**, it gradually displaces fossil fuel-based electricity on the grid, lowering overall greenhouse gas emissions

# Three Main Channels of Sales for RECs



Less Intermediaries = More Margin

To get higher margin, more effort is needed to remove intermediaries



## Different Types of Transactions

1. Seller > Broker > Marketplace > Broker > Buyer [for large or cross-border deals]
2. Seller > Broker(s) > Buyer [for tailored/negotiated deals, small sellers, big buyers]
3. Seller > Marketplace > Buyer [for standard RECs, easy process, fast deals]
4. Seller > Buyer [large multinational buyers and sellers, long-term deal]

### Direct Power Purchase Agreement

**Seller & buyer negotiate directly;** either bundled with energy delivery or it's financial contract-for-differences (unbundled)

Best for: Large producers seeking maximum revenue

Smiley face icon: Highest margin, full control over terms and buyer, long-term revenue certainty

Frowny face icon: Significant sales effort, time-consuming, complex (negotiation, network & management expertise)

● **Sales Effort**

● **Margin**

● **Buyer Access**

● **Control**

### Brokers (Seller/Buyer) (Virtual PPA)

Either **one or two brokers** in the deal to match buyers & sellers, handling admin/reporting work

Best for: Smaller producers / New market entrants seeking minimal operational burden

Smiley face icon: Low operational effort, wider market access, pooled RECs

Frowny face icon: Reduced margin, less transparency on prices/buyer profiles, strong dependency

● **Sales Effort**

● **Buyer Access**

● **Margin**

● **Control**

### Exchange (Climate Impact X) (Virtual PPA)

Sellers registering & reporting RECs independently and listing them on the platform, fees only incurred when a deal is formed

Best for: General RECs, transparency, and fast trades

Smiley face icon: Fastest deals, simplified compliance (standard process), transparent prices, wide market access

Frowny face icon: Platform fee, Commoditized RECs lowering premium for high-impact project,

● **Sales Effort**

● **Buyer Access**

● **Margin**

● **Control**

# Overview of RECs in ASEAN and Vietnam

## Vietnam REC Landscape and Comparison with ASEAN Countries



### Overview of Vietnam's REC Market

- **Regional Position:** Vietnam now has the highest issuance but the lowest REC prices in Southeast Asia. Most RECs are exported rather than used domestically
- **Shift Toward DPPAs:** Direct Power Purchase Agreements are emerging as a more credible option for renewable procurement, which may reduce reliance on I-RECs because of increasing subsea cables
- **Outlook:** Market projected to grow 5× by 2032, though challenges like transparency and standardisation remain

### Reasons for Sudden REC Growth



#### Good Geographical Location

Compared to other SEA, Vietnam has flat land areas suitable for wind and solar farms



#### Increased Investments

Vietnam pushing for feed-in-tariffs from 2017-2021



#### Presence of Power Grids

Presence of regional grid through APG → can send their electricity to other countries



#### Electricity Growth

VN economy is growing fast – industrialisation, middle-class people using aircon, DCs, consumer electronics



#### Politics

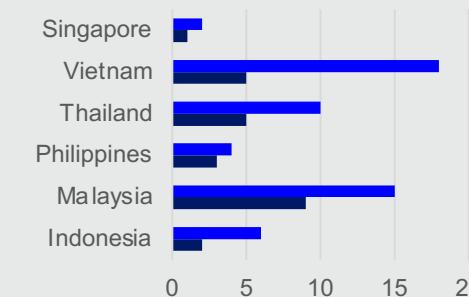
Global disruptions, such as the Russia-Ukraine war, have increased coal and gas prices

### Comparison to Other ASEAN Countries

- Since the “Do Moi” reforms in 1986, Vietnam has decided to invest more in the power sector to meet growing demand domestically



- With their domestic investments, their electricity consumption increased compared to their ASEAN counterparts except for Indonesia



- Issuances (Million MWh)
- Redemptions (Million MWh)

\*Vietnam has the highest renewable sources in SEA

A photograph showing two men in a tropical environment. One man is in the foreground, seen from the side, wearing a traditional grass skirt and a necklace. The other man is further back, wearing a hat and a light-colored shirt. They are surrounded by lush greenery and palm trees.

# REC Key Players and Market Processes

# Specialized Actors Connect Renewable Projects with Demand



Issuers, Registries, Intermediaries, and Buyers Sustain the REC Market in Vietnam

## Solar Panel Fund Platforms

- Stride
- Solarvest Holdings – recently launched a solar financing program, Powervest
- GreenYellow – finance, design, construct, and operate solar energy systems in VN

## Verifiers / Issuers

- GCC – official I-REC issuer in Vietnam
- APX (TIGR) – issues TIGRs, an alternative to I-RECs, but with a smaller market presence
- Independent auditors – verify generation data

## Registries

- Evident (I-REC) – main global registry used in Vietnam
- APX TIGR Registry – alternative registry system



## Buyers / End Users

- Heineken Vietnam – confirmed I-REC buyer
- Multinationals – global REC users in VN and Worldwide
- Local corporates & banks – **ESG focus, rising REC demand**

## Trading Platforms

- Xpansiv CBL – largest global REC exchange
- T-RECs.ai / GoNetZero – Asia & regional platforms
- OTC deals – direct to corporates or via brokers

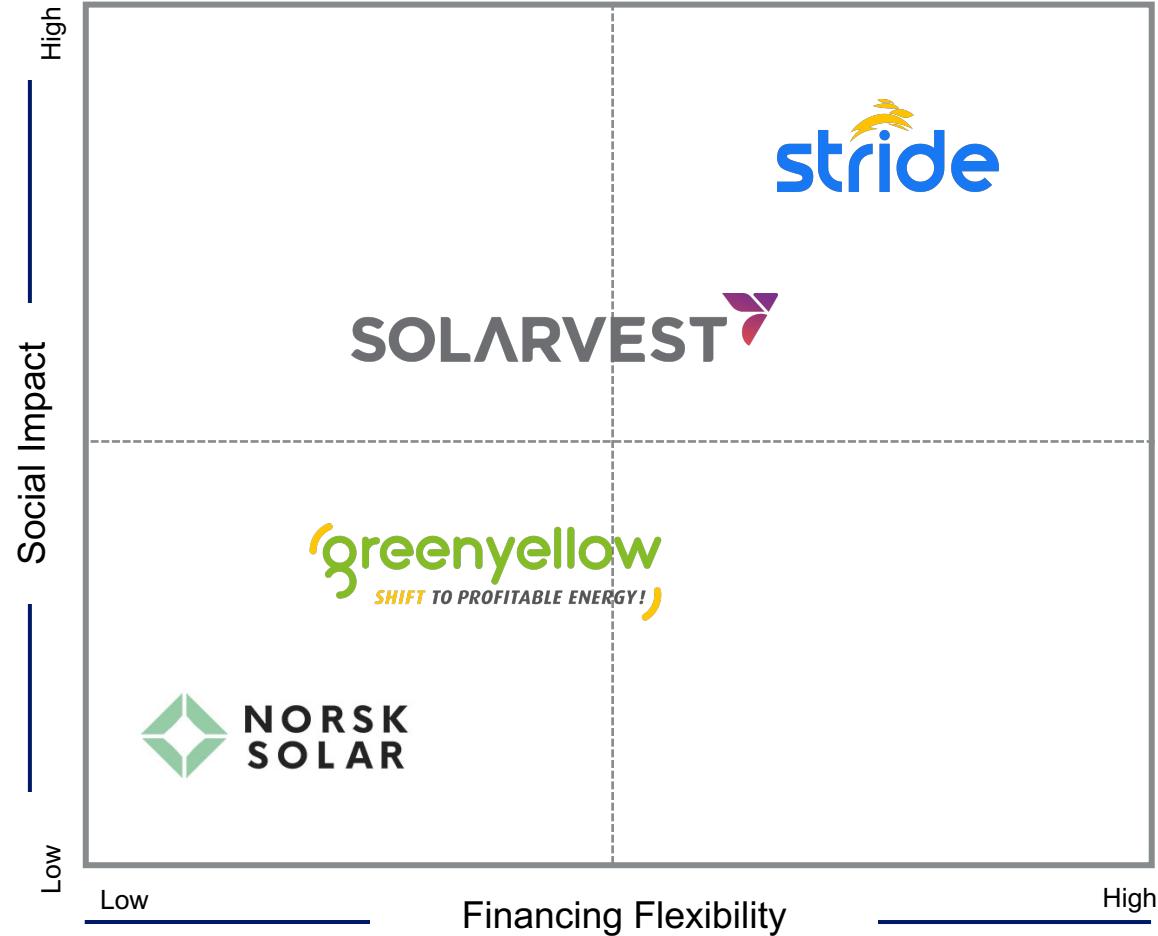
## Aggregators / Service Providers

- VP Carbon, ECOHZ, South Pole – **aggregators & advisors** linking projects with buyers
- PowerTrust – bundles community RECs, offers impact-focused advisory
- Local consultants

# Solar Panel Financing Platforms



Understanding the Competitive Landscape of Stride



## Competitor Analysis

Company	Short Description
Stride	<b>Primary Customer:</b> Households in Rural Areas <b>Financial Model:</b> 80% paid by Stride, 20% upfront by customer <b>Pros:</b> Unique target audience, great costing, opportunities for D-RECs
SolarVest	<b>Primary Customer:</b> SMEs, Commercial, Industrial <b>Financial Model:</b> 50% paid by SolarVest, 50% upfront by customer <b>Pros:</b> Offers flexible payments mostly for B2B
GreenYellow	<b>Primary Customer:</b> Large Commercial, Industrial <b>Financial Model:</b> 100% loan paid by GreenYellow <b>Pros:</b> Handling financing, operations, and maintenance of the solar panels
Norsk Solar	<b>Primary Customer:</b> Commercial, Industrial, Retail Chains <b>Financial Model:</b> 100% loan paid by Norsk Solar financed through debt+equity <b>Pros:</b> Strong finances and reliable returns

## Relevance to the Project

Stride is uniquely positioned well against their competitors, with pros including a higher REC pricing due to more impactful contributions to rural areas, highly demanded by MNCs.

# REC Registries and Issuers

REC Standards & Compliance Worldwide and Vietnam

## Registry (I-REC or TIGR Standards)

Depending on country, and seller preference, to pick ONE registry



By I-TRACK Foundation in Europe<sup>1</sup>

Manages RECs in 60 countries, with most issuances in China, Brazil, and Turkey

By APX in the USA  
Newer standard often used due to digital ease, tech-integrated, real-time tracking



## Local Issuer for I-REC

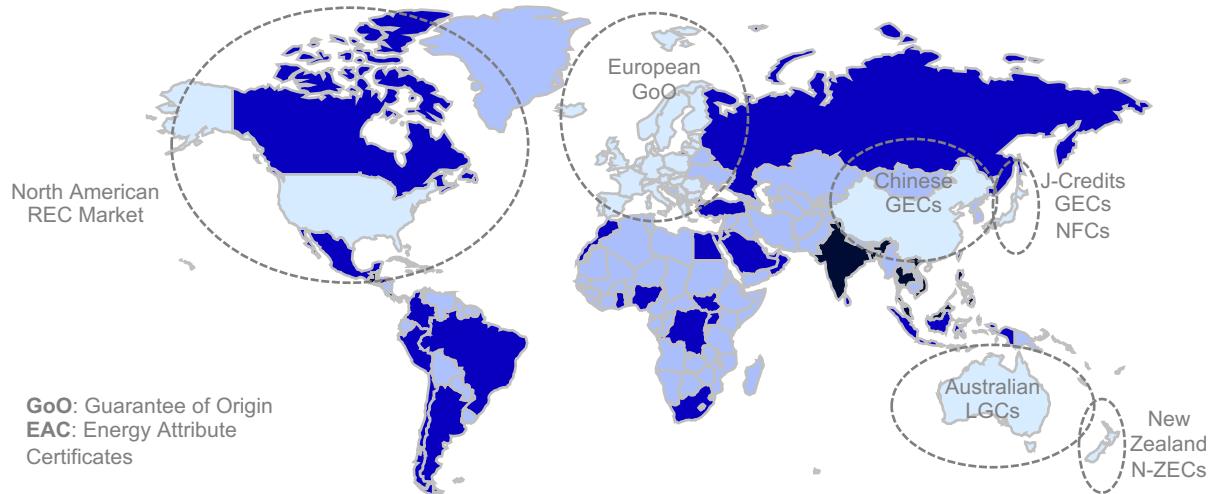
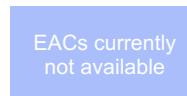
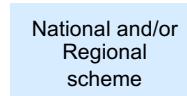
Dependent on country

Countries typically assign national electricity bodies to issuer RECs

(e.g. SP Group for SG, The Green Certificate Company for VN)

Companies that register can choose REC Standard to follow; else, will be determined by broker or exchange

## Global REC Market



## Vietnam REC Market



### 120 projects registered in Vietnam

- 80 Hydropower
- 26 Solar Projects
- 4 Wind
- More than 3,085 MW installed capacity



### 46 projects registered in Vietnam

- 14 Solar Photovoltaic Projects
- 31 Solar Serving On-Site Load
- 1 Wind
- More than 307 MW installed capacity

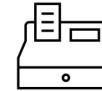
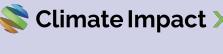
Recognized by organizations incl. the GHG Protocol, RE 100 and CDP



# REC Trading Platforms and Other Key Players

REC Registration Processes in Vietnam and Trading Platforms

## Trading Platforms for RECs

Key Features	In Vietnam	Key trading platforms / marketplaces that are accessible in Vietnam:
 Asia-wide REC marketplace with registry integration	Frequently used by corporates across the region	
 Frequently used by corporates across the region	Operational in Vietnam with multiple trades from VN to SG	 Allows companies to <b>purchase and sell RECs to and from Vietnam – mediating the best prices for sellers and best contract terms for buyers</b>
 Full-cycle digital platform from issuance to retirement	Fully scalable and global, accessible from Vietnam	*More popular with smaller REC producers without enough capacity to sign a DPPA  If companies do not want to go to these platforms directly and want to, <b>register RECs</b> they should go to service providers like <b>VP Carbon, Vu Phong Energy Group, etc.</b>

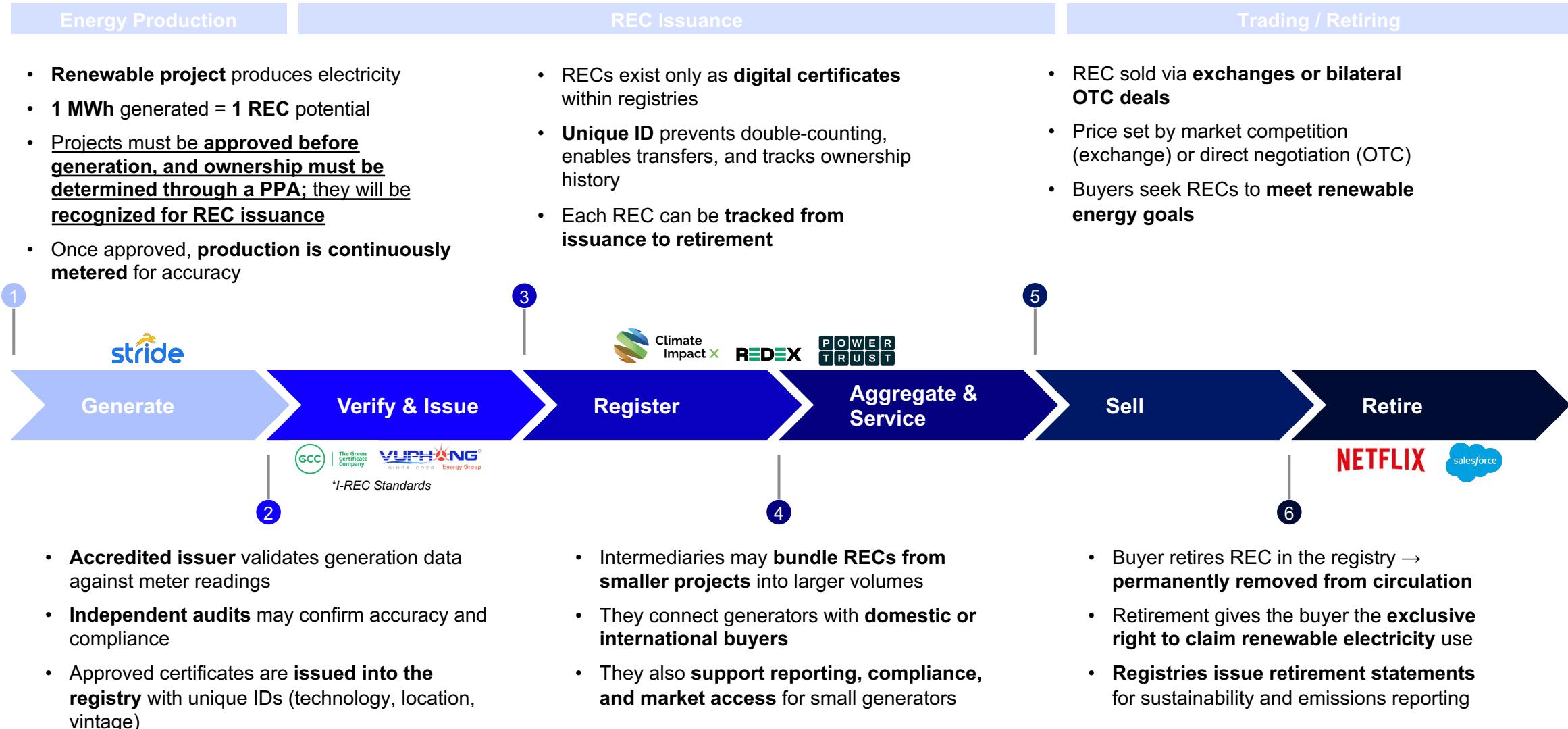
## Other Key Players in Vietnam

Official Issuer (GCC)	Service Providers	End Buyers
<ul style="list-style-type: none"><li>In Vietnam, the accredited I-REC issuer is the Green Certificate Company (GCC).</li><li>GCC is appointed by the International Tracking Standard Foundation (I-REC Standard).</li></ul> <p>Their role is <b>neutral and administrative</b>:</p> <ul style="list-style-type: none"><li>Register renewable energy projects in the I-REC registry.</li><li>Verify generation data.</li><li>Issue official I-REC certificates (1 MWh = 1 REC).</li><li>Ensure no double-counting or fraud.</li></ul>	<ul style="list-style-type: none"><li>Vu Phong Energy Group is not an issuer. They are a local partner / service provider.</li><li>Their role is commercial and operational:</li><li>Help renewable energy project owners (e.g., solar farms, wind farms) apply for I-REC registration through GCC.</li><li>Provide consulting, documentation support, and ongoing management.</li><li>Sometimes act as brokers — connecting project owners (sellers of RECs) with corporates (buyers who need RECs for sustainability targets)</li></ul>	<ul style="list-style-type: none"><li>Although not mandatory for RECs to be purchased and reported, many multinational corporations are purchasing RECs to report on their annual statements</li><li>Unlocks future incentives such as green financing investments, ESG government advantages, especially in tech, etc.</li><li>Examples: Unilever, Netflix, Amazon Web Services</li></ul>

# Structured REC Lifecycle Ensures Credible Renewable Claims



Verification, Registry Tracking, and Controlled Retirement Guarantee Traceable, Tradable Certificates for Reliable Corporate Reporting



# Current Developments on REC Standards Worldwide

Global Climate and Energy Landscape

## Current Standards for International Trade

Southeast Asia does NOT have a standard to guide the buying and selling of RECs – can only package as Asian RECs, but not able to sell directly to another country

Local guidelines in nearby countries make it difficult for RECs to be recognized cross-border

For instance, SG has the SS 673 which standardizes the trade of RECs in the country

International RECs are usually traded within international marketplaces such as TIGR (subject to whether REC standards are recognized in the buyer's country)

## Recent Developments

### The I-TRACK Foundation to support development of cross-border REC framework for Southeast Asia



**Regional Frameworks for Cross-Border Renewable Energy Certificates (RECs) Trading on Grid-to-Grid Transmission Lines: Gap Analysis vis-à-vis International Standards**

**Singapore seeks experts to work on global framework for cross-border renewable energy certificates**

## Summary

- With the APG, there are more calls for a standardized buying and selling of RECs in Asia
  - SG is collaborating with Malaysia to build a new REC framework for bilateral trade to standardize code of practices, ensure proper verification, support REC market development, and integrate with power grids for physical electricity trade in SEA
  - Prevent greenwashing in cross-border trade, especially in SEA, with an increase in REC supply
  - Provide government oversight over the trading of RECs, making it more credible
- However, proven to be challenging because of:**
- Potential to mix renewable and non-renewable energy sources in the local grid
  - Different financial constraints cross-border

## Relevance to the Project

The future framework in SEA provides additional standards and guidelines for the efficient trading of RECs. Once the framework is finalized, there will be a surge in REC demand as companies recognize RECs' credibility.

# Overview of D-RECs



# Overview of D-RECs

Distributed Renewable Energy Certificate Worldwide and Vietnam

## What is a D-REC?



- Distributed Renewable Energy Certificate
- 1 MWh of renewable electricity
- Small-scale, distributed energy systems



Unlock new climate finance and accelerate the adoption of DRE, creating measurable climate and social impact in underserved communities.

## D-RECs Initiative

- D-RECs = High-impact verification label for EACs, issued as a type of I-RECs, from DRE projects
- Launched in 2021 by South Pole & Positive Capital Partners
- To address the lack of access to clean energy in emerging markets

## Distributed Renewable Energy (DRE) Projects

*Small-scale, decentralized renewable energy systems (such as rooftop solar, village mini-grids, biomass, and wind) that generate power close to where it is used – often in off-grid or remote communities.*



### Local Generation

Installed near homes, businesses, or villages (not large power plants)



### Social Impact

Enhances energy access, supports health, jobs, and education in underserved regions



### Climate Benefits

Reduces fossil fuel dependence, supports clean energy transition

## Current Statistics



**400+ GWh**

**Committed for Purchase**  
By corporate buyers via D-REC-linked projects



**1850+ Devices**

**Verified DRE Systems**  
Small-scale assets across rural and community sites



**\$20 - \$30 per MWh**

**Average \$25/MWh**  
Stricter criterias reflecting dual climate and social-economic value



**22 Countries**

**Active or Pipeline**  
Across Africa, Asia, and Latin America (Vietnam included)



**700+ Sites**

**Project Sites**  
Verified installations across rural, semi-urban, and community-based energy system



**3,500 GWh by 2030**

**Value of USD 100 million**  
Aims to uplift 3.5 million people to the Modern Energy Minimum of 1,000 KWh/person/year

## D-REC Investment Decision Quadrant

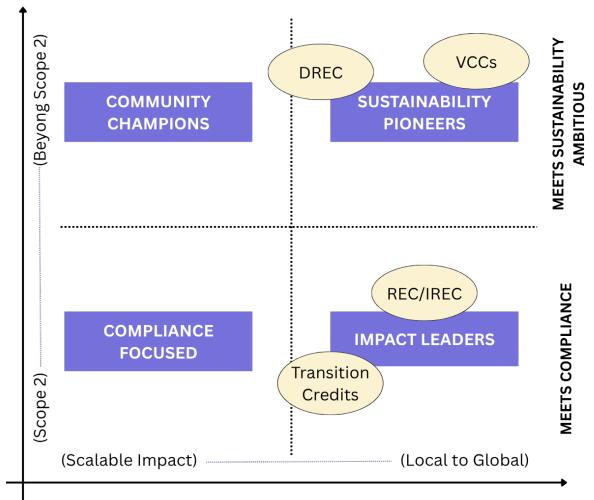
D-RECs enable corporations to position themselves at the forefront of meaningful change

### Growth Trends:

1. Limited supply of quality projects
2. With the 15-year rule kicking in to qualify projects, there's a demand for new assets

### Limitation:

1. Low awareness of D-REC
2. Not accepted in most compliance markets



# Worldwide D-REC Developments



Growing Need for D-RECs for Multinational Companies

## Current D-REC Landscape Worldwide

D-RECs are being piloted in **22+ countries** (Africa, Asia, Latin America) to support distributed renewable energy (rooftop solar, mini-grids)

D-RECs supply come from 3<sup>rd</sup> world countries, including Southeast Asia, Africa, Latin America

Attractive for large corporations due to positive impact made to customers and company

Multinationals like **Salesforce**, **Microsoft**, and **Meta** have started using D-RECs

## Recent Developments

**Productive Use:**  
Partner: SOGE  
Project: Solar powered irrigation pumps  
Location: Cambodia

**SDG Outcomes:**  
SDG icons: Productivity, Health, Education, Environment, Gender Equality, Decent Work.

**Social/Environmental Impact:**  
SOGE has installed solar irrigation pumps serving ~1,500 hectares of farmland in rural, unelectrified communities in Cambodia. With the amount of the REC generated, the project will help to reduce greenhouse gas emissions by 1,500 tonnes per year.

**Support Financing:**  
Partner: Stella Futura  
Project: Christian Health Association of Ghana  
Location: Ghana

**SDG Outcomes:**  
SDG icons: Productivity, Health, Education, Environment, Gender Equality, Decent Work.

**Social/Environmental Impact:**  
The CHAG hospital network provides healthcare to 700,000+ patients every month, primarily women and children. The RECs helped support upfront financing.

**Financing New Projects:**  
Partner: Solar Village Project  
Project: R.S. Memorial Public School  
Location: India

**SDG Outcomes:**  
SDG icons: Productivity, Health, Education, Environment, Gender Equality, Decent Work.

**Social/Environmental Impact:**  
D-REC revenues were used to install a 2 kW solar array for the R.S. Memorial Public School in the Patuna locality of the Lucknow district in Uttar Pradesh, India. This will help to reduce greenhouse gas emissions by 1,500 tonnes per year.

**Support Financing:**  
Partner: OMC Power  
Project: Rural small & Micro-enterprises  
Location: India

**SDG Outcomes:**  
SDG icons: Productivity, Health, Education, Environment, Gender Equality, Decent Work.

**Social/Environmental Impact:**  
OMC will be helping rural small and micro-enterprises that do not have required credit history in Uttar Pradesh access clean, reliable electricity to power village industries.

**Projects supporting the lifestyle of whitespace communities**

## Summary

- New framework (D-REC) introduced with the purpose of **making a more tangible impact** to be reported by larger corporations
- **Recognised by I-REC standards**, it still has multiple developments to be made, including standards on solar panel farm quality
- Has been **growing in impact in Asia and South America**, with projects procuring RECs in rural areas and from microenterprises

However, proven to be challenging to push:

- Limited panel farms dedicated to D-RECs due to **difficulties building in a rural area**
- Rural communities with **limited funding for upfront costs**
- **Limited Pricing Standards – no market mechanisms to show pricing trends, etc.**

## Relevance to the Project

The future framework in SEA provides additional standards and guidelines for the efficient trading of RECs and their pricing. Once the framework is finalized, there will be a surge in REC demand as companies recognize RECs' credibility. Nevertheless, currently it is a new and developing market with limited mechanisms.

# Relevance of D-RECs and Stride

Stride's Projects Fit D-REC Criteria, Which Explains the Premium Pricing Quoted by PowerTrust

<b>Stride's current deal with PowerTrust is via D-REC, selling at the price of USD 26</b>	 <b>Vietnam Underserved Household</b> Additionality - underserved household would not have access to renewable energy if it were not Stride's projects	 <b>Household Businesses</b> Economic and social benefits – reduced expenses on electricity & higher margin for businesses	 <b>Scope 2</b> Solar energy replaces coal-fired power plants, reducing carbon emissions	 <b>PowerTrust is a co-leader in D-REC Initiative</b> It pools small producers' D-RECs and sells to big corporations
---	---	---	---	---



## "Misalignment" with REC/I-REC Pricing in the Voluntary Market



**USD 25/MWh**

Premium pricing due to dual economic & social impact



**USD 0.44/MWh**

Low price due to oversupply



**USD 30/MWh**

Higher price in Asia due to limited land and solar energy supply



**USD 0.70/MWh**

2017 price, compliance market average USD 40

*Positioning Stride's projects' RECs as D-RECs seems the most promising at this stage if the D-REC price remains this high. However, since it is a developing instrument with few standards and limited customers, it poses risks to Stride.*

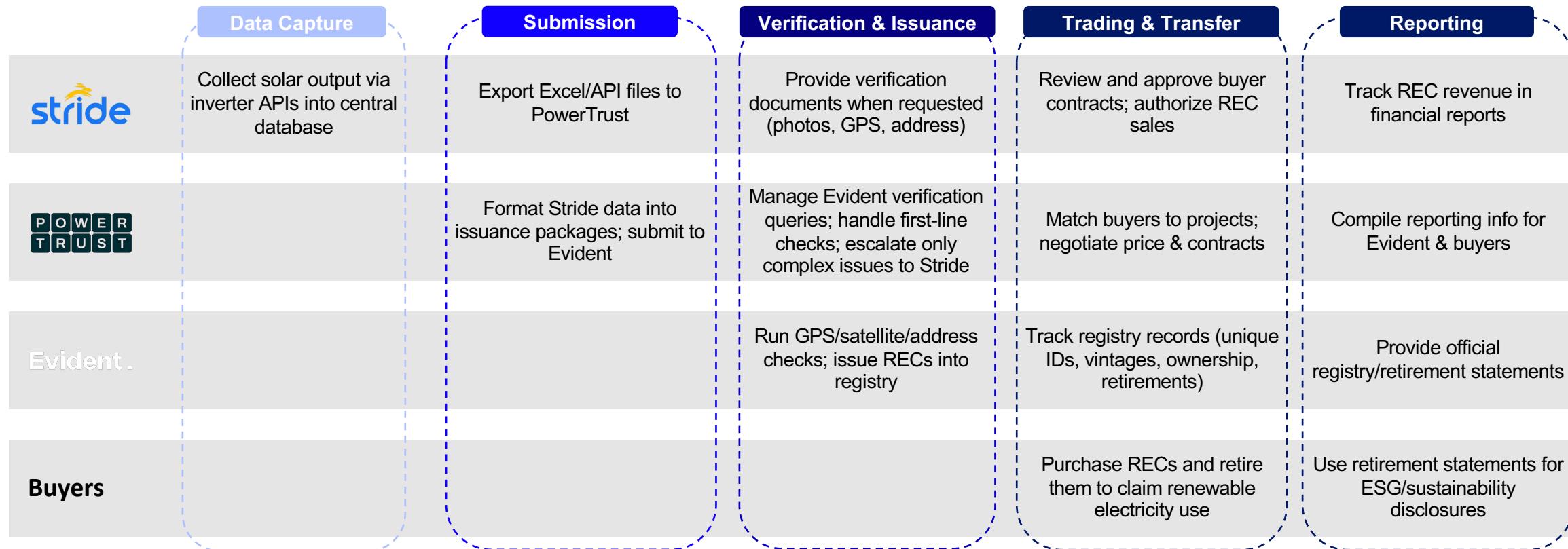
A photograph of a man working in a field, likely harvesting rice. He is wearing a conical hat and a cloth wrapped around his waist. He is bending over, working with a large pile of harvested rice. A blue vertical bar is positioned on the left side of the image.

# Stride's REC Model

# How Stride's RECs Move from Data to Retirement



Stride Captures & Submits → PowerTrust Facilitates → Evident Verifies & Issues → PowerTrust Trades → Buyers Retire



## Additional Context & Takeaways

- **REC issuance is demand-led** (only issued when a buyer/contract exists), with quarterly submissions as the standard cycle.
- Data capture is automated via inverter APIs and stored in a central database. The data is already collected for operations, so **no extra effort** is needed for REC reporting.
- Stride currently benefits from a **premium REC contract** (~\$26/MWh vs. ~\$0.50 local average).
- REC income contributes **<5% of gross profit** and is treated as additional upside rather than core business revenue.

# Modelling REC Eligibility Scenarios

Forecasting Stride's Monetisation Potential With/Without Post-Repayment REC Capture Strategy

What this model does	Input Lever	Purpose	Base case
<ul style="list-style-type: none"> <li><b>Portfolio REC Model:</b> Forecasts annual RECs &amp; revenue for Stride's entire fleet as capacity scales</li> <li><b>Unit REC Economics:</b> Estimates MWh → RECs → \$ over 35 years for an average rooftop system (with panel aging)</li> </ul>	<b>Growth of installed MWp</b>	Drives capacity expansion	UOB forecast: 50 – 36% (2026 – 2028), then stabilising at 30%
	<b>Capacity factor (CF)</b>	Converts MWp → MWh	7.8%
	<b>Degradation rate</b>	Reflects panel aging	0.8%/year
	<b>Ownership window</b>	Defines REC eligibility period	2 years
<b>Post-Repayment REC Capture Strategy</b>	<b>Sales share</b>	% of RECs monetized	95%
	<b>REC price</b>	Converts RECs → Revenue	\$26/REC
	<b>Post-repayment rights</b>	If Stride retains post-repayment REC rights → additional revenue tail unlocks	NO

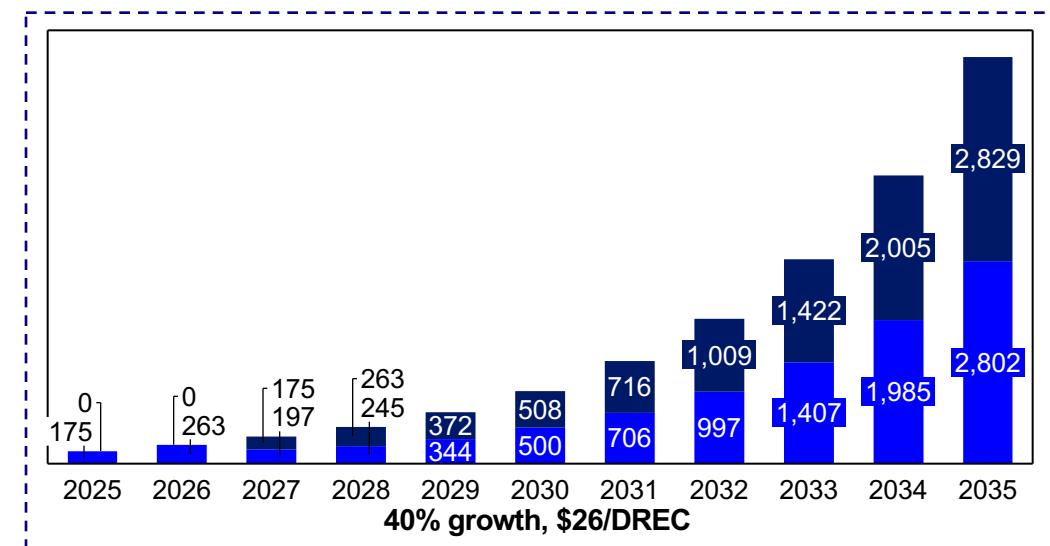
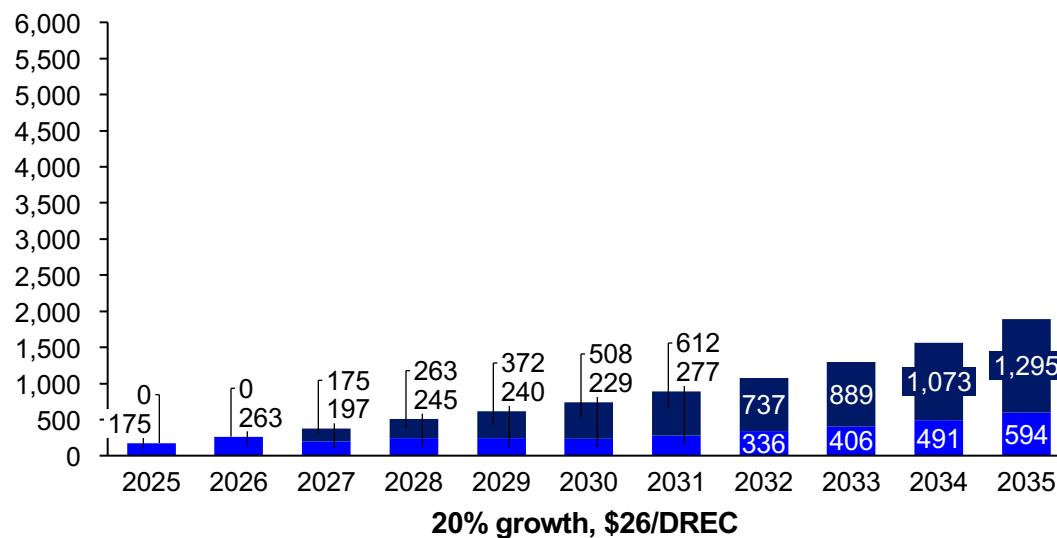
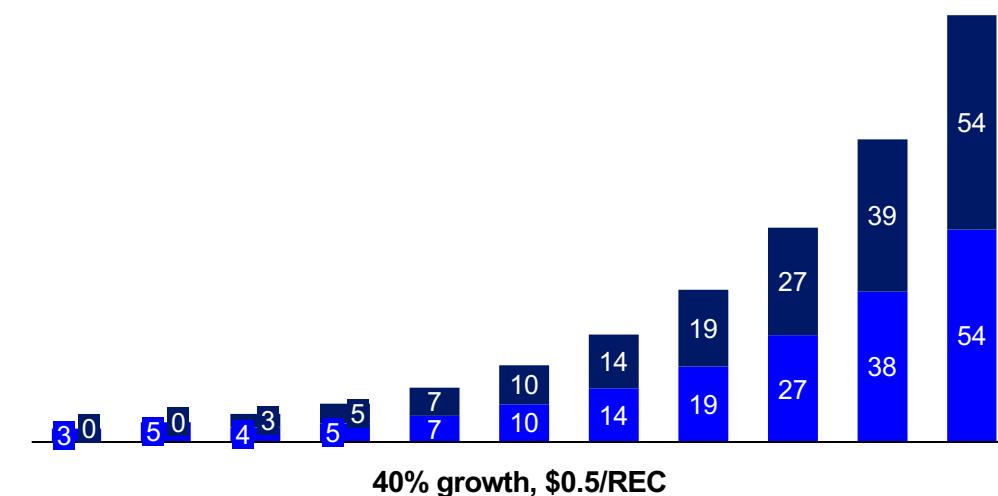
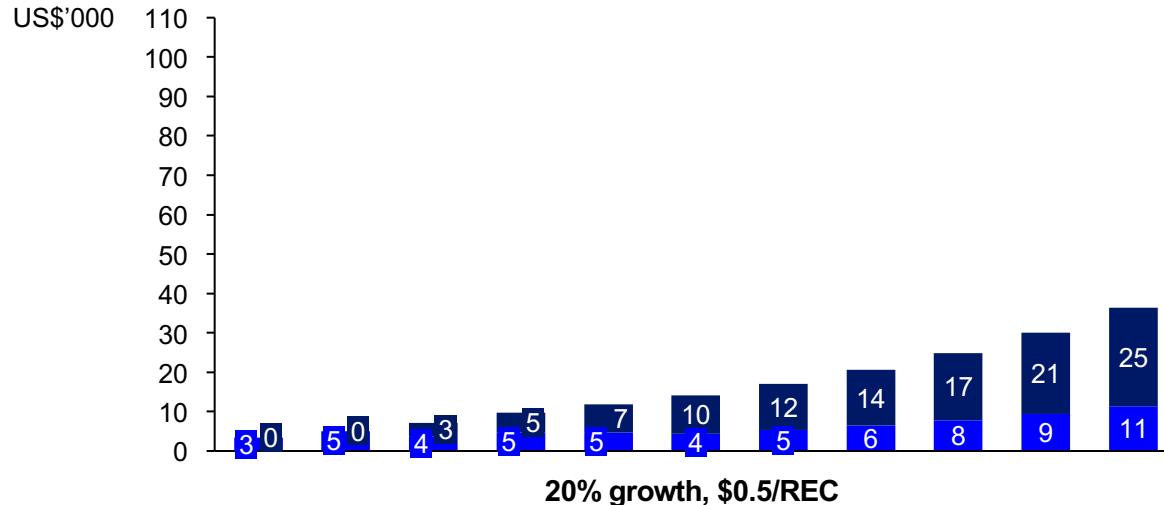
## Computation logic



# REC Portfolio Revenue Potential to 2035



Premium Pricing Is the Real Value Unlock, Especially When Paired with Rapid Capacity Growth and Extended REC Rights



Without Post-Repayment REC Capture Strategy

With Post-Repayment REC Capture Strategy

Source(s): own calculations (REC Revenue Excel Model)

Note: Scales differ to maintain visibility of low-revenue scenarios

# Strategic Interpretation of REC Revenue Scenarios



Premium Pricing Is the Key Revenue Driver. High Growth and Post-Repayment Capture Amplify Strategic Upside

	Low Growth (20%)	High Growth (40%)
Low REC Price (\$0.5/REC)	<p>At low pricing and modest capacity growth, <b>REC income stays negligible</b> and does not influence strategic priorities.</p> <p>It remains a <b>minor side effect</b> of operations rather than something worth optimising</p>	<p>Rapid growth increases REC volume, but <b>without pricing leverage</b>, the <b>revenue pool remains too small</b> to justify strategic investment or negotiation effort.</p>
Premium D-REC Price (\$26/REC)	<p>Even without aggressive scaling, premium pricing <b>begins to turn RECs into a meaningful side revenue stream</b>.</p> <p>This starts to justify process optimisation and contracting discipline.</p>	<p>The combination of scale and premium pricing transforms RECs from incidental income into a <b>scalable revenue pillar</b>.</p> <p>This is the scenario where extending REC capture beyond repayment holds the highest upside.</p>

## Key Strategic Takeaways

- **Pricing** leverage is the **primary value driver**. Volume without premium pricing creates limited financial relevance
- When **premium pricing is paired with high growth**, REC monetization becomes strategically relevant and financially material
- Introducing a **Post-Repayment REC Capture Strategy** could **unlock a second revenue curve**, extending cash flow beyond the current 2-year ownership window with minimal additional capex

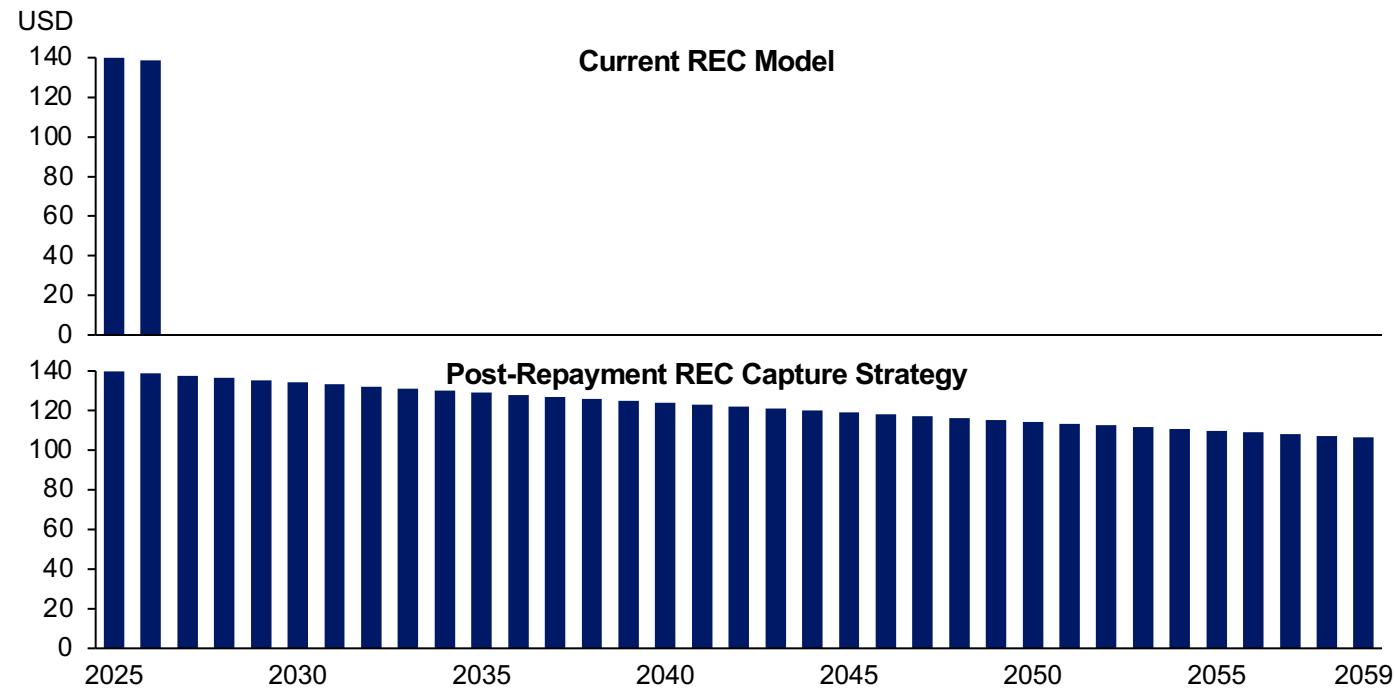
## Potential Strategic Lever: Post-Repayment REC Capture

- Stride currently monetizes RECs only during the ~2-year financing window.
- If **REC rights were extended beyond repayment**, installed systems could generate **long-tail REC revenue without additional capex**.
- *(Detailed financial effect quantified on the next slide)*

# Lifetime REC Value of a Single Rooftop System

Unlocking \$4,283 in Lifetime Rec Value Beyond Today's \$278 Cap Without Additional Capex

System Profile (Household)	
Parameter	Value
System size	7.9 kW
Capacity factor (CF)	7.8%
Degradation rate	0.8%
REC price	\$26/REC
REC Eligibility (Current Model)	2 years
REC Eligibility (Extended Case)	35 years (panel life)



## Strategic Considerations

- Today, post-repayment RECs are not monetized. **This value is left uncaptured** and goes unused.
- After repayment, households currently capture \$0 from RECs.
- Stride could offer micro-payments (e.g., \$0.5/REC) via an in-app opt-in to secure long-term REC rights.
- Even after sharing value, **Stride keeps almost the whole upside** while households get passive income.

## Total REC Revenue

- Current model: ~\$278 over a 2-year period
- Post-repayment REC capture strategy: ~\$4'283 over a 35-year period
- 15.4x higher monetization potential** without additional capex



# PowerTrust's Business Model

# How PowerTrust Facilitates REC Sales



Understanding the Overall PowerTrust Business Model

## Overview on PowerTrust



### Development of D-REC Initiative

PowerTrust collaborated with Southpole and Positive. Capital Partners – addressing access to clean energy & climate financing



### REC Broker

Connects a willing buyer with a willing seller on a predetermined amount-by-amount basis the buyer is willing to pay



### Supporting Impactful Energy Projects

Besides Stride, PowerTrust focuses on financing partners that support indigenous communities with ONLY solar energy

## Main Selling Proposition to Sellers



### Registration of RECs

Providing convenience to sellers like Stride by handling the REC registration for sale



### Connections with High-Profile Buyers and Multiple REC sellers globally

Multiple connections to Asian sellers and global buyers – consolidating RECs



### Competitive Pricing

Compared to regular REC pricing, D-RECs handled by PowerTrust provide a premium pricing, only determined by the buyer

## Main Revenue Drivers



e.g. \$26

RECs from Stride Projects



e.g. \$35

RECs sold through PT



- PowerTrust to handle registration of RECs (e.g., going through The Green Certificate Company in VN to get I-REC certification)
- Agreed price determined by PowerTrust through discussions internally with the corporate buyer
- PowerTrust to sell at a higher price to the end customer
- PowerTrust to position Stride's VN RECs as ASIAN RECs – bundling with other nearby countries to meet the needs of large corporations

## Current Buyer Profiles



### Netflix to bring high-impact D-REC Projects to rural areas in India

To provide funding for solar panels while obtaining D-RECs involved



### Salesforce to buy 280GW Renewable Energy

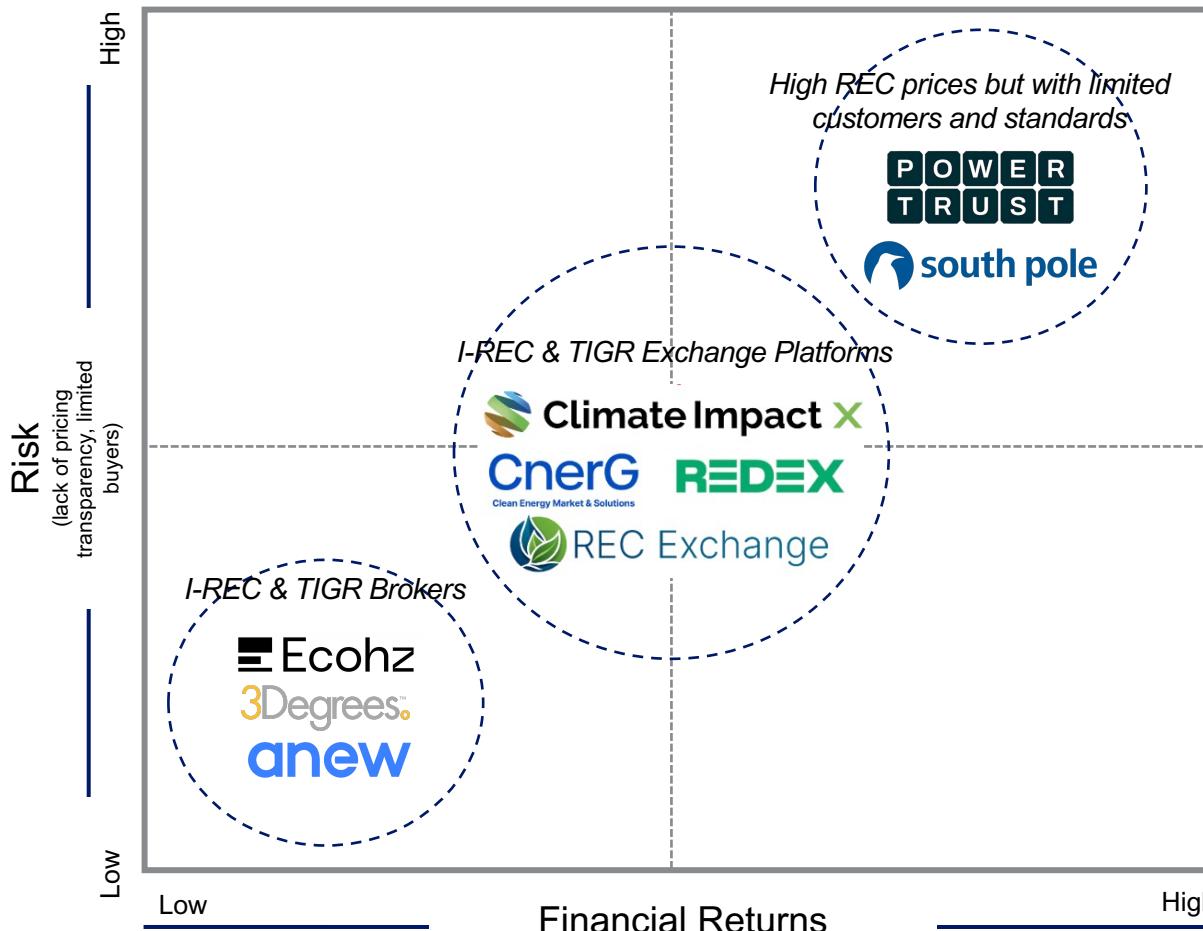
Partnering with PowerTrust to find D-RECs from emerging markets, including India, Myanmar, Vietnam, etc.

### Buyer Profile: Large Tech Corporations

Finding customers with enough budget to purchase D-RECs while consuming a lot of electricity – PowerTrust to aggregate RECs from sellers and facilitate trade

# PowerTrust Compared to Other Brokers & Exchanges

Understanding PowerTrust's Business Model and Advantages Compared to Other Similar Intermediaries

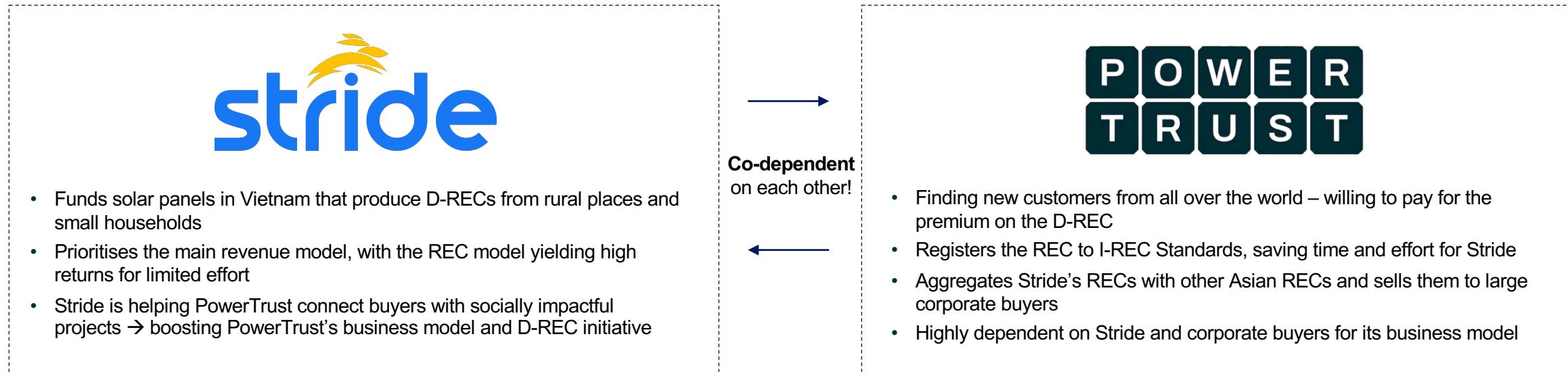


Relevance to the Project

Different risk profiles and financial returns can provide better information for Stride to diversify their REC registries and buyers, providing good financial return and reduced risk

# PowerTrust and Stride's Current Relationship

Stride and PowerTrust Provide Advantages to Each Party, Strengthening Synergies



## Key Advantages of PowerTrust to Stride



### Access to Global Markets

Contacts with large corporate buyers worldwide



### Premium Pricing

D-RECs provide a high market price compared to regular RECs in VN



### Reduced Administrative Burden

PowerTrust to provide registration services to sale of RECs

DPPA might be difficult due to the limited RECs being procured by Stride, therefore limiting the buyer pool to customers with high purchasing power



With Stride focusing on making social impact, PowerTrust directly recognises the extra effort and impact on small communities, charging a premium to buyers – great for Stride to support future endeavours

Stride focuses on finding new communities to build solar panels on and improving their current business model; PowerTrust to handle most of the value chain, lifting the burden of Stride

A photograph showing a man from behind, wearing a traditional wrap and a necklace. He is working in a field, possibly harvesting or weeding. The scene is set outdoors with lush greenery and trees in the background. The lighting is dramatic, with the subject silhouetted against a bright, overexposed sky.

# Strategic Recommendations

# Maximize REC Value Chain for Stride



Current Operational Gaps and Lifecycle Inefficiencies Leave Value Untapped

## Stride Should Invest More Resources In RECs Market

Vietnam RECs market is projected to be a **USD50 million market opportunity**

D-REC initiatives are accelerating and regulatory frameworks are taking shape, ensuring **stable pricing (\$20–30/REC)** and long-term market viability.

**Global and regional decarbonization push** (Vietnam, ASEAN, multinational corporations) will drive **sustained REC demand** from corporate buyers operating in the region.

RECs revenue for stride could 4x by 2030, assuming a 20% annual growth (slide 33)

## Three Areas Our Strategies Focus On

### Overdependence on PowerTrust

Operations and income from RECs are fully dependent on an external partner

- 90% of the REC process (issuance, verification, sales, etc.) is done by PowerTrust
- Stride does not have any in-house expertise in MRV
- PowerTrust's cut on margin is not communicated

*The lack of REC and MRV knowledge **hampers long-term scalability**, weakens strategic bargaining power, and limits profit potential due to overreliance on external partners.*

### Underutilization of RECs' Revenue

Current RECs' revenue is only used to cover credit risk from customer default; the growing market is underutilized

- RECs' revenue is not fully leveraged as an independent revenue source
- RECs are not a self-sustaining financial asset in this case (no cyclical revenue model)

*Stride is missing out on a **recurring, scalable revenue stream** that could enhance financial independence and long-term growth since its RECs are not leveraged as **self-sustaining assets**.*

### Loss of REC Value After Financing Period

Ownership of RECs belongs to the customer after the financing payments are completed, and the RECs' value goes to waste

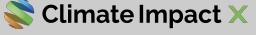
- Most customers lack awareness/capacity to utilize these RECs
- There is a gap in lifecycle asset management (loss of recurring revenue potential from the projects)

*By letting RECs lapse after financing ends, Stride forfeits the potential to **reclaim, trade, or extend monetization** of these certificates for long-term income and impact.*

# (1) REC Buyer Recommendations

Basing Our Recommendations on Our Findings from Our Primary and Secondary Research

## Interview Quotes on Buyer Preferences

 Climate Impact X

Business and Client Development Director

**"I do not recommend Carbon Credits** to my clients due to the weak structures they have in place, coupling with additionality."

"Small companies depend on brokers or exchange platforms because of their limited RECs. What happens is that brokers like PowerTrust aggregate these RECs and position it as **Asian RECs** – alleviating any greenwashing concerns."

 E3C Energy Market Company  
Forging A Resilient Energy Market

Assistant Business Manager – focusing on REC trading

"We see a trend where **large companies do not prefer REC exchanges** because they usually have DPPAs. However, these companies diversify their sources, having multiple PPAs."

"It might be better to position Stride's RECs as an **Asian D-REC**, else it would not be sufficient for large corporations buying it at a premium. I recommend trying REDEX too if you want less risk and more transparency with contract terms."

 ESR Keppel

Data Centre Business Development

"We purchase DPPAs from nearby countries. We prefer long term contracts. Data Centres also **NEED to purchase RECs** to get preference in CFAs from the government"

"Companies like Keppel usually directly make contracts with **REC buyers** or go through a broker like Climate Impact X. We focus our efforts more on cheaper RECs"

## Main Findings on Suitable Buyer Profile



### Main focus on RECs

Stride focuses on Scope 2, with RECs having more standards



### Large Electricity Consumers prefer Long-Term Contracts

Stride cannot do direct contracts with companies because they do not procure many RECs



### Small and Medium Enterprises prefer Exchanges & Brokers

SMES prefer working through an intermediary to facilitate ease of sale and aggregation of needed RECs



### Brokers like PowerTrust Aggregate RECs

Brokers like PowerTrust do not sell the RECs as "Vietnamese" RECs, rather, it is packaged as Asian RECs



### Some but not all Exchanges help with Registration to Sale

REDEX helps with registering RECs and selling them in their own exchange platform → Rehash, currently operational and developing to build a better market system

# (1) REC Buyer Recommendations

Primary Research Recommendations Fit with Stride's Current Model

Main Goal: Get closer to the end buyer to eliminate any excess costs and shorten the value chain, while considering the risk and return preferences of Stride.



Buyer Profile 1

Buyer Profile 2

Buyer Profile 3

Who	Large corporations with high electricity consumption in Singapore (e.g., Data Centers)	SMEs with medium electricity consumption buying <b>RECs from exchange platforms</b>	SMEs with medium electricity consumption buying <b>D-RECs from brokers</b>
Advantages	<ul style="list-style-type: none"> <li>Need to purchase RECs to gain preference from the government in Call For Actions – long-term contracts, less risk</li> <li>No intermediary transaction fees</li> </ul>	<ul style="list-style-type: none"> <li>Facilitate exchanges between seller and buyer, working for the interest of Stride</li> <li>Transparent fees, sure sale</li> </ul>	<ul style="list-style-type: none"> <li>Highest Returns from D-RECs</li> <li>Brokers handle verification and sourcing directly with project developers</li> <li>Offers storytelling value, ability to trace renewable energy impact</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>Lock in the price from when the PPA is signed</li> </ul>	<ul style="list-style-type: none"> <li>Transaction fees</li> <li>Less opportunity for brand storytelling</li> <li>Price volatility driven by market</li> <li>Lower returns compared to D-RECs</li> </ul>	<ul style="list-style-type: none"> <li>Limited price transparency compared to open exchange markets</li> <li>Limited willing customers</li> </ul>
Stride Compatibility	Low compatibility, prefers long-term contract and more RECs procured	Medium compatibility, medium risk and medium returns	High compatibility, aligned with D-REC initiative with high returns
Recommend for Current Stride Model?	<u>No</u> , however potential for future to get closer to end customer	<u>Yes</u>	<u>Yes</u>

# (1) REC Buyer Recommendations

Primary Research Recommendations Fit with Stride's Current Model

Main Goal: Get closer to the end buyer to eliminate any excess costs and shorten the value chain, while considering the risk and return preferences of Stride.



Buyer Profile 1

Buyer Profile 2

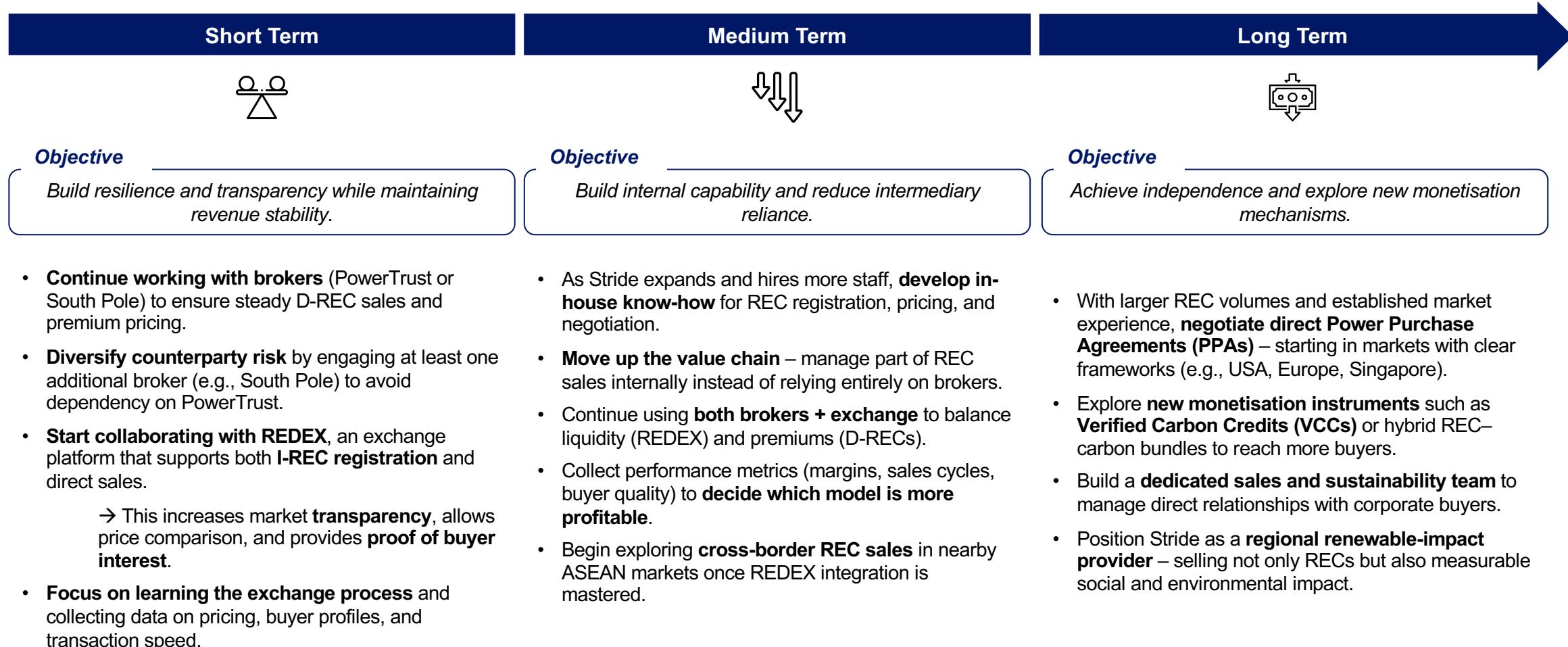
Buyer Profile 3

Who	Large corporations with high electricity consumption in Singapore (e.g., Data Centers)	SMEs with medium electricity consumption buying <b>RECs from exchange platforms</b>	SMEs with medium electricity consumption buying <b>D-RECs from brokers</b>
Advantages	<ul style="list-style-type: none"> <li>Need to purchase RECs to gain preference from the government in Call For Actions – long-term contracts, less risk</li> <li>No intermediary transaction fees</li> </ul>	<ul style="list-style-type: none"> <li>Facilitate exchanges between seller and buyer, working for the interest of Stride</li> <li>Transparent fees, sure sale</li> </ul>	<ul style="list-style-type: none"> <li>Highest Returns from D-RECs</li> <li>Brokers handle verification and sourcing directly with project developers</li> <li>Offers storytelling value, ability to trace renewable energy impact</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>Lock in the price from when the PPA is signed</li> </ul>	<ul style="list-style-type: none"> <li>Transaction fees</li> <li>Less opportunity for brand storytelling</li> <li>Price volatility driven by market</li> <li>Lower returns compared to D-RECs</li> </ul>	<ul style="list-style-type: none"> <li>Limited price transparency compared to open exchange markets</li> <li>Limited willing customers</li> </ul>
Stride Compatability	Low compatibility, prefers long-term contract and more RECs procured	Medium compatibility, medium risk and medium returns	High compatibility, aligned with D-REC initiative with high returns
Recommend for Current Stride Model?	<u>No</u> , however potential for future to get closer to end customer	<u>Yes</u>	<u>Yes</u>

# (1) Recommended to go with Brokers and Exchange Platforms

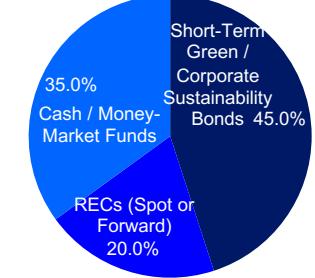
Gradually Reducing Dependency on a Single Broker While Improving Transparency, Reach, and Learning.

Main Goal: Get closer to the end buyer to eliminate any excess costs and shorten the value chain, while considering Stride's risk and return preferences.



## (2) RECs as Risk Buffer

Excess RECs Provide a Flexible Hedge Against Isolated Defaults and Liquidity Stress, Optimizing Capital Use in Volatile Environments

Concept Overview	Potential Advantages	Portfolio Mix	Dynamic provisioning:						
<ul style="list-style-type: none"> <li>As financed systems mature, Stride periodically gains excess RECs from repaid or overperforming projects</li> <li>Instead of selling them immediately, these RECs can serve as a renewable-linked financial buffer</li> <li>Their sale or forward contracts can provide liquidity during defaults or cashflow stress</li> <li>Turns an impact by-product into a risk-mitigation tool, reducing need for external credit lines or idle cash</li> </ul>	<ul style="list-style-type: none"> <li>Capital efficiency: allows Stride to hold less unproductive cash while still maintaining coverage for credit losses.</li> <li>ESG-linked resilience: aligns risk management directly with renewable energy generation, strengthening the sustainability narrative for investors.</li> <li>Liquidity flexibility: RECs can be sold on demand or pledged in forward contracts, offering optionality depending on market conditions.</li> <li>Reputation and investor confidence: demonstrates an innovative, impact-driven approach to managing credit exposure in emerging markets.</li> </ul>	<p>10-15% of net REC proceeds are automatically allocated quarterly</p>  <table border="1"> <tr> <td>Short-Term Green / Corporate Sustainability Bonds</td> <td>45.0%</td> </tr> <tr> <td>Cash / Money-Market Funds</td> <td>35.0%</td> </tr> <tr> <td>RECs (Spot or Forward)</td> <td>20.0%</td> </tr> </table>	Short-Term Green / Corporate Sustainability Bonds	45.0%	Cash / Money-Market Funds	35.0%	RECs (Spot or Forward)	20.0%	<p>Reserve size and asset composition are recalibrated quarterly using the automated default-probability model (repayment data, generation telemetry, EPC quality, and regional risk).</p>
Short-Term Green / Corporate Sustainability Bonds	45.0%								
Cash / Money-Market Funds	35.0%								
RECs (Spot or Forward)	20.0%								

Scenario	Usefulness of RECs as Credit Default Hedge	Rationale
<i>Isolated Defaults</i>	High	<ul style="list-style-type: none"> <li>Excess RECs can be <b>sold or pledged quickly</b> to cover shortfalls</li> <li><b>Liquid REC markets</b> (e.g. Vietnam I-REC) stabilize cashflow and keep lending active</li> </ul>
<i>Macro or Sector-wide Downturn</i>	Low-Moderate	<ul style="list-style-type: none"> <li>In systemic stress, <b>REC prices fall</b> as supply rises and demand drops</li> <li><b>Liquidity weakens</b> cash or bond reserves work better</li> </ul>
<i>Stable or Low-default Environment</i>	High (Optimized Liquidity Use)	<ul style="list-style-type: none"> <li>Excess RECs act as <b>growth capital</b>, not hedge</li> <li>Can be <b>forward-sold or securitized</b> to fund new loans or EPC prepayments</li> </ul>
<i>Counterparty Concentration Risk (few large buyers)</i>	Moderate	<ul style="list-style-type: none"> <li>RECs offer <b>partial diversification</b> if large buyers default</li> <li><b>Liquidity-dependent</b> useful bridge, but not a full hedge</li> </ul>
<i>Regulatory or Policy Risk</i>	Low	<p>In case of regulatory shifts that affect REC pricing or certification rules, their hedge value may be impaired. Cash reserves are safer in such cases.</p>

# (2) Reinvestment & Market Exploration

Reinvesting in Stride's Proven Model and Building Early R&D Footholds for Cross-Border Growth

## Reinvestment into Strides Operations

### Strategic Intent

- Allocate released capital and REC income into Stride's proven deferred-payment solar-financing engine to deepen market penetration, accelerate installations, and reinforce credit quality.
- The company's highest-return, lowest-execution-risk segment.
- Stride's effective loan yield of ≈ 21 – 25 % p.a. captures total annualized return including up-front and monthly fees.

### Opportunities for Expansion

#### a) Expand Working Capital for Deferred-Payment Loans

- Increase lending capacity to households and SMEs without relying on external credit lines.
- Shorter approval-to-installation cycle = higher loan volume and fee income.

#### b) EPC Network Expansion and Enablement

- Grow from 40 + active installers to ≈ 80 within 18 months to achieve full geographic coverage.
- Provide short-term bridge financing for smaller EPCs to pre-purchase equipment improves execution speed and locks in loyal partners.
- Continue strict due diligence and independent QA checks to maintain credit standards.

#### c) Liquidity and Revenue Enhancement via RECs (future tools)

- Option for structured REC forward sales to secure upfront cash when funding needs peak.
- Long-term goal: act as REC aggregator for partner EPCs to diversify income and strengthen buyer relationships.

## Exploring new Markets in neighbouring Countries



### Strategic Intent

- **Early-stage R&D, not market entry:** Focus on low-cost research to understand regulatory, REC, and financing frameworks in the Philippines and Thailand; minimal capex required.
- **Long-term advantage:** Establishes knowledge, data, and partnerships to enable faster cross-border scaling once Stride's home market matures.
- **Strategic rationale:** While Vietnam expands toward its 2030 target, early research in neighbouring markets builds optionality and reduces future regulatory concentration risk.
- **First-mover advantage:** Early R&D engagement with EPCs, REC registries, and regulators positions Stride ahead of later entrants, establishing credibility and insight for future scaling.

**Bonus Opportunity:** Offer solar + battery (storage) financing bundles to help customers build resilience against grid outages. Stride would retain its financing model while increasing average ticket size and lowering default risk.

## (2) Smart Capital Use – Balancing Impact, Resilience and Expansion

Targeted Reinvestment, Credit Hedging and Market Exploration Enhance Stride's Financial and Strategic Positioning

### Priorities against Strategies

Priority	Option	Strategic Role	Horizon
High	Reinvest in Core Model	Scale loan portfolio → more MWh → more RECs → DPPA eligibility → margin uplift	Short-Mid
Medium	REC Credit Hedge	Strengthen portfolio stability & ESG credibility through impact-linked risk management	Immediate
Exploratory	New Market exploration	Low-cost market exploration (Philippines & Thailand) + battery demand mapping	Long-term

### Combined Strategic Impact



**Financial resilience:** REC reserve buffers default risk and improve institutional investor confidence.



**Growth & impact:** Core model scaling multiplies MWh output → higher REC volume → access to DPPA markets → stronger margins.



**Future readiness:** Regional R&D builds an expansion blueprint and captures battery storage trends for next-gen solar finance.



**Visual Suggestion:** Centre of gravity → Option 2 (growth engine); supported by Option 1 (stability) and Option 3 (long-term option value).

### Discussion Space

Which horizon do you want us to focus more on? How detailed would you want our plans to be moving forward after this presentation? Which strategies have you tried or prefer?

# (3) Extending REC Monetisation Beyond Repayment

Unlocking Long-Tail Value from Existing Solar Assets

For about two years, Stride owns the solar panels and can claim RECs. After reimbursement, the panels belong to the clients. Most clients don't know what RECs are or how to sell them. They also lack the time, network, or resources to do so. As a result, REC income stops once the repayment period ends.



## Our Solution

**Buy back** or manage RECs from past clients **once ownership transfers**.

Bundle these “legacy RECs” with Stride’s active portfolio to **increase total REC volume**.

Offer clients  
**simple incentives**

**Small cash payment per REC**; giving them “free money” from an asset they were not using.

Or **free solar-panel insurance/maintenance**, providing peace of mind and long-term protection.

Use Stride’s existing data and registry systems to **track, issue, and resell those RECs efficiently**.



## Advantages



**Unlocks long-tail revenue** (potential ×15 increase in lifetime REC value per system).



**Creates shared value** — clients gain financial or protection benefits from unused assets.



**Aggregates volume**, enabling sales to larger corporates at premium prices.



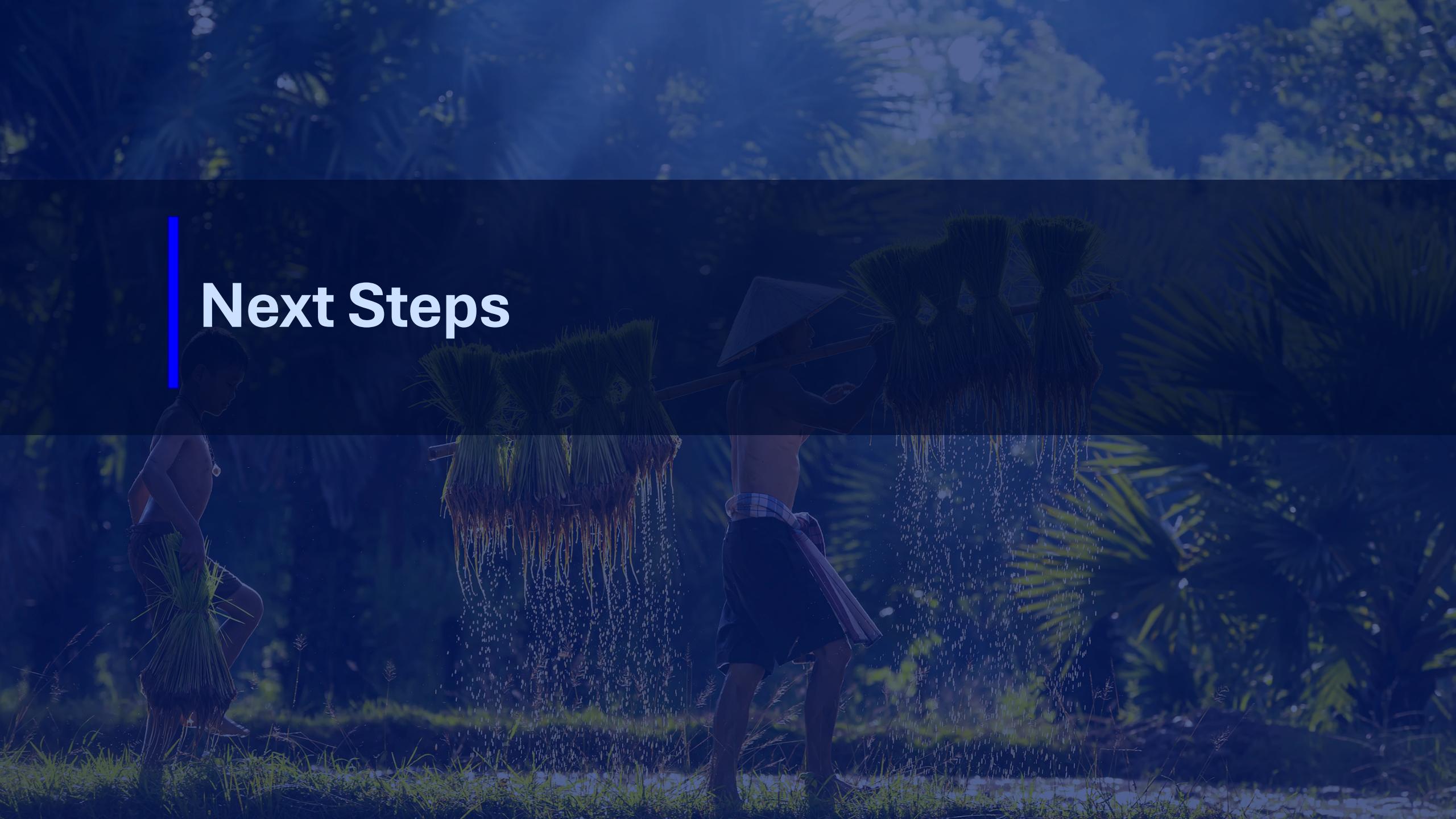
**Strengthens client relationship** through continuous engagement and visible benefits (payments / insurance).



**No additional capex** — uses existing solar assets and data infrastructure.

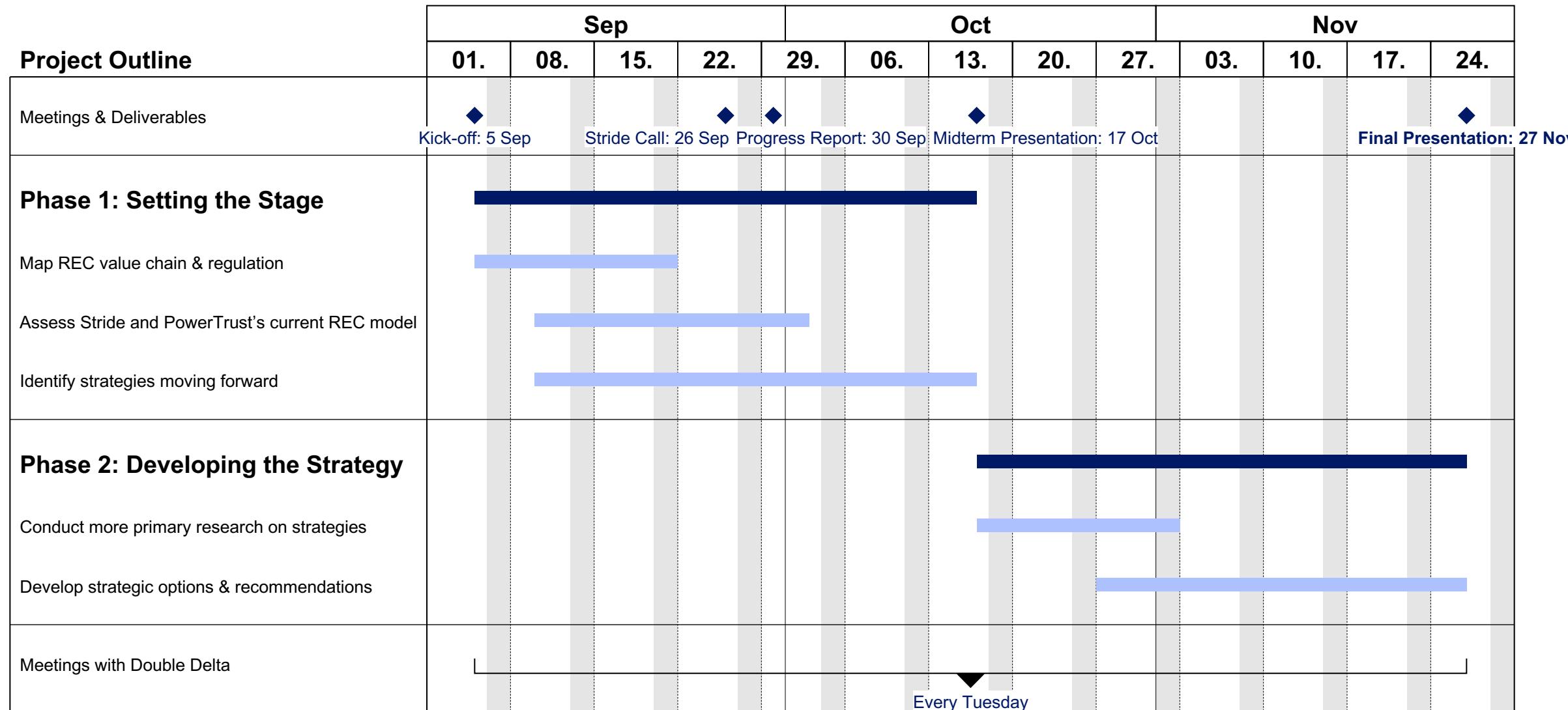
*Do you see this post-repayment REC buyback model as a scalable way for Stride to balance profitability and client impact?*

# Next Steps



# Current Project Status and Moving Forward...

Agenda, Milestones, and Deliverables





---

Thank you for Listening!

---

Adrian Joachims  
Adrien Paul  
Jamie Kohchet-Chua  
Satine Villard  
Verlin You



# Appendix



A photograph of a woman in a traditional conical hat harvesting rice in a field. She is using a long wooden tool to pull rice plants from the ground. The field is lush and green, with many rice plants. The woman is wearing a simple, light-colored dress. A blue vertical bar is positioned to the left of the text.

# Regulatory Trends

# Vietnam – Advancing Regulation via DPPAs and ETS Pilot

Vietnam Builds Structure and Credibility via National DPPA Regime and Pilot ETS, Enhancing Corporate Participation and Long-Term Market Stability

Vietnam	The Philippines	Thailand	Malaysia	Indonesia	Singapore																								
																													
Renewable Electricity Tracking	<ul style="list-style-type: none"><li>Active I-REC market; historically high issuance has kept prices relatively low.</li><li>Decree 80/2024 established the national Direct Power Purchase Agreement (DPPA) regime; Decree 57/2025 refined rules for private line and grid-connected models.</li><li>Grid-connected DPPAs link corporates to the spot market, offering long-term price visibility and credibility.</li></ul>																												
	<table><thead><tr><th>Source</th><th>Vietnam</th><th>Indonesia</th><th>Malaysia</th><th>Philippines</th><th>Thailand</th></tr></thead><tbody><tr><td>Total Output</td><td>250k</td><td>310k</td><td>170k</td><td>110k</td><td>190k</td></tr><tr><td>Non-renewable</td><td>140k</td><td>250k</td><td>140k</td><td>90k</td><td>150k</td></tr><tr><td>Renewable</td><td>105k</td><td>55k</td><td>30k</td><td>24k</td><td>35k</td></tr></tbody></table>	Source	Vietnam	Indonesia	Malaysia	Philippines	Thailand	Total Output	250k	310k	170k	110k	190k	Non-renewable	140k	250k	140k	90k	150k	Renewable	105k	55k	30k	24k	35k				
Source	Vietnam	Indonesia	Malaysia	Philippines	Thailand																								
Total Output	250k	310k	170k	110k	190k																								
Non-renewable	140k	250k	140k	90k	150k																								
Renewable	105k	55k	30k	24k	35k																								
Carbon Market Instruments		<ul style="list-style-type: none"><li>Pilot Emissions Trading Scheme (ETS) launched Aug 2025 with free allocation in the early phase.</li><li>Up to 30% of compliance obligations may be covered with carbon credits during the pilot; full market expected by 2029.</li></ul>																											
Impacts		<ul style="list-style-type: none"><li>Corporate buyers: DPPAs create more robust Scope 2 claims than certificates alone</li><li>Emitters: Prepare for MRV requirements, declining free allocations, and offset limits as the market matures.</li></ul>																											

# Philippines – Compliance-Based REC Market Fuels Renewable Demand

Operational REM System Creates Compliance-Linked Demand; Safeguards Ensure Integrity While Spurring Corporate Alignment and Project Bankability

Vietnam	The Philippines	Thailand	Malaysia	Indonesia	Singapore
Renewable Electricity Tracking					
	 <ul style="list-style-type: none"><li>▪ First compliance-based REC market in ASEAN: Renewable Energy Market (REM), directly tied to Renewable Portfolio Standards (RPS).</li><li>▪ The Philippine Renewable Energy Market System (PREMS) fully operational since Dec 2024; managed by IEMOP as RE Registrar.</li><li>▪ Creates stable demand since utilities must meet RPS obligations.</li></ul>				
	 <ul style="list-style-type: none"><li>▪ No ETS or carbon tax yet; regulatory focus remains on RPS enforcement via REM.</li><li>▪ Safeguards in place to prevent double counting between compliance RECs and voluntary I-RECs.</li></ul>				
Impacts	 <ul style="list-style-type: none"><li>▪ Corporate buyers: Must align REC procurement with PREMS schedules; voluntary I-REC use requires careful diligence.</li><li>▪ Project developers: Compliance-driven demand strengthens offtake channels and enhances project bankability.</li></ul>				

# Thailand – Carbon Cooperation with Singapore Enables Premium Credits

Active I-REC Market and T-VER Premium Credits Combine with Article 6 Framework to Open High-Integrity Export and Reporting Opportunities

Vietnam	The Philippines	Thailand	Malaysia	Indonesia	Singapore
Renewable Electricity Tracking			<ul style="list-style-type: none"><li>▪ Active I-REC market; EGAT acts as local issuer accredited by the I-TRACK Foundation.</li><li>▪ Provides corporates with straightforward instruments for Scope 2 reporting.</li></ul>		
Carbon Market Instruments			<ul style="list-style-type: none"><li>▪ T-VER voluntary credit program; Premium T-VER offers higher environmental integrity and potential price premiums.</li><li>▪ Article 6 Implementation Agreement with Singapore (Aug 2025) enables authorized exports with corresponding adjustments.</li></ul>		
Impacts			<ul style="list-style-type: none"><li>▪ Corporate buyers: I-RECs meet standard needs; Article 6 credits offer higher-integrity claims.</li><li>▪ Developers: Premium T-VER and Article 6 pathways unlock access to higher-value markets and improve project bankability.</li></ul>		

# Malaysia – Unified Green Power and Carbon Framework Boosts Access

National mREC and BCX Platforms Provide Bundled, Government-Endorsed Instruments Improving Transparency and Market Accessibility

Vietnam

The Philippines

Thailand

Malaysia

Indonesia

Singapore



Renewable  
Electricity  
Tracking



- Malaysia Renewable Energy Certificates (mRECs) issued under the I-REC framework via the mGATS platform, operated by TNBX.
- Green Electricity Tariff (GET) allows bundled purchase of green power with mRECs; 2025 premium cut broadened accessibility.

Carbon Market  
Instruments



- Bursa Carbon Exchange (BCX) is the national voluntary exchange.
- First auction in July 2024 featured “Malaysia Nature-based Carbon Credits Plus (MNC+)” from a forest conservation project.

Impacts



- Corporate buyers: Bundled GET + mREC provides a traceable, government-endorsed option at lower cost.
- Developers/financiers: National exchange and local attribute tracking create clearer revenue certainty and easier market access.

# Indonesia – Growing Carbon Market Driven by IDXCARBON and PLN RECs

Indonesia Advances Carbon and Renewable Tracking Through IDXCARBON Launch and PLN Retail RECs, Broadening Access for Corporates and Emitters

Vietnam	The Philippines	Thailand	Malaysia	Indonesia	Singapore
					
Renewable Electricity Tracking		<ul style="list-style-type: none"><li>▪ Corporates primarily use I-RECs; PLN offers retail REC products from geothermal and hydropower.</li><li>▪ Retail options expand access to smaller buyers beyond large corporates.</li></ul>			
Carbon Market Instruments		<ul style="list-style-type: none"><li>▪ Indonesia Carbon Exchange (IDXCARBON) launched Sept 2023 under OJK supervision.</li><li>▪ Power sector leads initial ETS transactions, with phased coverage expansion expected.</li></ul>			
Impacts		<ul style="list-style-type: none"><li>▪ Corporate buyers: PLN RECs provide a straightforward local option; multinationals often prefer I-RECs for global consistency.</li><li>▪ Emitters: Should model allowance exposure early and pre-arrange eligible credits, as price discovery and standards are still developing.</li></ul>			

# Singapore – ASEAN Hub for Article 6 and High-Integrity Credits

Singapore Leads ASEAN with Carbon Tax Escalation, Bilateral Article 6 Partnerships, and Strong Frameworks Driving Real Decarbonization

Vietnam	The Philippines	Thailand	Malaysia	Indonesia	Singapore
Renewable Electricity Tracking			<ul style="list-style-type: none"><li>▪ No national REC registry; corporates mainly rely on International RECs (I-RECs), often sourced regionally.</li><li>▪ Government is building an Article 6 pipeline to enable bilateral transfers of authorized credits while preventing double counting.</li></ul>		<ul style="list-style-type: none"><li>▪ Carbon Tax: in place since 2019; SGD 25/t (2024–25), SGD 45/t (2026–27), SGD 50–80/t by 2030.</li><li>▪ Carbon tax-liable facilities may offset up to 5% of emissions with eligible International Carbon Credits (ICCs).</li><li>▪ Article 6 Implementation Agreement signed with Thailand in Aug 2025, setting rules for authorized credit use.</li></ul>

# Comparative Market Analysis



## Regulatory Framework & Market Maturity



Philippines has a **mandatory REC system** (compliance) AND also **allows I-RECs** (voluntary).



The REC system is legally mandated under the **Philippine Renewable Energy Act (R.A. 9513)** and its implementing rules.



REC issuance is handled through **PREMS** (Philippine Renewable Energy Market System), managed by PEMC.



**Only registered facilities** (net-metered, own-use, or embedded non-WESM) are eligible for **REC issuance**.

## Barriers & Opportunities



- **Complex and detailed reporting requirements** (monthly/hourly MQ data, CSV templates, validation errors).
- **Lack of cooperation** from voluntary RE facilities prevents REC issuance.
- No mechanism yet to check if RECs are being **double-issued in other markets**.



- The **DOE and PEMC** are exploring a **voluntary REC market** to expand participation.
- The bulletin board and **proposed price cap** provide tools for **greater market transparency**.
- **Rules are being adjusted** to streamline facility registration, data submission, and REC issuance.

## Pricing & Liquidity

1

The system is market-based but under oversight:

- REC prices are expected to follow supply and demand fundamentals.
- A REC price cap methodology has been proposed by DOE and submitted to the ERC for approval.

2

REC transfers occur through a bulletin board system, where buyers and sellers transact bilaterally; the seller lodges a transfer request which the buyer must accept.

3

The existence of a compliance market under RPS supports more predictable REC demand and pricing, compared to markets like Vietnam.

## Comparisons with Vietnam

- The Philippines has a **legally mandated, compliance-driven REC market with monthly issuance and structured governance**.
- This system is **transparent, rule-based**, and offers **higher market maturity**.
- Mechanisms like the Renewable Portfolio Standards (RPS) and Green Energy Option Program (GEOP) create structured and mandatory demand for RECs.
- Vietnam remains **voluntary-only, I-REC dependent, and fragmented**, with no central REC exchange or compliance obligation.
- Transactions rely heavily on bilateral deals, brokers, and international registries.
- Investors may prefer the Philippines over Vietnam in the near term due to its **transparent and mandatory REC structure**.

Similar Challenges to Vietnam: Voluntary + Weak Framework

## Regulatory Framework & Market Maturity



Indonesia has **no domestic REC scheme** → relies entirely on I-REC and TIGR under oversight from the Ministry of Energy and Mineral Resources.



A draft **New and Renewable Energy Bill** (RUU EBT) may introduce a **Renewable Portfolio Standard** (RPS).



Market still developing: issuance fell from 1.7m MWh (2023) to 1.4m MWh (2024), while redemptions rose, showing **demand outpacing supply**.



Adoption is **sector-specific** (strong in manuf. and data centres; weak in oil, gas & mining), widening access via **small-volume REC products**.

## Barriers & Opportunities



- No unified national REC law.
- Resource-intensive industries (oil, gas, mining) show slow REC uptake.
- RE deployment limited by geography (many islands, poor interconnections).
- Bankability issues: of 70 RE projects signed pre-2017, only 4 reached completion).
- Issuance volumes lag behind demand.



- **Vast RE potential** (29 GW geothermal, abundant hydro and solar).
- Legalising a **national REC framework**.
- Embedding RECs in export compliance.
- Increasing facility registration outside Java to diversify REC supply.

## Pricing & Liquidity



Mismatch between issuance and redemption, with demand rising faster than supply.



Liquidity is improving through PLN's retail REC products and registry systems.



However, gaps in facility registration limit available REC volumes, constraining market depth.



No domestic price benchmarks exist since Indonesia relies solely on I-REC, which avoids overlap or double counting.

## Comparisons with Vietnam

- **Both markets share similarities:**
  - Both rely heavily on I-REC voluntary frameworks.
  - Both lack a domestic compliance-driven REC system (unlike the Philippines).
- But Indonesia's PLN is more proactive than Vietnam's regulators, offering structured REC products, auctions, and small-scale entry points.
- The difference is Indonesia's report makes clear there is no national REC framework at all, whereas Vietnam has started discussions but not yet implemented one.

A photograph of a man working in a field, likely harvesting rice. He is wearing a conical hat and a cloth wrapped around his waist. He is bending over, working with a large pile of harvested rice. A blue vertical bar is positioned on the left side of the image.

# Stride's REC Model

# Input Assumptions – REC Revenue Model

Sources and Justifications

Input Lever	Assumption used	Range	Source / Derivation
<b>Initial capacity</b>	11.26 MWp	-	AIIF II Impact Metrics Stride 2Q2025.xlsx (cell F5)
<b>Growth of installed MWp</b>	50% (2026), 41% (2027), 36% (2028), 30% (2029+)	20% (conservative) – 40% (optimistic) (2029+)	3. Stride AIIF II IC (selected slides).pdf (page 22)
<b>Capacity factor (CF)</b>	7.8%	7% (conservative) – 10% (optimistic)	AIIF II Impact Metrics Stride 2Q2025.xlsx (own calculation)
<b>Degradation rate</b>	0.8%/year	1.0%/year (conservative) – 0.6%/year (optimistic)	Kirmani and Kalimullah (2017)
<b>Ownership window</b>	2 years	-	4. Stride Impact Reporting Company Baseline.pdf (page 16)
<b>Sales share</b>	95%	-	Interview with Andrew Fairthorne, CEO, Stride (Sep 2025, personal communication)
<b>REC price</b>	\$26/REC	\$0.5/REC - \$26.0/REC	Interview with Andrew Fairthorne, CEO, Stride (Sep 2025, personal communication)
<b>Toggle: Post-repayment rights</b>	NO	-	-