



**NovA!**

**Singapore Fintech Festival 2023**



**November 2023**

CONFIDENTIAL AND PROPRIETARY



# We have identified a clear problem statement in consultation with the industry and determined a path forward



Theme	Key outcomes
<p>1</p>  <p><b>NovA! Phase 1</b></p>	<ul style="list-style-type: none"><li>• <b>Identified problem statement</b>, priority use cases, MVP's capabilities and validated FI demand:<ul style="list-style-type: none"><li>◦ <b>Real estate sustainable financing</b>: feasibility of solution validated with BCA and Reluvate (Tech partner); MVP built and tested with lead banks; confirmed demand from 26 out of 40 Banks surveyed (63%)</li></ul></li></ul>
<p>2</p>  <p><b>NovA! Phase 2</b></p>	<ul style="list-style-type: none"><li>• <b>Collaboration with BCA finalised</b> for real estate sustainable finance use case with a clear path to unlock access to country-wide utility data</li><li>• Identified Lead Banks for priority use cases.</li><li>• <b>Confirmed willingness to pay for NovA!</b></li><li>• Developed a <b>pitchbook</b> for NovA! to drive investor engagement</li><li>• Developed a <b>plan for Phase 2</b> for progressing development of NovA!; including refining Climate-Risk Use Case</li></ul>



**1a.**

**Use Case 1 – Real Estate Sustainable Financing**



# Failure to address key sustainability risks and the required financing gap could have catastrophic global consequences...



87%

of investors say that some **greenwashing** is prevalent in sustainability performance reporting

18%

global GDP reduction by 2050 from **climate change** if no action is taken

5

USD  
Trillion

of global **financing gap** required to transition to Net Zero

# ...to mitigate these challenges, financial institutions will need to focus on addressing three key challenges



Inconsistent data & quality



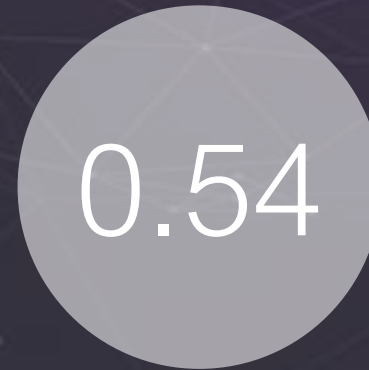
of organisations identified lack of robust ESG data as the greatest barrier to ESG adoption<sup>1</sup>

Lack of robust monitoring & reporting



of organisations recognised getting consistent ESG reporting as a challenge<sup>2</sup>

Absence of trusted and transparent methodologies



average correlation among different ESG score providers which shows inconsistent methodologies<sup>3</sup>

**Key Problem that NovA! will solve**

**FIs lack robust and actionable insights to finance their decarbonisation agenda and limit exposure to vulnerabilities across their portfolios**



NovA!'s mission is to empower global financial institutions with AI-driven sustainability insights, accelerating the transition to net zero.

# NovA! will provide FIs with actionable insights needed to finance their decarbonisation agenda and limit exposure to vulnerabilities



## Overview of NovA! problem statement and ambition

### Problem Statement for NovA!



FIs lack robust and actionable insights to finance their decarbonisation agenda and limit exposure to vulnerabilities across their portfolios

NovA! Scope & Solution				
<b>Sustainable Finance</b>				
Real Estate	Manufact.	Power	Transport	
SLLs	Green loans	Green mortgages	Green bonds	
<b>Climate Risk</b>				
Banks	Insurers	Asset Managers		
Corporate and SME	Retail	Wealth		
Physical & Transition	Nature	Social		
<b>Other use cases</b>				
Real Estate	Climate Risk	Supply Chain	Carbon Credits MRV	Green-washing detector
<b>Markets</b>				
Singapore	Middle East	South East Asia	China / HK	

### What NovA! aims to achieve in 5 years...



#### 1 Pioneer AI standards and methodologies for Sustainable Finance and Climate Risk

co-created with regulatory bodies, academia, financial institutions and technology players



#### 2 Expand capability across new use cases

e.g. Carbon credits, Greenwashing detection through AI-powered monitoring, reporting & verification



#### 3 Create a trusted global ecosystem of sustainability partners

comprising of banks, data and Greentech players that will drive NovA!'s standards for decarbonisation and climate risk

#### Legend:



Current priority



Future priority

# Our industry study validated demand across 2 use cases from >40 banks



## Priority use cases for NovA!

	1  Real estate sustainable financing	2  Climate risk assessment
Description	Providing financial institutions with insights, leveraging at-source data, to accelerate <b>sustainable finance in the real estate sector</b>	Supporting financial institutions to <b>assess the impact of climate risk through AI &amp; Data Analytics</b>
Survey Results	<p><b>63%</b> (26 out of 41) of banks interested in using NovA</p> <p><b>16 interested in co-developing</b></p>	<p><b>85%</b> (35 out of 41) of banks interested in using NovA!</p> <p><b>16 interested in co-developing</b></p>

<sup>1</sup>UOB and Green Link Digital Bank (GLDB) indicated interest to be the lead bank via external engagement and correspondence





**1a.**

**Use Case 1 – Real Estate Sustainable Financing**



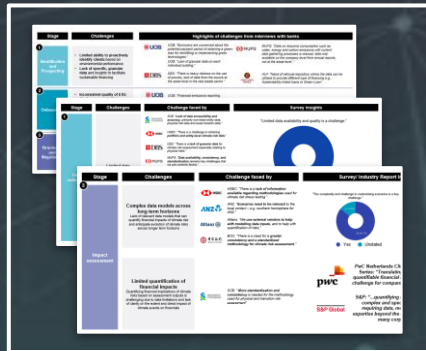
# For each use case, we have identified the problem statement that NovA! can address and designed a proposed solution



## Sections of use case deep-dive

### 1 Problem Statement

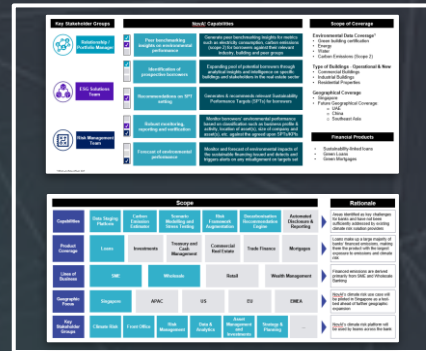
What is the problem we are solving?



- Challenges faced by FIs across the process of real estate financing and climate risk assessments
- Validated through engagement with >40 FIs including interviews with 20 FIs and through an Industry Survey with ~120 industry experts

### 2 Proposed Solution

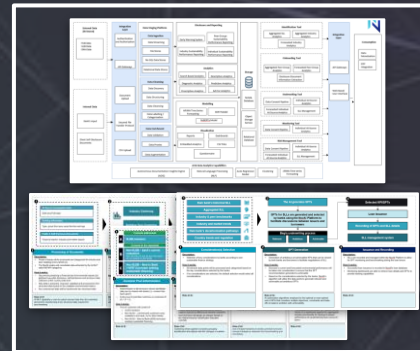
How are we solving the problem?



- Proposed solution and key capabilities to help address key challenges
- Defined scope/coverage and target user groups

### 3 Functional Arch. & Technical Deep-Dives

What capabilities are required to deliver the solution?



- Functional architecture showing system work required to provide services
- Technical deep-dive for each capability
- Role of AI for each capability
- MVP and Solution Mock-ups

### 4 Appendix: Competitor Analysis

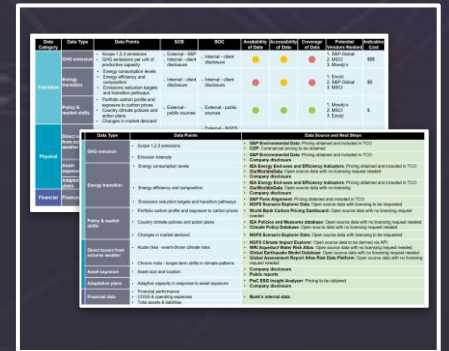
Who are the key competitors?



- Shortlist key competitors (with coverage of Singapore, regional & global markets)
- Assess competitors using a set of key criteria: geographical scope, value proposition, coverage, capability, use of AI or data intelligence

### 5 Appendix: Data Feasibility

Is the data required available and obtainable?

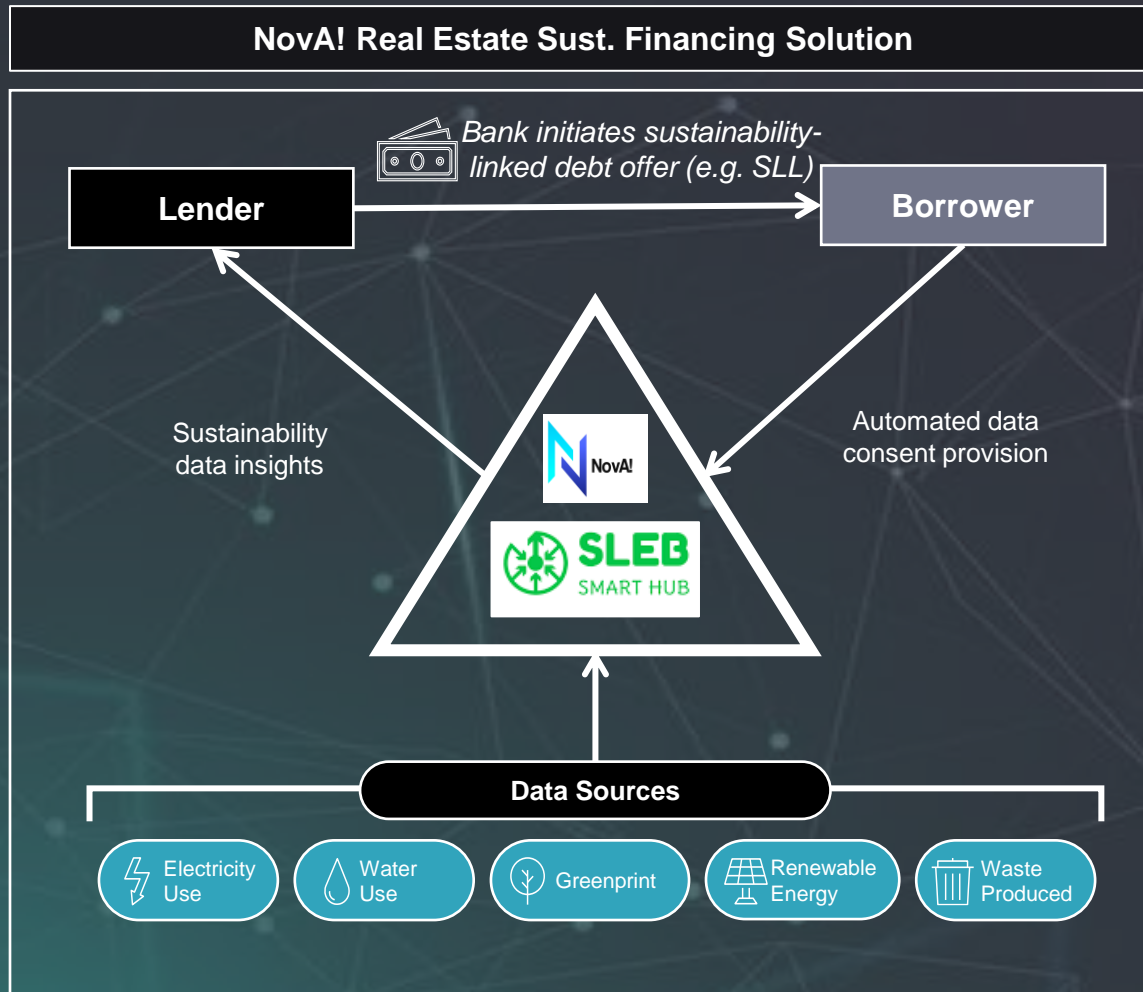


- Identification of data points and data sources
- Current status and next steps to obtain data



# How NovA! aims to address the challenges Banks face when issuing sustainable finance to borrowers in the real estate sector

## Key capabilities



How NovA! solves identified problem statements		
Stage	Problem statements	With NovA! tomorrow
1 Identification and Prospecting	Limited channels to identify new borrowers	Through identification of laggards and requests from borrowers
2 Onboarding	Time-consuming to identify and review relevant disclosure documents	Automated extraction of customer sustainability data from disclosure docs. using NLP
3 Structuring and Negotiation	Lack of credible and transparent benchmarks to set ambitious SPTs and avoid greenwashing	Peer benchmarking and recommendation on SPT setting
4 Monitoring & Reporting	Lack of at-source data to verify borrower's SPT performance	Automated tracking and forecasting of SPT performance using actual, at-source utility data

# Real estate sustainable financing demo video



Click to play video

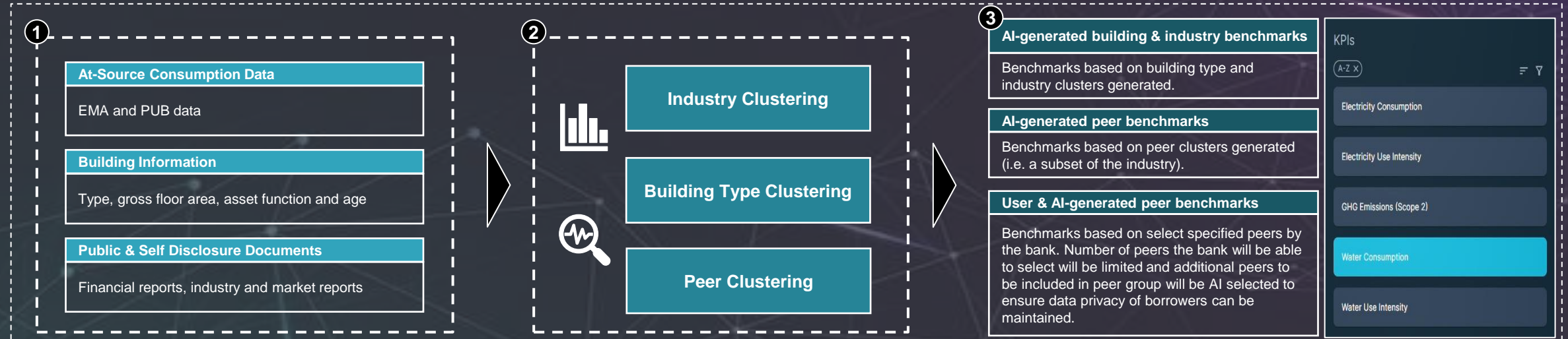


**1b.**

**NovA! Minimum  
Viable Product  
(MVP)'s 5 Core  
Capabilities**



# Capability 1: Industry and peer benchmarking insights on environmental performance



**1 Processing of Documents**

**Description:**

- Points of inputs will be processed and categorised for industry and peer mapping to be carried out
- The NovA! engine will consolidate data extracted by the AI-NLP within the KPI categories

**How it works:**

- Documents pertaining to financial and environmental reports are gathered via public disclosure, self-disclosures and at-source data collection at the country-wide level
- Raw data is extracted, cleansed, validated and processed to form structured data based on the available environmental metrics
- Any unstructured data will be transformed into structured data

**2 Industry, Building Type and Peer Clustering**

**Description:**

- Industry groups are clustered based on sector and asset function type
- Building type groups are based on type of building registered
- Peer function type, gross floor area (GFA) & age groups are clustered based on sector & additional building information

**How it works:**

- SSIC codes will be used as a starting point to categorise businesses based on their primary economic activities
- Additional factors such as financial indicators, market data and product services will be used to capture nuances and differentiate between industries to assign an industry based on the Global Industry Classification Standard (GICS®)

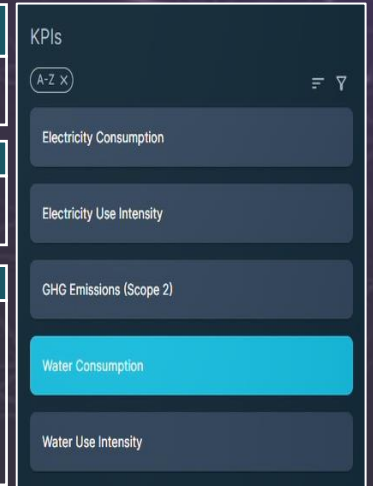
**3 Peer & Industry Benchmarks Generation**

**Description**

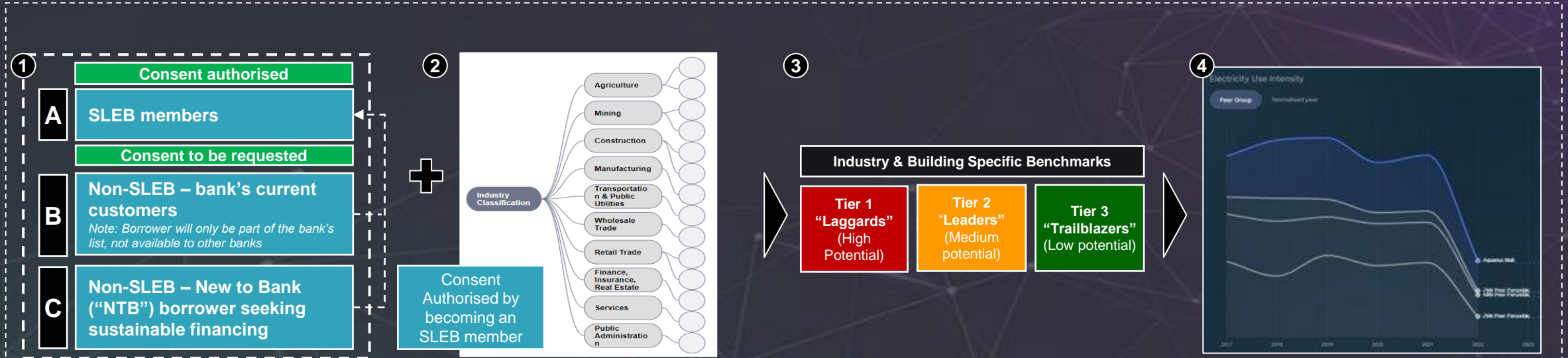
- Three type of benchmarks can be generated for the KPI categories
  - Option A: AI-generated building and industry benchmarks
  - Option B: AI-generated peer benchmarks
  - Option C: User & AI-generated peer benchmarks

**How it works:**

- Data aggregation scripts will be integrated to calculate peer and industry benchmarks based on 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentile performers



# Capability 2: Identification of prospective borrowers



**1 Customer Pool Determination**

**Description:**

- Determination of all borrowers whose identifiable data can be shared with banks (i.e. consent has been given)
- Entire pool of potential customers is comprised of (A + B + C)

**How it works:**

- Pool of customers will consist of:
  - SLEB members
  - Non-SLEB – current bank customers (only available to the bank, not to other banks)
  - Non-SLEB – New-to-Bank (NTB) borrowers seeking sustainable financing

**2 Industry & Building Type Mapping**

**Description:**

- List of borrowers identified will be mapped to an industry group and / or building type group

**How it works:**

- SSIC codes will be used as a starting point to categorise businesses based on their primary economic activities
- Additional factors such as financial indicators, market data & product services will be used to capture nuances & differences between industries
- Each borrower will assign an industry based on the Global Industry Classification Standard (GICS®)

**3 Prospective Borrower Identification**

**Description:**

- Banks will be able to see a shortlist of prospective borrowers across different industries and different building type

**How it works:**

- Prospective borrowers will be ‘graded’ based on existing sustainability performance (e.g. energy efficiency) compared to the industry and / or building benchmarks generated by NovA!

**4 Visualisation**

**Description:**

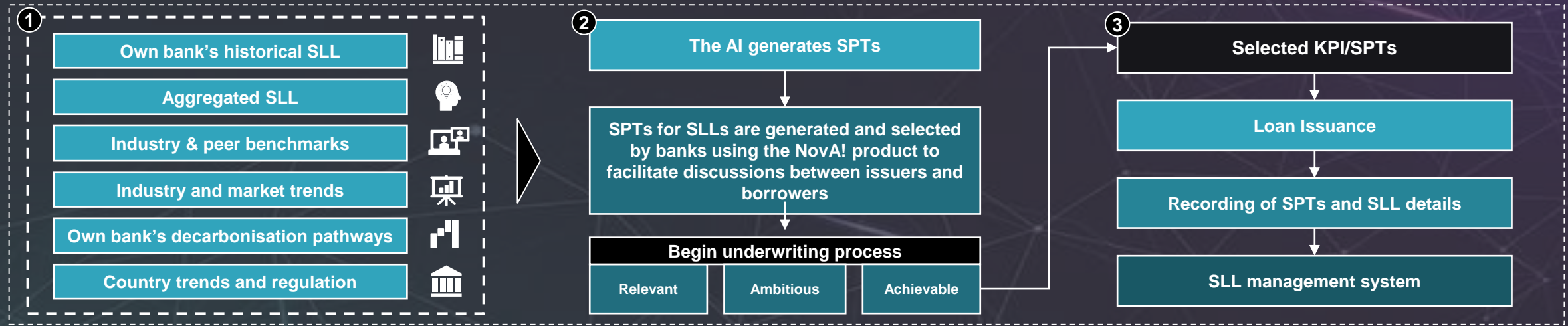
- Banks will be able to view YoY forecasted environmental performance of a prospective borrower against the relevant industry and building type group
- Information can be utilised during discussions with customers

**How it works:**

- The prospective borrowers’ KPI metrics can be shown on a dashboard against the aggregated industry benchmarks for viewing to assess performance of a potential borrower versus its peers



# Capability 3: SPT recommendation generation



**1 Consideration(s) Selection**

**Description:**

- Selection of key considerations by banks according to own sustainable finance strategy

**How it works:**

- All relevant data points will be processed and categorised based on the key considerations selected by the banks
- If no considerations are selected, the default selection would select all considerations

**2 SPT Recommendation**

**Description:**

- Recommendation of ambitious yet achievable KPIs that can be viewed by both banks and borrowers to facilitate negotiations of SLL

**How it works:**

- Borrower's current and forecasted environmental performance will be taken into consideration to ensure that the SPT recommendation generated is achievable
- Based on the considerations selected by the banks, NovA!'s algorithm will utilise the data points to generate relevant and achievable yet ambitious SPTs

**3 Issuance and Recording**

**Description:**

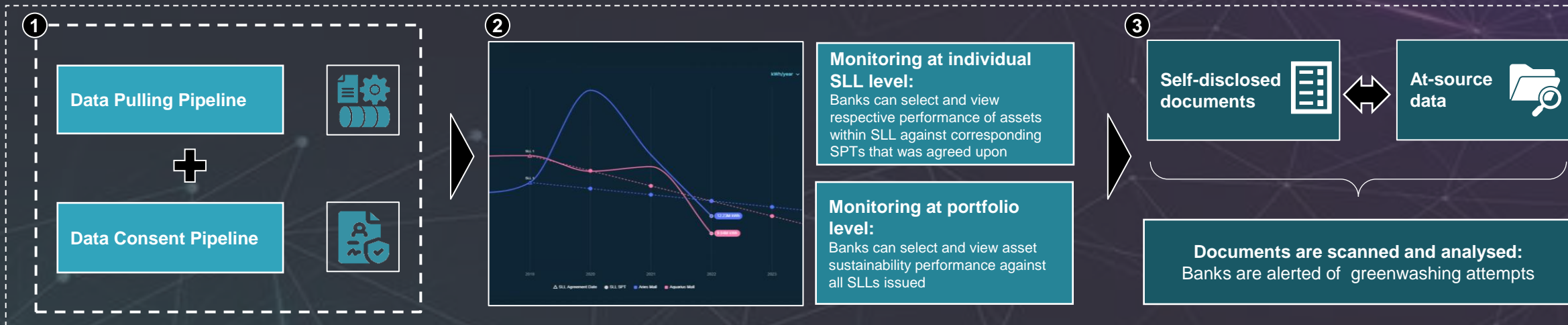
- SLLs are recorded and managed within the NovA! product to allow for SPT monitoring and benchmarking during the loan tenure

**How it works:**

- Successful loan issuance is recorded in NovA!'s loan database
- Monitoring dashboards are able to retrieve loan details and SPTs to provide tracking capabilities



# Capability 4: Robust monitoring, reporting and verification



**1 Retrieval**

**Description:**

- Monthly at-source data will be retrieved per environmental performance metrics as specified in the SLL

**How it works:**

- Data pulling pipeline integrated with government bodies to retrieve real time at-source sustainability performance data.
- Consent provisioning pipeline provides access to building specific sustainability performance data with prior consent from borrowers, whilst maintaining data privacy.

**2 Performance Tracking**

**Description:**

- During the loan-term, a borrower's ESG performance data and other ESG metrics are tracked

**How it works:**

- Banks can reduce their dependence on secondary data and self-reported data to acquire standardised, clean and verified at-source data
- Direct visualisation of environmental KPI performance is available via dashboards on NovA's product

**3 Potential Greenwashing Detection**

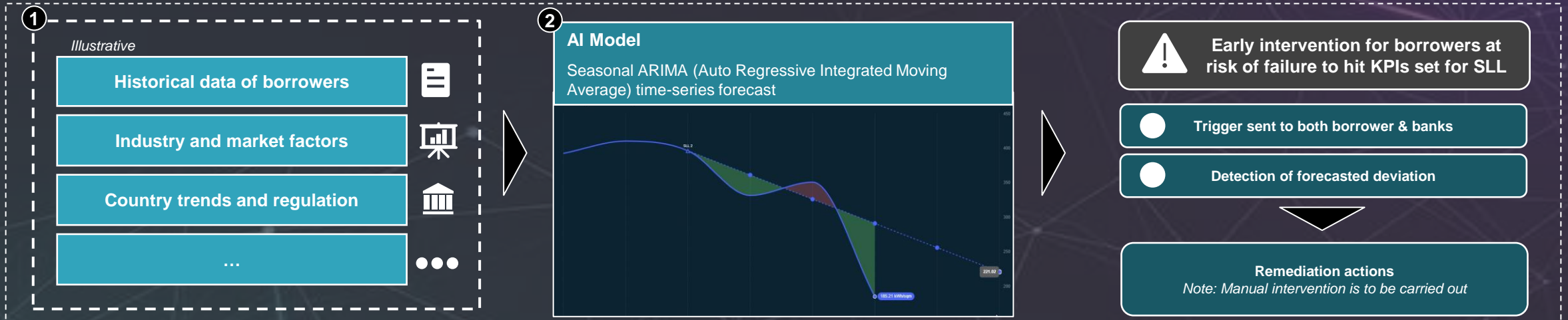
**Description**

- Comparison of borrower's self-disclosed documents with at-source data to identify greenwashing attempts

**How it works:**

- Documents from borrowers are scanned and benchmarked against actual performance to identify any discrepancies in measured environmental performance
- Greenwashing attempts are flagged out and banks will be alerted if they are financing potential clients that are greenwashing

# Capability 5: Forecast of environmental performance



**1** Environmental Factors Selection

**Description:**

- Selection of material environmental factors to take into consideration for forecasting of environmental performance of borrowers

**How it works:**

- Application of factor selection techniques to identify the environmental factors that have the most significant impact on the target variable
- Traditional statistical methods like correlation analysis or stepwise regression can help identify variables with strong relationships.
- Machine learning algorithms, such as feature importance ranking in random forests or gradient boosting models, can provide insights into the relative importance of different factors for selection

**2** Forecasting

**Description:**

- Time-series forecasting on sustainability performance data of borrowers.

**How it works:**

- Monthly sustainability performance data for both mid-term (up to 6 months) and the long-term (up to 5 Years) will be forecasted using the AutoRegressive Integrated Moving Average (ARIMA) model.
- ARIMA model takes into account the factors selected from the previous step

**3** Early Warning Signals

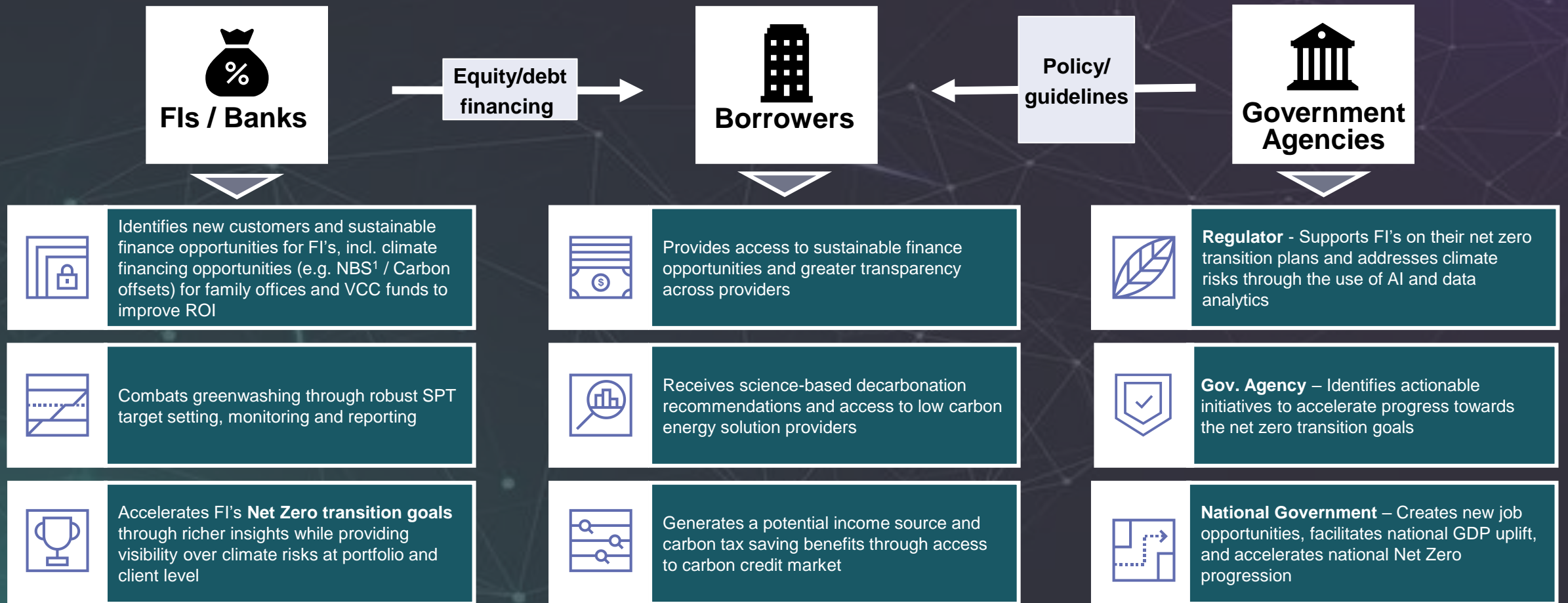
**Description:**

- Early warning signals / alerts for borrowers who are at risk of inability to hit KPIs set for the SLL for early intervention

**How it works:**

- An early warning signal will be triggered to both borrowers and banks as soon as a potential forecasted deviation is detected
- This will allow both parties to take necessary remediation actions for course correction

# NovA! have a strong value proposition for financial institutions, borrowers and government agencies



Note: 1. NBS - Nature Based Solutions



# 2.

## NovA! Phase 2 Plan

# In Phase 2, NovA! will adopt a co-development approach with ecosystem partners



## Activities and Deliverables for Phase 2

Theme	Product	
	Sustainable Finance Use Case	Climate Risk Use Case (NEW – prioritised by Industry Study) <sup>1</sup>
Activities	<ul style="list-style-type: none"> <li>• <b>Formalise collaboration with BCA</b>, activate data access for AI model training</li> <li>• Establish <b>roles and responsibilities</b> of working group</li> <li>• <b>Finalise detailed solution design</b></li> <li>• <b>Develop AI models and methodologies</b> linked to key solution capabilities</li> <li>• <b>Train AI models</b> using real data</li> <li>• <b>Alignment on data flows</b>, consent mechanisms, data privacy &amp; security</li> <li>• <b>Deploy AI models</b> into ecosystem partner solution(s)</li> <li>• Refine <b>commercial model</b></li> </ul>	<ul style="list-style-type: none"> <li>• Identify and select <b>data (e.g. S&amp;P)</b>, <b>tech. partners (e.g. S&amp;P Global, CDP)</b>, <b>Climate risk specialists</b> and finalise partnerships</li> <li>• <b>Mobilise working group</b>, including Lead Banks i.e. BOC, ICBC, ecosystem partners</li> <li>• Establish <b>roles and responsibilities</b> of working group</li> <li>• <b>Finalise detailed solution design</b></li> <li>• <b>Develop AI models and methodologies</b> linked to key solution capabilities</li> <li>• <b>Train AI models</b> using real data</li> <li>• <b>Deploy AI models</b> into ecosystem partner solutions</li> <li>• Refine <b>commercial model</b></li> </ul>

<sup>1</sup> – Use case selected and prioritised through the Industry Study

<sup>2</sup> – Use case to be assessed and studied in phase 2

# NovA! Methodology for Calculating Energy Conservation



## Concept, Objective and Use Case

Similar to a Renewable Energy Certificate, Energy Conservation Certificates (ECCs) could be issued based on the NovA! methodology for energy conservation calculation, which quantifies the additional energy consumption avoided via “in-set”

- **Real Estate Borrowers:** take measures to conserve the energy beyond the sustainability performance target as the baseline
- **Financial Institutions:** quantitatively incentivize the borrowers based on their sustainability performance

**FIs can enhance sustainable financing product offerings and incorporate:**

1. Eligibility criteria for sustainable financing products
2. Science-based ECC baseline as Sustainable Performance Targets

**Provide alternative incentives such as Energy Conservation Certificates (ECCs), documented in every 1000 kWh energy savings, which can potentially be monetised, as alternative of interest rate discounts or rebate for better sustainability performance**

Green Loans



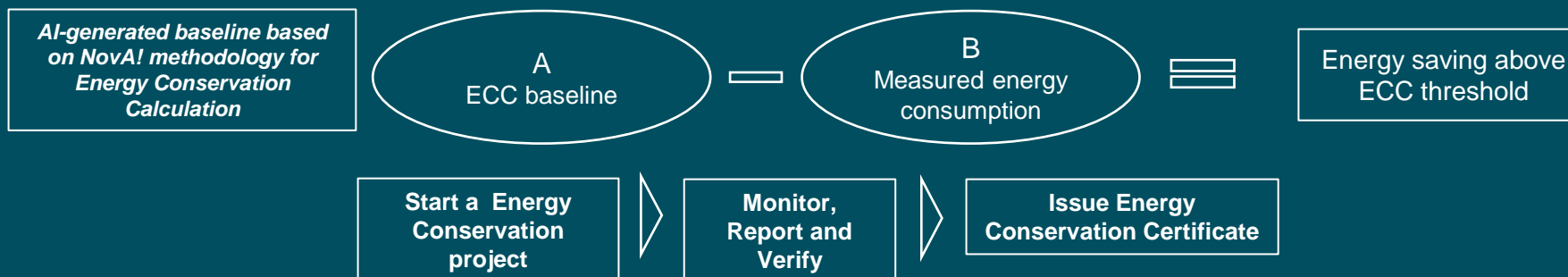
Green Mortgages



Sustainability Linked Loans

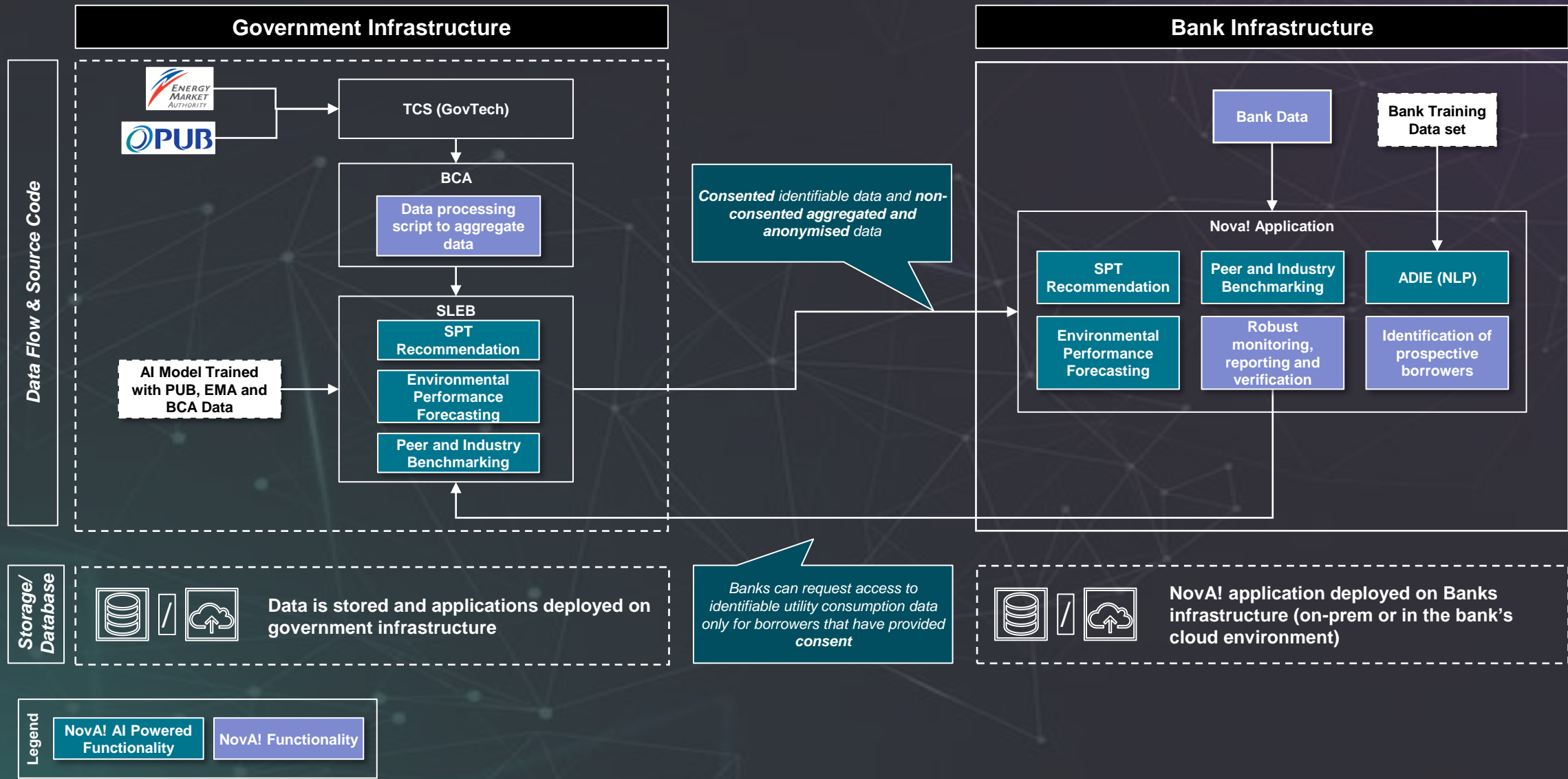


Recognise the additional energy savings beyond the rigorous baseline, i.e. ECC threshold





# NovA!'s Distributed System Architecture





# NovA! will have access to at-source building data and added credibility through involvement of an ecosystem of partners

## Summary of NovA! USP – Real estate sustainable financing

1



**Access to country-wide data**

NovA! will have access to at-source, verifiable building & utility data through the MAS X BCA collaboration (e.g. PUB, EMA, SLEB platform).

Competitors will not have access to this breadth or quality of data, provided by Government departments or agencies

NovA! USP & differentiation from competitors

2



**Trusted AI standards and methodologies**

Trusted AI methodologies and standards co-created with gov. agencies, academia, AI companies and FIs.

Competitors will not be able uphold the same level of trustworthiness in the market

3



**Bridge between FIs & prospective customers**

NovA! enables banks to proactively identify new customers i.e. developers & building owners. The platform acts as a bridge to connect supply & demand.

Competitors will not be able uphold the same level of trustworthiness in the market



# In Phase 2, NovA! will work with an ecosystem of partners to develop trusted AI models, methodologies and NovA!'s source code



	Real Estate Sustainable Finance	Climate Risk
Lead Banks		
Technology and Data Partners		
Government Agencies and key consortium members		

\*TBC

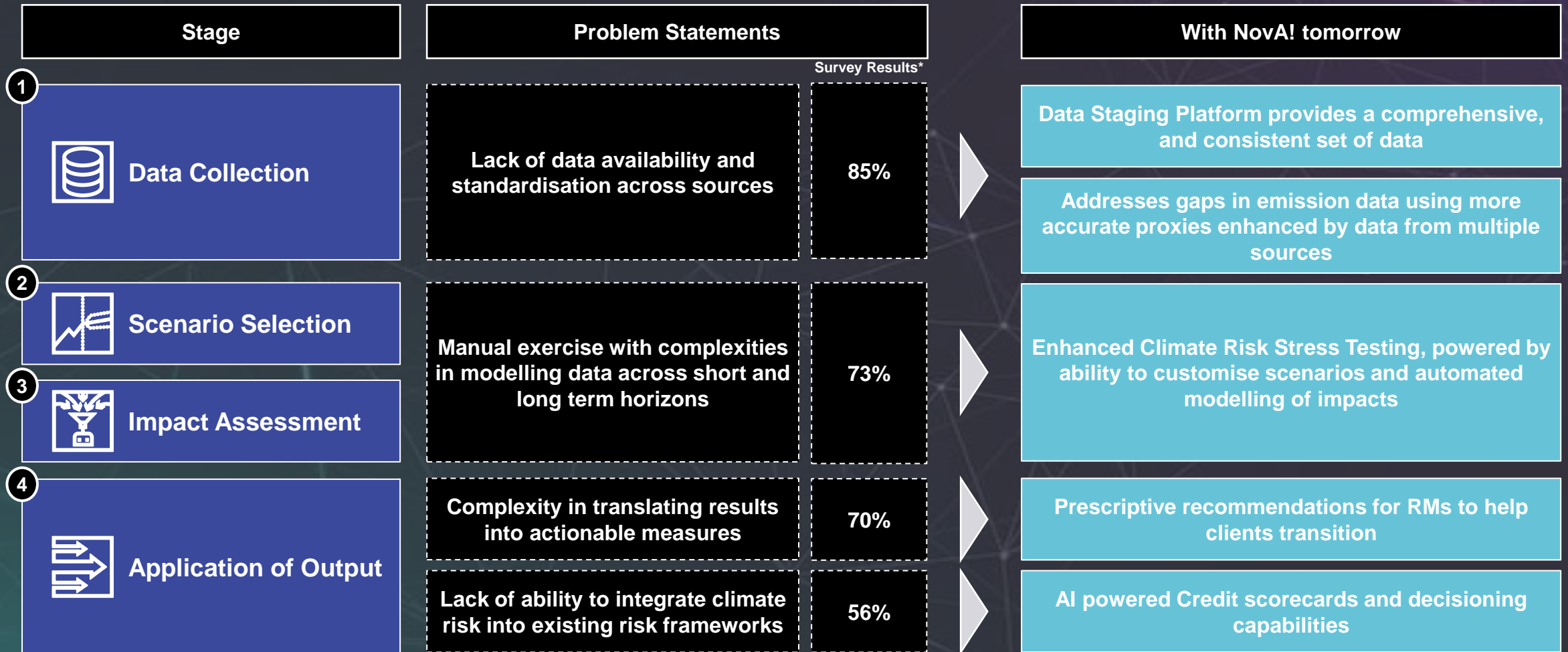


**2a.**

**Use Case 2 –  
Climate Risk  
Assessment**

# How NovA! aims to address the challenges Banks face when assessing climate risks

## Key capabilities



\*Problem statement validation from Industry Study survey conducted with 41 banks in Singapore



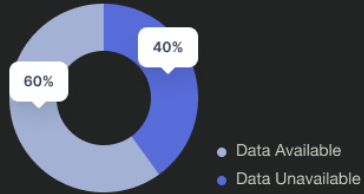
# Carbon Emission Estimation

Carbon Emission Estimation

## Your Portfolio

### Data Availability

[Review data](#)



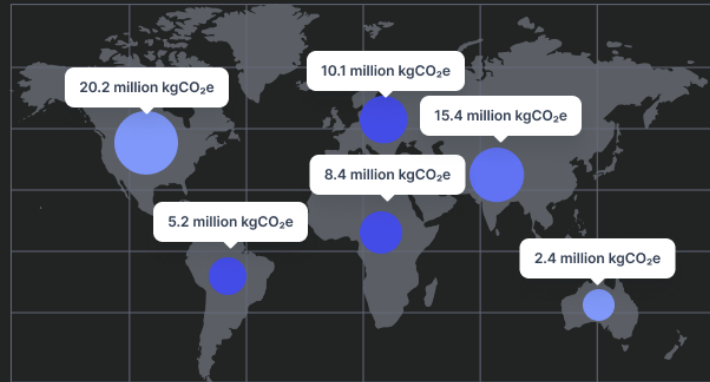
### Emissions by Scope

[View details](#)



### Emissions by Region

[View details](#)



### Emissions by Sector

[View details](#)



1. **Proxies will be identified and calculated to fill in emission data gaps.**
2. **Custom Emission factors are created and used to convert activity data into GHG emissions**
3. **NovA! will adopt the PCAF standard to calculate financed emissions across various asset classes.**



# Scenario selection and Climate Risk Stress Testing

Scenario Modelling

← Add New Scenario

Enter a Scenario Name...

Scenario Provider: NGFS

Scenario: Net Zero 2050

Scenario Modelling Variables

Policy Reaction: Immediate and smooth

Technology Change: Fast

Carbon Dioxide Removal: Medium use

Regional Policy Variation:  Low  Medium  High

Further Customisation Options

Time Horizon: 2050

Geography: Select geography

Simulated Scenario

Transition Risks (Y-axis: Low to High)

Physical Risks (X-axis: Low to High)

Quadrants: Disorderly, Too little, too late, Orderly, Hot house world

Save scenario

1. Users can select climate scenarios from a list of pre-defined scenarios.
2. More advanced users can further toggle advanced levers to customise scenarios. Users to have the option to understand underlying data impacting scenarios and models.
3. Based on the selected scenario, a financial impact analysis of the bank's portfolio is generated e.g. impact on probability of default, Loss given default

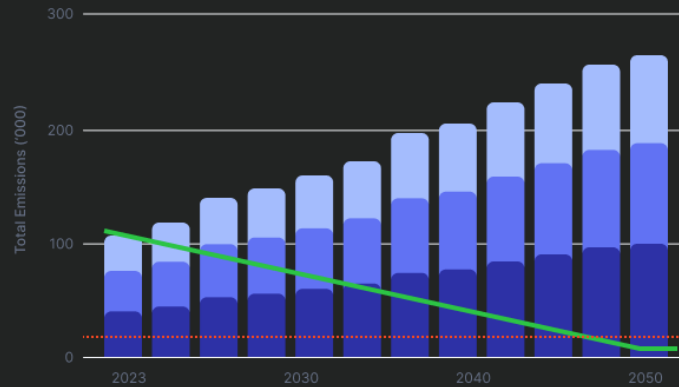


# Decarbonisation Recommendation Engine

Energy fertilisation and manure management

<input checked="" type="checkbox"/> Lever 5	Agroforestry and afforestation projects	0.5-0.8K	100-200K	4.3
<input type="checkbox"/> Lever 6	Nutrient optimisation and soil testing	0.3-0.9K	10-50K	20
<input type="checkbox"/> Lever 7	Precision fertilisation and irrigation management	0.2-0.9K	1-8K	122.2
<input type="checkbox"/> Lever 8	Conservation agriculture and cover crops	0.1-0.3K	10-100K	3.64

Emissions Chart



1. Identification of levers that organisations can use to lower carbon emissions.

2. Bank user is able to simulate level of investment required based on levers selected

Actionable Steps

<input type="checkbox"/> Steps	Investment (\$)	Emissions Reduction Estimate (kgCO <sub>2</sub> e)	Relevant Financial Product	
<input checked="" type="checkbox"/> Recommendation 1 <u>Implement agroforestry and afforestation projects</u>	1.2M	5,123	\$1M Green Loan 5% per annum, 2 years	<a href="#">View details</a>
<input checked="" type="checkbox"/> Recommendation 2 <u>Adopt water-efficient irrigation systems</u>	3K	3,354	Sustainability Linked Loan Tenor and interest will be determined based on sustainability performance	<a href="#">View details</a>
<input checked="" type="checkbox"/> Recommendation 3 <u>Transition to renewable energy systems</u>	12.5K	1,566	Sustainability Linked Loan Tenor and interest will be determined based on sustainability performance	<a href="#">View details</a>

# Credit Risk Framework Augmentation



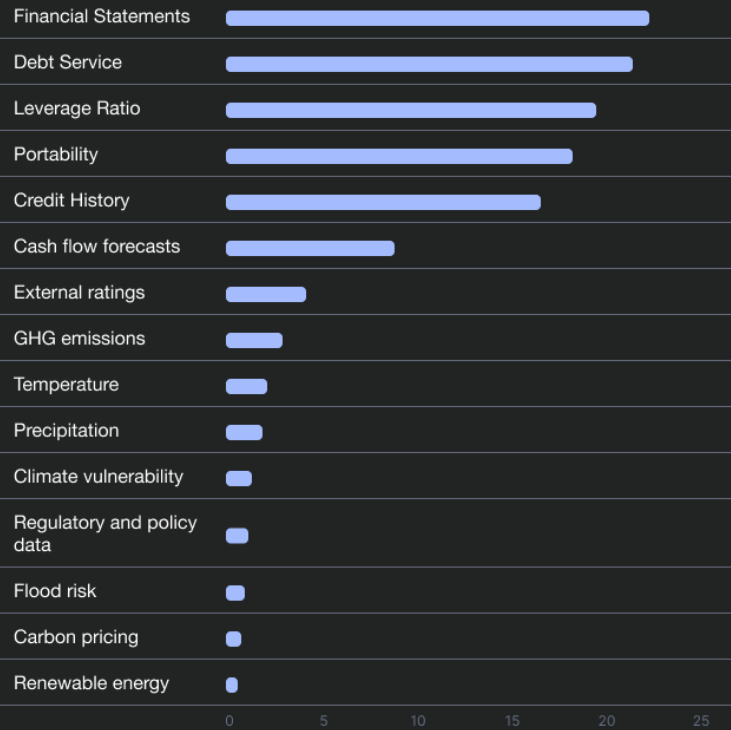
Climate Augmented Scorecard

## ← Model Optimisation

Stop Calibration

Analyse

### Augmented Variable Importance Edit



### Calibration in Progress



### Model Optimiser



1. **Provides tools and methodologies for integrating climate risk data into credit models.**
2. **Facilitates the calibration and validation of the integrated credit models that incorporate climate risk**
3. **Enables sensitivity analysis to assess credit models' vulnerability to climate-related variables.**



# NovA! aims to set the industry-leading standard for Climate risk assessments, with further validation needed in Phase 2

## Summary of NovA! USP – Climate risk assessment

NovA! USP & differentiation from competitors

### 1



#### Addressing the market gap in data

Data availability was identified as critical market gap by FIs, particularly for private companies and SMEs. NovA! will address by aggregating, standardising and enriching data from different sources including SME/Private company data from Greenprint.

Competitor solutions are predominantly focused on public companies and offer limited insights on private companies/SMEs.

### 2



#### Transparency of methodology

NovA! will build trusted AI methodologies co-developed by private and public sector to provide actionable insights to address climate risk and opportunities

Competitor solutions lack transparency of their methodologies and are not developed in consultation with regulators and FIs.

### 3



#### Inclusivity

As an industry-utility, NovA! ensures equity of access and opportunities for all FIs and customers (of varying sizes) and that no group of stakeholders are disadvantaged.

Competitors are primarily profit-driven, and not incentivised to ensure inclusivity.



**Thank You**