



# ESG risks and ratings: the materiality assessment evolution

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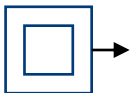
ESG Enterprise Risk Manager



# Climate/ESG risk score can be combined with the credit risk appetite and ratings through three different approaches

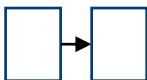
## Methodologies to combine Climate/ ESG score with Credit Risk Appetite

Integration of Climate/ESG score in internal rating model



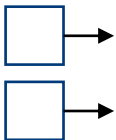
The **Climate/ESG score fully integrated in the rating** model with **dedicated modules** and quantitative and qualitative **variables capturing climate risk**

Notch-up/ down of internal rating based on Climate/ESG score



The **Climate/ESG score impacting** the credit rating with a **notch-down and notch-up of the rating** based on the Climate/ESG score value

Separate Climate/ESG score and credit rating



Two separate scores, i.e. the **Climate/ESG score** and the **credit rating**, integrated in the **underwriting and monitoring process** with **rules combining climate and credit risk assessment**

## Pros and Cons








- + Unique integrated model that **avoids double counting** of risks/elements
- + **Integrated across all credit processes without** need of significant **process design changes** and interventions
- Need of **rating model re-development** and **internal validation process**
- **Limited data availability** and **observed connection to credit performance** to match typical internal **rating model data quality standards**
- Potentially **limited impact** of climate risk components on **overall rating score**
- + **“Separate” and “visible” C&E** impact on credit risk assessment
- + **Flexibility for the use** of scores **in different components of the credit processes**
- **Potential double-counting** of risks/model elements between the two scores (only relevant if the final rating feeds all “use test relevant” credit processes)
- + **Flexibility in methodology for the combination** of climate score and rating, e.g. through **decision-making rules** within the credit processes
- **Lack of integrated score** with **overall risk profile** of the counterpart capturing both climate and credit risk assessment and, as a consequence, **need for climate-related overlays** in the credit UW processes

# To manage Climate risk, ISP adopted two main pathways

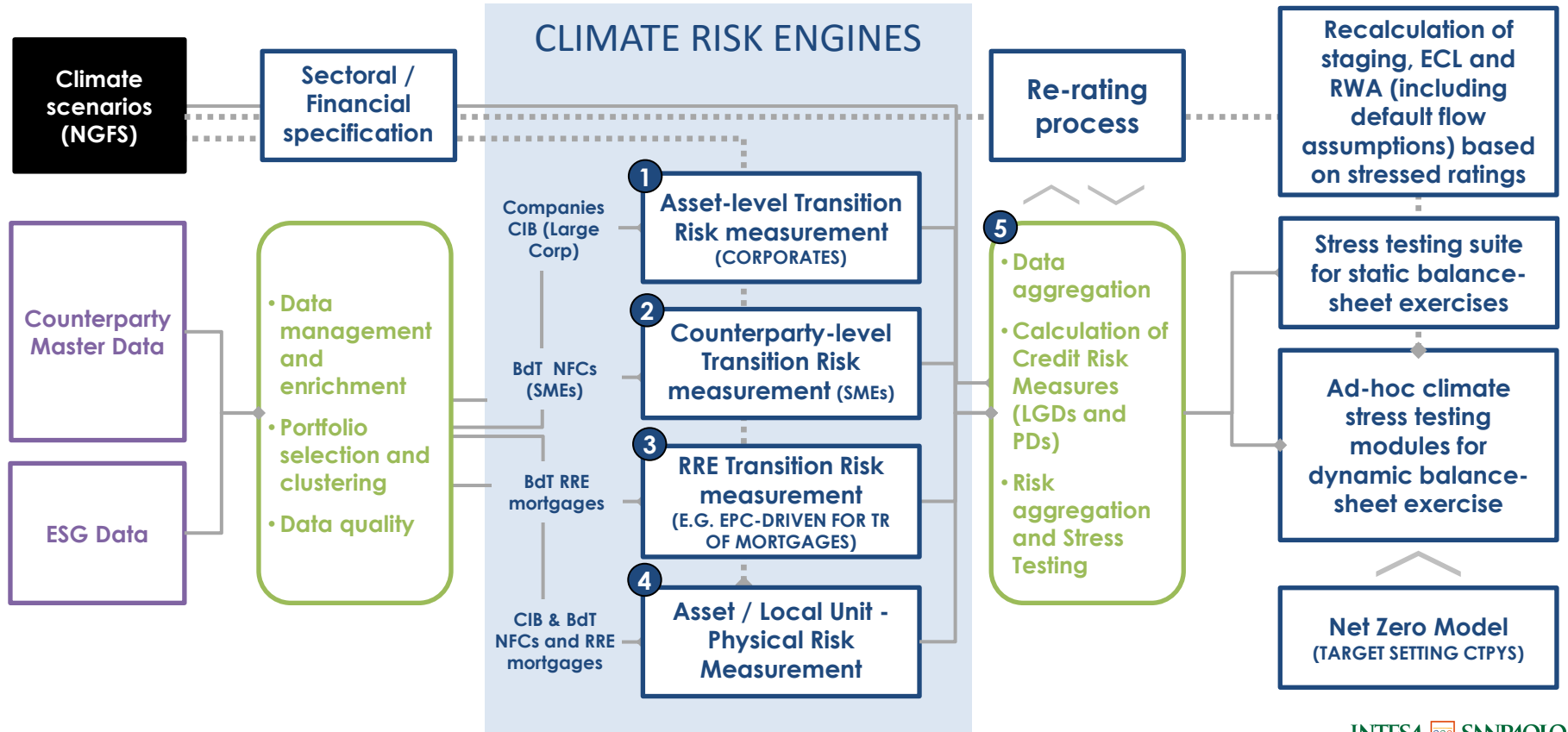
## Type of analysis

## Definition





## Use case examples (not exhaustive)

<p>Scorecard</p>	<p><b>NFC Scorecard</b> (UNEP FI/Moody's heatmaps, TAC, GHG emissions)</p> 	<p><b>Counterparty level scoring</b> analysis based on</p> <ul style="list-style-type: none"> <li>Industry <b>sectors</b> and <b>countries</b> of activities</li> <li><b>Idiosyncratic adjustments</b> for physical and transition risks at counterparty level</li> <li><b>Mitigation plan</b> of counterparty for physical and transition risks</li> </ul>	<p>Input to credit <b>underwriting and monitoring process</b>, as well as impacting <b>pricing</b> to reflect climate strategy of the bank</p>
	<p><b>Scorecard/ haircut table impacting collateral value</b></p> 	<p><b>Haircut tables</b> informing on property value reduction based on property type and location (informed by physical hazard mapping)</p> <p>Table informed by <b>output of stress test</b></p>	
<p>Scenario analysis</p>	<p><b>Bottom up stress test</b></p> 	<p>Stress test performed at <b>counterparty level</b> and aggregated into sectorial impact</p>	<p><b>Stress test</b> to understand <b>impact of Climate risk on portfolio</b> under different climate risk scenarios</p>
	<p><b>Top down stress test</b></p> 	<p><b>Portfolio level</b> stress test based on forecasted impact of climate change on different counterparty clusters (e.g. industry segment)</p>	

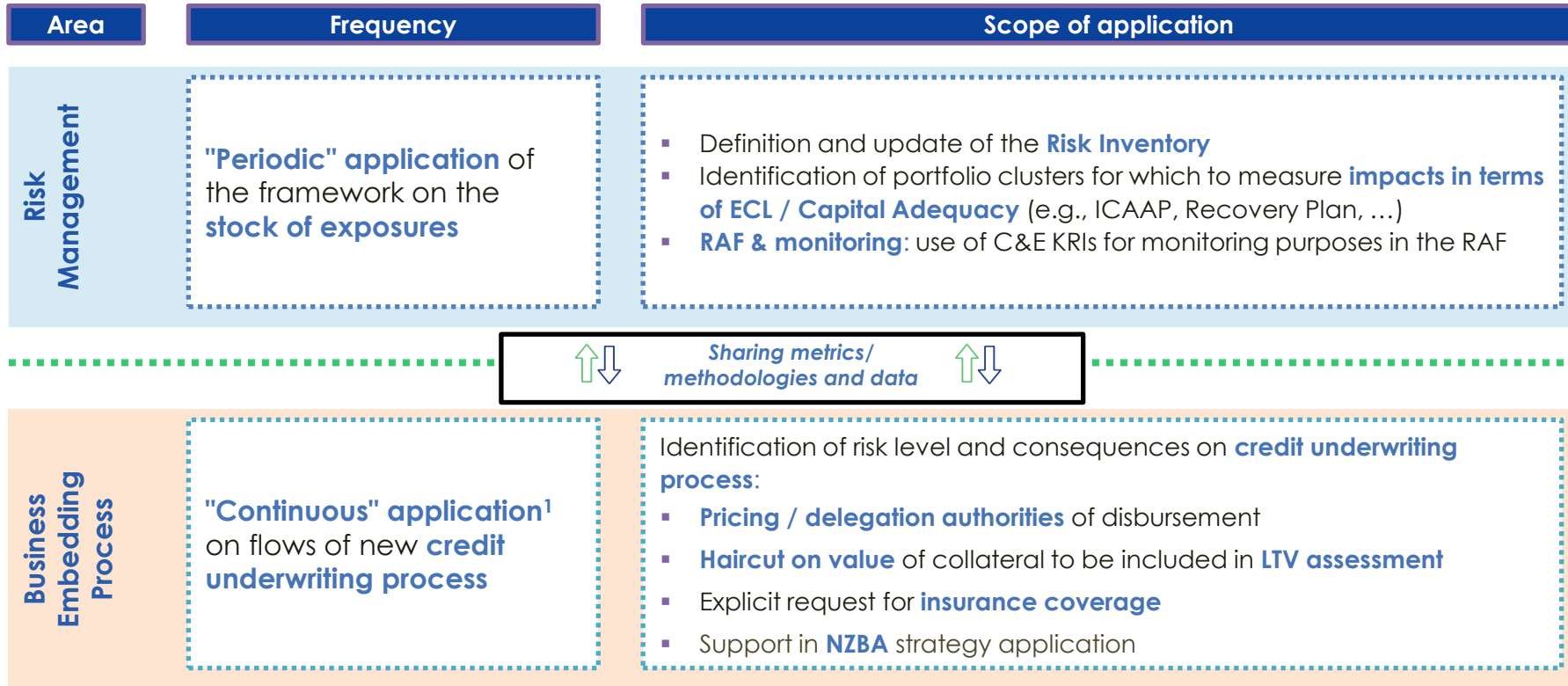
# Climate Risk Scenario Analysis - Different Re-rating simulation engines and integration into the ISP ecosystem



# Daily risk manager tasks: link between NZ strategies with RAF, Credit Strategies and Underwriting process

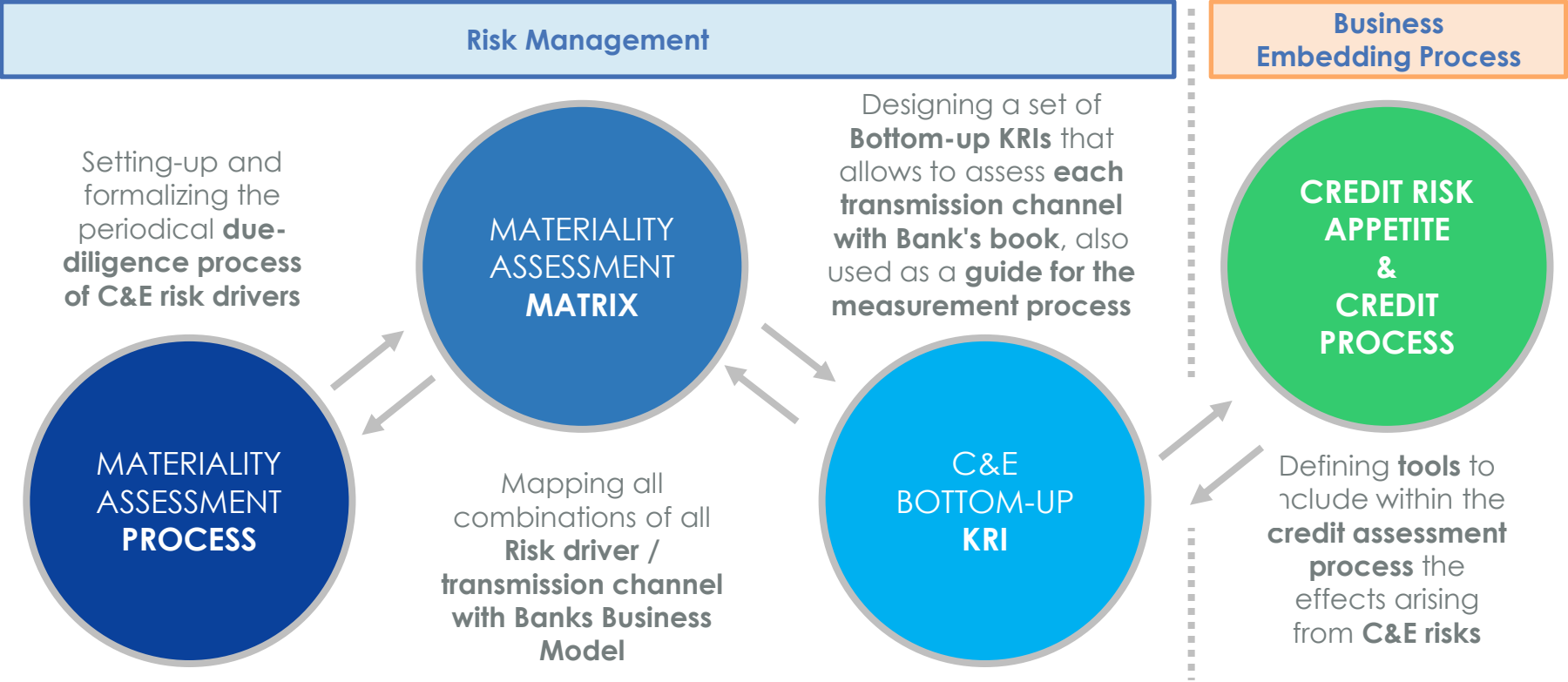
	Risk Appetite Framework 	Credit Strategies 	Underwriting 
ESG evolution of Credit Framework	<ul style="list-style-type: none"> <li>✓ <b>2022:</b> Introduction of specific <b>limits</b> on <b>high ESG/Climate risk sectors</b> within <b>RAF</b></li> </ul>	<ul style="list-style-type: none"> <li>✓ Full use of <b>ESG Sectoral Strategy</b> in the sectoral attractiveness of the <b>Credit Strategies</b></li> </ul>	<ul style="list-style-type: none"> <li>✓ Inclusion of ESG/Climate considerations in the <b>reinforced underwriting process</b> for high ESG/Climate transactions for <b>larger transactions</b></li> </ul>
Target Setting	<ul style="list-style-type: none"> <li>✓ <b>2022:</b> Introduction of <b>RAF exposure limits</b> on Oil &amp; Gas and full <b>phase-out</b> from <b>Coal mining</b> in 2025</li> <li>✓ <b>2023:</b> Introduction of specific <b>limits</b> related to counterparties CO2 emissions</li> </ul>		<ul style="list-style-type: none"> <li>✓ Requirement of <b>Transition plan assessment</b> for large exposure deals of clients <b>operating</b> in <b>Net Zero sectors</b></li> <li>✓ Pilot phase on Oil &amp; Gas is ongoing, further developments on additional sectors expected in coming months</li> </ul>
Green Asset Ratio – EU Taxonomy / ESG Reporting 	<ul style="list-style-type: none"> <li>✓ <b>2023:</b> Full implementation of <b>reporting</b> on RRE taken as collateral, broken down by <b>EPC certifications</b> and by <b>geomorphological characteristics</b>, consequently taking into account both transition and physical risks</li> </ul>	<ul style="list-style-type: none"> <li>✓ Definition of a <b>new additional incentive framework</b> to <b>include</b> also <b>counterparty/deal alignment</b> percentage to <b>EU Taxonomy requirements</b></li> </ul>	

# Materiality Assessment Framework: Main applications in Intesa Sanpaolo



(1) Leveraging the gathered information to enable classification of products according to EU Taxonomy (e.g., for GAR / BTAR calculation)

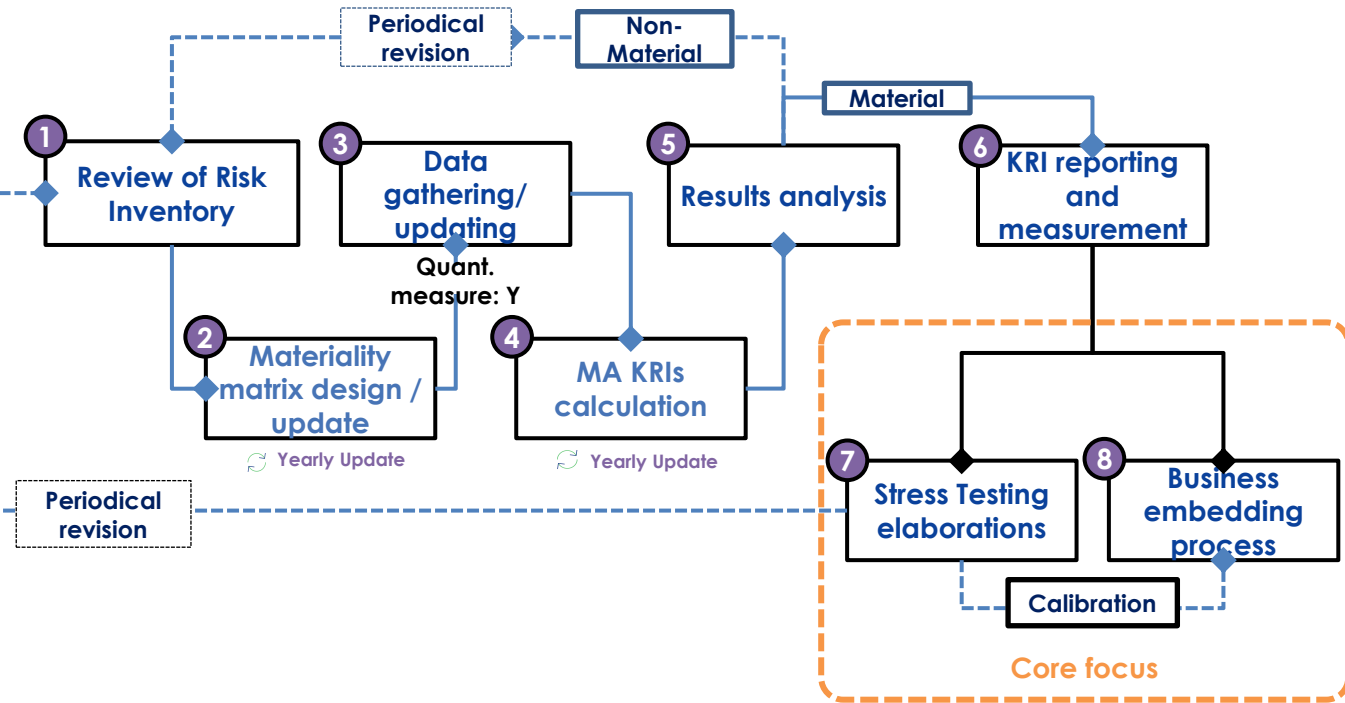
# Materiality Assessment Framework: Process overview



# Materiality Assessment Framework: Use of quantitative features for periodical due diligence



Bottom-up quantitative analysis will support the yearly process of Materiality Assessment impacting measurement, monitoring and reporting



- 1) Updating Risk Inventory through **regulatory / literature review**
- 2) Periodical **revising** of relationships between **risk factors** and **transmission channels** with **Banks business model**
- 3) For each combination, **collecting input and scenario data**
- 4) Calculation of MA KRIs leveraging **on bottom-up engines**
- 5) Result analysis
- 6) If impacts are deemed relevant, for this **risk-driver combination KRI are reported and measurement starts**
- 7) Undertake, for the material part of the portfolio, **stress test analyses and cascading on credit risk parameters**
- 8) Enhancement of **business process embedding** mechanism leveraging the stress test results for calibration purpose



# Materiality Assessment Matrix: Mapping all C&E risk drivers on Bank's business model



The Materiality Matrix relies on a holistic assessment of all the potential impacts of C&E Risks on Banks business model

Climate / Environmental Risk Drivers	Risk factors	Transmission channels	REP RISK																				
			CREDIT RISK							MKT RISK			OP / RISK			RE RISK			LIQ RISK		...		
			Credits				Government			Financial		Securities			Operations			Real estate			Liquidity		...
			NFC secured	NFC unsecured	Households secured	Households unsecured	Government	Financial	Governativi	Corporate	...	Filiali banca	Centri servizi	...	Ptf di proprietà	Garanzie repossessed	...	Inflows	...	...			
Transition risk	Policies & Regulations	Costs	x	x	i				x	x	...												
	Reputation	...	x	x																			
	Technology	Investments	x	x	x																		
	Market	Turnover																					
Physical risk - Acute	Floods	Losses due to damage	x	x	x								x	x	...	x	x	...	...				
	Drought	Turnover	x	x	x								x	x	...	x	x	...	...				
	...	...	...	...	...								...	...	...	...	...	...	...				
Physical risk - Chronic	Temperature	Turn./Invest.	x		x								x	x	...			...	...				
	Rainfall		x										x	x	...			...	...				
	...	...	...	...	...								...	...	...	...	...	...	...				
Environmental risks	Biodiversity																						
	Water stress																						
	...	...	...	...	...																		

For each combination of: Impacted risk / Portfolio, Risk Factor and Transmission Channel, a bottom-up materiality evaluation will be carried for Risk Management purposes and for Business Embedding Process calibration

Illustrative

# Materiality Assessment C&E KRIs: Possible future evolutions and approaches



After the Identification of **each relevant intersection within the Materiality Matrix** two alternative approaches can be applied:

- Approach A:** leveraging on the outputs of high-granularity **measurement engines** (e.g. Transition & Physical Risk Engines). Output can be used also as drivers for materiality assessment of **other risks** (e.g., Op. Risk, Liquidity risk, ...)
- Approach B:** **sectoral / geographical proxies** on which exposures will be classified in order to assess materiality

Climate / Environmental Risk Drivers	Risk factors	Transmission channels	REP RISK																	
			CREDIT RISK								MKT RISK				OP / RISK		RE RISK		LIQ RISK	
			Credits				Securities				Operations		Real estate		Liquidity					
Transition risk	Policies & Regulations	Costs	NFC insured	NFC unsecured	Households insured	Households unsecured	Government	Financial	Governative	Corporate	...	Filiali banca	Centri servizi	...	PII di proprietà	Garanzie ipotecarie	...	Influenza	...	
	Reputation	Investments	X	X	X	X			X	X	...									
	Technology Market	Turnover																		
Physical risk - Acute	Floods	Losses due to damage	X	X	X							X	X		X	X				
	Drought	Turnover	X	X	X							X	X		X	X				
Physical risk - Chronic	Temperature	Turn./Invest	X		X							X	X							
	Rainfall		X		X							X	X							
Environmental risks	Biodiversity																			
	Water stress																			

**Project scope**

**Approach A**  
"High-granularity"  
Focus next slide

**Potential widening of the perimeter scope**

**Approach A**  
"High-granularity"

**Approach B**  
"ESG proxy"

Perimeter currently outside the project scope but potentially eligible

- The **bottom-up measurement engines** allow to assess with a **scenario-based approach** both the single risk driver / transmission channel and the overall exposure to a risk area (e.g. Transition Risk) at **counterparty / asset level**
- For some risks (e.g., Operational Risk, ...) it is possible to use **bottom-up engines to assess the materiality** of some specific transmission channels (e.g., Use physical risk engines also to assess potential depreciation on branches)
- Where bottom-up measures are not available **exposure / business volumes** will be clustered at **sectoral / geographical level** (e.g. EAD prone to biodiversity risk)

# Materiality Assessment Framework: Transition Risk data & methodology

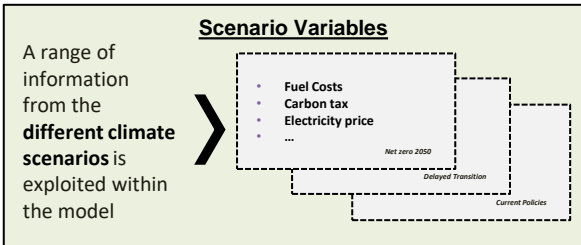


**Transition risk** is the risk factor associated with the **adjustment process toward a low-carbon economy** to meet the goals of the **Paris Climate Agreement**. This can directly result to a **depreciation** of a wide range of assets or **reduced productivity**.

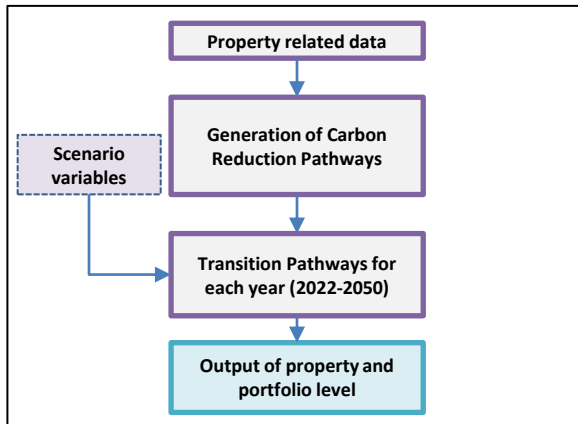
## 1 Input & Scenario Variables      2 Calculation logic      3 Outputs

To calculate the **impact of transition risk** on the **value of each RRE**, it is necessary to use the following **inputs**:

- Geographical information
- Market Value, floor area and EPC of the asset
- Energy demand estimates
- Technological upgrade options
- Capex costs for each transition option
- CO<sub>2</sub> emissions

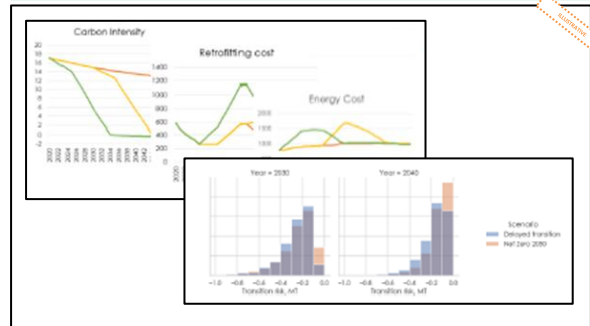


The **TR RRE model** detects the **most efficient transition pathway** for each property, evaluates the **costs and CO2 emissions** and projects total costs and transmissions risk impact for each scenario.



For each scenario, we have a time series of:

- **Energy Demand**
- **Carbon emissions**
- **Service costs**
- **Efficiency improvements**



# Materiality Assessment Framework: Transition Risk on Mortgages

## “Granular heat-map solution”



In order to **comply with the expectations of the Regulator on mortgages**, it is reasonable to imagine the creation of **Granular heat-map (ZIP code, EPC, Heating systems level)** that exploits the results of **bottom-up processing as of 31.12.2022** on the bank's stock performed with a transition engine as part of ICAAP processes

### Granular Heat-map solution

- Methodology**
- Analysis dimensions:** fixed geographical grid approach (ZIP Code) with breakdown by EPC and heating system
  - Measure:** Average % depreciation from transition risk event estimated on the stock
  - Scenario:** Orderly transition
  - Time horizon:** average residual maturity of the portfolio (13 years)

### How to & Results

- Average haircut → impact on LTV** (the same for each analysis dimensions)

### Granular Heat-map illustrative application

- TORINO**
- Sample number:** 2.896
  - Average zip code level Depreciation:** 3,2%
  - Given the **high dispersion** of the sample at the municipal level, it was decided to proceed with **ZIP code level maps**

City	Heating System	EPC Level	Depreciation %
Torino	Air source heat pump	A	1,5%
		B	2,5%
		C	4,5%
		D	5,5%
Torino	Electric resistive heating	A	1,5%
		B	2,5%
		C	4,5%
		D	5,5%



- ZIP Code 10121 (TO)**
- Sample number:** 845
  - Average zip code level Depreciation:** 2,5%
  - The depreciation was calculated considering some **key features** such as the **level of EPC** and the **heating system**

Zip Code	Heating System	EPC Level	Depreciation %
10121	Air source heat pump	A	0,5%
		B	1,0%
		C	3,0%
		D	4,5%
10121	Electric resistive heating	A	0,5%
		B	1,0%
		C	3,0%
		D	4,5

### APE & Heating system

# Materiality Assessment Framework: Physical Risk data & methodology



**Physical risk** refers to the financial impact of a changing climate, including more frequent extreme weather events and gradual changes in climate. This can directly result in **damage to property** or **reduced productivity**, or indirectly lead to the **disruption of supply chains**.

## 1 Geo-location & Mapping      2 Methodology application      3 ISP portfolio output

Geo-location process produce precise **latitude & longitude measures**, which are used for the **physical hazards' exposure** of any collateral and local unit

By computing the exposure of the single collateral and the potential damage, under the specific scenario, **impacts on MKT values** are simulated long the time horizon

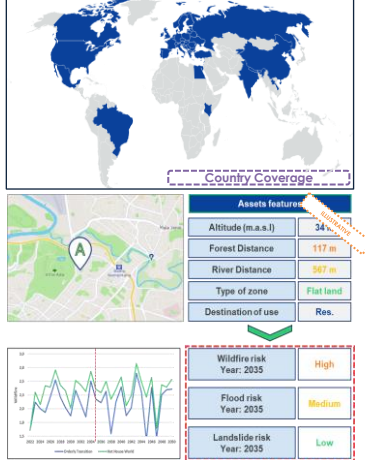
**Portfolio and asset-level calculation** (sample: 2.7 mln collaterals) of depreciation due to **flood events** and application of the measure in satellite models to calculate the **stressed prospective LGD**

**Geolocation**

- Single collateral granular geo-location, up to 1x1 km cell for Flooding

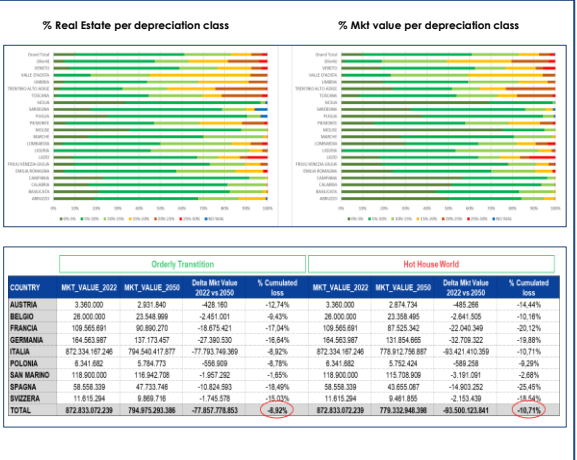
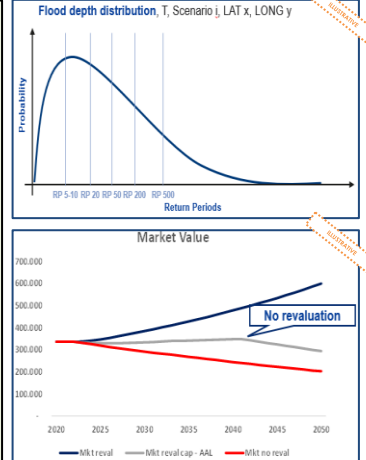
**Mapping**

- Synthetic Physical Risk Indicator<sup>1</sup> (SPRI) for any hazard, using scenario dependency and geomorphologic features



**Methodology**

- Calculation of the economic damage associated with hazards
- Depreciation for C/RRE as Expected Loss
- Evolution of collateral MKT value along the time horizon



(1) Synthetic measure of physical risk indicating the level of risk according to four categories (LOW, MEDIUM, HIGH, VERY HIGH) available for each hazard in perimeter

# Materiality Assessment Framework: Physical Risk on Mortgages

## “Granular heat-map solution”



In order to **comply with the expectations of the Regulator on mortgages**, it is reasonable to imagine the creation of **fixed-grid maps (ZIP code level)** that exploit the results of **bottom-up processing as of 31.12.2022** on the bank's stock performed with the physical risk engine as part of ICAAP processes

### Granular Heat-map solution

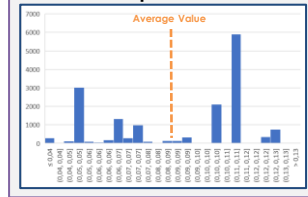
- Methodology**
- Analysis dimensions:** fixed geographical grid approach (ZIP Code level)
  - Measure:** Average % depreciation from physical risk event estimated on the stock
  - Hazards:** Flood Risk at 31/12/2022<sup>1</sup>
  - Time horizon:** average residual maturity of the portfolio (13 years)

### How to & Results

- Average haircut by Zip Code → impact on LTV (the same for each zip code)**

### Granular Heat-map illustrative application

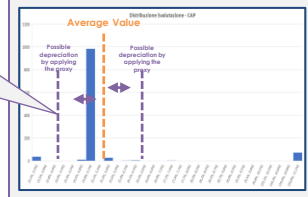
- TORINO**
- Sample number: 2.896**
  - Average zip code level Depreciation: 8,9%**
  - Given the **high dispersion** of the sample at the municipal level, it was decided to proceed with **ZIP code level maps**



Considering the **average level per ZIP code of the first-floor area over total area** of the asset, it is possible to change the overall level of depreciation associated with the new collateral as follows:  
 Avg surface 1<sup>st</sup> floor : 80%; new collateral surface 1<sup>st</sup> floor: 70% → zip code depreciation \* 70% / 80% )

- Low risk level
- Medium risk level
- High risk level
- Very-High risk level

- ZIP Code 10121 (TO)**
- Sample number: 845**
  - Average zip code level Depreciation: 5,3%**
  - Ability to refine the calculation by having the information of **first floor area/total area** <sup>(2)</sup>, the most important feature of the asset



Using open ZIP Code heatmaps reduces dispersion and increases estimation accuracy

(1) Damage functions are available also for other hazards but not elaborated on 31.12.2022 – TBD inclusion of other hazards  
 (2) Considering the average level per ZIP code of the first-floor area compared to the total area of the asset, it is possible to change the overall level of depreciation associated with the new collateral  
 (e.g., Avg surface 1<sup>st</sup> floor : 80%, new collateral surface first floor: 70% → zip code depreciation \* 70% / 80%)

# Materiality Assessment Framework: Potential evolution in High granularity assessment for origination process



The *Granular Heat-map solution* has the limit to be an approximation when assess the Climate Risk materiality of new business. Also, the materiality assessment of the *Granular Heat-map* solution are based on the stock portfolio with fixed geographical grid.

The possibility to switch to on-line Climate Engines, presents advantages:

<b>Target approach strengths</b> 	<b>1</b> <b>Analysis granularity</b>	<ul style="list-style-type: none"> <li>▪ <b>Complete bottom-up approach</b>, using specific features of the assets (surface, floor, ...) and using the specific geographic cells to which they belong (distance to river, distance to forest, ...)</li> <li>▪ <b>Consistency</b> between the approach in use for stock portfolio and new business</li> </ul>
	<b>2</b> <b>Evolution</b>	<ul style="list-style-type: none"> <li>▪ <b>Potential usage of future evolution of Climate Engines</b>, including insurance and adaptation measures (...)</li> </ul>
	<b>3</b> <b>Synergies</b>	<ul style="list-style-type: none"> <li>▪ <b>Synergies</b> with <b>EU-Taxonomy</b> and other functions usage<sup>(1)</sup></li> <li>▪ <b>Complete coherence</b> with Regulator Expectations</li> </ul>

### Technological requirement

<b>System integration</b>	<ul style="list-style-type: none"> <li>▪ Need for <b>system integration of Climate Engines</b> by <b>leveraging an API call</b> to make the service available</li> </ul>
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(1) Not in scope of this presentation



## Thanks for your attention!

The views and opinions expressed in this presentation are those of the author and do not necessarily reflect the official policies or position of Intesa Sanpaolo Group

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