EACH

European Association of CCP Clearing Houses

EACH Response – ESMA call for evidence on Climate Risk stress testing of CCPs

April 2022

1. Introduction

The European Association of CCP Clearing Houses (EACH) represents the interests of Central Counterparties (CCPs) in Europe since 1992. CCPs are financial market infrastructures that significantly contribute to safer, more efficient and transparent global financial markets. EACH currently has 18 members from 14 different European countries. EACH is registered in the European Union Transparency Register with number 36897011311-96.

EACH appreciates the opportunity to provide feedback to the ESMA call for evidence on the Climate Risk stress testing of CCPs (henceforth, '*the ESMA paper*').

2. Executive Summary

A summary of the key ideas contained in this response is included below:

- **Agree with Physical, Transition and Business as key pillars of Climate risk –** EACH agrees with the classification of Physical, Transition and Business risk as key pillars of Climate risk. We would however, welcome feedback from ESMA on how Collateral Replacement risk fits into the picture with three aforementioned standard risk categories.
- **Question Transition risk as a pillar in CCP Stress Testing, but relevant under Credit Counterparty risk –** Whilst Transition is a key pillar of Climate Risk, EACH respectfully considers that its relevance as its own pillar in stress testing CCPs is questionable. This is due to the fact that it is very unlikely that transition risk will take place during the 2-7 day MPOR. However, EACH considers that transition risk is relevant to stress testing in relation to Credit Counterparty risk as this takes place over a longer time-horizon.
- **The importance of Metrics –** Whilst not mentioned in this paper, EACH emphasises the importance of developing, using and disclosing metrics as a key factor for dealing with Climate risk going forward.
- **Modelling Business Risk –** When dealing with business risk, EACH believes that all sectors can be affected by it. Where modelling it is concerned, we note that certain sectors may face constraints here. In addition to this, we look at how to classify products in terms of Business risk, that would be to divide into the categories of 1) Green (clean) 2) neutral or 3) Brown (dirty).
- **Data Management and confidentiality –** EACH generally believes that ESMA's suggested process addresses Data Management concerns. We also note that using public sources, such as Public Quantitative Disclosures (PQDs) would deal with potential confidentiality issues related to publication of Stress Test results.
- **Mapping Climate risk –** Whilst it has it is divided into its own categories, such is the nature of Climate Risk that when mapping it, it will also undoubtedly appear in Credit, Market, Liquidity, Operational, and Legal risk. EACH notes the importance of considering this when mapping Climate risk.

3. General EACH feedback

EACH considers Climate Risk a hugely important topic. We note that Climate Risk in the context of the clearing activity performed by CCPs is not a subject that has been widely discussed until now. EACH contributed to this debate with a paper in February 2021.[1] EACH therefore appreciates this initial 'call for evidence' as an opportunity to contribute to an area only growing in importance.

EACH strongly believes that the development, use, and disclose of climate risk metrics are key factors to the next phase of improving climate risk management within CCPs, their investors and participants of cleared markets. Similar to the development of other areas of risk management, the risk approaches and frameworks needed to identify, measure and mitigate climate risks are yet to fully mature. As such, EACH would like to highlight the following areas for ESMA's consideration, given that metrics have not been mentioned in the call for evidence paper:

- **Development** - to the extent possible it is important that climate risk metrics be harmonised across industries/products/services. Common standards and definitions will aid comparison and consistency of model outputs. For instance, for credit risk, probability of default (PD), exposure at default (EAD) and recovery rate (RR) there are industry-standard definitions, but no equivalent concepts exist for climate risk metrics;
- **Use** - CCPs, and when appropriate the economic groups to which they belong, typically manage their climate-related risks through an ESG or Sustainability Programme for the micro-perspective and the Enterprise Risk Management for the macro-perspective. There is, however, a common understanding that such use can yet be expanded. For instance, as a part of the CCP credit risk management and scoring models, clearing members could provide non-public data on climate impact data. Similarly, driven by CCPs' governance and risk frameworks, climate-related data and metrics could be used to formulate Key Risk Indicators (KRIs) that track climate (or in a broader sense ESG) risks over time. These could be used to strategically steer businesses towards offering more sustainable products and services, as well as adjusting CCPs' own behaviour. Care should be taken to ensure a level playing field (globally), i.e. that those companies which disclose climate change related metrics should not be disadvantaged over those which do not disclose;
- **Disclosure** - as with any other area of risk management, for climate risk metrics to fully realise their effectiveness they must be transparent. CCPs, and when appropriate their economic groups or corporations, can contribute to climate risk management by offering such disclosures in line with the recommendations of the Taskforce on Climate-related Financial Disclosures (TCFD)[2]. In addition, equity and bond issuers should be encouraged to report their environmental impact (including measures like carbon footprint, water use, waste generation etc.) and exposure to

[1] https://www.eachccp.eu/wp-content/uploads/2021/02/EACH-Paper-Climate-Risk-and-CCP-Risk-Management-Feb-2021.pdf

[2] Final Report June 2017: Recommendations of the Task Force on Climate-related Financial Disclosures.

climate risks as a part of information provided to trading and clearing.[3] The disclosed data would support informed investment, credit, and insurance underwriting decisions, and will enable a variety of stakeholders (e.g. investors, regulators, risk managers and data product vendors) to understand the concentrations of carbon-related assets in the financial sector and the financial system's exposures to climate-related risk.

[3] One possibility could be ESG portals, including a wider disclosure capacity covering also Social and Governance factors and metrics.

4. EACH answers to ESMA questions

Question 1 – Classification of Climate Risk

Do you agree with this classification of relevant climate risks for CCPs in these four pillars? Do you see one or several other climate risks that need to be added to this mapping (if so, please provide a definition, relevant time horizon, an approach to its measurement approach)?

EACH answer: EACH broadly agrees with the classification suggested by ESMA. The classifications included the EACH paper on Climate Risk and CCP Risk Management match three of the four identified by ESMA, this being physical risk, transition risk and business risk (or future business impact in our paper).

Regarding **transition risk**, while we agree with it as one of the pillars of climate risk, we question whether it is a suitable to include as a pillar when stress testing CCPs, given that we see limited plausibility in a sharp market price movement in the relevant time frame (2 to 7 days) as a sole result of the materialisation of a given transition risk (see answer to question 5.a for more information). Furthermore, in the period covered by Margin Period of Risk (MPOR), where CCPs calculate and account for all risk factors, it is highly unlikely that any transition risk will arise. A way that EACH does see transition risk as relevant to stress testing, is on more granular level as part of counterparty credit risk. For example, in the short-term (pre-2030) the need for investment and raising capital (to finance green transition) increases leverage and cost of capital in those companies/banks that implement early/or are on target to transition to net-zero; in other words; the Probability of Default of early green adopters could increase if they do not have significant own means to finance the transition.

Regarding **collateral replacement risk,** while we agree that modelling the impact of climate change on certain types of acceptable collateral, in the shape of a squeeze on the highest quality assets as CCPs remove 'relatively more environmentally damaging issuers' from collateral eligibility, might be of interest, we do not believe that many CCPs currently accept many issuers of such securities, and if they do, the relative amounts are likely to be very small. We would therefore welcome clarification from ESMA on how collateral replacement risk relates to the three aforementioned standard climate risk categories (i.e. physical, transition, business).

Question 2 – Selection of a physical event

a. Is there a way to avoid having to specify the weather event (be agnostic on whether this is a flood or a landslide or a wildfire…)? Please describe.

EACH answer: As proposed by NGFS, and discussed in the ESMA paper, environmental risks materialize in the form of financial risks (e.g. credit, market, operational and legal risks). Therefore, as long as these impacts are or have been captured in the other risks that the CCPs are exposed to, then there is no need to specify the weather event.

b. Which past events would you point out as relevant, and how relevant is empirical evidence in general in building a relevant scenario?

EACH answer: Amongst the financial risks that are relevant for the purposes of CCP stress testing are market and operational risks. As such, past climate related events that have materially impacted those types of risk (e.g. price change for cleared contracts, triggering of BCP, etc.) are relevant for stress testing. Either to be used directly as a stress scenario or to calibrate hypothetical ones, empirical evidence is relevant.

c. To your knowledge, what are the available data resources to identify past or potential events (such as geographical maps of flood-paths or historical databases of past extreme weather events)?

EACH answer: Typical databases are Four Twenty Seven[4] and RisQ[5]. However, as discussed in item b of Question 2 above, as long as climate risks materialize in other risks, the necessity to model upstream climate events might be reduced. Under the current stress testing framework for CCPs, the modelling of climate events would be equivalent to the modelling of decisions of central banks regarding base rates for CCPs clearing interest rate derivatives. In this example, the modelling would be most efficiently performed on the interest rate curves, and not in the decision making process of central bankers.

Question 3 – Quantifying the impact

a. How should the assessment of the impact of physical risk on entities to which the CCP is exposed be conducted? (e.g. a questionnaire sent by the CCP to these entities? Any other approach?)

EACH answer: Due-diligence, credit rating agencies are a few of the options.

Whilst questionnaires by CCPs can be done, we would caution against their use in stress testing CCPs, as they may be conceptually and operationally difficult to perform depending on the scenario. For example, in a scenario where physical risk creates market and operational risk in clearing members, that in return could affect CCPs, the credit risk would be a lot harder to asses via questionnaire.

CCPs can also ask their members data related to their disclosures

b. How would you calibrate market moves corresponding to a given scenario of physical risk? In particular, would you use past events that had an impact on financial markets?

EACH answer: Market moves reflected in prices are most efficiently calibrated through the modelling of the statistical time series. Once calibrated, parametric or non-parametric techniques could be employed to create new hypothetical scenarios.

EACH believes that using past events is valid. The outcomes from physical risks may not change much in the next decade, given that the effects of climate changes lags in terms of timelines,

[4] https://427mt.com/
[5] https://www.risq.io/

the events in the next 10 or 20 years can have a similar outcome than the current events and events occurred in the previous decades.

c. Would this only affect energy/commodity prices, or would other asset classes be impacted? Please elaborate

EACH answer: in addition to energy and commodity prices, physical risk scenarios can also impact other risk factors such as CDS spreads, bond prices, equity prices, and interest rates.

Question 4 – The management of data

a. Do you agree that the process presented above (p.23) would address the confidentiality issue related to the location of CCP facilities?

EACH answer: In general, agree that the proposed process would address the confidentiality issue

b. In particular, what challenges would you expect for step iii.?

EACH answer: Requesting counterparties to perform the same assessment will present challenges, not only in sending out requests but in receiving and assimilating replies. Restricting to Counterparties which are contracted third party service providers would simplify the process but there would still be inconsistencies in responses. For counterparties who are clearing participants or investment/liquidity providers the data would be harder to collect.

c. Would you include in step iii a question from the CCP to the participants of how the market moves of the scenario would affect them, or would the question focus on the operational disruption? (please justify)

Participants may not wish to disclose such information to a CCP, as it would include information on exposures which are not cleared or cleared by other CCPs, which would likely be considered confidential.

d. Is there an alternative process that would avoid disclosing sensitive proprietary information? Please describe.

No EACH answer

e. How would the market moves associated with the physical event be reported in this framework (while ensuring anonymity and confidentiality needs)?

No EACH answer

Question 5 – Transition risk

a. What is your view on the plausibility of sharp market moves materialising in a time frame commensurate with the liquidation horizon of a CCP, as the sole result of transition risk? (if needed, please distinguish between types of market moves, e.g. first order price move affecting a large set of contracts vs. specific changes in a basis risk between two related contracts).

EACH answer: Our general opinion is that in the context of a CCP stress testing exercise there is limited plausibility on a scenario in which there is a sharp market price movement in the relevant MPOR time frame (2 to 7 days) as a sole result of the materialisation of a given transition risk. Thus, while we agree with it as one of the key pillars of climate risk, we believe that transition risk should not be considered in the context of stress testing CCPs.

Transition risk is based on the materialization of the effect of regulatory or technological changes or the perception of consumers and investors. EACH considers that a scenario in which a regulatory change is announced with a short time frame and that this type of announcement have not been anticipated by the market and has an immediate effect on market prices and/or creditworthiness of clearing members (or relevant clients of a given clearing member) is not plausible. In the same vein, technological changes with immediate effect only provoked by the materialization of a specific transition risk is also considered not plausible. On p.20 of the call of evidence it is mentioned as an example the March 2021 nickel event but this type of event is generated in the context of some news regarding supply and demand imbalance and this type of shocks may occur in commodities or commodity-related markets not necessarily uniquely linked to transition risk. Finally, regarding changes in preferences although consumer preferences may be more volatile than corporates or financial institutions preferences, consumer preferences have low impact on CCP activity that for instance consumer preferences impact on banks.

EACH considers that although climate risk drivers may have a relevant impact on the value of some financial instruments (e.g. commodity prices) the potential anticipation of some of the main sources of risk and specifically transition risk is also a factor to be taken into account when analyzing a potential risk scenario. See for instance BIS "Climate-related risk drivers and their transmission channels" (p.15) "*Climate risk drivers can have a significant impact on the value of financial assets. Specifically, physical and transition risks can alter or reveal new information about future economic conditions or the value of real or financial assets, resulting in downward price shocks and an increase in market volatility in traded assets. Climate risk could also lead to a breakdown in correlations between assets, reducing the effectiveness of hedges and challenging banks' abilities to actively manage their risks. However, where climate risk is already priced in, the potential for unexpected price movements may be reduced*".

As mentioned in the answer to question 1, a way that transition risk could be taken into account, is via Counterparty Credit risk, as a significant contributor to Counterparty defaults. Here, the Transition risk would be focused on Counterparty Credit risk and not on Market risk. A stress scenario could look as follows:

- -The CCP classifies members from the weakest ESG, highest new leverage for green transition, loan book with 3-10 years maturities (2030), etc.
- -Then chooses the top highest (stressed) IM among this group.

- -Test the default impact on the CCP of these two entities.
- -ESMA would be able to identify which companies/banks are repeatedly identified as the top-2 highest risk globally by all CCPs.

This said, we emphasise our belief that Transition risk is best avoided as its own pillar in the context of stress testing.

b. Should the stress test use scenarios with a narrative on a possible change of policy and/or technology in order to identify the root cause for the transition risk?

EACH answer: Yes, generally speaking, the stress test scenario may have a narrative on a possible change of policy leaving each CCP to analyse the potential impacts of this scenario on its specific activity and clearing members. As a first approach a qualitative analysis could be performed by the CCP. Some quantitative element are planned to be incorporated, with market shocks to be defined, these could be established in a similar vein as they have been implemented in previous ESMA stress test exercises although main market variables affected by transition risk should be identified.

In relation to Transition credit risk (see above answer), a narrative could be transition credit risk as the increased default probability and loss given default due to financing activities to transition to net-zero by 2030. Such activities could involve decommissioning of non-green assets, potentially stranded assets as proportion of balance sheet over a number of years, adoption or development of a new technology, phasing out non-green investments, heavy loan books in non-green industries that will be forced to transition/disappear (coal producers). Companies can be classified by using industry accepted indicators (ESG).

Again, EACH emphasises our belief that Transition risk is best avoided as its own pillar in the context of stress testing.

c. If so, how would these be crafted? Please provide one or a few examples.

EACH answer: EACH notes that a potential difficulty would be to generate a given general stress test scenario with a specific although broad narrative that may affect a large number of CCPs.

Regarding the Transition credit risk scenario, this could be crafted as follows:

1) CCPs classify members by industry accepted indicators (for example ESG, others).
2) CCPs organise from highest IM to lowest IM (stress the IM or take the largest over an observation period, i.e. 5 years).
3) CCPs identify the top weakest ESG with the top IM.
4) The top two Members default.

d. If not, should the analysis consist of a list of potential areas of vulnerability? How would this be done? (e.g. should there be a list of assets exposed to a given technology, should this be based on a survey of all technologies currently under development and the assessment of what they could replace if they suddenly became viable?). Please elaborate.

EACH answer: To identify a list of potential vulnerabilities seems a difficult and resource consuming exercise and should be left out of the scope of the climate risk stress testing exercise.

e. If no explicit root cause is modelled, how would you select and calibrate the market moves resulting from transition risk?

EACH answer: The calibration exercise could be performed in a similar way as the creation of other types of market risk scenario independently of the origin of the market shock. It would be very difficult to calibrate a market move specific to transition risk scenario (i.e. it would be nearly impossible to identify a stressed period specifically linked to the materialisation of a transition risk or in other words observed historical market moves will serve for the construction of a given stressed scenario with a narrative linked to a given transition risk scenario)

Question 6 – Business risk

a. Which sectors should be considered: only energy, all commodities, or all asset classes (for example by considering that some securities are issued with an ESG rating different from others)?

EACH answer: As a starting point it should be considered that all sectors can be impacted by climate risk. Some sectors may eventually be excluded due to risk modelling constraints (e.g. due to lack of relevant historical data, too much granularity required/difficulties in translating scenarios to loss of revenue etc).

b. Should the business risk be assessed across CCPs by using a common scenario for the reduction in activity for a given type of asset (e.g. a decrease in the use of oil futures contracts)?

EACH answer: Yes, please see the possible method below:
Begin by classifying products, with some level of granularity/breakdown, into:

1. Green/Clean
2. Neutral
3. Brown/Dirty

Please see the following example of classification:

Asset class	**L1**	**L2**	**L3**	**L4**	**L5?**	**Classification**
Commodities	Hard	Energy	Fossil	Oil	WTI	(3) Brown
					Brent	(3) Brown
				Coal		(3) Brown
				NG		(2) Neutral?
				Uranium		(2) Neutral
				…		
			Renewable	Water		(1) Green
				Wind		(1) Green
				…		

		Metals	Precious	Gold		(2) Neutral
				Platinum		(2) Neutral
				…		
			Base	Aluminium		(2) Neutral
				…		
			Ferrous	Iron		(2) Neutral
				…		
	Soft	Food & consumer	Wheat	Corn		(2) Neutral
				Rice		(2) Neutral
Equity	Energy	Energy	Equipment. & services			(2) Neutral
			Oil, gas & consumable			(3) Brown
	Materials	Materials	Chemicals			(2) Neutral
			Paper and forest	SCA B		(1) Green
	…		…	…		
Fixed income	Sustainable bonds					(1) Green
	Other bonds					(2) Neutral
	Interest rates					(2) Neutral

Where:<table mapping L1-L5 per Asset class, e.g. for stocks is L1=Sector, L2=Industry group, L3=Industry, L4=Name, e.g. based on the GICS>

For electricity classification, as an illustrative example, we see the following options:

- the base classification could be done on the relative mix of energy (per electricity price zone, or per country or all of Europe due to interconnectedness)
- alternatively, simply classify it as (1) Green since it is needed for the sustainable future.
- Or leave as (2) Neutral since it is hard to classify.

Stocks could also be classified on a name level basis, being classified based on having publicly and officially issued a Net-Zero commitment (-> (1) Green) or not (-> (3) Brown). Of course, this then raises the question of how to handle stock indices.

Currently it does not seem feasible for this classification be based on the EU Sustainable Finance Taxonomy.

In some more obvious cases it could be possible and desirable to go lower on level 5, while in others it could be better to stay at a higher level, e.g. classify all of Fixed Income as (2) Neutral (and leave it for future exercises to push it further down).

The principle should be to leave products at (2) Neutral unless there is a clear case for another classification.

c. If so, how would the scenario be calibrated (e.g. if a given path is assumed for the consumption of a commodity, how would this be turned into a decrease in the activity for the future contracts referencing this commodity)?

Historical churn rate (relation between value of underlying market to value of cleared derivatives) could be used, i.e. assuming that churn rates will not be changed. Say a given market has 10% churn rate, i.e. the cleared notional corresponds to 10% the value of the underlying market, then it is assumed that this relationship is preserved under the given path for the consumption of the commodity.

It is common (can be verified with historical data analysis???) that increased market volatility leads to short term increase in derivatives trading, since many positions need to be rebalanced. Increased vol also means opportunities for speculators leading to further short term volume increases. However on a longer term (12+ months, see below), that is considered here, should a preserved churn rate be a fair assumption.

d. What should the time horizon of this analysis be?

EACH answer: It is unclear to us how to combine the "normal" CCP stress test with a 3-7 day time horizon with a long term (1-5 years) business risk scenario.

Part of the "scenario run-up" (stress test prerequisites?) could be that a CCP has been exposed to revenue losses for identified cleared products during the previous year/years (1 or 5 year time period) which, unless the CCP successfully has mitigated through launching of new (green) products or through capital injections, could have eroded parts the non-regulatory capital of the CCP. This means that the CCP would be more vulnerable to non-default losses (that may stem from the climate risk scenario(s) chosen) and have a reduced capacity to replenish it's own waterfall resources or Art 16 capital (given that the default scenario may result in losses over margins). Consequently, only if the stress test scenarios in the first place leads to default or non-default losses will this part of the test have an impact on the test outcome.

e. What confidentiality constraints would you see for the publication of results?

EACH answer: Using publicly available business figures would mean there may be no need to be too careful with confidentiality.
However, this raises the question of how far is it possible to go on public figures? Could one use cleared volumes from e.g. PQD and revenues from annual report and assume revenue is distributed in line with cleared volumes?

Of course, if asking CCPs to map their products and in particular their revenues from the respective products, then confidentiality has to be kept.

A possible approach for using public figures:

1. Take annual revenue for the CCP from annual report
2. Take cleared volumes by product from PQD (DataFile 23)
3. Classify products into 1-3
4. Assume flat fees over all products to get annual revenue by product
5. Apply change in cleared volume scenario by product to get 12-month change in revenue on CCP level

ReportDate	ReportLevel	ReportLevelIdentifier	Description	Currency	23.1.1	23.1.2	23.2.1	23.2.2	23.2.3	23.2.4	Classification
2021-09-30	Clearing Service	Financial Markets	Equities (ETD and OTC)	SEK	68 920	1 250 800 110	1 909 881 705	Equities			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	Index (ETD and OTC)	SEK	141 482	32 604 725 596	101 899 358 376	Index			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	SEK IRS (OTC)	SEK	2 048	2 048 242 424	2 753 885 293 622	Swaps			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	Overnight index swaps (OTC)	SEK	0	0	1 000 000 000	Swaps			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	Repos SEK (OTC)	SEK	19 348	19 347 636 364	109 324 000 000	Repos			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	Repos DKK (OTC)	DKK	4 453	4 452 863 636	11 786 000 000	Repos			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	NIBOR FRA Futures (OTC)	NOK	0	0	0	FRA			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	NIBOR FRA (OTC)	NOK	0	0	0	FRA			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	STIBOR Options (OTC)	SEK	606	606 060 606	110 000 000 000	FRA			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	STIBOR FRA Futures (OTC)	SEK	0	0	0	FRA			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	STIBOR FRA (OTC)	SEK	5 486	5 486 363 636	414 500 000 000	FRA			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	STIBOR TM FRA (OTC)	SEK	1 333	1 333 333 333	1 133 500 000 000	FRA			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	Mortgage DKK (OTC)	DKK	63	62 878 788	550 000 000	Mortgage bond			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	Mortgage SEK (ETD and OTC)	SEK	3 656	3 656 075 757	77 764 000 000	Mortgage bond			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	Treasury SEK (ETD and OTC)	SEK	8 209	8 209 272 727	116 174 000 000	Treasury bond			(2) Neutral
2021-09-30	Clearing Service	Financial Markets	RIBA (ETD and OTC)	SEK	1 515	1 515 151 515	347 000 000 000	RIBA			(2) Neutral
2021-09-30	Clearing Service	Commodities	Power (ETD)	EUR	2 707 338	120 202 809	10 935 206 939	Power			(2) Neutral
2021-09-30	Clearing Service	Commodities	ElCert (ETD)	SEK	5	9 023	9 408 920	Elcert			(1) Green/Clean
2021-09-30	Clearing Service	Commodities	Carbon (ETD)	EUR	7	393 487	20 022 600	Carbon			(1) Green/Clean
2021-09-30	Clearing Service	Commodities	Renewables (ETD)	EUR	0	0	0	Renewables			(1) Green/Clean
2021-09-30	Clearing Service	Seafood	Seafood (ETD)	NOK	311	33 965 447	1 574 202 000	Seafood			(2) Neutral
2021-09-30	Clearing Service	Commodities	Gas (ETD)	EUR	7	486 758	70 171 332	Gas			(3) Brown/Dirty

Notes:

- Climate change also presents a business opportunity for CCPs, e.g. through clearing of new types of products.
- However it should be expected to take longer than 12 months to launch a new cleared product why the 12-month horizon might make sense? It might also make sense since revenues are published annually?
- Could increase in volumes and thus revenue for existing Green products be included, or should it only be reduction in revenue for Brown products?

Question 7 – Collateral replacement

a. In your view, are there any other climate-related events that could force clearing members to post new collateral to a CCP?

See answer to question 1.

EACH respectfully contests the use of the word "force" regarding CCPs accepting new types of collateral, as it is for individual CCPs' to decide whether they will do so. This said, in the same way as investors are under pressure to invest in green funds/assets; there could be a

requirement to incorporate green collateral in the collateral mix. This means that at least in the first next years, CCPs may likely have to accommodate to accept collateral that is less liquid, potentially more volatile.

It is also worth noting that certain events can impact the value of collateral itself: bonds, stocks, commodities, thus haircuts can be breached in the event of a physical risk or a sudden change to a transition risk.

b. Should this type of climate risk only be applied to collateral or would the CCP's investments be subject to the same type of risk?

EACH answer: Conceptually it would make sense to first consider price shocks/volatility and short-mid term reduction in values to any type of security and then analyse CCP impact on cleared positions, collateral, investments, etc.. This is less valid for investments as the instruments and issuers in which CCPs are permitted to invest are more restricted than margin collateral.

Where investments are concerned, identifying investment counterparties that could potentially leave the market, would reduce repo services to the CCP (liquidity stress).

c. Should the loss of value and/or the increased market volatility of the securities be taken into account? If not, please justify.

EACH answer: Yes, this would be covered by existing collateral haircut models, which include liquidity/concentration add-ons.

d. What would be relevant climate-related information to use in order to identify which assets may need to be replaced?

EACH answer: We would expect climate risk related disclosures such as those required by the TCFD, from security issuers to be monitored. This would ensure consistency of approach.

e. What types of assets would be concerned and how would you identify an asset as being potentially affected by climate-related changes in investor preferences in the future?

EACH answer: Corporate bonds and equities, possible government-backed mortgage bonds; all industry sectors should be monitored but issuers in certain sectors related to energy extraction/delivery and those industries with high energy use and/or emissions are likely to be have more of an impact on environmental factors. Likely to be some outliers, such as tourism.

See also the discussion in section on Business risk.

f. Should the outcome be just a disclosure of the concerned assets by CCP; or is there a quantitative impact (e.g. "XX bn of bonds and YY bn of equities would need to be replace in the next ZZ years")?

EACH answer: To begin with only the current value of such assets, expressed as a percentage of total collateral, although a quantified impact would be welcomed if possible.

g. What should be the time horizon of this analysis?

EACH answer: We used to give 4 weeks advance notice to changes to the collateral eligibility list but it might have been shortened now. Haircuts, in particular if making them more conservative, can be done with short advance notice (immediate if needed). Collateral securities are valued daily so a one-day price shock will have direct impact on value of posted collateral.

Question 8 – General practices

a. Did your CCP carry out any assessment of climate risk?

EACH answer: For some CCPs which are part of wider economic groups, group-wide exercises assessing physical risk of climate change to operations have been conducted (for example, as part of a general ESG risk assessment). In most cases, the results of these assessments cannot be disaggregated. see also the answer to question 2(b).

b. Did this assessment concern all clearing services or only some of them?

EACH answer: EACH members answering this question noted it covered all clearing services, but refer also to the above answer.

c. Did the assessment concern only clearing exposures or did it include other areas (please provide a short description)?

EACH answer:
One EACH member noted that in addition to clearing exposures, it also covered:

- Reputational risk
- Investment losses (perhaps related to "clearing exposures"?)
- Supply chain risk
- Operational risk/business continuity
- Risk of not meeting business targets due to high staff absence or turnover related to unhealthy physical environment

d. Was this assessment a one-off or is it (will it be) a recurring topic?

EACH answer: Responding EACH members noted this would be a recurring topic, with the frequency varying depending on the CCP – this ranging from a minimum annual repetition to a more frequent occurrence.

e. To which internal governance bodies was this assessment communicated (Risk Committee, Board…)?

EACH answer: Responding EACH members noted a variety of governance bodies these reports were sent to:

- Internal Risk Committee
- Board Committees
- Sustainability/ESG Committee

f. Did it lead to an action plan (please describe shortly)?

EACH answer: Whilst this varies depending on the CCP and the report, one CCP gave an example of a situation when it did. In this example, it led to developing a thematic ("narrative", "theoretical") Climate risk stress testing scenario, to introduce monitoring of market volatility from climate risk perspective and integration of ESG risk into the general ERM framework.

See also answers on Q15. Remedial actions below.

g. Was the assessment communicated to the NCA?

EACH answer: The answers received to this question were either "not known" or "no".

Question 9 – Mapping of risks

a. Does the assessment of climate risk feed into an existing mapping of risks, such as credit/liquidity/operational/business… or did you create one or several new risk categories (possibly along the lines of the four pillars described in this paper)?

EACH answer: Climate risk refers to risks posed by the exposure of firms acting as clearing members of CCPs, CCPs themselves, and/or the economy more broadly, to factors caused by or related to climate change. These can impact, and typically materialise through, a number of other risks such as credit, market, liquidity, operational and legal risks.

Some CCPs noted they include Climate Risk in their taxonomy, under the broader ESG risk under Business Risk.

b. If new categories of risk are identified, please list them with a short description

EACH answer: The answer below is provided with respect to ESG generally, not specifically climate risk.

A hybrid approach has been chosen where a new level 1 risk category "Environmental, Social and Governance (ESG) Risk" has been introduced in the risk taxonomy, in addition to the existing ("Strategic and Business Risk", "Financial Risk", "Operational Risk" and "Legal and Regulatory Risk").

Below the new level 1 ESG risks has three level 2 risks been identified and added so far; "ESG Disclosures Risk", "ESG Performance Risk" and "Supply Chain Risk".

Other ESG (including climate) risks are (so far) considered to be captured by existing risks, e.g.: Operational risk->External event disruption risk->Workplace unavailability risk: *"Operational disruption or inability to access worksites due to unavailability of physical premises, due to geopolitical events, natural disasters, medium and longer-term environmental impacts of climate change, accidents or other events."*
Financial risk->Credit risk->Counterparty credit risk: *"Risk that a counterparty will be unwilling or unable perform on its contractual obligations to the Company in a timely manner (i.e., through clearinghouse-member default, loss-sharing agreements, or other contractual obligations)"*

c. Does the assessment cover the activities of the CCP's members?

EACH answer: No. For one CCP, Clearing Member specific climate related risk has been added to the risk taxonomy; such risk is (so far) captured under Financial risk->Credit risk->Counterparty credit risk.

d. Does the assessment cover the activities of the CCP's other counterparties and some of all service providers? (please state which categories)

EACH answer: In the case of one EACH member, for non clearing member counterparties it is covered by the new Level 2 risk "Supply Chain Risk". For clearing members it is (so far) covered by Credit risk.

For other responding CCPs, the answer was "no".

e. What is the starting point of the scenarios built? (CO2 path, GDP path, specific theoretical or historical events?)

EACH answer:
In the case of one responding EACH member – For the purpose of stress testing has a thematic ("theoretical"/" narrative") scenario been developed, starting with a specific theoretical event (government response to drastic weather/sudden weather changes). Then transition risk is modelled based on the assumption of government (hasty and disorderly) responses such as increased borrowing and increased taxing (of primarily energy), which leads to high volatility. Basically are the long term (year 2050) price projections for relevant products compressed (to year 2030), i.e. assumed to materialize in a much shorter time period. Then through interpolation are the today-to-2030 price changes converted to short term price shocks. From the simulated market impact we investigate if this impact would/could result in

member defaults by analysing the member portfolios and the impact on their capital and liquid assets resulting from the market events. I.e. member defaults are not assumed to occur exogenously.

In the case of another EACH member, this took the CO2 path.

f. Please list the historical events that are used and considered as relevant to the CCP's climate risk assessment.

EACH answer: The energy crisis in 2021 was noted as a possible relevant historical event that could be used in this assessment.

Question 10 – Physical risk

a. Is physical risk part of the assessment?

EACH answer:
Yes, although in the case of one CCP, the assessment of the physical risk varies depending on the financial risk where the risk materializes. From a market move perspective (i.e. market risk), and for CCPs clearing contracts subject to a direct impact from physical risks (e.g. commodities and energy), the assessment of climate related risks happen on a periodic basis.[6] If an ad-hoc climate event happens in-between these assessments, the CCP will decide about the need to alter its models/parameters or its stress scenarios immediately after the event based on the materiality of the impact. From an operational risk point of view, similar periodic assessment is conducted when the physical risk impacts the ability of the CCP to continue to provide its services.

b. What types of physical events are taken into account? How were they selected?

EACH answer: From a market risk perspective, all climate events that are reflected in material price changes are typically considered by CCPs. From an operational risk perspective, all physical risks causing unavailability of primary premises, systems, or people are typically considered. Examples include:

- Flood depth of water
- thunderstorm probability
- wildfire risk
- extreme wind speeds
- hail probability

In some cases, these were recommended by external consultants.

c. Do the scenarios considered include market movements? operational disruptions? Any other aspect? Please provide a short description

EACH answer:

[6] Please note that market risk is being used here to capture the risks related to credit and liquidity exposures of the CCP.

Scenarios considered include:

- Market risk
- Operational risk (e.g. operational disruptions, increasing cost of insurance, and lack of insurance capacity/some events becoming uninsurable).

d. If the scenarios include market moves, are they integrated in the regular stress testing (or other regular risk assessment) or a separate assessment?

EACH answer: If they did, then, from a market risk perspective, these scenarios are typically included in the regular stress testing framework.

e. If market moves are included in the scenario, please describe shortly the calibration method, and whether consistency with specific climate change scenarios were considered.

EACH answer: please see response to Question 3 above.

f. Is the format of the assessment a set of scenarios and their outcome (operational, financial or other)? please describe if this is another format

EACH answer: As introduced in item a of Question 10 above, the assessment, and its outcome, of the physical risk varies depending on the financial risk where the risk materializes. From a market risk perspective, this is measured as part of the margin or stress testing assessments. From an operational risk perspective, the assessment is considered, for instance, as part of the business continuity exercises.

Question 11 on Transition risk

a. Is transition risk part of the assessment?

EACH answer: EACH would like to highlight that transitional effect risks arise over a longer period than the short time considered for CCP stress testing (the purpose of which is to consider worst case market movements during the time it takes to liquidate a defaulted member's portfolio), and are typically captured in other forms of assessments performed by CCPs, such as those that assess business and operational risks, and capital adequacy. Such risk management approaches include scenario analyses run over both short and longer time horizons.

In addition to this, EACH would like to note that CCPs may assess transition risks once more literature and regulatory guidance is available on the topic.

b. Is it based on a set of scenarios? If so, please indicate the number of scenarios, and whether they are integrated to the regular stress test scenarios or separate

No EACH answer

c. What is the basis for the scenarios (NGFS or other, please elaborate)?

No EACH answer

d. What is the time horizon of the scenario?

No EACH answer

e. Is the output a mapping of risks, a sensitivity test, or a classical stress test with a loss computed for the various margin accounts?

No EACH answer

Question 12 – Business risk

a. Is Business risk part of the assessment?

EACH answer: For a responding CCP, Yes

b. Is the output a projection of revenues/profitability, a mapping of "brown" vs "green" assets, or another form or output (please specify)?

EACH answer: A (1) green/Clean, (2) Neutral and (3) Brown/Dirty classification is considered by a CCP for future implementation.

c. What is the time horizon contemplated?

EACH answer: 1 and 5 years out

Question 13 – Collateral replacement

a. Do you assess the collateral and/or investment assets in terms of their environmental impact? If so, how do you assess a given asset/issuer/sector?

EACH answer: EACH members noted this is not currently the case. One member noted Extra haircut add-ons for Brown/Dirty classified collateral is considered, as well as collateral fee add-ons/incentives.

b. What are the conclusions of this assessment?

EACH answer: These are yet to be confirmed

c. To whom are the results communicated outside the CCP?

EACH answer: see above answer.

d. What is the time horizon of any projection in this respect?

EACH answer: see answer to question 11b.

Question 14 – Other risks

Are there other risks in your assessment or planned assessment? Please describe.

No EACH answer.

Question 15 – Remedial actions

a. Does the CCP have in place (or is working on the establishment of) remedial actions as a result of the assessment of climate risk?

EACH answer: EACH notes that for one CCP, a thematic climate risk stress test scenario has been introduced.
For the commodity (electricity) market the last years of market volatility is considered to already have been impacted by climate risk so in a way is this CCP's margins and the DF are already capturing climate risk.

EACH notes that other remedial actions considered / being planned by CCPs are to:

- Add Risk Appetite Statements (risk tolerances) for ESG risk
- Include ESG risk review in the New Product Approval Process
- Add ESG risk as factor in the counterparty credit scoring model
- ESG risk classification of all relevant financial instruments, first on market / sector level, then more granular (where relevant means relevant for cleared products, accepted collateral, allowed investments, etc)

b. In particular, has there been, or will there be a change to the BCP?

EACH answer: Significant changes are not expected since physical risks are already captured by existing BCP.

c. For each type of risk identified, does the assessment of climate risk take into account remedial actions (for example: if a business line is at risk due to transition of the market out of certain assets, does the assessment make the assumption that a new business line will replace it as a source of revenue; are back-up facilities taken into account when assessing the impact of a flood at the location of the headquarters…)?

No EACH answer.

d. Does the CCP have environmental disclosures in place, does it have a plan to introduce or change environmental disclosures?

EACH answer: ESG (including Environmental) disclosures are in place, however not in isolation for the regulated CCP entity. The disclosures are made on a regional level considered relevant for the organisation given that the CCP is part of a larger group.

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