LLOYD'S

Model Change Guidance

February 2024

Contents

1 Introduction

1.1 Purpose

This document provides guidance on syndicate internal model changes at Lloyd's. It is intended to be used by managing agents to inform and support their model change processes.

This document builds on the Lloyd's 'Principles for Doing Business' to provide more detailed requirements and guidance for managing agents. This document collates all model change guidance previously issued together into one document and can be read as a standalone document. It supersedes all previous versions of the model change guidance.

This document does not seek to repeat existing Solvency II requirements on model change. Managing agents must continue to refer to the Solvency II requirements as well as the Lloyd's 'Principles for Doing Business' with regards the model change sections , as well as modelling and validation requirements (see 'Principles for Doing Business').

In this guidance the words "must" or "required" mean a specific mandatory requirement. In contrast, the guidance uses "should" or "expected" to indicate that, while the presumption is that syndicates / managing agents comply with the provision in question, it is recognised that there will be some circumstances in which syndicates / managing agents are able to justify non-compliance.

2 Lloyd's Guidance on Model Change

2.1 Background

Lloyd's recognises that changes can be made to previously approved models for various reasons, e.g. addressing model limitations, addressing regulatory feedback, addressing validation and audit findings, improvements driven by ongoing use of the model and changes to business profile.

All model changes should have:

1. A structured rationale as to why they are being made,
2. A rationale describing how they have been prioritised over other changes,
3. Demonstration of governance procedures surrounding the changes.

For avoidance of doubt, the above list does not prescribe any documentation that must be submitted to Lloyd's alongside any major model change application or with the model change template return. Documentation requirements are covered in section 4.2.1. Please note, however, that Lloyd's reserves the right to request additional information, which may include evidence of the above considerations.

2.1.1 Classification of Change

Managing agents must develop a simple, reliable system for classifying changes to enable them to be managed more easily. Lloyd's also needs to maintain an understanding of agents' models to ensure that they remain adequate for capital setting and calibration of Lloyd's Internal Model. In addition, Lloyd's requires syndicates to map the changes to Lloyd's change types which are detailed in section 2.2.

The classification of change and the indicators used to assist in it are closely related to the business and risk profiles of the syndicate. Classification must be specific to the syndicate and cover both quantitative and qualitative criteria. Criteria might cover matters such as impact on the SCR, impact on tests and standards, the difficulty or sophistication of validation and the governance required.

In order to set out criteria for major changes, managing agents will need to:

- establish triggers for major changes;
- identify qualitative as well as quantitative triggers; and
- set out criteria for the identification of combinations of minor changes which might be equivalent to major changes. In such cases, the major change process will apply.

2.1.2 Validation of Changes

Where changes are made to the internal model, whether major or minor, the model validation procedures will need to be followed to confirm the appropriateness of the change. As part of reviewing any proposed change and its impact Lloyd's will expect agents to have carried out a validation process and agents must be able to provide the results to Lloyd's as part of the change application.

This validation process must conduct sufficient validation on model change, such that they can demonstrate continuing compliance with the Lloyd's or Solvency II requirements to use the internal model post the change. Such validation must be included in the model change policy and must cover the circumstances triggering validation and the relationship with the validation policy.

2.2 Change Types

Lloyd's has high-level and detailed change types, as detailed below and in Appendix 1 – Detailed Lloyd's Change Types. It is not mandatory for managing agents to adopt the Lloyd's model change types in their own model change policies. However, agents are required to select a Lloyd's change type for each change when submitting a Model Change Template or Major Model Change Application. Lloyd's therefore requires managing agents to map their own change types to the high-level Lloyd's change types.

Lloyd's definitions cover the following change types: data updates, risk profile changes, parameterisation changes, changes to model methodology and model design, non-functional changes, and changes in governance/controls. A description of each of these is set out below.

Whilst Lloyd's does not prescribe the model change categories that agents should use, Lloyd's will give feedback on these and require restatement of change aggregation if it is considered these are not applied appropriately.

Change type	Definition	Accu-mulates?
Data	• a change to any direct inputs into the model that are not designated as either an underlying risk profile change or a parameter change • this does not include any changes to data sources that are not direct inputs to the model. Changes to data sources should be reported under other categories, as appropriate	No
Underlying risk profile	• significant changes to the nature, scale and complexity of the risk profile of the syndicate • includes material changes in the business model, business strategy, products and lines of business, emerging risks and any other relevant changes to the risk profile (materiality defined as per agent's model change policy) • significance should be justified on a quantitative or qualitative basis (i.e. using indicators specified in the policy)	Yes
Model parame-terisation	• represents a change to the input parameters of the model. These might be driven by data – e.g. due to additional data being available, the perception of risk has changed; due to risk profile; or due to other considerations • includes changes to the assumption and the parameter, or the methodology and process to derive such an assumption or parameter • significance should be justified on a quantitative and qualitative basis	Yes
Model methodology	• changes to the methods used to calculate the probability distribution forecast including external models and data • Lloyd's interpretation is that this change reflects changes of the data sources, but excludes data updates • significance should be justified on a quantitative or qualitative basis	Yes
Model design	• a change in the underlying structure or design of the model including use of IT systems and platforms, moving to a newer version of the platform, increase/ decrease in the number of simulations, switching from bootstrapping to claim simulation in order to measure reserving risk, moving from scenario testing to stochastic method for a certain risk module, change from RMS to Verisk • significance should be justified on a quantitative or qualitative basis.	Yes
Non-functional	• a change relating purely to the efficiency of the model calculation, the reporting capabilities, or other operational improvements to the model • significance should be justified on a quantitative basis and the movement in SCR should be due to simulation error only	No
Governance/ controls	• a change to the control framework in which the model is operated e.g. switch from internal to external independent review, or to governance framework within which model output is used e.g. establishing a new committee • the significance of these changes will always be determined qualitatively	Qualitative

2.2.1 Data / Risk Profile Changes

Lloyd's requires data changes to be out of scope of the model change policies. Data changes will still need to be reported in the model change report and subject to Lloyd's review as part of LCR submissions.

Lloyd's recognises that the distinction between data and risk profile changes is not always clear cut, e.g. a change in asset allocations is usually a data change – however, if the change in allocation is material enough then this should be a risk profile change. Similarly, an update to volumes of business may be a data change, but if the change in volume is material this might indicate that the risk profile has changed. For example, a material reduction in reserve volumes for a syndicate in run-off might indicate that the key drivers of risk for the remaining reserves have changed, so consideration should be given to whether this changes the appropriate model design or parameterisation. A guideline is that all inputs to the model are either data or parameters – and data changes can become risk profile changes when significant enough (and might then also require some parameter changes). Lloyd's requires managing agents to set out a clear distinction between these two change types in their model change policy, including the qualitative and quantitative indicators which will be considered to classify a change as either a data or a risk profile change. It is not acceptable for no changes or hardly any changes to be classified as data changes.

Lloyd's needs to ensure sufficient focus in major model change reviews is given to the most material changes, therefore some changes need to be excluded from the accumulation of minor changes to achieve this.

The indicators for a risk profile change might include:

Quantitative:

- x% change in uSCR : exposure ratio (Exposure could be defined as prem + ½ reserves)
- x% change in one-year SCR : uSCR ratio
- x% change in premium risk : premium ratio
- x% change in reserve risk : reserves ratio
- x% change in prem volume : reserve volume
- x% change in Net to Gross premium ratio
- Cat risk: material change in region/peril AEPs
- Asset portfolio split incl. ratio of risk-free to risky assets
- x% change in market risk: available assets

Qualitative:

- Significant change in class balance (premium or reserves) e.g. moving from predominantly cat to predominantly long-tailed lines
- Material change in reinsurance programme (including Adverse Development Covers or Loss Portfolio Transfers)
- Material change in average reinsurer credit rating
- New business line (with at least £xm planned premium in the first year)
- Removal or acquisition of business through RITC, merger, closing lines of business.

The above lists are non-exhaustive and are not intended to define the indicators that agents should use. Lloyd's recognises that defining the indicators can be challenging and policies will necessarily require some flexibility. The syndicate should consider the nature of the risk profile – e.g. a fast-growing or shrinking syndicate might require larger thresholds to allow for organic growth than a more stable syndicate. Size of the syndicate and hence stability of the metrics might also be a consideration when defining them. However, Lloyd's does require that some minimum levels are set on pre-defined metrics to ensure more objectivity in assessing when data changes should be assessed as being re-classified as a risk profile change. Lloyd's will require agents to justify the classification of items as data where they could be interpreted as representing risk profile. Lloyd's does not expect material changes in the Reinsurance Contract Boundary (RICB) adjustment to result in a major model change. It is recommended that this change always be treated as a data change.

2.2.2 Parameter Changes

Parameters are usually set based on data – however any input that requires some level of expert judgement to determine its value should be classified as a parameter change instead of a data change and accumulated. Even if the parameterisation is automated, a parameter change is still likely to require expert judgement, and therefore be classified as a parameter change. For example, suppose a change in the size in reserves triggers a change in CoVs. In that case, a judgement is made on how the CoV should change with volume changes. If a parameter change is classified as a data change, Lloyd's will require managing agents to evidence that no expert judgement was involved in the change.

Further details outlining Lloyd's views on categorisation of data, risk profile, and parameter changes are included in Appendix 1 – Detailed Lloyd's Change Types.

2.2.3 External Models

Changes in the versions of external models are in general either data or parameterisation changes – because either the underlying data or the method of parameterisation is changing. However, in certain cases, this can also be a methodology change (e.g. if the new version of an ESG uses a refined methodology). Managing agents should classify the model change according to a "look-through" approach, i.e. depending on the specific changes to the external model. Agents should justify their categorisation decision.

2.2.4 Non-Functional Changes

Non-functional changes relate purely to the efficiency of the model calculation, the reporting capabilities or other operational improvements to the model which do not have an impact on model output.

Non-functional changes only cause numbers to move due to simulation error. Managing Agents should be able to provide evidence to support this. Agents are required to not accumulate these changes – as these changes should not accumulate towards major model change thresholds. This includes, for example, the following changes that do result in a change in capital that is only due to simulation error:

- Changes to reports/model output
- Code changes improving the efficiency of calculations without changing any methodology or underlying calculations
- Changes to Group Models which do not impact the syndicate model
- Other operational model improvements

As a minimum, Lloyd's would expect the following conditions to hold true for non-functional changes and for this to be reviewed at least annually and escalated internally if found to not hold true:

- The aggregate accumulation of multiple non-functional changes should tend to zero since these are expected to be unbiased.
- Any single change should be less than simulation error, as evidenced by prior stability testing.
- Agents should be able to evidence that single changes are within simulation error and unbiased through multiple seed runs, if requested.

2.3 Minor and Major Model Changes

Any model change must be defined as either a minor or major change, depending on the impact on the SCR (quantitative) or a significant change to the internal model governance or controls (qualitative), as detailed below. This classification will affect how model changes are to be reported and reviewed by Lloyd's, with all major model changes requiring agreement before the previous version of the model can be retired in favour of the amended version (see section 3.3).

All model changes will need to be reported to Lloyd's, but the process will vary according to whether it is deemed to be a major or a minor change. The board or committee responsible for model oversight must decide whether the change is major or minor as per the model change policy control process.

Criteria that a managing agent must take into account in determining whether a change is minor or major are set out below.

An LCR submission alone should not trigger a major model change application.

There must be allowance for qualitative criteria in determining whether a model change is major or minor. For example, a significant change in methodology may result in an immaterial change in the SCR but such significant changes must still be classed as major.

Where a syndicate is novated to a new agent or merged with another syndicate, agents will be expected to consider this as a major model change, even if existing models continue to be used. Significant changes in capital support are likely to lead to a revised risk appetite and must be treated as major model changes. Changes in the material ownership of managing agencies are also likely to trigger a major model change. Any corporate transaction leading to a change in the modelling platform will trigger the major model change process.

A change can be qualitative, quantitative or both. Any change that has a potential or actual quantitative impact on the SCR must be captured as a quantitative change (or both a quantitative and qualitative change if this is in line with the agent's internal model change policy). As well as being different in nature, model changes will also differ in terms of materiality to the internal model and the resultant output and use of the model. Managing agents must consider a range of criteria in determining whether a change is to be treated as major or minor, and must not focus solely on the impact on the SCR.

Implementation of a methodology change that has zero impact on SCR at the time, may potentially impact SCR later. Review of such a methodology change should not be missed, either by the agent nor by Lloyd's. For example, a change in methodology with respect to holding equities would have no effect if no equities were held at that point in time; the SCR may remain constant. However, a change in investment portfolio at a later date could then increase the SCR significantly and so the potential impact must be considered when determining if a model change is major or minor. Therefore, Lloyd's expects such methodology changes to be reviewed either at the time of the change, or as part of later risk profile change. Likewise, Lloyd's will not review such a methodology change twice i.e. at the time of change of implementation with zero impact on SCR and then again at the point it triggers a risk profile change (or similar). A major change application can either be a major change in its own right or a major change due to the aggregation of minor changes. Whatever approach agents adopt to classify changes (as either minor/major, and

quantitative/qualitative), they should ensure that it is clearly explained in their model change policy together with a rationale as to why they consider that it meets the EIOPA guidelines. The points below relate to quantitative changes or qualitative changes that can be quantified.

Four trigger points are required for quantitative major model changes within an agent's model change policy:

- Aggregate trigger point in relation to the one-year SCR;
- Aggregate trigger point in relation to the ultimate SCR;
- Absolute trigger point in relation to the one-year SCR; and,
- Absolute trigger point in relation to the ultimate SCR.

For definition:

- The aggregate value refers to the sum of a number of smaller values e.g. +8%, -2% = 6%.
- The absolute value refers to the sum of smaller values irrespective of their signage e.g. +8%, -2% = 10%.

It is acknowledged that the ordering of minor changes can have an impact on whether a major change application is triggered. This is partially mitigated by absolute thresholds, but the possibility still exists. As such, to avoid any bias within the ordering of model changes, Lloyd's recommends that changes are reported in chronological order.

Lloyd's expects the aggregate trigger points to fall between 10% and 15% of the SCRs and expects the absolute trigger points to be no greater than double the aggregate trigger points. This expectation is intended to trigger major change at the same overall level of change as the relative threshold (assuming change is equally likely to be upwards/downwards) and avoids agents being able to make large volumes of offsetting change that is not visible to the change approval process.

The rationale for the level of trigger points should be documented in the agent's model change policy and agents should back-test their model change trigger points to challenge their chosen thresholds. It is noted that the levels above are considered to allow for meaningful model change to take place between Lloyd's reviews. Any minor changes made (by nature or magnitude) can be challenged and potentially rejected as part of Lloyd's review of capital submissions. Agents are required to provide strong justification if the trigger points fall outside the levels stated above. When selecting the trigger points, the overarching principle that agents should keep in mind is that a major model change should be triggered by any accumulation of changes or single change that reflect a material change in the syndicate's capital requirements, risk profile, and/or modelling changes that require the board's attention and approval. Lloyd's will engage with managing agents with thresholds that do not clearly give appropriate board visibility of change.

The above mandatory triggers must capture aggregation of all in-scope model changes; Lloyd's will not accept triggers which do not relate to all model changes if these triggers mean that the four trigger points above could be exceeded without a major model change being triggered, e.g. it is not acceptable to aggregate changes by risk type separately or by change category.

For qualitative changes the differentiation between minor and major changes is not as straightforward due to the nature of the changes. The classification should be guided by the principle of visibility to the board, i.e. if a change is deemed to be material enough to require board attention, then this should be classified as major. On the flipside, Lloyd's would advise managing agents to ensure that not every minor update to e.g. the governance triggers a major change. For example, policies should be made as generic as possible by e.g. using role names instead of names of people etc. If syndicates are unsure on the classification, they are asked to engage with their capital point of contact.

A "pure governance" qualitative major model change, i.e. a major model change which only includes governance related changes, does not require the submission of a model change template. Nor will any preceding minor changes be reviewed as part of Lloyd's review and therefore, the approval of such a change will not reset the accumulation of changes described below.

2.4 Model Changes and SCR Review Process – Resetting Change

Any major change application must include all minor changes since the last model change approval or the last approved SCR. Unless otherwise stated, consideration of the accumulation of minor changes re-starts from one of the following points:

i)   a major change being approved by Lloyd's (excluding a "pure governance" qualitative major model change),

ii)   the SCR being approved for the Quarterly Corridor Tests (QCTs)/CiL (if a submission/resubmission has occurred).

This is the case whether it is a major change driven from a combination of minor changes or a major change in its own right. As part of the SCR review process, Lloyd's can review and challenge any minor changes that have occurred since the last major model change submission or the last SCR review even if a major change has not in itself been triggered. This includes any changes to the methodology used or adjustments made to syndicates' models due to review feedback. As part of the SCR submission, there should in any case be suitable board visibility of any changes to the capital model since the previous approved SCR, whether or not a major change has been triggered.

Lloyd's approval of SCR for any QCT or coming-into-line, with or without capital loadings, does not automatically constitute a decision to accept or reject any accompanying major model change application. Whilst the two processes clearly overlap, the primary focus of Lloyd's at these times of year is to ensure appropriate capital is held by all syndicates, and therefore Lloyd's cannot guarantee a decision on any accompanying major model change application. Lloyd's will clearly communicate whether the model changes are approved with the agreed capital.

2.5 Batching Changes

Batching of changes refers to the reporting of more than one model change as a single change to the internal model. Unrelated changes should not be batched, but instead split out in a suitable level of detail that would allow a technically competent reviewer to understand the drivers of change in capital and to accumulate the changes in a way that sufficient visibility of change to the board can be achieved

In particular, the update of different data sources should usually not be batched. For example, an "update of the business plan" can include the update of premiums/expenses and loss ratios of various classes at the same time – however it cannot also include an update of the technical provisions, parameter updates and updates of the asset portfolio. These updates should be reported as several changes as it is otherwise unlikely that the reviewer has enough detail to make themselves comfortable with the change. Furthermore, agents should consider whether updates to gross values and reinsurance should be reported separately (particularly where the model is used for reinsurance planning / purchasing decisions), but there may be instances where it is appropriate to batch changes on a net basis, e.g. if a line size is increased for a class with reinsurance purchased in order to keep the line size as per previous plans. It is expected that justification of any batching is provided.

For parameter changes, regulatory guidelines recognise that there are likely to be a large number of individual parameters within an internal model and that it may be appropriate to consider the impact of changes to these parameters in batch, rather than individually. Lloyd's considers it acceptable for agents to batch changes that are related to updating or refreshing the same existing parameters across classes of business or related parameters for one risk type.

Another source of batching is where various updates are made to the same data source at various points in the year. For example, if a syndicate runs various versions of a business plan, then these changes can be batched together and reported as one data or risk profile change if it is appropriate to do so. Also, if the asset portfolio and/or ESG is updated at various points in the year, then the syndicate can batch these changes together. However, the agent should make sure that any changes reported reconcile with the model change logs reported to Lloyd's in March and September – this means if changes have already been reported in March they cannot be batched with later changes, and the agent is able to provide a breakdown of the various updates made upon request.

Agents should ensure that they explain which changes have been batched and reported as one when they submit their major model change application or model change templates to Lloyd's, together with a short rationale as to why it is appropriate that such changes are batched together. The agent's model change policy should also provide sufficient detail on how they have considered and applied batching within their internal model change processes.

However, changes in unrelated parameters, changes in methodology or changes to separate data sources should not be batched together. If Lloyd's does not receive sufficient granularity of change to allow an appropriate level of review, we will require the managing agent to produce more granular change splits before changes can be accepted.

2.6 Special Purpose Arrangements ("SPAs")

Where the model change applies to a SPA the agent should report the changes and resulting SCR impact for each syndicate/SPA separately.

2.7 Group Models

Where the syndicate model forms part of a larger group model, Lloyd's only requires changes that impact the syndicate model to be reported e.g. a new line of business that is written by a group company but not the syndicate does not need to be reported to Lloyd's, unless it changes the syndicate SCR. New business lines will not be considered as model scope extensions until the agent proposes to write them in the syndicate, when model change approval will be required, even if they are already modelled elsewhere. However, model stability issues might mean that the result for the syndicate is impacted slightly, and the syndicate will have to report the change in the model change report in order to allow for full bridging between SCRs. If this is the case, the change is non-functional should not contribute to the accumulation of minor changes and can be out of scope for the syndicate model.

2.8 Model Change Template

The model change template (MCT) is both a regular submission requirement to Lloyd's and a method by which agents can manage their recording of model changes and their accumulation on both an aggregate and absolute basis.

The model change template must contain all changes, no matter if minor or major, qualitative or quantitative or in or out of scope of the model change policy regarding change accumulations. The most up to date version of Lloyd's model change template can be found on Lloyds.com.

Agents can use this template as the method of establishing when a major change is triggered and how accumulation of minor changes work. The model change template should be updated at the same time as changes are approved by syndicate internal governance. The model change template should accompany any LCR submission. A template submission will also be required with any major model change application (see section Internal Approval) that is not a "pure governance" major model change. Lloyd's may request ad hoc submission of the template at any time.

The template should contain the changes from the last approved model. So, if a syndicate only has one annual submission, then the model change template should cover all changes made in that year. However, if a syndicate has re-submitted an LCR at any point in the year due to material movements or due to a major model change application which was approved, then only changes from that point to the current submission should be covered.

Lloyd's will utilise the information collected in the model change report to aide SCR reviews and expects that it bridges the changes between submissions. For the avoidance of doubt there should be no restatement of historically reported changes in subsequent template submissions.

2.9 Major Model Changes and the Lloyd's Principles for Doing Business

Agents must consider how any major model change submission may impact their self-assessment against the capital principle of the Lloyd's 'Principles for Doing Business'. Where an agent considers that an update to a syndicate's self-assessment against the capital principle is appropriate, an updated self-assessment should be provided to Lloyd's as part of the major model change submission.

Note that as part of the process of reviewing a major model change submission Lloyd's will review the syndicate's rating for the capital principle and update it if considered appropriate. This will occur regardless of whether there has been an update to the self-assessment for the syndicate. The agent will be informed of any such changes upon conclusion of the major model change review.

3 Governance of Model Changes

3.1 Model Governance Procedures

The internal model has a key role in the system of governance and managing agents must ensure that the model continues to reflect appropriately the risk profile of the syndicate. There must be appropriate internal governance around changes to the model as well as appropriate communication of these both internally and to Lloyd's.

No changes should be made to the internal model without following the relevant governance procedures which must be set out in the model change policy. These procedures must be clearly documented and understood by all staff for whom they are relevant.

3.2 Model Change Policy

The model change policy should be reviewed regularly (at least annually) and must be re-approved by the board or appropriate committee for continued use. Unless immaterial, changes to the model change policy must follow the same governance approval process as major model changes, e.g. be approved by the board and notified to Lloyd's for review and approval, before being implemented.

Managing agents are required to implement a written policy which sets out how they will manage model change. The policy should specify:

- the procedure to determine if a change in the internal model is needed as a consequence of:
    - any relevant change in the system of governance;
    - change in compliance with the requirements to use the internal model;
    - change in the appropriateness of the technical specifications of the internal model;
    - any relevant change to the risk profile of the business;
    - validation results; and
    - general model improvement.
- the criteria for considering an internal model change a major change;
- when a combination of minor changes should be considered a major change;
- the governance requirements in relation to changes to the internal model, including, but not limited to :
    - internal approval of changes;
    - internal and external communication;
    - documentation of changes; and
    - validation of changes.
- that changes to the model change policy itself fall outside of the scope of the policy but should still be treated in the same way as major model changes.
- that changes to the scope of the model, when these fall outside the scope of the model change policy, should still be treated in the same way as major model changes.

3.3 Internal Approval

Potential changes to the internal model may be notified to an appropriate function within a managing agent (such as a Model Steering Committee) who will assess the potential change in accordance with the internal model change control process. This process may be used to identify the necessary actions in response to the potential change. One of the initial stages of this process would be to determine what type of change is proposed and to classify the change as either minor or major.

It must be clear as part of the model governance how major and minor model changes are approved and that major changes need board sign-off.

Potential changes classified as major must be notified to the board and senior management of the Managing Agent for approval, within defined timeframes in accordance with Lloyd's requirements under Solvency II and with the authorised model change policy. Minor changes must be recorded and reported to the board and senior management also.

Lloyd's expects agents to estimate the potential effect of any change before the model is amended so that the board or relevant committee can approve further development work on the change, though in some cases, this won't be possible, for example, where a new model platform is to be implemented. In such cases, the managing agent may

continue with the development, testing and validation of the development version of the internal model. Model changes approved by the board must be incorporated in the version of the model used to meet model use requirements, as agents must always use the most appropriate model for the risk profile of the business.

In addition, managing agents must ensure that all appropriate individuals have been advised of the change and this notification must be wider than the board or committee approving the change. The level of understanding required of changes will vary across the business, but sufficient notification and explanation will be key to maintaining a good understanding of the model and its uses. The model change policy must also cover the requirements for external reporting of changes, in line with the standards and guidance.

An agent must be prepared to roll back any major change that fails to obtain internal approval.

In line with Lloyd's Principles, the agent's board must approve major model changes, including accumulation of minor changes to a major model change. This must be evidenced through the submission of board papers and minutes showing that the changes were discussed and challenged at a formal board meeting.

It would be acceptable for a managing agent to make an initial application with a confirmation from the Senior Nominated Person (SNP) that the appropriate board approval has been achieved. If this approach is taken, this will initiate the Lloyd's process and approved board minutes must be submitted to Lloyd's as soon as they are available. The board minutes can be provided in draft if the approval of the minutes would hold up the application materially.

Where the detailed review of a major model change is delegated to a committee of the board, the board must still discuss and challenge the change. An information paper from a delegated committee is not sufficient.

The board or committee responsible for model oversight must decide whether the potential change is major or minor, consistent with the model change policy, and where the change is considered major it must be approved by the board.

3.4 Lloyd's Approval

All model changes will need to be reported to Lloyd's, but the process will vary according to whether the changes are major or minor.

Managing agents must obtain Lloyd's approval of major changes to the model change policy and all major changes (including where combined minor changes result in a major change).

The model change policy should specify a process for notifying Lloyd's of the potential major change within a defined period of approval by the agent (see section 4.1 for further details). The process for recording and notification must also be consistent with Lloyd's requirements.

Major changes to the internal model must be approved by Lloyd's before the revised model can be considered authorised by Lloyd's, without which the previous version of the model cannot be retired (see section 4.6 for further details).

Minor changes must be notified to Lloyd's as required. So long as minor changes are treated in accordance with the model change policy, the internal model may be modified for minor changes without pre-authorisation by Lloyd's, unless they are considered as a major change when combined.

3.5 Change Documentation

Managing agents must ensure that documentation of major model changes addresses the implications for both the design and operational details of the internal model and an assessment of continued compliance with technical quality, robustness, data and use requirements after the model change has been implemented. When a major change has had a significant impact on the outcome of the internal model, the outcome must be calculated with both the revised version and the previous version of the internal model, and the outcomes compared. Any differences arising from the model change must be identified, quantified, and documented. Internal model documentation must be updated to ensure all model changes are recorded, both in terms of historical development of the model and documented methodology. Agents must also consider any update needed to the model change policy itself.

3.6 Changes to Model Scope

Changes to the scope of the internal model will often lead to changes in the model change policy, and so trigger a pre-approval application. Whether a change or extension of scope leads to an amendment of the model change policy or not, it must still be approved by Lloyd's.

Managing agents must ensure that model change policy provides for changes to the scope and nature of the business and changes in the risk management system.

4 Process for Application of a Major Change

4.1 Pre-Application

Lloyd's wishes to engage with managing agents to understand material planned changes to syndicate models and to syndicates' views of catastrophe risk in internal models, as early as possible. Lloyd's does not require agents to submit model development plans; however, the agent must submit a major model change pre-application form (which can be found online and in Appendix 3 – Lloyd's Major Model Change: Pre-Application Form). **The deadline for submission of major model change pre-application forms is the third Monday of January in the calendar year in which the MMC is to be submitted.**

Lloyd's will then go through all MMC pre-applications and schedule the review of applications. If more applications are expected than can be reviewed, then the review (and approval) of some major model change applications might have to be deferred at times.

The pre-application form includes a high-level summary of the planned major model change(s), such as:

- The type of planned model change(s) and description(s),
- the reasons for the change(s),
- the potential impact (both qualitative and quantitative),
- planned independent validation
- the intended timescales for implementation and progress to date

This information will provide Lloyd's with the opportunity to provide feedback on potential concerns (e.g. on intended timescales) or suggest changes that the agent could consider ahead of any application, to enable a smoother review process for both parties upon application. Please note that if the volume of model change applications throughout the market remains as high as in recent years, Lloyd's may have to restrict the number of model change applications made. Early engagement on plans and timescales will give agents the greatest chance of being able to make their application.

Agents should ensure they have addressed any outstanding capital feedback and loads (including waived loads) in line with the deadlines given in their capital feedback document. Applications might not be accepted if loads/feedback are outstanding, and the major model change is not made in response to these.

4.1.1 Material Changes in an Agent's View of Natural Catastrophe Risk

Changes in an agent's view of catastrophe risk within the internal model should follow the process described above – but agents should be aware that any changes to View of Risk for LCM5 perils will need to be approved by Lloyd's Exposure management ("EM"). Hence, these should be flagged to Lloyd's Exposure Management ("EM") at the earliest possible opportunity. This includes changes which are deemed to be minor by the managing agent's own model change policy.

The degree of discussion, validation and/or evidence required by Lloyd's will vary according to materiality of syndicate contribution of cat risk to Lloyd's, materiality of cat risk relative to syndicate overall SCR and materiality of the region/peril within overall cat risk, as well as the Lloyd's 'Principles for Doing Business' position. This will be agreed by the EM Manager in conjunction with the managing agent, on a case-by-case basis.

4.2 Application Process

Once an agent has been through their internal governance process to approve a major change, a major model change application form (which can be found online and in Appendix 4 – Lloyd's Major Model Change: Application Form) and all other required documents as set out in section 4.2.1 should be uploaded to the agent's SecureShare site and a notification should be sent to SCRReturns@lloyds.com and your capital point of contact.

Lloyd's will conduct an initial assessment of the completeness and quality of the application and will give agents an expected review timeframe within 2 weeks of the submission. Lloyd's will review the major model change application according to its own model governance process, the target being 8 weeks from receipt of the submission. Lloyd's discourages agents to submit major model changes which are not due to risk profile or parameterisation changes with the capital submissions in September/October and March. For submission at these times, approval of the model change can be delayed given the priority of approving capital. Model design changes (e.g. platform changes) and model methodology changes should be submitted:

- By the third Thursday in June to guarantee feedback before the September/October SCR submission

- By the first Thursday in January to guarantee feedback before the March SCR re-submission

As a result of the new Quarterly Corridor Test process, MMC applications in addition to the above are possible, as long as the following deadlines are met, 1pm on:

- Penultimate Thursday in January for review ahead of the Q1 QCT
- The March LCR resubmission date for review ahead of Q2 QCT /June CiL
- The first Thursday in April for review ahead of the Q3 QCT

Any methodology/model design changes submitted later than this may lead to the review being delayed until after the review and approval of submissions in September/October. This does not apply to risk profile or parameterisation changes: these will be reviewed in line with the capital submissions.

Notes for review timeframes:

1. Lloyd's expectation is that a major model change application from any one syndicate only contains one (quantitative) major model change, and that only one major model change application is open with Lloyd's at any time. Lloyd's accepts that there might be exceptions to this expectation – for example, a model platform change might identify issues with the model methodology that result in a further major model change. These are exceptions and should be discussed with the agent's capital point of contact as early as possible who will advise you on how to proceed.
2. Agents should have operational contingency plans in place to allow for rejection of any submitted major model change application. When a major model change has been triggered, an application should be made and the agent should consider the operational issues involved in having to reverse the change when making any more changes to the model before Lloyd's has concluded its review and assessment (see section 3.4).
3. There may be reasons that Lloyd's is unable to meet or commit to the eight-week target. For example, if a major model change application contains more than one major model change or is particularly complex in nature, the review may take longer.
4. During the review the technical review team may ask questions or request further information from the agent to form an opinion on the change. If the quality of the application or subsequent responses are poor and several iterations of further requests are necessary, the time to review the change will exceed the target given above.
5. In order to achieve timely approval from Lloyd's, agents should ensure they submit high quality major model change applications. This includes providing sufficient information up front, communicated effectively, as a complete application, and proactive engagement with Lloyd's during the review.
6. If the volume of change remains as high as in recent years Lloyd's may have to restrict the number of major model change applications made. Early engagement and no delay to communicated plans are the best ways for syndicates to ensure that their major model changes can be reviewed.

4.2.1 Changes in capital requirement and the QCT

Note an MMC will NOT lead to a change in the capital requirement in the QCT if the major model change does not result in a material (>10%) change in uSCR. All MMC applications require submission of a "hypothetical" LCR via MDC. If an MMC submission is approved and does result in a material (>10%) change in uSCR, then an LCR resubmission will be required via MDC (which may just require the "hypothetical" submission to be made "real" but may also require a change in FX rate), and this will feed into the QCT process. See section 5.5 of the Lloyd's Capital Guidance for further details.

4.3 The Information to be Provided with a Model Change Application

When a major model change application is made the following documents are required as a minimum:

– Application form
– Model Change Template (for major model changes that are not "pure governance" changes)
– A response to any prior feedback which has been requested to be addressed as part of the next MMC submission
– Supporting validation documentation (quantitative changes only)
– Supporting documentation, including an analysis of change (AoC) (one-year and ultimate SCR, for quantitative changes only).
– The amended expert judgement log (if relevant)
– Underlying model documentation that is materially affected by the model change, or that would be useful as reference documentation for the purposes of review (with tracked changes if possible)
– Information presented to board
– Board minutes evidencing discussion, challenge and sign-off (can follow shortly after application, see section 3.3).

- All LCR forms for quantitative changes. These should be provided via MDC as a hypothetical submission (i.e. ensure the hypothetical submission option is ticked on form 012).
- Evidence how prior feedback/loadings has been addressed if the deadline for feedback/loadings was the next LCR submission.

The following should be contained in the supporting documentation – the principle of proportionality can be applied here for minor changes:

- Description of the major change and all other changes that have occurred since the last approved model change
- Rationale/justification for the change. This can be included in the analysis of change document
- The analysis of change should draw out and explain (as Lloyd's will query these points):
    - Any changes where the impact on the one-year SCR is materially different to the ultimate SCR
    - Any changes where the impact on SCR is not in line with expectations.
- The analysis of change should link back to the model change template (i.e. impact of changes should reconcile) and should explain impact on one-year and ultimate SCR as well as movements by risk category on both a pre-diversified and post-diversified basis..
    - If relevant, class level information should also be included to facilitate review. As a guideline the information provided should be sufficient for a knowledgeable independent individual to understand the change. See Appendix A in 'Capital Guidance' for further details on analysis of change requirements.
- The analysis of change is also important for an accumulation of minor changes which trigger a major model change. The main cause(s) that gives rise to a major model change being triggered should be highlighted, justification provided, and relevant validation test signposted.
- Demonstration of ongoing compliance with Use Test requirements
- For changes with a specific risk impact this should be isolated, even if the overall capital impact is not material. For example, for changes to Catastrophe Risk the impact on catastrophe risk should be isolated. Similarly, for changes to Market Risk the change on pure asset risk (excluding the impact of discounting on the liabilities) should be included to facilitate the review.

Lloyd's may also request additional information once a major model change has been submitted.

Appendix 2 – Validation Activity for Different Change Types provides a longer (but non-exhaustive) list of examples of documentation / justification / validation requirements.

It is Lloyd's expectation that changes are justified by the first line. This includes checking the correct implementation of the change, explaining the capital impact (overall, and by risk category/class) and any deviations from the expected impact. Where the actual impact differs to that expected, this should be escalated, and the cause should be investigated. This could result in corrections in the implementation, or an explanation provided in the documentation submitted with the model change application.

All major model changes must be validated. Validation must be independent (see section 2.3 of 'Validation Guidance') but can be carried out internally or externally, relative to the agent. That is, by an independent in-house team or consultancy. The validation is expected to review the work of the first line (e.g. justification, the implementation and how this has been checked as well as the analysis of change and raise any issues/questions. Furthermore, additional validation tests (like sensitivity tests, scenario tests, testing against experience, testing of alternative methods etc.) should be carried out when deemed necessary – the principle of proportionality should be applied here. If the major model change application accompanies the annual LCR submission some model changes (like e.g. parameterisation changes) might be covered by the usual annual validation exercise. However, validators should tailor the validation report to include specific validation of model changes when required.

4.4 Specific Requirements for Platform Changes

Software platform changes should automatically trigger a major model change application to Lloyd's. The following are specific requirements for submission with a platform change. The over-arching principle is that the model being replaced should be replicated as far as possible in the new platform. Any deviations from this should be submitted as a separate model change as they do not represent part of a platform change per se.

- Reasons for migrating the model;
- Any impacts on model use;
- Extent to which standalone distributions at an overall SCR, risk and class of business level differ between old and new models;
- Testing should not be restricted to the 99.5th percentile. We expect to see testing and explanations of differences at various points of any distribution;
- Testing of dependency structures. Please note that it is not sufficient to rely on standalone distribution being similar and aggregating to the same Risk or SCR level. We expect to see testing done on the dependency structure specifically, which might include a comparison between the old and new models of:
    - JEP's; or
    - contribution to capital by risk/class of business

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- input vs output correlation tests;
- Sensitivity testing showing the two models have similar drivers;
- The validation report should make it clear what the criteria are for a test to pass/fail and also for escalating issues. Where distributions are being compared in the two models, we would expect the criteria for escalation of differences to be linked to stability testing of the two models;
- We would wish to see visibility in the documentation of tests being "failed", and the process that has been followed to address this. We would expect all escalations to have been handled in accordance with your validation policy. Furthermore, we would expect to see the results of the escalation, e.g. a change to the model or acceptance of a limitation in the modelling;
- Reverse Stress Testing should be applied to the new model and the results of this analysis compared to those on the old model;
- Description of key expert judgements (including materiality and falsifiability) and how these have been validated;
- Where relevant, how any previous validation points have been addressed or an explanation of why these are no longer relevant.

In all cases, we would expect to see detailed explanations of any differences between test results on the old and new models.

As far as possible the major model change application for the model migration should exclude methodology and parameter changes. These should form separate model changes and should be subject to their own validation and investigation. Any methodology changes should be clearly reported, and their impacts analysed; similarly, for any associated parameter changes. For all methodology and parameter changes, syndicates should carefully assess the need to review methodology and parameters in conjunction – so if a methodology is changed that involves setting a new or different level parameter then the changes should be made in one application and the parameterisation change not delayed to a later BAU exercise.

It is understood that some migrations may result in unavoidable methodology/parameter changes as the methodology in the old platform may not be exactly re-producible. In such cases the impact of the different methods should be quantified, explained and bridged, often by using separate (temporary) models. This does usually result in bespoke coding being required and syndicates should factor this in when planning their major model change application. An unavoidable change does not include changes associated with moving from one standard model in one platform to another in a different platform. Instead, unavoidable changes refer to cases where one of the platforms is unable to be changed to match the other e.g. moving from Verisk to RMS or where certain methods are proprietary, e.g. adjusting correlation matrices to achieve positive definiteness. Unavoidable changes are not out of scope of review, agents must quantify the impacts of these and validate the changes. The principle of proportionality may be applied, for example, if the impact of the methodology change has an immaterial impact on overall capital and by risk type. However, in such cases, the agent should demonstrate how the conclusion of low materiality has been obtained. In summary, any such unavoidable changes, must be made visible and the impact on the validation tests, results and conclusions made clear.

4.5 Specific Requirements for External Model Vendor Changes

Changes to the external model vendor, or the introduction of an external model where previously there was none, should always trigger a major model change. A move to a new model version with the same vendor would only trigger a major model change if the syndicate's thresholds for a major model change are breached, as per the syndicate's model change policy. Regardless of whether a syndicate defines a model change as major or minor, if there are updates to an LCM5+ region-peril, the syndicate must inform their Lloyd's Exposure Management Manager of this change.

Some model vendors have recently released new high definition (HD) and Next Generation Models (NGM) and platforms. There may be situations where syndicates will remain with a particular external model vendor, but will transition to the new platform, and start to use new HD/NGMs in their view of risk. In these cases, the syndicate should consider whether a major or minor model change is triggered as per the syndicate's own Model Change Policy. If the change is deemed minor, the syndicate will be asked to demonstrate this to Lloyd's Exposure Management at the time of the model change. Regardless of whether a syndicate defines a model change as major or minor, if there is a move to using these new HD/NGM models and platforms, the syndicate must inform their Lloyd's Exposure Management Manager of this change.

The following table provides examples of these requirements:

Old Model	New Model	Classification of Change
No 3rd party model	CyberCube	Major. Must inform Lloyd's Exposure Management.
RMS (any)	Verisk (any)	Major. Must inform Lloyd's Exposure Management.
Verisk (any)	RMS (any)	Major. Must inform Lloyd's Exposure Management.
RMS RiskLink model	RMS HD model	Must inform Lloyd's Exposure Management regardless of whether major or minor. Consult Model Change Policy; if the impact is minor, demonstrate to Lloyd's at the time of the change that the change to new technology and models doesn't materially impact results.
Verisk Touchstone model	Verisk NGM	Must inform Lloyd's Exposure Management regardless of whether major or minor. Consult Model Change Policy; if the impact is minor, demonstrate to Lloyd's at the time of the change that the change to new technology and models doesn't materially impact results.
RMS RiskLink model	RMS RiskLink model, same version but accessed via Intelligent Risk Platform	Must inform Lloyd's Exposure Management and demonstrate that there is no impact to model results or View of Risk.

The following are specific requirements for submission of an external model vendor change.

– Rationale for change
– Explanation of how the external model meets the Use test standard.
– Evidence of agents and boards understanding of the model, including model limitations.
  – Document reasons for using the model, including why alternative models not chosen
– Evidence of enough resource and expertise to run the chosen model/select the assumptions and validate it
– Detailed Description including:
  – Modelling software and version used,
  – any alterations made to standard model assumptions and settings
  – for cat vendor changes:
    – which perils have been modelled, and where geographically (e.g. US windstorm, Japanese earthquake)
    – details of data used in model and any alterations made for planned prospective year underwriting
    – any blending of model results
– Provide an expert judgement log, clearly highlighting which judgements/assumptions have changed from the previous model and any adjustments to the new model's default parameters.
– Appropriateness of assumptions and methodology. Agents can apply the principle of proportionality but should cover:
  – how assumptions are considered to be realistic and justifiable, understanding of assumptions which may be false, and how the assumptions/methodology are considered to be in line with the agent's risk profile.
– Demonstration of model completeness e.g. with respect to unmodelled elements of catastrophe losses
– Validation of changes in expert judgments, parameters, methodology or data.
– Evidence of independent review
– Any updated documentation and demonstration of how this complies with Lloyd's 'Principles for Doing Business'
– The following quantitative impacts should also be provided:
  – For cat vendor change:
    – Impacts on overall capital, standalone cat risk, and by class and peril. Including evidence how the impact is deemed to be reasonable.
    – Reinsurance and how the impact on net cat risk is deemed reasonable.
    – Actual vs Expected i.e. model output vs actual loss experience and how model output is deemed reasonable.

- For ESG vendor change:
  - Impacts on overall capital, standalone market risk, and by subclass. Including evidence how the impact is deemed to be reasonable.
  - Insurance risk with regards to the impact on discounting claims which is dependent on interest rates
  - Diversification benefit between insurance risk and market risk, and within market risk.

- For HD/NGM: consideration and discussion of the magnitude of change attributed purely to methodology changes in the new platforms, as well as regular region-peril hazard/vulnerability changes.

Please contact your Lloyd's Exposure Management Manager to discuss detailed requirements for review of both a major and minor model change in relation to catastrophe risk.

While it might be difficult to unpick changes in capital as a result of changes in external vendor models (e.g. ESGs or cat vendor models), the causes of changes in capital must still be understood and explained. It is not acceptable for example, that moving to a newer and easier to use external vendor model alleviates the need to explain changes in capital. Overall, syndicates must be able to demonstrate ownership and understanding of external vendor models and be able to clearly explain and evidence causes of impacts to capital as a result of such changes.

4.6 FX rates to be used for a Major Model Change application

MMC applications should be made using the same FX rates as those used in the previously approved model. If agents wish to use different FX rates or are unsure about the appropriate rates to use, they are asked to engage with their capital point of contact.

4.7 Use of a Changed Model

Agents should have contingency plans in place to allow for rejection of any submitted major model change application. In the period between a major change application being made to Lloyd's and Lloyd's concluding its review, agents must have the ability to reverse the change if required by Lloyd's. This may require agents running licences on two different model versions or platforms, and the practicalities associated with this should be taken into consideration by agents when planning their major model changes. In this interim period, managing agents should use the most current version of the model (including the changes for which approval is sought) for decision making. On this basis, there should be no issue in relation to ongoing compliance with the Use Test requirements to ensure that managing agents have a clear view of model output. The ability to reverse changes naturally applies to the situation where a major change application has been rejected.

Appendix 1 – Detailed Lloyd's Change Types

Change type	Detailed Change Type
Data updates (*excluded from scope, but still reported in model change template*)	Data Changes
	Changes as a result of movements in exchange rates
Underlying risk profile	Risk Profile
Model parameterisation	Parameterisation and Parameterisation Methodology
Model methodology	Dependencies
	Insurance – Underwriting (Non-Catastrophe)
	Insurance – Underwriting (Catastrophe)
	Insurance – Reserves including Risk Margin
	Operational Risk
	Market Risk
	Credit Risk
	Other
Model design	Dependencies
	Insurance – Underwriting (Non-Catastrophe)
	Insurance – Underwriting (Catastrophe)
	Insurance – Reserves including Risk Margin
	Operational Risk
	Market Risk
	Credit Risk
	IT changes – including change in modelling platform
	Other
Governance/controls	Governance – including Change Policy, Validation, Scope and Model Use
Non-functional	Non-functional – including changes to reports, code changes, or other operational improvements
	Changes to Group Models
Other	Other

The following table provides further detail on the Lloyd's change type definitions:

Change Type	Description
Design/methodology - Dependencies	Any change to the dependency structure used in the internal model, for example: • Introduction of new dependency between classes of business and/or risk types or removal of existing dependency (whether driver or copula) • Change in copula used e.g. from Gumbel to student • Change in dependency structure used • Change in methodology applied to model tail drivers
Design/methodology - Insurance - Underwriting (non-catastrophe)	Any change to the methodology used in modelling non-catastrophe insurance losses, for example: • Change in modelling total losses to a frequency severity approach • Change in the loss distribution used • Change to methodology of generating 12-month losses compared to ultimate losses • Changes in modelling of existing outwards reinsurance program - introduction of new program would be captured by changes in risk profile
Design/methodology - Insurance - Underwriting (catastrophe)	Any change to the methodology used in modelling catastrophe losses, for example: • Change to vendor model used e.g. change in RMS model version or change from Verisk to RMS • Introduction of new perils
Design/methodology - Insurance – Reserves including Risk Margin	Any change to the modelling of technical provisions, for example: • Change to distribution used • Change to simulating incurred losses instead of paid losses • Change to calculation of risk margin • Change to granularity of classes modelled
Design/methodology - Operational Risk	Any change in the modelling of operational risk, for example: Change to distribution used Introduction of new scenarios (if this falls within the definition of model change)
Design/methodology - Market Risk	Any change in the modelling of market risk, for example: • Change to ESG provider • Introduction of new asset classes or currencies (or removal) • Change in time horizon used to model market risk
Design/methodology - Credit Risk	Any change to the modelling of credit risk, for example • Change to distribution used for generating defaults or loss given defaults • Allowing for impact of security held against credit risk e.g. LOC's, funds with-held • Inclusion of new source of credit risk
Design/methodology - Other	Any design/methodology change falling outside of the above - this must be explained under 'Description of change'

Change Type	Description
Parameterisation & parameterisation methodology	Change to the parameterisation or the methodology used to parameterise the internal model. For example: • Use of new data sources to parameterise assumptions • Changing adjustments to historic data within the parameterisation process • Changes to parameters as a result of data updates • Changing the degrees of freedom in a copula • Changes as a result of a change in expert judgement • Change in external model calibration
Risk Profile	Changes to the risk profile used in the internal model as a result of business developments, for example: • Introduction of a new reinsurance program • New classes of business being written or a significant change to existing classes • Change in asset allocation
Governance	Including changes to Model Change Policy, Validation Policy, Model Scope & Model Use
IT changes – including change in modelling platform	For example, change from ReMetrica to Igloo or vice versa
Non-functional	Any change that is expected to have no effect on the uSCR or one-year SCR but causes a small change in one or both capital numbers due to simulation error. These include: • Changes to reports/model output • Code changes improving the efficiency of calculations without changing any methodology or underlying calculations • Changes to Group Models which do not impact the syndicate model • Other operational model improvements
Data changes	A change to any direct inputs into the model that are not designated as either an underlying risk profile change or a parameter change. Changes as a result of movements in exchange rates (for example, when re-running the model for year-end reassessment in March)
Other	Anything outside of the above.

Data, risk profile, and parameter changes

Section 2.2 includes guidance on categorisation of changes as data, risk profile, or parameter changes. In particular, Lloyd's specifies a parameter change as an "input that requires some level of expert judgement". The below lists provide further guidance on what Lloyd's could consider to be a reasonable categorisation as either a data (or risk profile) or parameter change. The below lists are non-exhaustive and non-binding; agents would still be required to justify their selected categorisation.

Data (or risk profile) updates

- Changes to existing business plan
- New business plan
- Changes to outwards reinsurance programme (e.g. new contracts, limits, reinstatements, coverage etc.) and RICB
    - NB. Changes to reinsurance <u>modelling</u>, where the underlying reinsurance contracts have not changed, would not usually be considered a data/risk profile change
- Reinsurer credit ratings

- Updates to technical provisions
- Cat data input
- Asset mix
- FX changes
- EIOPA discount rates

Parameter updates

- Volatility parameters
- N:G ratios, if used in reserve risk
- Correlation parameters
- Degrees of freedom in copula
- Updates to non-modelled cat risk parameters
- RI default probabilities
- Operational risk event likelihoods and severities

Where a single change could be considered as either a data or parameter change, agents should make an appropriate judgement on the best categorisation in line with Lloyd's guidance and their own internal model change policy.

Appendix 2 – Validation Activity for Different Change Types

All major model change submissions require a full set of documentation highlighting what has changed from the approved model and a summary of the rationale/justification for the change. This document gives examples of what additional validation and quantitative information may be required to assess continued compliance with Lloyd's validation and modelling Principles. The supporting documents submitted with a major model change thus should inform Lloyd's about the change along with information on the validation work performed.

This section provides further guidance on the type of documentation and level of validation (see last table for examples of validation at different levels) that could be undertaken to support a major model change submission. Note that this list is not exhaustive or prescriptive and agents should contact Lloyd's for clarification, if required. Lloyd's may also request more information once a major model change has been submitted. Different model changes have been grouped into different sections in this appendix. This segmentation is for the purposes of this appendix only and syndicates are not required to comply with this set of segmentation.

We expect type II sensitivity tests to be carried out as part of validation, when relevant. Type II sensitivity tests are carried out to test plausible alternative assumptions. The impact of these plausible alternative assumptions should be reviewed. This can help give comfort to the selected parameters, especially when there is a large degree of subjectivity. Also, stress and scenario tests should be carried out, in order to sense check the model. See sections 3.2.2 Plausible alternative set of assumptions ("ST-2") and 3.5 Stress and scenario tests, within 'Validation Guidance' for further details on these tests.

Change type	Detailed change type	Example(s)	Potential Documentation/validation*
Underlying risk profile	Insurance risk: underwriting risk (non-catastrophe)	i. Addition of a new class of business / significant change to existing classes ii. Change of volume of premium written	i. - Details of modelling methodology and parameterisation for the new class of business (level of detail dependent on materiality of the class) - Validation tests to support the new assumptions, methodologies and parameters. For example, stress tests to validate selected parameters, sensitivity tests to assess materiality of the change to the SCR and scenario tests to check adequacy of capital/risk - Amount of validation required is dependent on materiality of the change; please contact your MRC analyst for more specific requirements. ii. - Details of reasons for change e.g. change in plan, market conditions
	Insurance risk: underwriting risk (catastrophe)	iii. Introduction of new perils	iii. - Details of any new perils.

Change type	Detailed change type	Example(s)	Potential Documentation/validation*
			- Validation tests on new assumptions, methodology and parameters. If these changes require new methodologies, please refer to the 'model methodology / design' section below.
	Insurance risk: reserve risk (including risk margin)	iv. Material deterioration of reserves	iv. - Validation tests on new assumptions, methodologies and parameters (including backtesting). If no changes are made to the reserve risk parameterisation, rationale explaining why this is appropriate would be required.
	Credit risk	v. Change of reinsurance programmes / reinsurer panel vi. Change of reinsurance default rates	v. - Summary of the changes and supporting rationale - High level justification that the quantitative impact is reasonable e.g. increase of quota share cession rate should lead to an increase in reinsurance credit risk and fall in premium risk (quantum should also be validated). - Copies of expert judgement log / review of parameter changes. vi. - As above
	Market risk	vii. Change in asset portfolio/allocation viii. Change in ESG provider	vii. - Details of the changes of the asset portfolio/allocation. - High level justification that the quantitative impact is reasonable e.g. a movement from equities to cash should reduce market risk and profit. - If these changes require new methodologies, please refer to the 'model methodology / design' section below. viii. - Rationale for change. - How the external model meets the Use test standard - Evidence of enough resource and expertise - Detailed descriptions of model e.g. software and version used - An expert judgement log, highlighting which judgements have changed

Change type	Detailed change type	Example(s)	Potential Documentation/validation*
			- Justification of how assumptions and methodology are deemed appropriate, in line with market practice and agent's risk profile - Description of material changes between ESG versions. - Justification that the quantitative impact is reasonable - Quantitative impacts to overall capital, standalone market risk, insurance risk (as a result of change in discount benefit dependent on interest rates) and on dependency between insurance risk and market risk.
	Operational risk	ix. Change of risk register	ix. - Details of the changes to the risk register. - High level justification that the quantitative impact is reasonable. - If these changes require new methodologies, please refer to the 'model methodology / design' section below.
Model parameterisation	Parameterisation methodology	i. Use of new data sources to parameterise assumptions e.g. credit ratings from S&P to AM Best ii. Changing adjustments to historic data within the parameterisation process iii. Changes to parameters as a result of data updates. iv. Changing the degrees of freedom in a copula	i. - Description of, assumptions behind and rationale for, using new data sources. ii. - Description and rationale of adjustments made. - Validation and/or justification of new parameters. iii. - High level justification that the changes are appropriate. iv. - Description and rationale of the choice of degrees of freedom. - Validation and/or justification that this is appropriate. - Expert judgement log, if applicable.

Change type	Detailed change type	Example(s)	Potential Documentation/validation*
	Parameterisation	v. Update to intra-class correlation matrix vi. ESG version update	v. - Validation and/or justification that the changes and the resulting dependency structure is still appropriate. vi. - Please refer to the 'Underlying risk profile' section above.
Model methodology / design	Insurance risk: underwriting risk (non-catastrophe)	i. Change of method of modelling of attritional / large / catastrophe claims. ii. Change in modelling total losses to a frequency severity approach. iii. Change in the loss distribution used. iv. Changes in modelling of existing outwards reinsurance program (requiring a change to the model methodology)	i. - Details of the new methodology, impact on other risks and relevant validation tests should be included. ii. - As above. iii. - As above. iv. - As above.
	Insurance risk: underwriting risk (catastrophe)	v. Change to vendor model used e.g. change in RMS model version or change from Verisk to RMS	v. - Rationale for change - How the external model meets the Use test standard - Evidence of enough resource and expertise - Detailed descriptions of model e.g. software and version used - An expert judgement log, highlighting which judgements have changed - Justification of how assumptions and methodology are deemed appropriate, in line with market practice and agent's risk profile

Change type	Detailed change type	Example(s)	Potential Documentation/validation*
			- Justification that the quantitative impact is reasonable - Quantitative impacts to overall capital, standalone cat risk, by class and peril, on reinsurance and impacts on net cat risk as well as actual loss experience vs model output

	Insurance risk: reserve risk (including risk margin)	vi. Change of method of calculation of risk margin
		
		vii. Change to distribution used
		
		viii. Change to simulating incurred losses instead of paid losses
			vi. - Analysis of change of risk margin.
			  - Validation tests on this new methodology.
			
			vii. - Full validation tests on new distribution e.g. scenario tests to validate the shape of the distribution.
			
			viii. - Rationale detailing the reasons for this change.
			  - Full validation tests on new methodology

	Credit risk	ix. Change in approach to modelling downgrades
		
		x. Change to distribution used for generating defaults or loss given defaults
		
		xi. Allowing for impact of security held against credit risk e.g. LOCs, funds with-held
		
		xii. Inclusion of new source of credit risk
			ix. - Relevant sections of the supplementary questionnaire.
			  - High level justification that the quantitative impact is reasonable.
			  - Full validation tests on new methodology and any new expert judgements
			
			x. - As above
			
			xi. - As above
			
			xii. - As above

Change type	Detailed change type	Example(s)	Potential Documentation/validation*
	Market risk	xiii. Introduction of new asset classes or currencies xiv. Change of methodology (e.g. from a scenario-based approach to using an ESG)	xiii. - Documentation detailing how the new asset classes/currencies have been modelled and rationale for doing so. - Full validation tests on new methodology. xiv. - Documentation detailing the new modelling approach and its rationale. - Full validation tests on new methodology.
	Operational risk	xv. Change in method of modelling operational risk xvi. Introduction of new scenarios (if this falls within the definition of model change)	xv. - Documentation detailing the new modelling approach and its rationale. - Full validation tests on new methodology. xvi. - Documentation detailing the new scenarios and their rationale.
	Dependencies	xvii. Change from correlation to driver-based dependency approach xviii. Introduction of new dependency between classes of business and/or risk types or removal of existing dependency (whether driver or copula) xix. Change in copula used e.g. from Gumbel to student-t	xvii. - Documentation detailing the new methodology design and rationale. - Re-run of validation tests on the new dependency structure and new tests if appropriate. xviii. - Analysis of change of the joint exceedance probabilities between material classes of business and/or risk types. - Validation and/or justification of resulting dependency structure e.g. reasonability check on change in output correlations xix. - Documentation detailing the new methodology design and rationale. - Re-run of validation tests on the new dependency structure and new tests if appropriate. - Copy of updated Expert Judgement Log

Change type	Detailed change type	Example(s)	Potential Documentation/validation*
	One-year methodology	xx. Change to methodology of generating 12-month losses compared to ultimate losses	xx. - Documentation detailing the new methodology design and rationale. - Re-run of validation tests on the new methodology and new tests if appropriate e.g. sensitivity testing of new one-year emergence parameters
Model platform change	Vendor change	i. Change in vendor (e.g. Igloo to ReMetrica)	i. See section 4.4 for specific requirements for platform changes
	Other change	ii. Change in platform version where there have been several methodology changes (e.g. Igloo GBM to ICE) iii. Change in platform version with no methodology changes	ii. - Documentation detailing structural, methodology and assumption changes. - Parallel run on both models as at last approved SCR date. - Explanation of differences by risk type. - Quantitative evidence may be required in some cases e.g. Analysis of change template. iii. - Evidence that no changes in methodology have occurred (see 'Validation Guidance').
Governance / controls	Model Change policy	i. Quantitative amendment to model change policy (e.g. change of thresholds) ii. Qualitative amendment to model change policy	i. - Documentation detailing the reasons for the quantitative amendment to model change policy. - Depending on the level of the amendment, validation e.g. backtesting of the new trigger would be required. - No MCT is required ii. - Outline of rationale for the change

Change type	Detailed change type	Example(s)	Potential Documentation/validation*
			- Evidence that the change followed the correct governance process including final sign-off.
	Scope	iii. Addition of a new legal entity iv. Novation of a syndicate to a new agent or merged with another syndicate v. Changes in the material ownership of managing agencies	i. - High level justification that these changes are appropriate. - Documentation detailing any structural, methodology and assumption changes made to the model.
Data	Data	i. Update to reflect year-end technical provisions	i. - Outline of drivers of the change - Refer to the relevant sections above if parameter/methodology changes are made as a result of this
Other	Other	*Please initially refer to your Lloyd's capital point of contact for further guidance.*	

Appendix 3 – Lloyd's Major Model Change: Pre-Application Form

Lloyd's Major Model Change: Pre-Application Form

Agent	
Syndicate	
Date of planned submission	

Lloyd's change type (if single change), or accumulation of minor changes	
Agent change type	
Quantitative/Qualitative/Both	

Expected Aggregate impact on SCR(U) *relating to the major model change*	Choose from (within sim error, <5%, 5-10%, or >10%)
Expected Aggregate impact on SCR(1) *relating to the major model change*	Choose from (within sim error, <5%, 5-10%, or >10%)

Summary of reason for planned change

- Driver of planned change
- Benefits of planned change
- Risks associated with the implementing the planned major model change

High level description of the planned change and expected implication on the design and operation of the model

High level description of independent validation to be undertaken on the planned model change

Progression of work undertaken so far/status of project

- Please include any project plans that are relevant and confirm if these are on track for application
- Explain any potential delays which might impact the targeted submission date/contingency plans

Any further information

Please confirm the following *(Yes/No)*:

Any SCR loads (including waived loads) will be addressed before submitting this MMC application *(NB evidence of addressing the loads can be submitted with the MMC application)*	
Outstanding feedback will be addressed in line with the deadlines given in the capital feedback document. *(NB evidence of addressing feedback can be submitted with the MMC application).*	

Name of contact at agent	
Title of contact at agent	

Appendix 4 – Lloyd's Major Model Change: Application Form

Lloyd's Major Model Change: Application Form	

Agent	
Syndicate	
Date of change	
Model change policy version	
Board approval date	

Lloyd's change type (if single change), or accumulation of minor changes	
Agent change type	
Quantitative/Qualitative/Both	

Aggregate SCR(U) *relating to the major model change*	**Percentage impact (%)**	
	Aggregate impact (£)	
Aggregate SCR(1) *relating to the major model change*	**Percentage impact (%)**	
	Aggregate impact (£)	

In addition to completing the above table, please complete the below table if there are any preceding changes not captured above.

Aggregate SCR(U) *Relating to all changes from previous approved model or SCR(U)*	**Percentage impact (%)**	
	Aggregate impact (£)	
Aggregate SCR(1) *Relating to all changes from previous approved model or SCR(1)*	**Percentage impact (%)**	
	Aggregate impact (£)	

Details of trigger for major model change

Driver of change (e.g. addressing model limitation)

Description of change and implication of change on the design and operation of the model

Description of independent validation undertaken on the model change

Any further information

Please confirm the following documents are included as part of the application *(Yes/No)*:	
Application form *(this template)*	
Board minutes	
Information presented to Board	
Other supporting documentation	
Validation	
Model Change Template (*if applicable*)	
Analysis of change	
Updated self-assessment against the capital principle of the Lloyd's Principles of Doing Business (*if applicable*)	

Name of contact at agent	
Title of contact at agent	

Appendix 5 – Changes from Previous Versions

The list below summarises changes in this guidance from the previous version, which was published in January 2023:

- Inclusion of further commentary on considering whether changes in business volumes should be classified as risk profile or data changes (Section 2.2.1).
- Clarification of the requirements for external model changes and for syndicates moving to next-generation or high-definition external cat models (Section 4.5).