I. BACKGROUND AND PURPOSE

The American Academy of Actuaries (Academy) has developed an Economic Scenario Generator (ESG), which may be found on the Society of Actuaries website at https://www.soa.org/tables-calc-tools/research-scenario/ and https://www.naic.org/cmte_e_lrbc.htm. The ESG is currently used by the life insurance industry in calculations of life and annuity reserves and capital.

Beginning in early 2017, the Academy notified the Life Actuarial (A) Task Force (LATF) that it did not have the resources to maintain the ESGs, except in their current form until a suitable replacement can be found. Since the NAIC does not currently have the resources or expertise to develop and maintain an ESG, a third-party ESG vendor is needed for these functions. In an open meeting held on 7/16/19, LATF and the Life RBC Working Group (LRBC WG) requested that NAIC staff consider issuing a Request for Proposals (RFP).

The purpose of this RFP is to solicit proposals from vendors to provide, maintain, and support an ESG producing real-world interest and equity scenarios to be prescribed for use in calculations of life and annuity Statutory reserves according to the Valuation Manual (e.g., VM-20, VM-21) and capital under the NAIC RBC requirements (e.g., C3 Phase 1, C3 Phase 2). The chosen vendor will deliver an ESG and supporting tools that meet requirements set by regulators, along with robust documentation and training materials. On an ongoing basis, the vendor will produce the scenarios, support end users of the ESG, research changes considered by LATF and LRBC WG and implement those that are adopted.

II. DELIVERABLES

This project requires an initial set of deliverables, as well as ongoing maintenance and support. As noted in Section III below, bids should include a detailed breakdown of costs for each of the initial and ongoing items listed in A-P below.

Initial Deliverables (Items with One-Time Costs)

A. An existing ESG capable of producing, at a minimum, real-world interest rate, equity, and bond fund return scenarios for use in calculations of life and annuity Statutory reserves according to the Valuation Manual (e.g., VM-20, VM-21) and capital under the NAIC RBC requirements (e.g., C3 Phase 1, C3 Phase 2). If the ESG can produce additional variables beyond the minimum requirements (e.g. inflation rates, risk-neutral scenarios, corporate bond spreads, implied volatility scenarios,
credit defaults, credit rating migrations, etc.), indicate if there is an additional cost for these features.

B. Meetings with NAIC staff and regulators as needed to discuss the vendor’s existing economic scenario generator (ESG) features and parameters, as well as potential modifications.

C. Customization of ESG features and parameters to reflect any modifications adopted by regulators.

D. A scenario reduction tool to allow companies to choose a specific number of representative scenarios (e.g. 100, 500, 1000, etc.) from a universe of 10,000 scenarios. Scenario subsets provided by the tool as of a valuation date must contain the same scenarios for all users of the tool.

E. Calibration criteria used to determine whether stratified scenario subsets are sufficiently dispersed relative to the universe of 10,000 scenarios.

F. A tool to generate scenarios for the VM-20 Stochastic Exclusion Ratio Test.

G. A tool to generate the VM-21 Company-Specific Market Path method scenarios.

H. A tool to generate statistics on the output of the ESG.

I. Full documentation on the ESG specifications, calibration, and tools.

J. Robust training materials for regulators and industry end-users.

Ongoing Production, Maintenance and Support (Items with Ongoing Costs)

K. Run the ESG as of each month-end and produce the required scenarios on the first business day of the following month. The process to generate the scenarios must be completed in time to post scenarios on business day one of each month. Statistics on the output of the ESG are expected to be delivered simultaneously with the scenarios. Note that NAIC staff intends to provide the scenarios on the NAIC website to ensure they are available to all companies regardless of whether they have licensed the vendor’s software.

L. Develop parameter updates at a frequency determined by the regulators. The process to update the ESG will include the following steps:
   1. Perform research on potential changes as requested by regulators.
   2. Document and present potential changes to regulators for exposure and adoption. Attend regulator meetings as needed to respond to questions/comments received during the exposure period. Materials to be provided for consideration of changes should include a) discussion on how changes were vetted for complex interactions between parameters, b) attribution analysis showing the impact of each change, and c) documentation on the above in sufficient detail to allow independent review.
   3. Modify the ESG to reflect final adopted updates in a timely manner and provide evidence to NAIC staff that they were made appropriately.
4. Update documentation on the ESG specifications.
M. Update training materials for regulators and industry end users.
N. Provide full support to end users of the economic scenario generator (ESG) scenarios who have licensed the ESG software.
O. Provide help desk support to end users of the ESG scenarios who have not licensed the ESG software.
P. Provide scenarios to support field testing of the new ESG under regulatory reserving and capital frameworks.

III. CONTENT OF PROPOSAL

For final evaluation of proposals, it is important that vendors provide the information requested below:

A. A breakdown of the number of staff dedicated to ESG development by division (e.g., parameterization, software development, documentation, training, etc.) along with the resumes of key staff members.

B. The number of life insurance and annuity companies that are currently licensed to use the ESG for real-world liability valuation. Additionally, please provide at least three named clients to act as references along with their contact information.

C. Description of the ESG indicating the type of model (e.g. stochastic log volatility, independent log normal, regime switching lognormal with number and frequency of regimes, stochastic volatility jump diffusion, other etc.). The vendor should also include a discussion of the benefits and limitations of their recommended ESG model.

D. Description of the ESG parameters and how they are determined (e.g. fitting model to actual historical data using maximum likelihood estimation, etc.).
   1. If model fitting is done using historical data, detail the source of the data and length of the period used and whether any adjustments are made to the source data.
   2. Describe how any parameters, including mean reversion parameters, are derived and whether they are static or dynamic.
   3. Provide information on the level of customization available to regulators in specifying ESG features and parameters. For example, regulators may want to specify a certain type of mean reversion formula, the historical period used to determine parameterization, or other items.

E. Description of the types of returns that can be simulated by the ESG (e.g. Treasury rates, bond returns of different maturities and credit qualities, equities of different indices, different types of international equities, currencies, inflation rates, etc.).

F. Details on how credit spreads and defaults are implicitly reflected or explicitly simulated in bond fund returns.
G. Description of the methodology for completing the full Treasury yield curve from the simulated interest rates.

H. The level of dependency between different financial variables in the economic scenario generator (ESG). If the ESG is integrated, describe how the correlations are developed and whether they are dynamic (e.g. either exhibiting both positive and negative correlations if appropriate, etc.).

I. Statistics on the range of scenarios produced (e.g. the percentage of scenarios with low interest rates coupled with low equity returns, low interest rates coupled with high equity returns, etc.).

J. An analysis showing how the range of scenarios produced compares to the current Academy VM-20/VM-21 and C3 Phase 1 ESGs, including testing over different historical and/or potential future economic conditions.

K. The frequency of review and consideration of updates for each ESG parameter. Please describe the rationale for the frequency of each parameter update and specify which parameters require judgement to calibrate and those that do not (e.g. parameters updated formulaically).

L. Information on how end-users of the ESG will be able to generate scenarios on-the-fly through a mechanism such as software licensing, an application programming interface (API), and/or available full documentation of the technical workings the ESG.

M. A copy of existing ESG documentation.

N. A copy of existing ESG training materials, and a description of any other support provided.

O. A detailed breakdown of costs for each of the one-time and ongoing deliverables listed in Section II. Bids should also include both first year and ongoing ESG software licensing costs for NAIC staff, regulators, and companies that may wish to license the software for up to five years.

IV. SELECTION PROCESS

The NAIC will be responsible for the selection of the vendor that will be awarded this project to be funded. Input from regulators and other subject-matter experts may also be sought, but the NAIC will make the final decision.

The following factors will be considered in making the vendor selection:

- Completeness of the proposal
- Qualifications of staff dedicated to developing and supporting the ESG
- Professional reputation of the firm
- Ability to deliver the items listed in Section II
- Capability to perform updates to ESG features, parameters, and tools in a timely manner
• Flexibility in being able to work through the NAIC process to customize ESG features, parameters, and tools as needed
• Robustness of economic scenario generator (ESG) and calibration documentation
• Quality of training materials and other means for providing support
• Price, including one-time and ongoing costs

V. CONFLICTS OF INTEREST

The NAIC recognizes that, given the broad scope of this project, any vendor with the experience reasonably necessary to produce the ESG may have certain conflicts of interest based upon past associations with industry participants. These conflicts of interest will not automatically disqualify the vendor, but the vendor must have verifiable policies and procedures in place designed in compliance with established industry standards to address conflicts of interest issues that may arise.

VI. CONDITIONS

The NAIC reserves the right to not award a contract for this ESG. Reasons for not awarding a contract could include, but are not limited to, a lack of acceptable proposals or a finding that insufficient funds are available to proceed. The NAIC also reserves the right to redirect the project as is deemed advisable. The NAIC also reserves the right to cancel this RFP at the direction of its membership.

VII. QUESTIONS

Any questions regarding the Scope of Work should be directed to: Proposals@naic.org
Questions related to any other matter should be directed to Jim Woody, e-mail: JWoody@naic.org