PROJECT AND PORTFOLIO MANAGEMENT

1.0 PURPOSE

This evidence provides an overview of OPG's Nuclear Operations, Renewable Generation ("RG") and Support Services (Digital Technology & Services and Real Estate) approach to project and portfolio management. The project portfolio consists of projects funded through capital expenditures ("Capital Projects") and projects funded through OM&A expenditures ("Project OM&A"). Since EB-2020-0290, OPG has established an Enterprise Project Management Office ("EPMO") to further standardize its project management approach. The project and portfolio management methodology is substantively the same as described in EB-2020-0290. This methodology has now since been expanded across the enterprise.

2.0 ENTERPRISE PROJECT PORTFOLIO OVERVIEW

OPG employs a portfolio management approach to assess, prioritize, and deliver all portfolio projects (Capital Projects and Project OM&A). The portfolio management approach is characterized by two interrelated cycles of Asset Investment Planning and Management (i.e., defining the portfolio) and Portfolio Management and Execution (i.e., delivering the portfolio). Since EB-2020-0290, OPG has further enhanced its project management proficiency programs and established a Construction Centre of Excellence ("CCoE") while continuing to seek opportunities to improve and standardize its portfolio management approach.

The project portfolios are developed to help ensure strong safety and reliability of OPG's assets, address obsolescence, optimize electricity generation, meet regulatory requirements, manage risks or realize improvement in cost efficiency. Expenditures on major capital spares are also considered part of the capital project portfolio due to their role in supporting system or unit reliability.[1]

[1] A capital spare is a spare part that exceeds $200K per item, must consist of a complete assembly or major subassembly (i.e., cannot be a single part), and must be repairable. If not classified as a capital spare, the spare part would be included within the materials and supplies inventory (Ex. B1-1-1, Section 3.2.4).

OPG's Board of Directors approves the annual projects portfolio and non-portfolio projects or programs budget as part of OPG's corporate business plan. The actual and forecast project portfolio spending (i.e., annual capital expenditures and project OM&A expenditures) and key drivers of the changes over the 2020-2031 period are addressed in their respective Exhibits below:

- Hydroelectric – Ex. D1-1-2 and Ex. F1-3-2
- Nuclear – Ex. D2-1-3, Ex. F2-3-1 and Ex. F2-3-2
- Support Services – Ex. D3-1-2 and Ex. F3-1-2.

Management of major programs is separately discussed in the following Exhibits:

- Darlington Refurbishment Program (Ex. D2-2-1)
- Pickering Refurbishment Program (Ex. D2-3-1)
- Darlington New Nuclear Program (Ex. D2-4-1).

Section 3.0 below outlines the current project portfolio process regarding project identification and prioritization, portfolio and project management, and commercial (contactor) management. It also highlights enhancements made to the asset and investment planning processes, the continuous improvement of the EPMO, and associated project management initiatives.

3.0 PROJECT PORTFOLIO MANAGEMENT PROCESSES

3.1 Overview

The project portfolio management processes consist of three main components: Project Identification and Prioritization (Section 3.2), Portfolio and Project Management (Section 3.3), and Commercial (Contractor) Management (Section 3.4). OPG also works to continuously improve its project management practices, as described in Section 3.5.

OPG divides responsibilities into two separate governing bodies within each business unit:

- Asset management governing bodies, which focus on planning and prioritizing new investments for existing assets. The role of the asset management governing body is to review and evaluate asset investments based on risk and value for business plan endorsement, as detailed in Section 3.2.

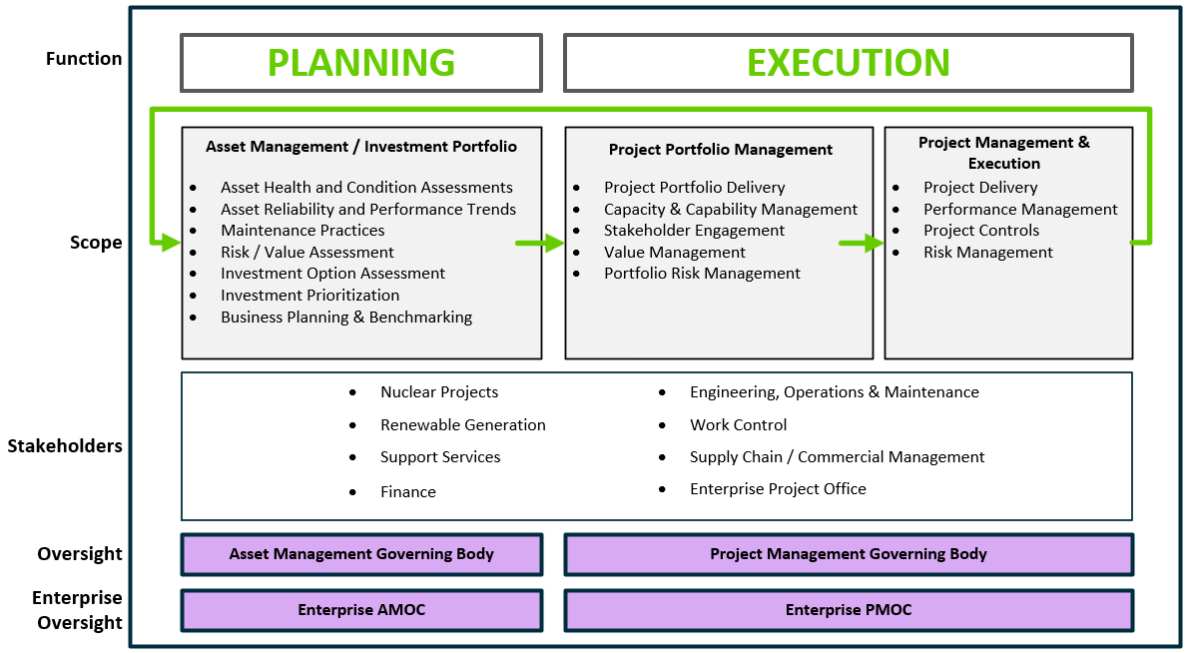
- Project management governing bodies, which focus on project execution and portfolio management. The role of the project management governing body is to provide oversight for each project through the project's life cycle, as described in Section 3.3.

Enterprise-level Asset Management Oversight Committee ("AMOC") and Project Management Oversight Committee ("PMOC") were established to provide executive oversight and calibration on performance objectives and risks pertaining to fleet assets and project portfolios overseeing the business unit governing bodies.

The distinct accountabilities of the governing bodies allow for enhanced focus and expertise within the respective committees, facilitating more efficient and effective asset management, investment planning, and project portfolio management practices across each business unit.

Figure 1 outlines the function, scope, stakeholders, and interrelationship between asset and project governing bodies during the investment life cycle.

Figure 1 - Investment Lifecycle



The activities performed across the investment lifecycle fall broadly into two functions: planning and execution. The scopes of work performed under these functions are described in Sections 3.2 and 3.3 of this evidence, respectively.

3.2 Planning

OPG's current asset management and investment planning process overseen by the asset management governing body consists of the following three steps:

- Identification of Investment Need: Identify asset investment business needs, including emergent and potential projects with start dates in the future.
- Investment Assessment: Analyze investments with consideration of balancing risk mitigation and cost.
- Project Selection and Prioritization: Produce a prioritized list of candidate projects for inclusion in the business plan within unallocated Capital Projects and Project OM&A, subject to the business planning approval process.

3.2.1 Identification of Investment Need

Periodic asset reviews evaluate asset performance, reliability, health, and obsolescence. These reviews may include creating/evaluating health reports, condition assessments, inspections, and/or security and safety evaluations. These assessments contribute to recommendations to request capital/OM&A expenditure funding for project needs.

3.2.2 Investment Assessment

Investment assessment, along with the supporting reliability considerations, cost forecast, and risk assessment, are prepared according to an OPG-defined Value Framework described below.

The "Value Framework" provides a quantitative means to evaluate each investment's benefits, costs, and ability to mitigate critical risks. In alignment with OPG's business imperatives, several areas have been identified within the Value Framework:

- Safety
- Regulatory

- Lost Generation
- Social License and Reputation Impact
- Environmental
- Financial
- Cyber Security

The Value Framework quantifies the value of each investment based on the summation of all benefits and costs in the risk areas. This model is used to help select the preferred projects that provide the highest net benefit to address business needs.

3.2.3 Project Selection and Prioritization

The asset management governing bodies review the recommended investments to determine their feasibility and risk assessment conclusions. Once reviewed, the selected investments may be approved as candidate projects for inclusion in the business plan.

All selected investments endorsed by the business unit asset management governing body undergo an annual prioritization process during business planning. These investments are prioritized within funding, resource, environmental and scheduling constraints to maximize overall portfolio value based on the Value Framework, taking into account station operation and safety risks. Throughout this investment prioritization process, assumptions, including project cost forecasts (before contingency), are reviewed and may be revised as necessary. This allows for adjustments in an iterative process to refine the project prioritization process and maximize business unit portfolio value.

Similar to other investments, emergent projects are also approved through the asset management governing body process. If required for an immediate start, projects are injected and approved into the portfolio through both the asset management and project management governing bodies. The injected project is managed within the business plan portfolio budget until the next business planning cycle when projects are reprioritized.

Following this process, project prioritization lists are finalized through business plan review meetings after which the asset management governing body provides concurrence of the prioritized project lists. Upon concurrence, a prioritized list of candidate projects is included in the business plan subject to the business planning approval process.

3.3 Execution

The project management governing bodies' primary focus is on the "execution" function, which includes the monitoring and control of all active projects moving through these five phases to ensure that periodic and systematic reviews are conducted before proceeding to the next phase. Based on the level of assessment and engineering work completed at each project life cycle phase, the project management governing body seeks to ensure that project scope, cost, and schedule are appropriately defined, reviewed, and approved before proceeding to the next phase.

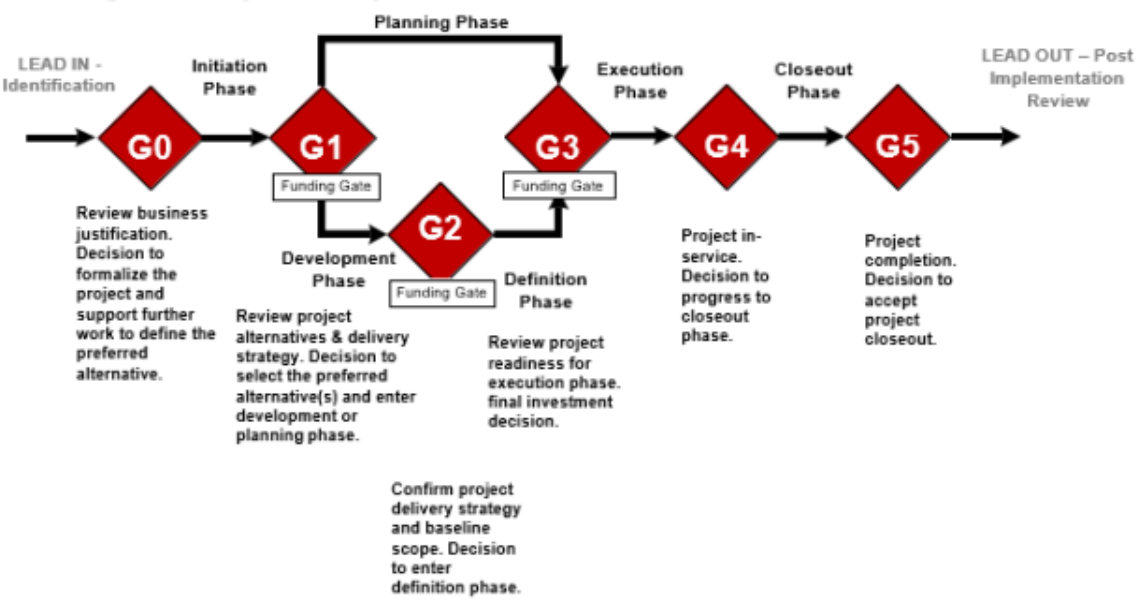
Once an investment has been endorsed by the asset management governing body and is captured as a project in the business plan, the project management governing body will oversee the project throughout its life cycle. Oversight includes ensuring projects are executed within the approved timelines, project expenditures remain within funding constraints in the plan, and deviations from the plan have documented lessons learned and corrective actions to mitigate a recurrence.

The project portfolio management and execution processes manage projects through five life cycle phases:

1. Initiation
2. Development
3. Definition
4. Execution
5. Closeout.

Figure 2 illustrates the relationship between the five phases, the phase gating process, and the funding approval process. Detailed descriptions of the five project phases are available in Attachment 1.

Figure 2 - Project Life Cycle Phases and Gates



As projects move through the phase gates shown in Figure 2, their planning, scope, engineering, procurement, and execution strategies are further refined, advancing the level of project definition. A project scale is determined based on estimated total cost and complexity factors, such as:

- Station outage requirements;
- Experience of executing organization;
- Interfaces requirements with other departments or contractors;
- Technology (First of a Kind, First in a While, maturity);
- Integration or schedule constraints; and
- Safety, environment, and regulatory requirements.

The project scale determines the specific front-end requirements for cost estimates and planning at each phase gate. Each time a project moves forward into a subsequent phase, a Business Case Summary ("BCS") is approved, with the first stage typically being "initiation BCS" (thereby making this an "allocated" project within the portfolio), with the last stage being an "execution BCS". For each BCS, OPG estimates contingency as part of total project cost, which is released in accordance with project governance and correspondingly forecasted when approved.

The project management governing body ensures accountability in phase-gating by reviewing all BCSs. If the project management governing body supports the proposal, the approved project phase moves forward for the appropriate funding approval release according to the Organizational Authority Register.

For a project to be approved by the project management governing body and move from the definition phase to the execution phase, substantial completion of detailed engineering, procurement, and detailed construction/installation planning is required. This requirement ensures that total project cost estimates are based on the necessary level of definition and accuracy before execution. Generally, movement to the execution phase requires that a project has progressed to at least a Class 3 estimate (as defined in the Association for the Advancement of Cost Engineering International partial release[2] execution phase BCS) to be approved. After an execution phase BCS has been approved, the project is considered to have a committed total cost. Projects in the execution phase are still subject to known and unknown risks, which can result in cost and schedule variances.

As shown in Figure 1 above, there continues to be an interface between asset management and project management governing bodies throughout the project life cycle. After a project is complete, the new asset information is fed back to the databases used to inform the planning process and the identification of investment needs as described in Section 3.2.1, updating the

[2] Prior to the integration of major project execution groups in 2020, the RG business unit used partial execution BCSs to authorize a release of funds for procurement of long-lead items. This practice was phased out after 2020; see Ex. D1-1-2, Section 3.0.

applicable asset attributes (e.g., asset reliability, risk). Subsequent system health reports, component condition assessments, life cycle management plans, and investment assessments include new asset end-of-life targets and strategies based on this updated asset information.

3.4 Commercial (Contractor) Management

OPG pursues various contracting strategies depending on the business unit and project specifics. OPG's approach in determining contracting strategies considers project cost estimates, unique risks or risks that can be effectively transferred, contractor capability/specialization, and project complexity.

Engineering, Procurement, and Construction: OPG may use an Engineering, Procurement and Construction ("EPC") contracting strategy. This model establishes a single point of accountability for the engineering, procurement, and construction components of a designated portion of a project while OPG maintains oversight. Reliance upon a single contractor responsible for all three components generally results in increased predictability of cost and schedule by reducing delays or conflicts that may occur among contractors and/or OPG during handoffs along the three stages. An EPC contracting strategy also increases OPG's project execution capabilities by reducing any potential impact from OPG resource constraints.

Collaborative Front-End Planning: OPG may also employ a Collaborative Front-End Planning program that allows early planning and estimating with the contractor during the definition phase of a project. This allows OPG to work with the contactor on construction/installation planning and estimating while ensuring in-depth and real-time oversight by OPG. Collaborative Front-End Planning between the contractor and OPG ensures there is a common understanding of the project requirements and the proposed solutions to meet them.

OPG can consider other contract strategies, which may separate the engineering, procurement, and construction components. In some circumstances, OPG's optimal strategy is to rely solely upon in-house resources and expertise for one or more of these three

components. For example, rather than rely on an EPC contractor for procurement, OPG may conduct procurement internally to pursue strategic sourcing arrangements for economies of scale. The use of project-specific agreements allows OPG to select a contractor best suited for specialized projects, optimize risk transfer, and leverage specific performance incentives related to cost and schedule expectations.

3.5 Project Management Improvement Initiatives

OPG continuously seeks to improve the performance of its project and portfolio management functions. These initiatives may be enterprise-wide or specific to particular business units.

3.5.1 Project Management Proficiency

OPG employs a comprehensive training and development program designed for Project Managers and Project Control teams. This program encompasses key areas such as project management, project controls, and contractor oversight. It includes various components such as training sessions, experiential-based learning, and practical exercises. A major focus of the program is to enhance participants' skills in collaborating with and directing a contractor to ensure projects are delivered on time and within budget.

This training program is designed to equip OPG with a skilled workforce capable of effectively executing projects across the project lifecycle. OPG has continuously enhanced its comprehensive training programs and implemented improvements to further strengthen course content and delivery.

3.5.2 Asset and Portfolio Management Improvement

Since establishing integrated Asset and Portfolio Management for nuclear operations, the asset management and investment planning processes have been enhanced to systematically assess and prioritize potential investments across all business units. This process applies a common approach to evaluating investment value based on cost, complexity, and risk across the enterprise. Asset management governing body oversight and accountability have been aligned with updated asset management and investment planning processes designed to efficiently improve reliable operation, maintenance, and asset investment, balancing cost and

risk appropriately. Project portfolio management was standardized through the project management governing bodies across the business units to provide consistent enterprise project portfolio performance oversight.

3.5.3 Digital Innovation and Artificial Intelligence ("AI")

OPG has enhanced its project management information systems to include standard project management digital forms, centralized data architecture, and interactive reports. These systems improve process efficiency and streamline communications with stakeholders. OPG leveraged the centralized data architecture to collect structured historical project information and begin implementation of advanced generative AI. These AI tools retain and reinforce historical project knowledge to apply for future projects, thus allowing project managers the capability to access this information more efficiently, thereby helping to reduce front-end planning and execution effort whilst improving knowledge retention and collaboration across projects. Exploration of AI opportunities is expected to be ongoing as the technology continues to evolve.

3.5.4 Fit for Purpose

Fit for Purpose is a value-focused mindset instilled in OPG's project management and engineering organizations to deliver intelligent solutions. It focuses on understanding and refining project requirements and scope to optimize project quality and cost. Fit for Purpose promotes a questioning attitude toward project scope at all stages of the project lifecycle, while applying appropriate rigour. OPG provides project managers and engineering with several tools such as the Intelligent Requirements guide, Fit for Purpose questionnaire, checklists, and project planning/design roadmaps to ensure the Fit for Purpose mindset is applied throughout the project's lifecycle from initiation to closeout.

3.5.5 Construction Center of Excellence

A dedicated CCoE organization was established to ensure consistent construction oversight standards within Nuclear and RG projects. The CCoE organization included Quality Management, Field Engineering, Field Construction, and the Contract Management Office functions.

Industry best practices in Quality Management (e.g., surveillance and support) were applied to the portfolios and programs, including the Darlington Refurbishment Program, Pickering Refurbishment Program, and the Darlington New Nuclear Program. The Quality Management team engages contractors to ensure all parties maintain compliance with their managed systems.

Field Engineering conducts quality control activities for contractors working under OPG's Quality Assurance program and quality surveillance on contractors working under their own Quality Assurance program.

Field Construction and the Contract Management Office teams provide consistent safety, contract and special process oversight in support of expeditious completion of fieldwork. They ensure work is completed safely and meets the contract terms and conditions set by the project management team. There are subject matter experts in the process areas of hoisting and rigging, foreign material exclusion, confined space, work protection, and hot work that guide workers, ensuring nuclear and personnel safety is paramount.

LIST OF ATTACHMENTS

Attachment 1: Project Life Cycle Phases and Gates

Project Lifecycle Phases and Gates

Once a project has been identified through the asset management and investment planning process and then approved through the business planning process, a project enters the project lifecycle. There are five phases to the lifecycle of a project:

1. Project Initiation – The purpose of the initiation phase is to evaluate viable alternatives and identify the initial project scope, schedule, conceptual funding, and applicable stakeholders for the preferred alternative. This phase is generally funded from the project OM&A budget in order to prepare the Business Case Summary ("BCS") for the development phase.

2. Project Development – The objective of the development phase is to prepare the preliminary design, schedule, and cost information, as well as relevant project strategies and the project management plan.

3. Project Definition – The purpose of the definition phase is to further refine the project and demonstrate readiness for execution. This includes completion of sufficient engineering to determine bulk material requirements, development of the project cost estimate and execution plan, assessment of risk and development of mitigation plans, identification of and application for any requirements for regulatory approvals, and procurement of engineered equipment. Generally, a Class 3 estimate would be prepared for the completion of the project, and a full release or partial release execution phase BCS would be developed. This estimate would form the basis to measure the performance of project execution.

4. Project Execution – The execution phase includes completion of detailed engineering, procurement (if not completed in the definition phase), and detailed construction/installation planning and/or physical execution of the project and commissioning work.

5. Project Close-out – The close-out phase is the last phase in the project life cycle and includes the administrative close-out of contracts and the project, as well as the preparation of a project close-out report to document final costs and lessons learned.

Following the project close-out phase, a post implementation review is conducted, as applicable, to assess whether the project benefits were achieved as intended and as documented in the approved BCS, and to capture the key lessons learned for OPG to use in improving future undertakings.

As part of its project management process, OPG uses cost estimate ranges that are consistent with industry best practices as reflected in the Association for the Advancement of Cost Engineering International ("AACE") Estimate Class guidance. Estimate Class is a cost estimate classification system which defines the "quality" of the estimate based on the input information used and the project's stage of development. AACE uses five estimate classes, with Class 5 being the least accurate and Class 1 being the most accurate. For example, execution phase releases would generally be Class 3, and for a large pool of projects, on average, an accuracy range of -20% and +30% is expected. A summary of the Estimate Class and expected accuracy range is provided in Figure 1 below.

Figure 1

AACE Estimate Class and Accuracy Range

ESTIMATE CLASS	**MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES** Expressed as % of complete definition	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges
Class 5	0% to 2%	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	L: -5% to -15% H: +5% to +20%
Class 1	65% to 100%	L: -3% to -10% H: +3% to +15%

Given the amount of assessment and engineering completed at each phase of a project life cycle, OPG works to ensure that the project scope is appropriately defined prior to the next stage in the process. In general, a project is approved for execution when project engineering, scope definition, and planning execution are sufficiently complete. The scoping process,

combined with phase-gating and the ongoing governing body review and approval processes, enhances OPG's ability to bring projects to completion within budget and on schedule.