Section 4: Conceptual Financial Model for New Reactors

Disclaimer: **This draft report was prepared to help the Department of Energy determine the barriers related to the deployment of new nuclear power plants but does not necessarily represent the views or policy of the Department.**

Conceptual Financial Model for New Reactors

Overview

- **Background:** Working from the information gained through Tasks 1, 2 and 3, Scully Capital developed a spreadsheet-based financial model to analyze the base case for new nuclear plants and a number of alternative financing structures for the base case, and to estimate the impact of different financing and risk mitigation mechanisms based on plant economics.
- **Objectives:** The key objectives for developing this model included the following:

  Develop a base business case that demonstrates the economics for the addition of nuclear capacity absent government support.

  – Investigate how DOE and industry can work together to manage the financial risks associated with development and construction of new nuclear facilities.

  – Analyze the impact of alternative financing structures, risk mitigation measures, and financing strategies on overall project economics.

  – It is noteworthy that a number of industry stakeholders (e.g., vendors, associations, utilities) have developed similar developmental models. Therefore, one of our objectives was to attempt to calibrate to the results of these models and understand the differences in results (if any) to highlight the sensitivities of the project economics.

- **Section overview:** Appendix 2 presents a description of the following elements of the financial model:

  – Design

  – Functionality

  – Physical Characteristics

  – Individual Sheet Descriptions.

  This section of the report contains a short introduction to the model.

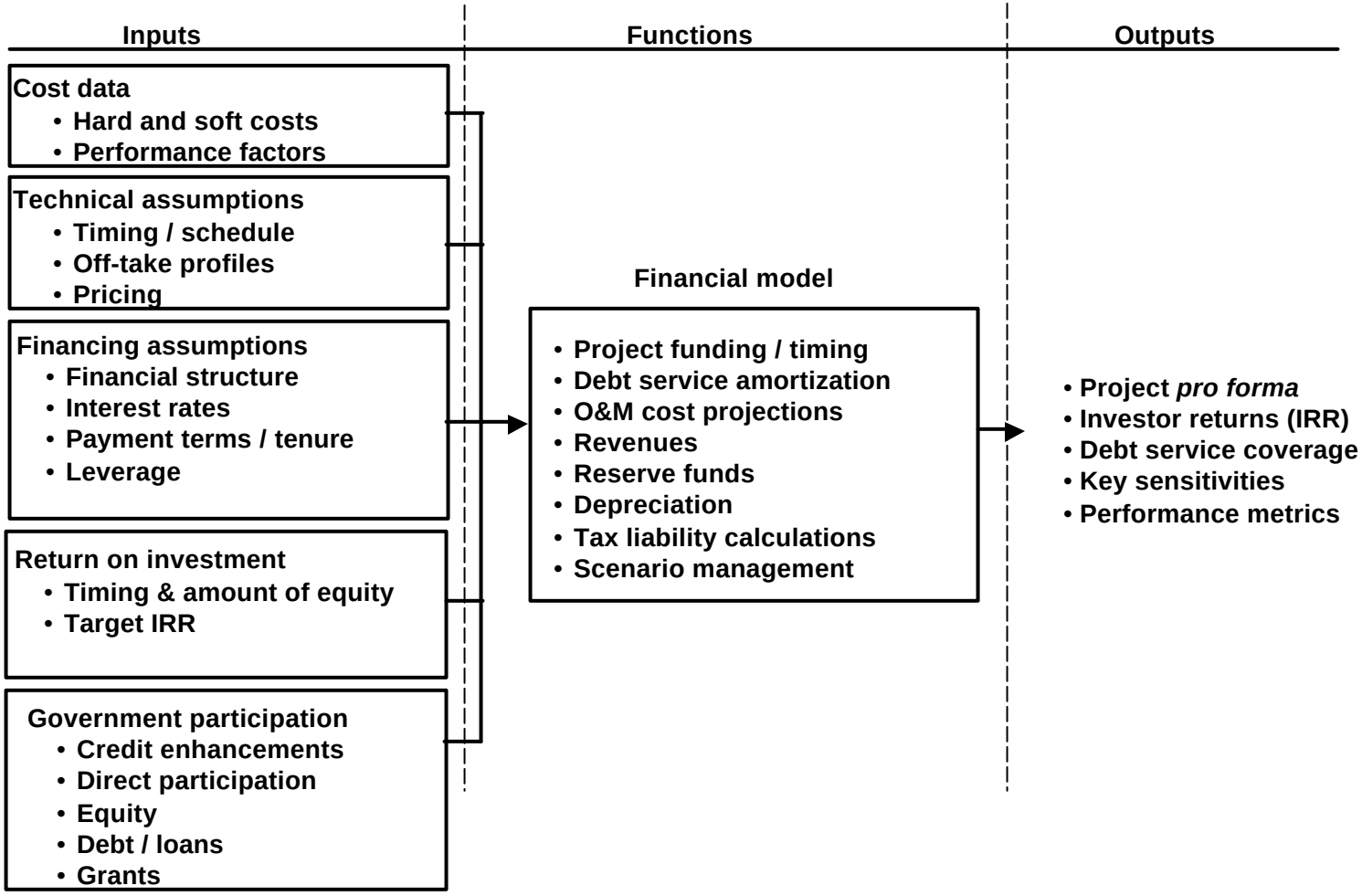
Spreadsheet Design

Key Design Parameters

- **Approach:** Based on the scope of Task 4 and on our understanding of the intended use of this spreadsheet for sensitivity analyses, Scully Capital incorporated a number of key design requirements into the development of the spreadsheet. These requirements have materially affected the complexity of the model and have provided a foundation for the future enhancements and analysis. Specifically, we accommodated the following key considerations and elements:
  - **Layered Financing Structure:** Since the spreadsheet was developed in parallel with the investigations undertaken in Tasks 2 and 3, the design had to accommodate financing scenarios that arise from the study, as well as future policy development efforts. Therefore, the design of the model contemplated a financing structure that may be composed of different types of debt instruments, as well as potential grant or equity funding by the federal government at different stages of a project's development.
  - **Multiple Scenarios:** A key element of the spreadsheet's design allows users to find and analyze different scenarios without having to save numerous model runs in separate files.
  - **Transparency:** While detailed cell calculations involving nested conditional statements is often a necessity if the model is to accommodate multiple types of inputs, an effort was made to preserve the transparency of the spreadsheet by incorporating interim calculations and providing detailed pro-formas for different elements of project performance. In addition, while the structure of the spreadsheet is protected from manipulation in order to avoid file corruption, the cell formulas and calculations are not protected, allowing them to be displayed and audited by the user.
  - **Flexibility:** Because we recognize that the model and the scenarios it evaluates will evolve over time as new options are considered, we made a deliberate effort to preserve flexibility for future modifications and enhancements. In particular, space has been reserved within the different components in the spreadsheet to allow for future additions.
  - **User Profile:** Based on our understanding of DOE's intention to utilize this model after the conclusion of this engagement, and based on our understanding of the experience of potential users in spreadsheet applications, the design of the spreadsheet has assumed that subsequent users will possess experience in manipulating spreadsheet applications and specific experience in Microsoft Excel.

Overview of Sensitivity Analysis Data Flow

The inputs, functions, and outputs of the model flow are depicted below.



Data Flow

The model sheets are arrayed in three-dimensional fashion, with data entry sheets providing information to subsequent sheets, resulting in summary exhibits and analysis.