Appendix 15.1: Methodology for GVA and Jobs Estimation

Kintore Hydrogen

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1. INTRODUCTION

1.1 CONTEXT

Kintore Hydrogen intends to develop a 3 GW electrolyser capacity in the Aberdeenshire region in Scotland. The development, construction and operation of the project have the potential to boost the economic productivity of the region and the wider UK. While the project operation concerns the energy sector, its development, construction and operation will also result in investment across multiple industries, including construction and the manufacturing of materials and equipment. The positive impact of this investment is captured both directly in the industries and indirectly, along with the accompanying supply chains. For example, the procurement of equipment such as compressors will also result in added value along the supply chain required to produce the equipment.

1.2 OBJECTIVES OF STUDY

In 2023, ERM conducted a study to estimate the potential economic benefits of the Kintore Hydrogen project. The study aimed to quantify the direct and indirect economic benefits to Scotland and the wider UK from the development of the Kintore Hydrogen project. The analysis resulted in estimates for the gross value added (GVA) and the gross job opportunities generated for the Scottish and UK economies.

The estimate for jobs generated does not account for the net impact of Kintore Hydrogen. Therefore, the study did not account for a counterfactual scenario, such as another low-carbon project being deployed in the local area.

1.3 RELATION TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The outputs of the macroeconomic benefits assessment form part of the evidence used to assess the impacts of the project within Chapter 15 of the Kintore Hydrogen Plant Environmental Impact Assessment (EIA) report. This methodology statement forms an appendix to the EIA report.

The following definitions apply to the study conducted by ERM:

- **Direct jobs** – the employment created to fulfil the demand for a good or service. These jobs are generated in the core activities of the project[1]. This is calculated as a product of the UK domestic output and the adjusted labour intensity. In the EIA report, direct employment instead refers to direct on-site employment. Any direct employment as estimated by ERM generated off-site, such as the manufacture of the balance of plant equipment, was treated as indirect employment in the EIA report.
- **Indirect jobs** – the employment generated in the upstream industries to fulfil the demand created by the direct employment across the supply chain[1]. Within the EIA report, indirect employment includes the direct off-site jobs generated.
- **On-site employment** – the employment that will involve labour occurring within the Kintore Hydrogen premises. This category includes the labour required to construct and operate the facility. The EIA report further classifies the gross job creation into on-site and off-site employment, based on the expected origin of the required labour.

[1] Sustainable Energy Jobs Platform - Employment Direct Indirect And Induced

- **Off-site employment** – the employment that will involve labour or the manufacture of materials or equipment outside the Kintore Hydrogen premises. This category includes the manufacture of equipment, including electrolysers and electrical equipment.
- **Construction phase** – the period from the start of construction at the site to the completion of the site commissioning.
- **Operational phase** – the period when the plant's commissioning tests have been passed and the facility starts to produce hydrogen to generate revenue and supply the gas network.
- **UK Input-Output multipliers** – multipliers provide the ratio of the direct impact to calculate the total impact[2]. Type I multipliers, which include the direct and indirect impacts, were used in this study. The model did not calculate the induced jobs from expenditure in an industrial sector. For instance, employment cost multipliers show the ratio of total gross job creation (including direct and indirect jobs) to the direct employment change[3].

2. METHODOLOGY

2.1 OVERVIEW

The following steps were taken to estimate the macroeconomic impact of Kintore Hydrogen:

i. **The investment profile** was developed based on a provisional capital and operational spend summary provided by Statera Energy. This focused on the engineering and EPC (Engineering, Procurement and Construction) work and the procurement of long lead items such as the electrolyser and the supporting Balance of Plant. As the estimate focused on the economic benefits to Scotland and the wider UK, the cost items expected to be purchased or contracted from outside Scotland and the wider UK were not considered in the estimate.

ii. **Each cost item was assigned a Standard Industrial Classification (SIC) code,** which was linked to UK input-output tables and business surveys produced by the Office of National Statistics (ONS). While it is anticipated that Kintore Hydrogen could impact a wide range of industries (see Table 1 and Table 2), the project will also strengthen the supply chains for the UK energy sector.

   Each cost item was classified within the relevant five- and two-digit Standard Industry Classification system, as defined by the ONS. There is a wide range of SIC codes that classify economic activities across industries[4]. Where an individual cost item could have aligned with more than one classification, ERM worked with Statera Energy's project delivery and engineering team to select the most appropriate SIC code for this study.

iii. **The GVA and job creation estimates** were calculated from the investment figures based on UK input-output tables and the Annual Business Survey produced by the Office of National Statistics (ONS). For each SIC code, the number of direct jobs estimated was calculated as a product of the UK domestic output and the adjusted labour intensity. The distribution of direct employment on-site and off-site was then

[2] ONS – Input-output analytical tables: guidance for use
[3] Gov.scot – Supply, Use and Input-Output Tables
[4] A full list of current UK standard industry classification can be found here.

determined through collaboration with Statera Energy's project delivery and engineering team.

The indirect job generation was also calculated as:

Indirect jobs = Direct job creation × (Employment cost multiplier – 1)

The employment cost multipliers are sourced according to the corresponding SIC codes from the Input-Output Analytical Tables.

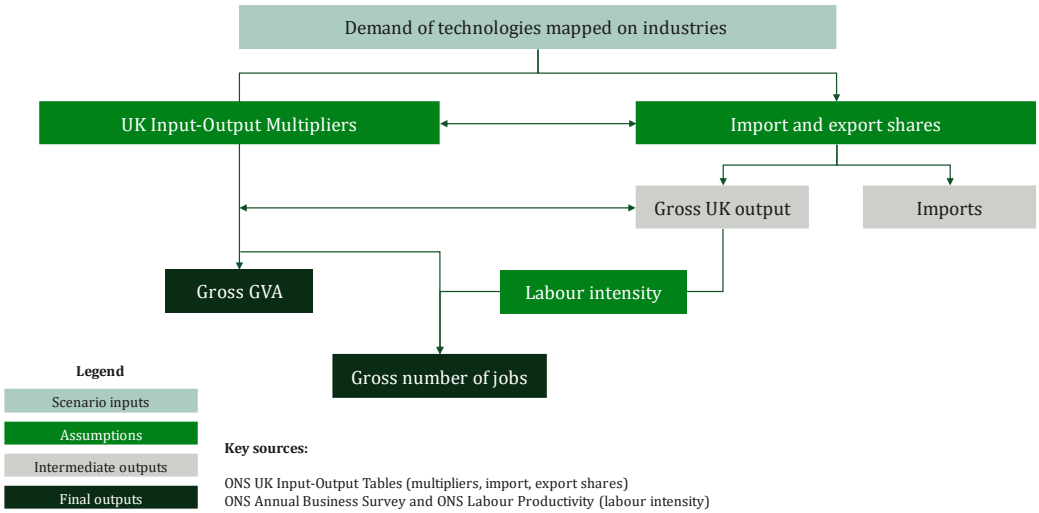

FIGURE 1: ERM MACRO-ECONOMIC IMPACT ASSESSMENT ANALYSIS

2.2 ASSUMPTIONS

The forecast expenditure included eleven categories of cost items (tabulated below), which were distributed across the project construction and operational periods. Table 1 and Table 2 outline the SIC activities assigned to each capital and operational cost category.

TABLE 1: CAPITAL EXPENDITURES FOR KINTORE HYDROGEN

CAPEX item	CAPEX share, %	Industrial activity (Five-digit SIC)	Two-digit SIC code
Engineering	5%	Engineering design activities for industrial process and production	71
Project and construction management	5%	Other professional, scientific and technical activities n.e.c.[5]	74
Construction bulks	18%	Casting of steel	24.4-5
Construction labour	18%	Other specialised construction activities n.e.c.	41-43
Balance of Plant	6%	Manufacture of other special-purpose machinery n.e.c.	28

[5] n.e.c (not elsewhere classified)

CAPEX item	CAPEX share, %	Industrial activity (Five-digit SIC)	Two-digit SIC code
Electrolyser Cell Manufacture	23%	Manufacture of other special-purpose machinery n.e.c.	28
Electrolyser Module Assembly	14%	Manufacture of other fabricated metal products n.e.c.	25OTHER
Electrolyser Bought-In Items	9%	Manufacture of other special-purpose machinery n.e.c.	28
Electrical equipment	2%	Manufacture of other electronic and electric wires and cables	27

TABLE 2: OPERATIONAL EXPENDITURES FOR KINTORE HYDROGEN

OPEX item	OPEX share, %	Industrial activity (Five-digit SIC)	Two-digit SIC code
Operation of site	70%	Manufacture of industrial gases	20A
Maintenance	30%	Repair of machinery	33OTHER

The study also made the following assumptions in developing the cost profile:

Category	Assumption
Timeline	• Kintore Hydrogen will be developed in phases, with the first 500 MW phase beginning construction in 2025 and commencing commercial operation in 2028. • The additional 2.5 GW deployment begins construction in 2029 and commences commercial operation in 2032. Therefore, the total construction period for the full 3 GW project is eight years. • A fixed annual operational spend was applied for the operational years for the 500 MW capacity, beginning from 2028, and the additional 2.5 GW capacity, beginning from 2032.
Location of spend	• The labour spend is expected to be within the Aberdeenshire region, where the Kintore Hydrogen facility is located. • 80% of the construction labour costs and all the project and construction management costs would be in Aberdeenshire. Leakages such as staff commuting from beyond Aberdeenshire were not accounted for.
Leakages	• The study does not include place-based analysis e.g. leakages to and from the Aberdeenshire region were not considered. Leakages are also incorporated in Chapter 15 of the Environmental Impact Assessment report.

3. SUMMARY OF RESULTS

The results of the study are summarised in Table 3 and Table 4.

TABLE 3: OVERVIEW OF DIRECT AND INDIRECT JOBS GENERATED ACROSS THE UK[6]

Phase	Year	Direct Jobs (FTE)	Indirect Jobs (FTE)	Total Jobs (FTE)
Construction	2028	470	350	820
	2030	3660	2250	5900
	2032	1220	930	2150
Operation	2028	40	50	90
	2030	40	50	90
	2032	190	230	420
	2035	190	230	420
Total	2028	510	400	910
	2030	3700	2290	5990
	2032	1420	1160	2570
	2035	190	230	420

TABLE 4: OVERVIEW OF DIRECT AND INDIRECT JOBS GENERATED ACROSS SCOTLAND[6]

Phase	Year	Direct Jobs (FTE)	Indirect Jobs (FTE)	Total Jobs (FTE)
Construction	2028	380	280	660
	2030	1110	790	1900
	2031	1650	1300	2940
	2032	1000	720	1720
Operation	2028	40	50	90
	2030	40	50	90
	2032	190	230	420
	2035	190	230	420
Total	2028	420	320	740
	2030	1150	840	1980
	2032	1190	950	2140
	2035	190	230	420

[6] The results are rounded to the nearest 10