E2 - Interoperability Report

Sustanability Data Space

December 2025

Disclaimer

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This document is provided for technical reporting and transparency. It does not substitute for official regulatory interpretation.

Scope note: Deliverable E2 in this repository is scoped to ESRS and GRI evidence for submission deliverables.

Abbreviations

Abbreviation	Definition
CSRD	Corporate Sustainability Reporting Directive
DCAT-AP	Data Catalog Vocabulary - Application Profile
EDC	Eclipse Dataspace Connector
ESRS	European Sustainability Reporting Standards
GRI	Global Reporting Initiative
iXBRL	Inline eXtensible Business Reporting Language
NGSI-LD	Next Generation Service Interface - Linked Data
SDS	Sustainability Data Spaces

Version Control

Version	Date	Authorship	Description of change
1.0.	19th December 2025	SDS Team	ESRS↔GRI interoperability report (scoped topics, gates, and evidence catalogue)

1. Executive Summary

Deliverable **E2** documents how Sustainability Data Spaces (SDS) achieves **pragmatic interoperability** between **ESRS** (European Sustainability Reporting Standards) and **GRI** (Global Reporting Initiative) by maintaining a **traceable, version-controlled ESRS↔GRI crosswalk across the curated inventory** (spanning all ESG dimensions). This deliverable then highlights three priority environmental topics—**energy**, **water**, and **greenhouse gas (GHG) emissions**—as concrete reuse cases for evidence-backed acceptance metrics and page-friendly example diagrams.

The SDS approach is standards-first and conservative: mappings are anchored in authoritative clause and disclosure references and are treated as **reusable, version-controlled assets**. A core requirement for subsidy deliverables is **auditability**, therefore every metric and figure in this report is evidence-linked to reproducible files in the repository.

Key Results:

Topic	Coverage (with_both)	Detection (with_any)	Coverage Gate (≥75%)	Detection Gate (≥90%)
Energy	80/85 (94%)	85/85 (100%)	**PASS**	**PASS**
GHG	153/163 (94%)	161/163 (99%)	**PASS**	**PASS**
Water	56/70 (80%)	66/70 (94%)	**PASS**	**PASS**

All three priority topics meet the E2 operational gates. The underlying crosswalk includes an additional other topic bucket for the rest of the inventory; however, only the three priority topics are evaluated against acceptance gates in this deliverable. The crosswalks are enriched with catalogue metadata (labels, units, dimensions, and digital reporting tags) so that interoperability is not only about code matching but also about preserving the measurement context needed for reuse.

This deliverable complements:

- **E1 (Inventory):** A canonical register of variables with traceability and governance-ready metadata
- **E3 (Common Model):** The semantic representation of variables and their relationships
- **E4 (Prototype):** Pipeline transformations and validation built on the same inventory and crosswalks

These mapping assets feed downstream dataspace publication workflows: variables and dataset metadata are modelled using NGSI-LD (the EU linked-data API standard) and catalogued with DCAT-AP (the EU data portal metadata standard), enabling "report once, reuse many times" across contexts. [1] [2]

2. Introduction

2.1 Context and Background

Under the Corporate Sustainability Reporting Directive (CSRD), ESRS creates a regulated baseline for EU sustainability disclosure. In practice, many organisations use GRI for broader stakeholder communication beyond regulatory compliance. Interoperability between the two frameworks is therefore not an abstract exercise—it reduces duplicated effort, strengthens consistency of reporting narratives, and improves assurance by preserving the meaning of measurements across reuse contexts. [3]

ESRS is the mandatory EU framework defining detailed datapoints across environmental, social, and governance topics. It became effective with Delegated Regulation (EU) 2023/2772. [4]

GRI Standards are structured around Universal Standards (foundations, general disclosures, and material topics) plus Topic Standards that define disclosure requirements for specific sustainability themes. GRI remains the most widely used voluntary sustainability reporting framework globally. [5] [6] [7]

2.2 Objectives

The objectives of E2 are to:

1. **Provide a traceable ESRS↔GRI crosswalk** across the curated inventory (with topic classification for analysis)
2. **Quantify interoperability** for priority topics using transparent, reproducible coverage and detection metrics
3. **Demonstrate bidirectional reuse** with page-friendly, example-based illustrations of one-to-many mapping cases
4. **Support downstream deliverables** (E3 modelling, E4 pipeline) with enriched mapping assets

2.3 Scope and Boundaries

This deliverable covers:
Crosswalk coverage (inventory-wide):

- The E2 crosswalk is generated from the curated E1 dataset register and spans variables across **Environmental, Social, Governance, and Transversal** ESG dimensions.
- Each crosswalk row is classified into an interoperability topic bucket: `energy`, `water`, ghg, or `other` (used to separate priority topics from the rest of the inventory).

Priority topics (acceptance gates + narrative case studies):

The E2 acceptance metrics and the example diagrams in Annex B focus on three priority environmental topics:

ESRS Topical Standards:

- ESRS E1 (Climate change) — covering energy consumption and GHG emissions disclosures [8]
- ESRS E3 (Water and marine resources) — covering water withdrawal, discharge, and consumption disclosures [9]

GRI Topic Standards:

- GRI 302 (Energy) — energy consumption within and outside the organisation [10]
- GRI 303 (Water and Effluents) — water withdrawal, discharge, and consumption [11]
- GRI 305 (Emissions) — GHG emissions by scope and other air emissions [12]

Scope Boundary: E2 deliverables are scoped exclusively to **ESRS↔GRI interoperability**. Other reporting frameworks are outside the current scope and are not referenced for E2 conclusions.

2.4 Document Structure

- **Section 3** explains the methodology for crosswalk generation and metric calculation
- **Section 4** presents the results with evidence-backed metrics
- **Section 5** provides analysis and interpretation of the findings
- **Section 6** discusses limitations and open decisions
- **Section 7** offers conclusions and recommendations
- **Annexes** provide the evidence catalogue and example diagrams

3. Methodology

3.1 Approach Overview

E2 interoperability analysis follows a structured approach designed for auditability and reproducibility:

Step 1: Source Alignment

The analysis begins with the E1 inventory baseline. The dataset register provides the canonical list of variables with their ESRS and GRI references, reflecting the latest curation state. This ensures that E2 crosswalks and interoperability metrics are computed from the same authoritative source used for E1 coverage metrics—there is no separate "E2 inventory." Topic-level acceptance metrics are computed by filtering the crosswalk to the priority topic buckets.

Step 2: Crosswalk Generation

ESRS↔GRI correspondences are established at the clause and datapoint level for the curated inventory. For each variable, the crosswalk identifies:

- The ESRS datapoint or clause reference (e.g., `E1-5_01` for total energy consumption)
- The corresponding GRI disclosure code(s) where present (e.g., `GRI 302-1.e`)
- A topic classification (`energy`, `water`, `ghg`, or `other`) used to separate priority topic metrics from the rest of the inventory

The resulting crosswalk is a mapping table where each row represents a potential correspondence. Some rows have both ESRS and GRI codes (indicating full interoperability), while others have only one (indicating a gap that may require manual review).

Step 3: Metric Calculation

Two complementary metrics are computed for each priority topic:

- **Coverage (with_both):** The percentage of rows where both ESRS and GRI references are present. This indicates the translation potential—how many variables can be meaningfully crosswalked.
- **Detection (with_any):** The percentage of row where at least one framework reference is present. This indicates practical findability—whether the variable is anchored to a standard reference.

Step 4: Enrichment

The crosswalk is enriched with catalogue metadata including:

- Human-readable labels for each datapoint
- Unit of measurement information
- Dimensional structure (for multi-dimensional datapoints) [13]
- XBRL/iXBRL tagging hints—guidance for digital reporting using eXtensible Business Reporting Language (XBRL) and its inline variant (iXBRL), which embeds structured tags in human-readable documents [14]

Step 5: Visualisation

Example diagrams are generated to illustrate one-to-many relationships in both directions (ESRS→GRI and GRI→ESRS).

3.2 Methodological Principles

Conservative Mapping

Interoperability can fail if a mapping discard meaning. For example, mapping an ESRS datapoint that requires Scope 1 emissions to a GRI disclosure that combines Scopes 1 and 2 would lose the boundary distinction. Similarly, mapping a datapoint measured in tonnes to one measured in tonnes CO2-equivalent would conflate different units. SDS therefore maps only where the correspondence is defensible from standard texts and the EFRAG–GRI interoperability index (published by the European Financial Reporting Advisory Group, which develops ESRS). Where correspondence is uncertain, the mapping is flagged for expert review rather than forced.

One-to-Many as Expected

It is common for one ESRS requirement to correspond to multiple GRI disclosures (and vice versa). The methodology treats this as expected complexity rather than a problem to be forced into one-to-one relationships.

Version Control

All work is tracked in version control, so improvements do not erase audit trails. Each analysis cycle creates dated snapshots that can be compared over time.

3.3 Authoritative References

The crosswalk methodology draws on:

- **ESRS–GRI Interoperability Index** (EFRAG/GRI, 2023) — The authoritative reference for defensible correspondences between the two frameworks [15]
- **ESRS Delegated Regulation (EU) 2023/2772** — The legal basis for ESRS datapoint definitions [16]
- **GRI Topic Standards** (302, 303, 305) — The authoritative definitions for GRI disclosure requirements [17] [18] [19]

4. Results

4.1 Crosswalk Results

The interoperability analysis delivers crosswalk tables at increasing levels of detail, designed for different use cases:

Result	Description
`e2_crosswalks_esrs_gri.csv`	Clause/datapoint-level crosswalk (ESRS↔GRI)
`e2_crosswalks_esrs_gri_full.csv`	Topic-classified crosswalk with coverage indicators
`e2_crosswalks_esrs_gri_full_atomized.csv`	Enriched crosswalk with labels, units, dimensions
`e2_crosswalks_esrs_gri_ixbrl.csv`	Crosswalk with iXBRL annotation hints

The base crosswalk (`_esrs_gri.csv`) is the minimal mapping table—useful for quick lookups and integration with external tools. It contains only the essential columns: ESRS code, GRI code, and topic classification.

The full crosswalk (`_full.csv`) adds coverage indicators that show whether each row has both framework references, only one, or neither. This file is used for metric calculation and gap analysis.

The enriched crosswalk (`_full_atomized.csv`) adds human-readable labels, units, dimensional structure, and classification tags from the atomisation catalogue. This is the most complete version—designed for analysts who need to understand what each datapoint means, not just its code.

The iXBRL crosswalk (`_ixbrl.csv`) adds tagging hints for digital reporting. Organisations preparing ESRS reports in iXBRL format can use these hints to identify which XBRL taxonomy concepts correspond to each datapoint.

The enriched crosswalk is designed to be "interoperability-ready" for downstream work: it carries not only ESRS/GRI references but also the measurement metadata needed to avoid semantic drift when reusing data.

4.2 Coverage and Detection Metrics

The following acceptance metrics are computed from the crosswalk filtered to the three priority topics:

Topic	Total Rows	Coverage (with_both)	Detection (with_any)	Coverage Gate (≥75%)	Detection Gate (≥90%)
Energy	85	80/85 (94%)	85/85 (100%)	**PASS**	**PASS**
GHG	163	153/163 (94%)	161/163 (99%)	**PASS**	**PASS**
Water	70	56/70 (80%)	66/70 (94%)	**PASS**	**PASS**

Evidence: `e2_completeness_by_topic.csv` (coverage), `e2_detection_by_topic.csv` (detection)

Interpretation:

- **Energy** achieves the highest interoperability (94% coverage) because ESRS E1 energy disclosures and GRI 302 share well-defined consumption categories.
- **GHG** also achieves strong coverage (94%) though the mapping is more complex due to scope semantics (Scope 1/2/3) and location-based vs market-based distinctions.
- **Water** shows good but lower coverage (80%) because some ESRS E3 disclosures address marine resources and biodiversity aspects that have weaker GRI 303 correspondences.

4.3 Mapping Matrix Extract

The following extract illustrates the crosswalk structure. This is illustrative only; the canonical mapping is in the evidence files listed in Annex A.

Topic	Indicator (excerpt)	ESRS Code	GRI Code	Source Row
Energy	Total energy consumption related to own operations	E1-5_01	GRI 302-1.e	284
Energy	Fuel consumption from coal and coal products	E1-5_10	GRI 302-1.a	291
GHG	Gross Scope 1 greenhouse gas emissions	E1-6_01	GRI 305-1/305-2/305-3.a/a; b/a	377
GHG	Gross location-based Scope 2 greenhouse gas emissions	E1-6_09	GRI 305-2.a	381
Water	Total water recycled and reused	E3-4_03	GRI 303-5	670

Water	Water withdrawals	E3-4_11	GRI 303-3.a	676
Water	Water discharges	E3-4_12	GRI 303-4.a	677

Evidence: `e2_crosswalks_esrs_gri_full.csv`

5. Analysis and Discussion

5.1 Practical Interoperability Use Cases

The E2 crosswalk spans the curated inventory across ESG dimensions. This section uses three priority topics as **concrete reuse use cases**:

1. Energy Reporting Reuse (ESRS E1 ↔ GRI 302)

When an organisation maintains an internal dataset of energy consumption by fuel type, it can reuse the same underlying measurements for ESRS climate disclosures and for GRI energy disclosures. The crosswalk makes the correspondence explicit—for example, the linkage between ESRS energy datapoints (E1-5 series) and GRI 302-1 subclauses (fuel consumption within the organisation).

The enrichment layer provides unit and dimension cues that support consistent aggregation. For organisations preparing iXBRL-tagged reports, the tagging hints indicate which XBRL concepts correspond to each datapoint.

2. GHG Inventory Reuse (ESRS E1 ↔ GRI 305)

GHG reporting is especially sensitive to boundary choices and scope semantics. SDS therefore treats the crosswalk as a **correspondence map, not an equivalence claim**: it preserves the reference codes and points reviewers to where one ESRS datapoint may correspond to several GRI datapoints (and vice versa).

Key semantic distinctions preserved in the mapping:

- **Scope 1/2/3** — Direct emissions, indirect energy emissions, and value chain emissions
- **Location-based vs market-based** — Different methods for calculating Scope 2 emissions
- **Category structure** — GHG Protocol categories for Scope 3

Where organisations follow the GHG Protocol—the widely adopted corporate standard for greenhouse gas accounting that defines Scope 1/2/3 boundaries—the crosswalk helps keep these semantics visible during reuse without forcing false equivalences. [20] [21]

3. Water Reporting Reuse (ESRS E3 ↔ GRI 303)

Water withdrawals, discharges, and reuse volumes can often be reused across ESRS E3 and GRI 303 disclosures. However, interpretation depends on basin context and definitions:

- **Water stress** — Whether withdrawal occurs in water-stressed areas
- **Source/destination categories** — Surface water, groundwater, seawater, third-party sources

- **Quality considerations** — Treatment levels and effluent standards

The crosswalk and enriched metadata (units, period type) support consistent reuse while retaining the need for contextual narrative where required.

5.2 Relationship Patterns in the ESRS↔GRI Crosswalk

Interoperability is not a single mapping "type". In practice, SDS manages a **set of traceable correspondences** between ESRS and GRI codes (represented as rows in the crosswalk). From that set, several common relationship patterns emerge:

- **1↔1 (one-to-one, bidirectional).** One ESRS datapoint corresponds to exactly one GRI disclosure and, in the scoped crosswalk, that GRI disclosure corresponds back to only that ESRS datapoint. This is the simplest case for "report once, reuse many times".
- **1→n (one-to-many).** One ESRS datapoint maps to multiple GRI disclosures. This is common where ESRS aggregates what GRI expresses as several distinct disclosure points (for example, a single ESRS table row corresponding to multiple GRI subclauses).
- **n→1 (many-to-one).** Multiple ESRS datapoints map to one GRI disclosure. This occurs where GRI uses broader categories while ESRS disaggregates requirements into more specific datapoints.
- **1→none (gap / "no mapping on the other side").** A datapoint has a code on one side of the crosswalk but no defensible code on the other side. In the crosswalk this appears as a row where either the ESRS code is present but the GRI code is blank, or vice versa. These rows are not "errors" by default: they represent genuine non-overlap, narrative-heavy requirements that cannot be reduced to a single metric, or mapping work that remains open and is tracked through reviewer backlog artefacts.

How SDS computes and uses these patterns

- The crosswalk schema contains row-level presence flags (`ESRS_Detected`, `GRI_Detected`, `WithBoth`). These indicate whether each row has one side, the other, or both.
- Cardinality patterns (1↔1, 1→n, n→1) are derived analytically by grouping rows: for a given ESRS code, count distinct GRI codes; and for a given GRI code, count distinct ESRS codes.

To keep figures readable, this report includes four small example diagrams (Annex B), one for each relationship pattern:

- **1↔1:** One-to-one mapping (bidirectional)
- **1→n:** One ESRS datapoint maps to multiple GRI disclosures
- **n→1:** Multiple ESRS datapoints map to one GRI disclosure (shown as one GRI disclosure mapping to multiple ESRS datapoints)
- **1→none:** Gap example (a datapoint present on one side with no mapped counterpart)

5.3 Worked Example (Boxed): From Activity Data to ESRS+GRI Outputs

Worked example — E1-5/E1-6 Sygris slice (fuels → energy → Scope 1 emissions)	
What it shows	A minimal, fully worked slice that links (a) a small Sygris indicator cluster with composition + formulas, and (b) the corresponding ESRS datapoints and selected GRI references.
Why it matters for SDS	It demonstrates that interoperability is not just code matching: SDS preserves the measurement chain (units, conversion factors, emission factors, aggregation formulas) that allows the same underlying activity data to be reused across ESRS and GRI without losing meaning.
Evidence (files)	`E1-5_E1-6_SigrisExample_V2025-11-18.csv`, `E1-5_E1-6_SigrisExample_ontology.ttl`, `ESRS_E1-5_E1-6_energy_ghg_protocol_v10_scope2_loc_mkt_ef_em.csv`

The excerpt below illustrates the core idea: the organisation can collect a small number of operational inputs (for example, litres of diesel consumed), apply controlled conversion factors to express energy in a common unit (MWh), and then apply controlled emission factors to compute CO_2e emissions. Those same computed quantities can then be reported under ESRS datapoints (E1-5 and E1-6) and reused for the corresponding GRI disclosures where overlap exists (for example, GRI 302 energy consumption).

Step (excerpt)	ESRS code	Variable (label)	Unit	Formula / relation	GRI reference (if present)
Reported datapoint	`E1-5_01`	Total energy consumption	MWh	(reported total)	`302-1` (“Energy consumption within the organisation”)
Activity input	`E1-5_05-010`	Mobile combustion – diesel quantity	litres	component_of_parent	—
Conversion factor	`E1-5_05-011`	Mobile combustion – diesel energy conversion factor	MWh/litre	component_of_parent	—
Converted quantity	`E1-5_05-012`	Mobile combustion – diesel energy content	MWh	`E1-5_05-010 * E1-5_05-011`	—
Emission factor	`E1-6_01-110`	Scope 1 – mobile combustion diesel – CO2 emission factor	tCO2e/MWh	component_of_parent	—

Computed emission	`E1-6_01-111`	Scope 1 – mobile combustion diesel – CO2 emissions	tCO2e	`E1-5_05-012 * E1-6_01-110`	—

This is the same pattern SDS applies at scale: cross-standard correspondences (E2 crosswalk) remain traceable to authoritative code references, while the Sygris layer provides the auditable relationships (composition, formulas, conversions) required to reuse data safely across reporting contexts.

5.4 Semantic Preservation Considerations

Interoperability requires more than matching codes. In the priority topics, typical pitfalls include:

Boundary Ambiguity: Organisational vs operational boundary choices for energy and emissions can lead to different totals even when the same data sources are used.

Scope Semantics: Scope 2 market-based vs location-based reporting conventions require clear documentation to avoid mixing approaches.

Water Stress Definitions: Spatial context may change interpretation and comparability of water data across geographies.

SDS mitigates these by:

- Preserving measurement metadata (units, period type) in the enriched crosswalk
- Treating some mappings as candidates for expert review rather than forcing deterministic equivalence
- Documenting known semantic distinctions in the methodology

6. Limitations and Open Issues

6.1 Narrative-Heavy Disclosures

Some ESRS and GRI requirements are narrative-heavy or combine policy/process disclosures with metrics. These cases require modelling conventions (addressed in E3) to avoid false precision.

6.2 Evolving Standards

Both ESRS and GRI standards continue to evolve. EFRAG has signalled simplification proposals for ESRS, and GRI periodically updates its Topic Standards. The crosswalk methodology is designed for versioned updates, but mappings may need revision as standards change.

6.3 Coverage Outside Priority Topics

The E2 crosswalk includes an `other` topic bucket for the rest of the curated inventory. This deliverable does not evaluate acceptance gates for those rows; instead, it focuses acceptance metrics and worked examples on the three priority environmental topics (energy, water, GHG).

Extending the same coverage/detection reporting and reviewer backlog curation beyond the three priority topics is a straightforward next step: it primarily requires prioritising additional topic groupings and applying the same evidence-backed review workflow.

6.4 iXBRL Tagging Alignment

The iXBRL hints in the enriched crosswalk are best-effort tagging cues derived from catalogue metadata and mapping context. They are provided as implementation guidance (not as normative equivalence claims) and should be validated against the ESRS taxonomy version and reporting tooling used in the target reporting context.

7. Conclusions and Recommendations

7.1 Summary of Achievements

E2 demonstrates that SDS can produce a **traceable ESRS↔GRI crosswalk across the curated inventory**, and can meet evidence-backed acceptance gates for three priority environmental topics with clear documentation of one-to-many relationships.

Key achievements:

- The crosswalk spans ESG dimensions (Environmental, Social, Governance, Transversal) and is maintained as a versioned asset
- All three priority topics (energy, water, GHG) meet the acceptance gates (≥75% coverage, ≥90% detection)
- Crosswalks are enriched with measurement metadata for downstream reuse

- Methodology is documented and reproducible from versioned evidence files

7.2 Recommendations

1. Maintain as Versioned Asset

The ESRS↔GRI crosswalk should be maintained as a versioned asset. Refresh the crosswalk when source standards or mapping references change, and track changes in version control.

2. Expand Expert Review

Some mappings (particularly for narrative-heavy clauses and borderline one-to-many cases) would benefit from expert review to confirm semantic equivalence.

3. Continue iXBRL Readiness

Continue enriching the crosswalk with labels, units, dimensions, and XBRL hints to reduce tagging ambiguity when organisations prepare digital reports.

4. Extend to Additional Topics

Consider extending the same topic-level metrics and reviewer backlog curation to additional ESRS/GRI topics (for example, biodiversity, circular economy, social disclosures) as project scope permits.

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ANNEX A: EVIDENCE CATALOGUE

E2 Crosswalk Results

File	Description
`e2_crosswalks_esrs_gri.csv`	ESRS↔GRI crosswalk (clause/datapoint level)
`e2_crosswalks_esrs_gri_full.csv`	Crosswalk with topics and coverage indicators
`e2_crosswalks_esrs_gri_full_atomized.csv`	Enriched crosswalk with labels/units/dimensions
`e2_crosswalks_esrs_gri_applied.csv`	Crosswalk with backlog entries applied
`e2_crosswalks_esrs_gri_ixbrl.csv`	Crosswalk with iXBRL annotation hints

Metrics Evidence

File	Description
`e2_completeness_by_topic.csv`	Interoperability coverage (with_both) by topic
`e2_detection_by_topic.csv`	Detection coverage (with_any) by topic

Supporting Files

File	Description
`gri_datasets_V2025-12-19.csv`	GRI datapoint baseline (680 datapoints) for consistent cross-standard curation

Source Materials

File	Description
`Datasets.csv`	Raw baseline export from the master workbook—preserved for traceability
`Datasets_applied.csv`	Curated inventory with reviewer decisions applied—used for E2 metrics and crosswalks

Atomisation and Enrichment Assets

File	Description
`gri_esrs_crosswalk.json`	Curated ESRS↔GRI cross-reference map
`esrs_crosswalk.json`	ESRS datapoint cross-reference map
`gri_disclosures.json`	GRI disclosures catalogue

`gri_datapoints.json`	GRI datapoints catalogue
`framework_datapoints.csv`	Framework datapoint catalogue (labels/XBRL hints)
`atomized_variables.csv`	Atomised variable definitions with units and dimensional axes

Supporting Documentation

File	Description
`ESRS_GRI_ATOMIZATION_REPORT.md`	Technical guide to the atomisation approach: catalogue vs atomised structures, naming patterns

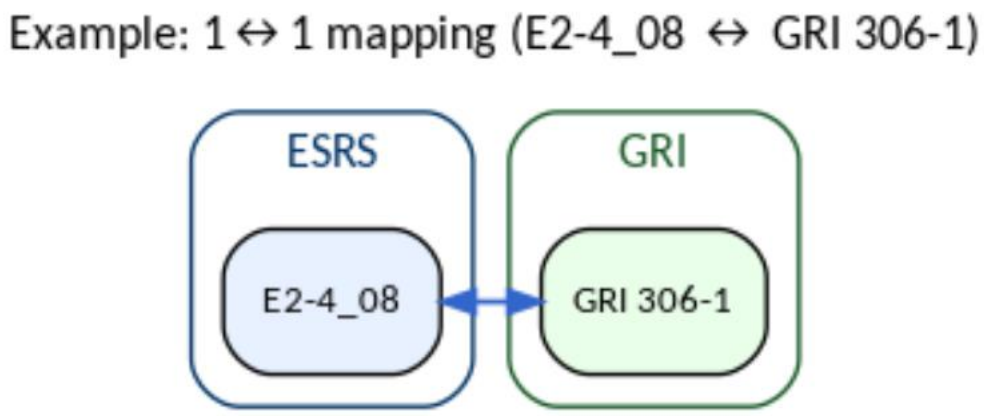
Example Diagrams

File	Description
`e2_example_one_to_one.svg`	One-to-one mapping example (1↔1, bidirectional) (SVG)
`e2_example_one_to_one.png`	One-to-one mapping example (PNG fallback)
`e2_example_esrs_to_gri.svg`	ESRS→GRI one-to-many example (SVG)
`e2_example_esrs_to_gri.png`	ESRS→GRI one-to-many example (PNG fallback)
`e2_example_gri_to_esrs.svg`	GRI→ESRS one-to-many example (SVG)
`e2_example_gri_to_esrs.png`	GRI→ESRS one-to-many example (PNG fallback)
`e2_example_one_to_none.svg`	One-to-none gap example (1→none) (SVG)
`e2_example_one_to_none.png`	One-to-none gap example (PNG fallback)

ANNEX B: EXAMPLE DIAGRAMS

Figure B1: One-to-One Mapping Example (1↔1)

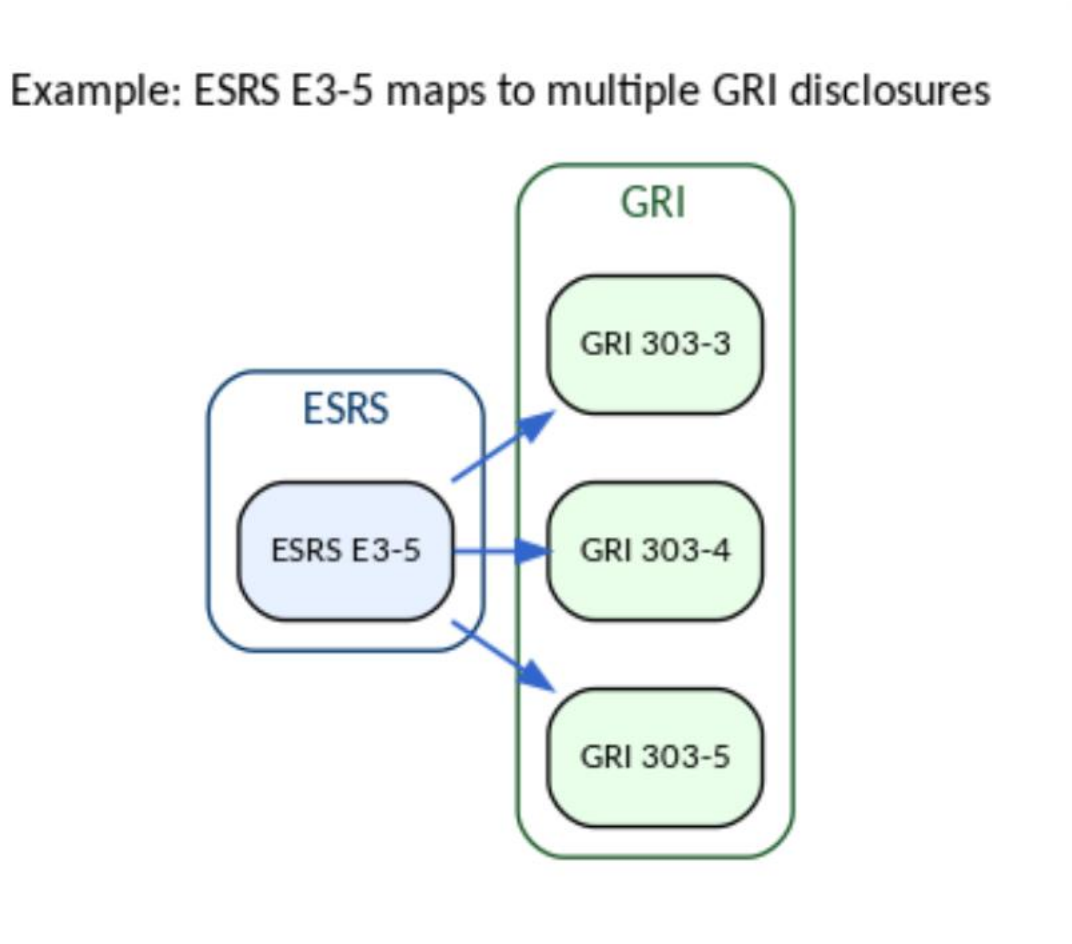
This diagram shows a one-to-one correspondence where a single ESRS datapoint maps to a single GRI disclosure and the mapping is bidirectional (1↔1).



(PNG fallback: `e2_example_one_to_one.png`)

Figure B2: One-to-Many Example (ESRS→GRI, 1→n)

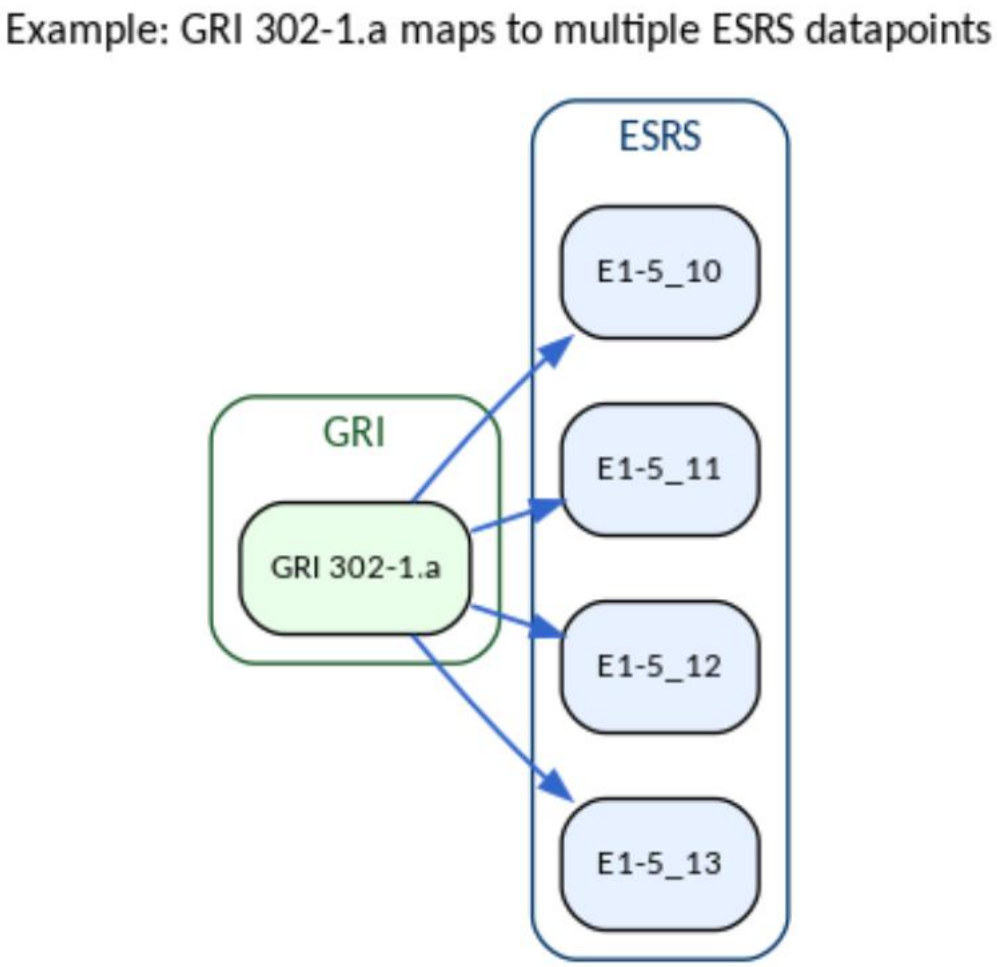
This diagram illustrates how a single ESRS datapoint can map to multiple GRI disclosures. This one-to-many relationship is common when ESRS aggregates information that GRI breaks into multiple disclosure points.



(PNG fallback: `e2_example_esrs_to_gri.png`)

Figure B3. Many-to-One Example (n→1, shown as GRI→ESRS)

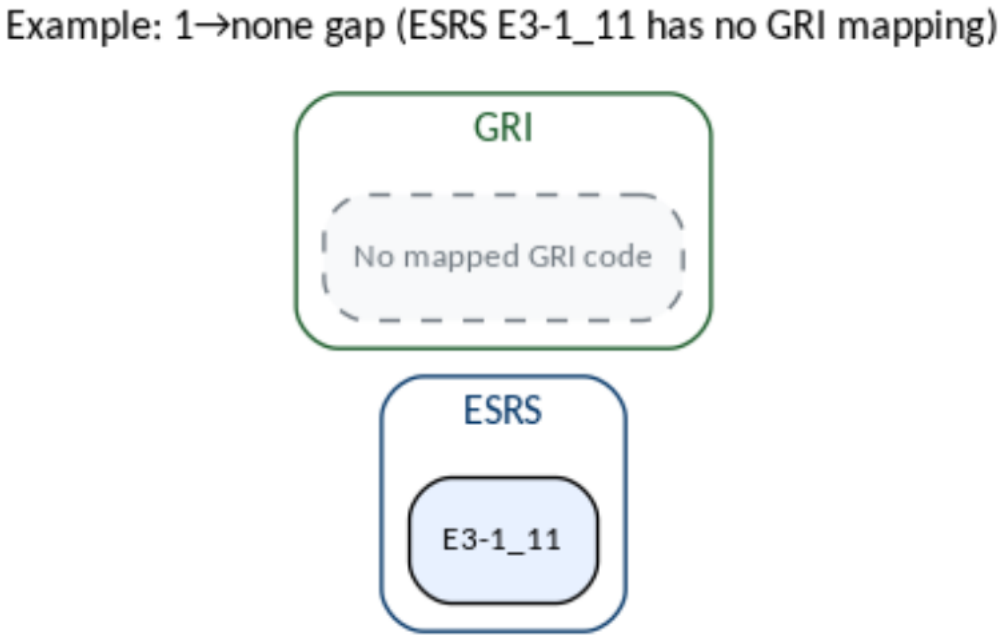
This diagram illustrates the inverse pattern: multiple ESRS datapoints correspond to a single GRI disclosure. In the diagram this is shown as one GRI disclosure mapping to multiple ESRS datapoints.



(PNG fallback: `e2_example_gri_to_esrs.png`)

Figure B4: Gap Example (1→none)

This diagram shows a gap case where a datapoint is present on one side of the crosswalk but has no mapped counterpart on the other side in the current versioned crosswalk.



(PNG fallback: `e2_example_one_to_none.png`)