

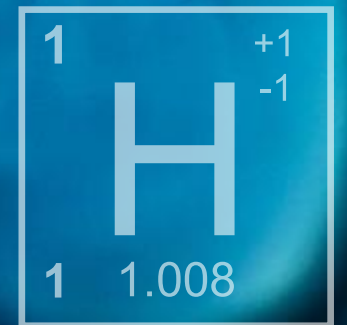


Chain of Custody

AEA Annual Conference

November 13 - 15

BRUSELAS • PARÍS • ROTTERDAM • WASHINGTON D.C.
• SANTIAGO • BOGOTÁ



Agenda

- ▶ Pre-Certification and Auditing
- ▶ Implementing Mass Balance & Incorporating Book & Claim
- ▶ Certificate blending



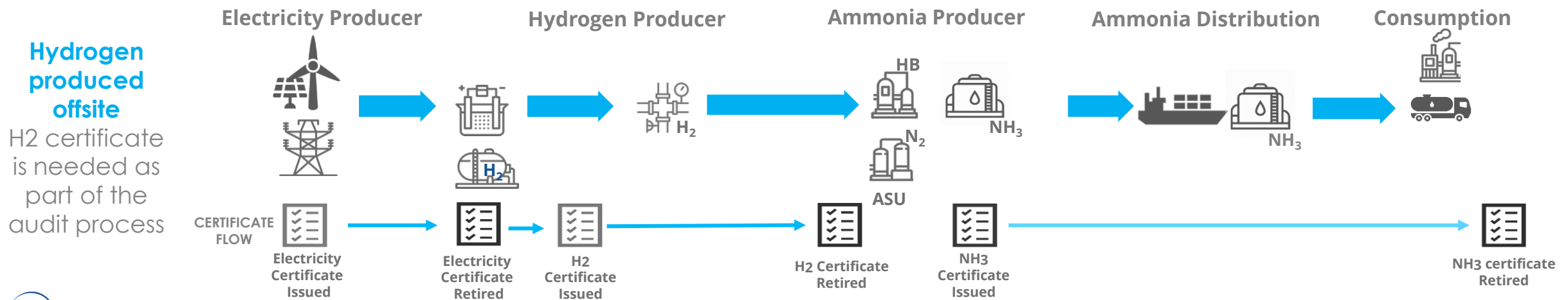
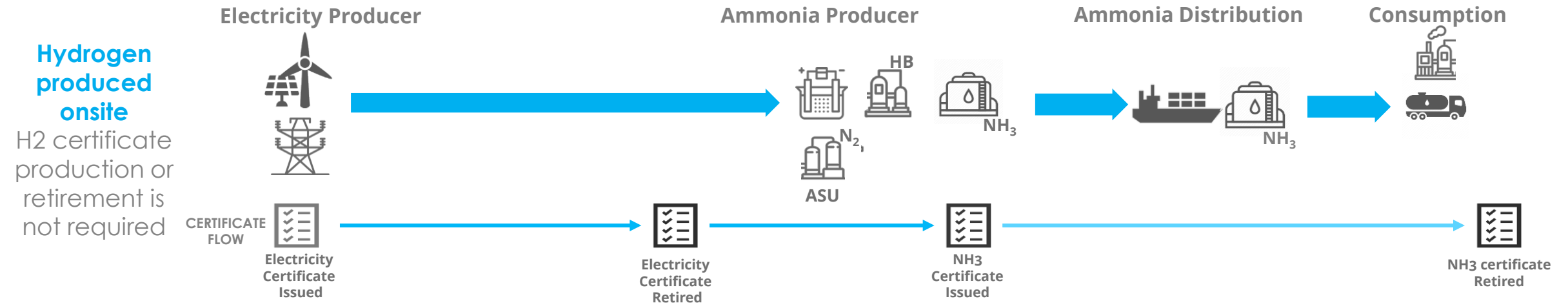
1

Pre-Certification and Auditing

Ammonia production plants is focus of the audit process

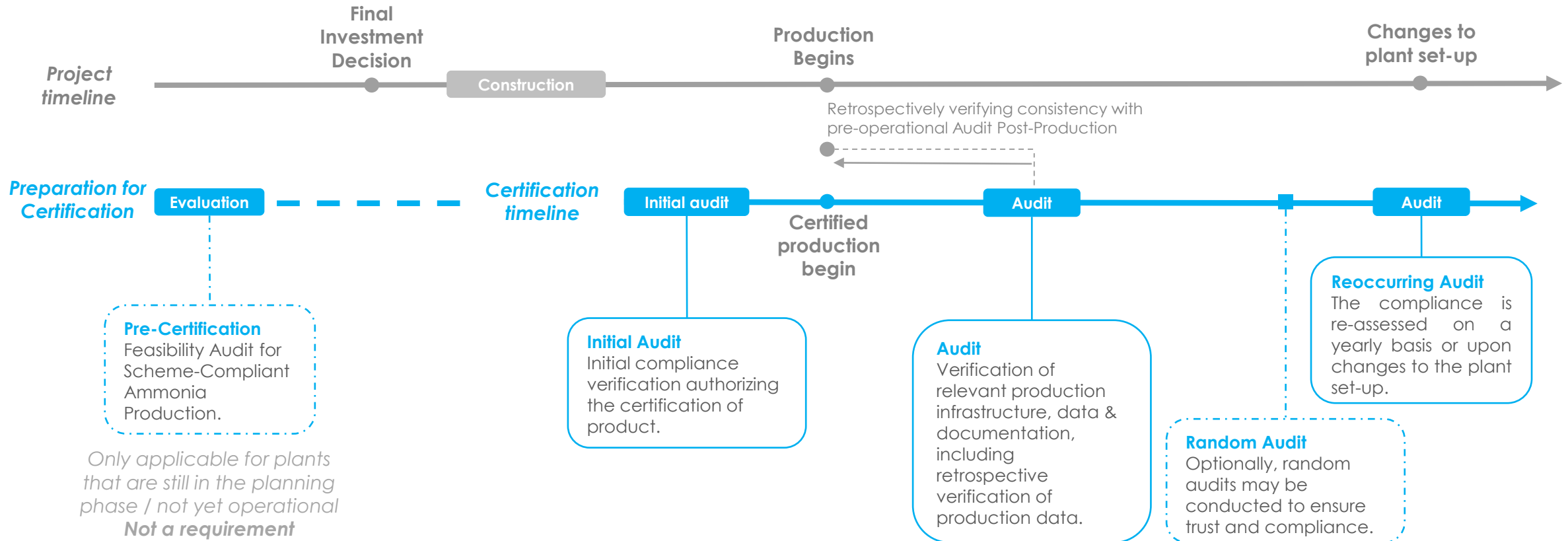
Most items checked by auditors pertain to the activities carried out at the ammonia facility

Example Pathways



Overview of how a plant becomes certified

Pre-certification is not a requirement of the certification process



Annual audits are the base case but, depending on the first audit results, the frequency might be modified (e.g., if major risks are identified during the audit, a quarterly or random audit control could be integrated).

Operational vs. non-operational ammonia plants

Some plants may not yet be operational but can be eligible for pre-certification

Desk Audit (Non-Operational Plants)

- ▶ Thorough review of plant designs, blueprints, and specifications.
- ▶ Examination of relevant construction agreements.
- ▶ Reviewing CFP calculations corresponding to plant blueprints and specifications.

Physical Audit (Operational Plants)

- ▶ Physical inspection of machinery and equipment utilized in ammonia production.
- ▶ Direct observation and review of operational processes as well as verification of calibration reports and data records.
- ▶ Examination of CFP calculations based on facility data.

2

Implementing Mass Balance & Incorporating Book & Claim

Concepts of the AEA Ammonia Certification System

Developing a robust certification system able to integrate multiple schemes



Address the needs of **global ammonia markets** where supply chains for low carbon ammonia demand for the industry and consumers are not well established



Developing a chain-of-custody that **combines mass balance and book-and-claim** providing flexibility in the physical world and ability to take part in a regulatory and voluntary market



Full Disclosure: Characterize all production and supply participating in the system, and enable legitimate **access to information on the ammonia's environmental attributes**



Mass balance is shipping of physical molecule with environmental attributes attached to the actual molecule



Book-and-claim decouples the product certificates and the physical molecule, independent of the physical supply chain

AEA scheme Book & Claim domain definition

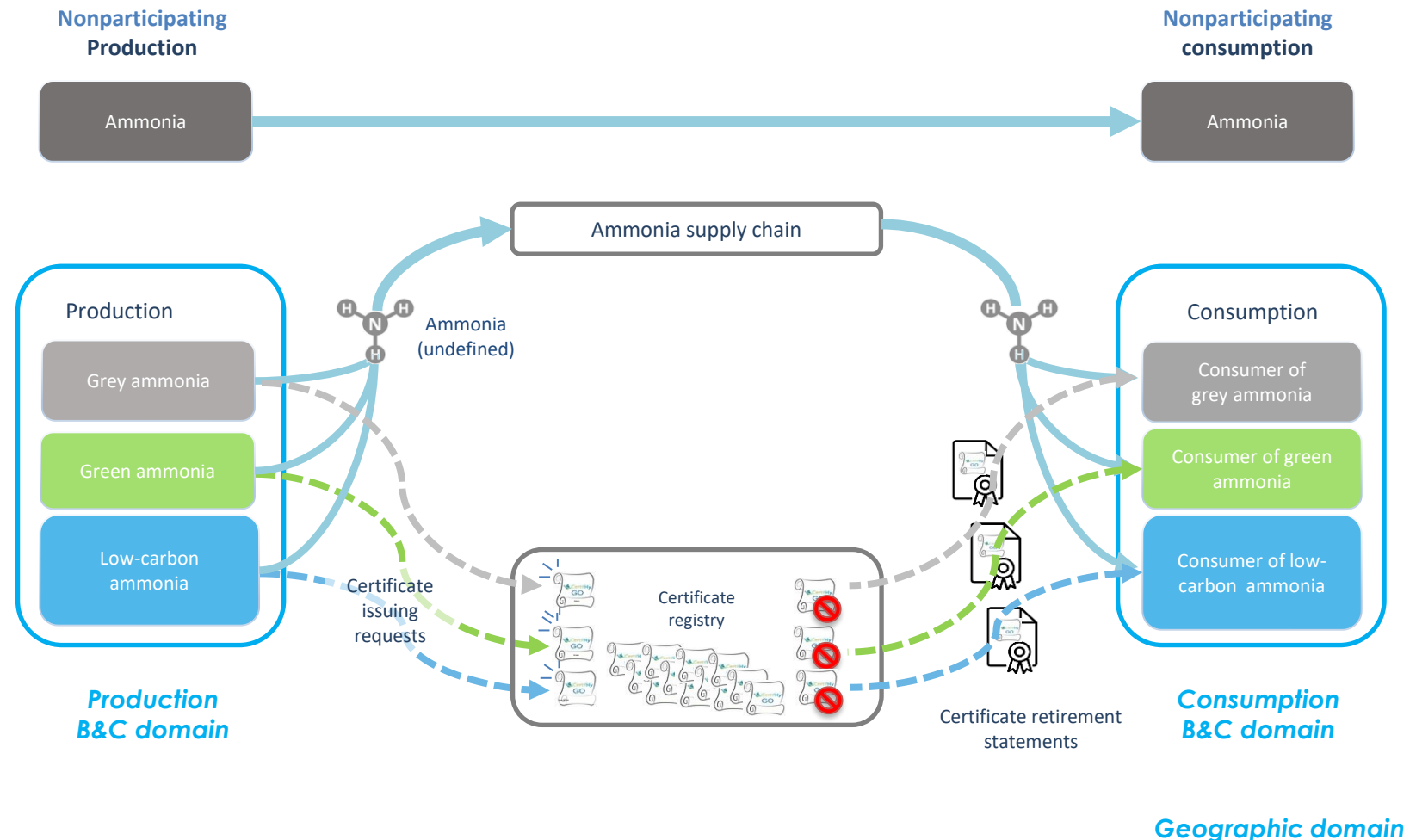
Limitation of B&C domain to consumption physically derived from participating production

Domain limitation to production of participating producers

Certificates may only be retired for ammonia produced in a plant participating to the scheme

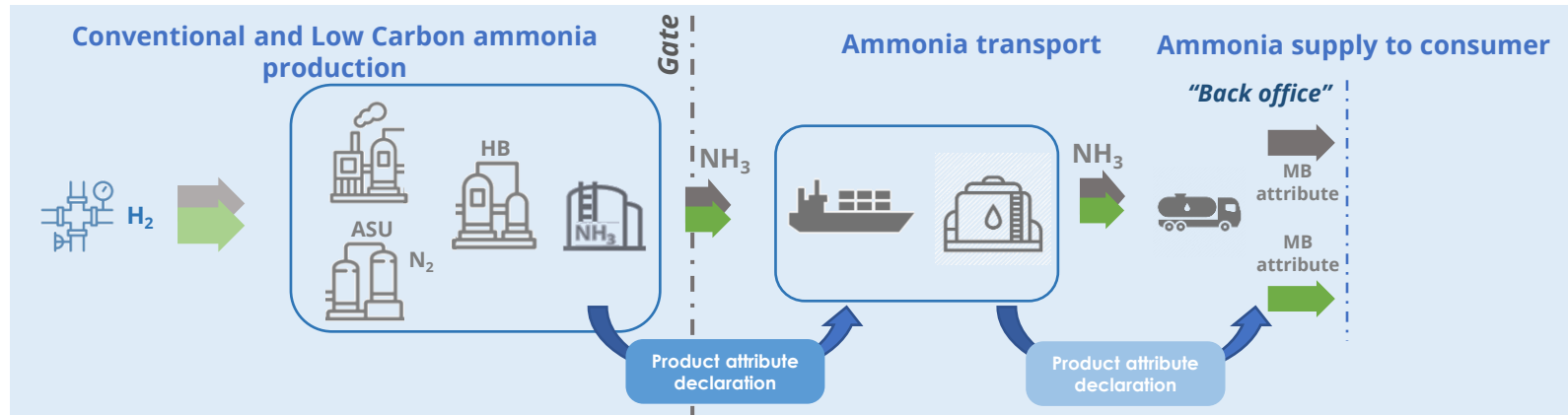
No Residual Mix if certificates are issued for all production (full disclosure).

Impact: Certificate retirement requests will need to include **identification of the plant where the consumed ammonia was physically produced.**



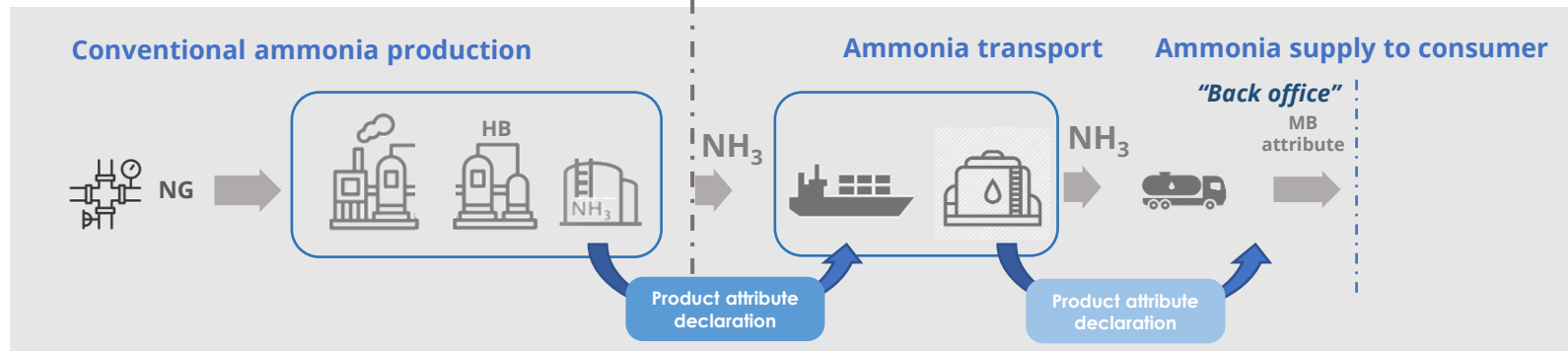
AEA scheme CoC model : 1. Mass Balance systematically implemented in supply chain for all supply of ammonia from participating production plants

**Supply chain A:
Mix of Conventional
and Low Carbon (LC)
ammonia**



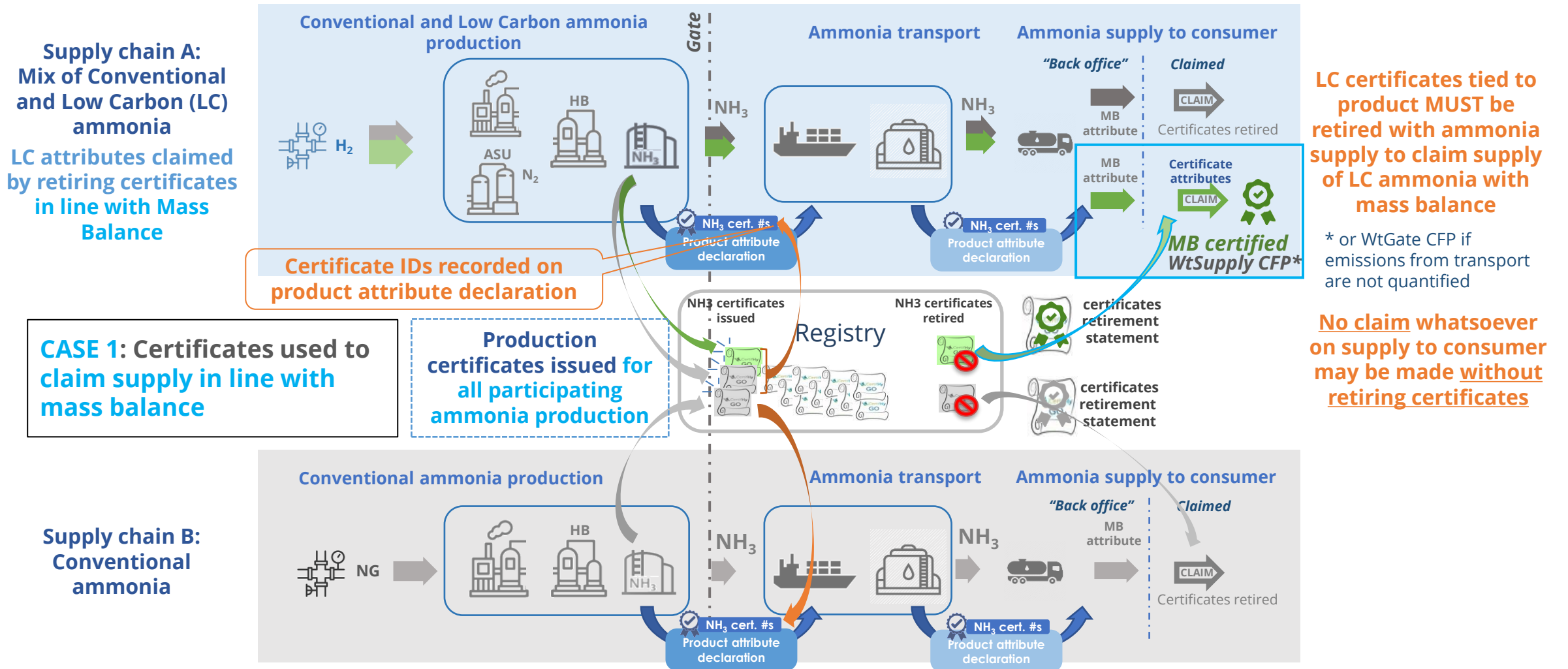
"Back office":
relevant for supply
chain operators but
not necessarily for
the consumer

**Supply chain B:
Conventional
ammonia only**



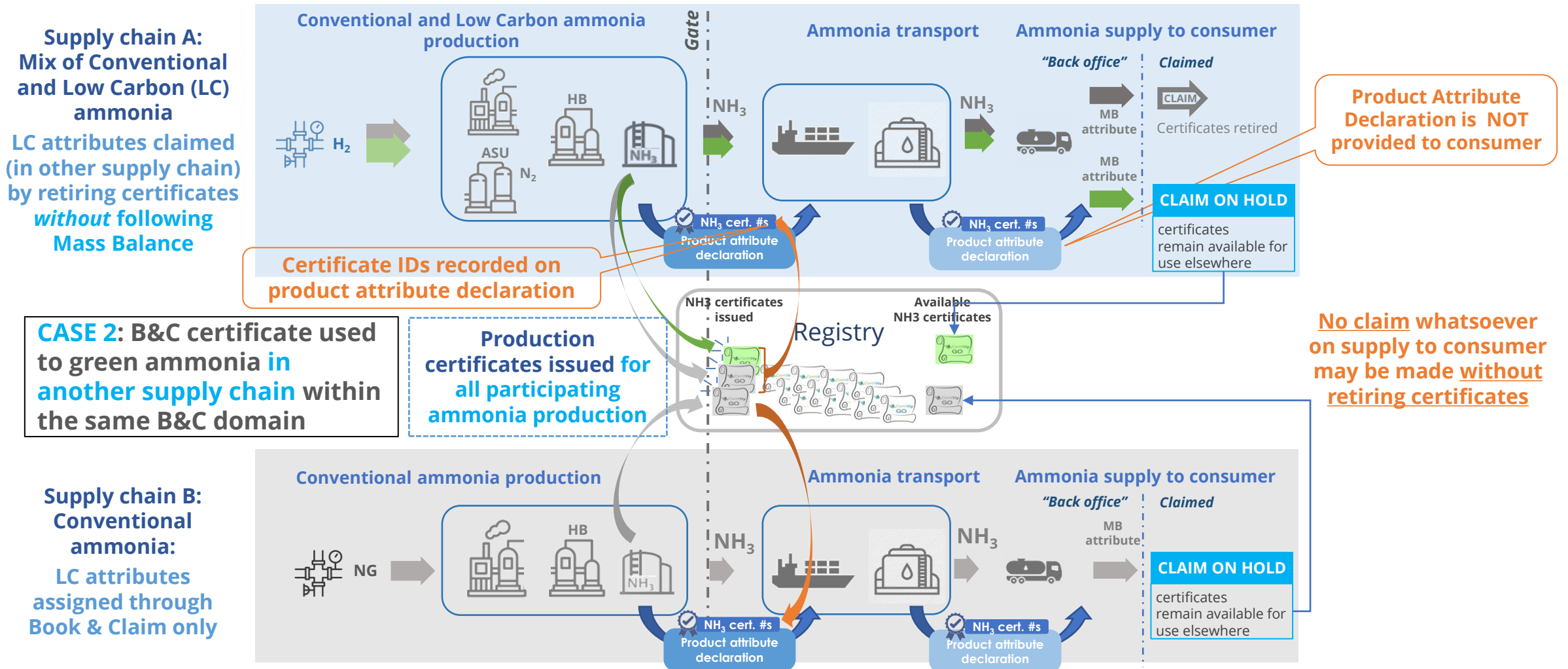
AEA scheme CoC model: 3. Disclosure of attributes to the consumer by retiring certificates

Case 1: Disclosure in line with mass balance



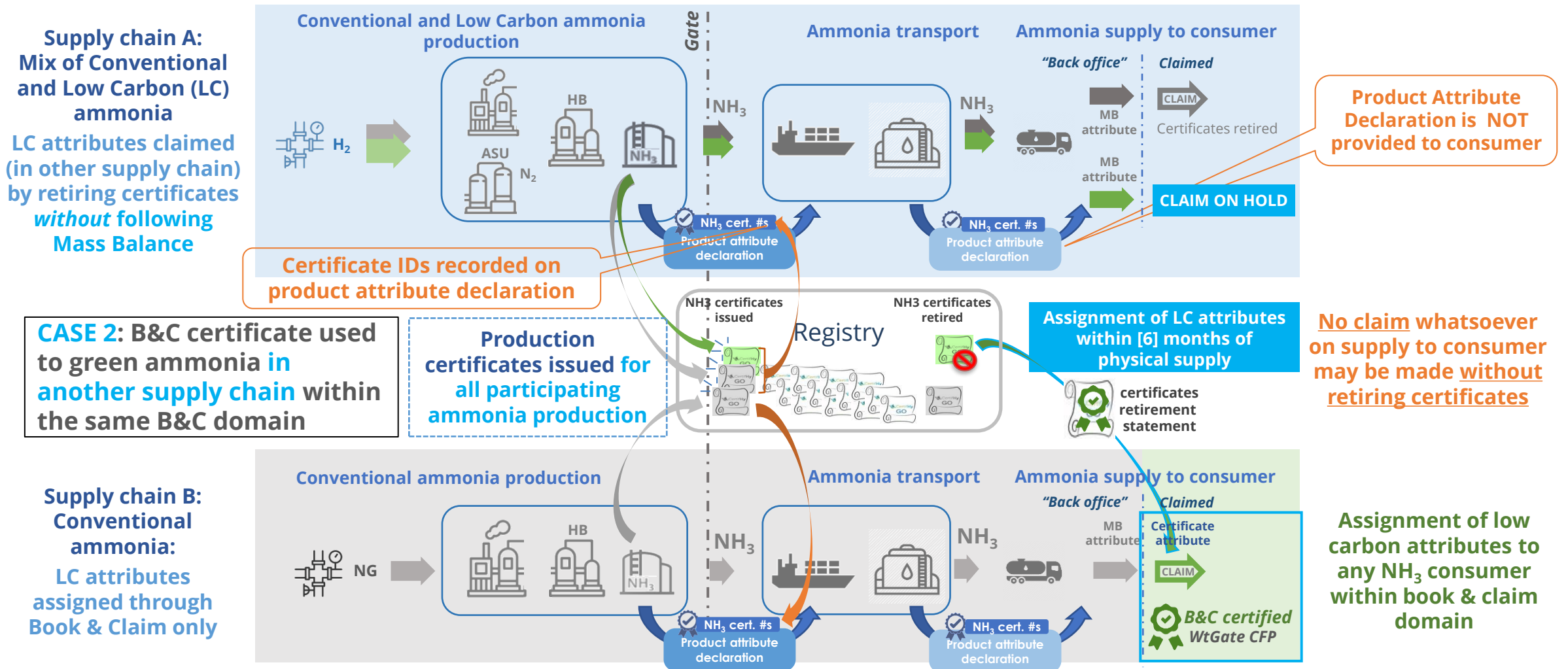
AEA scheme CoC model: Disclosure of Attributes by Retiring Certificates

Case 2: Disclosure **without following mass balance** – Step 1: Supply with claim on hold



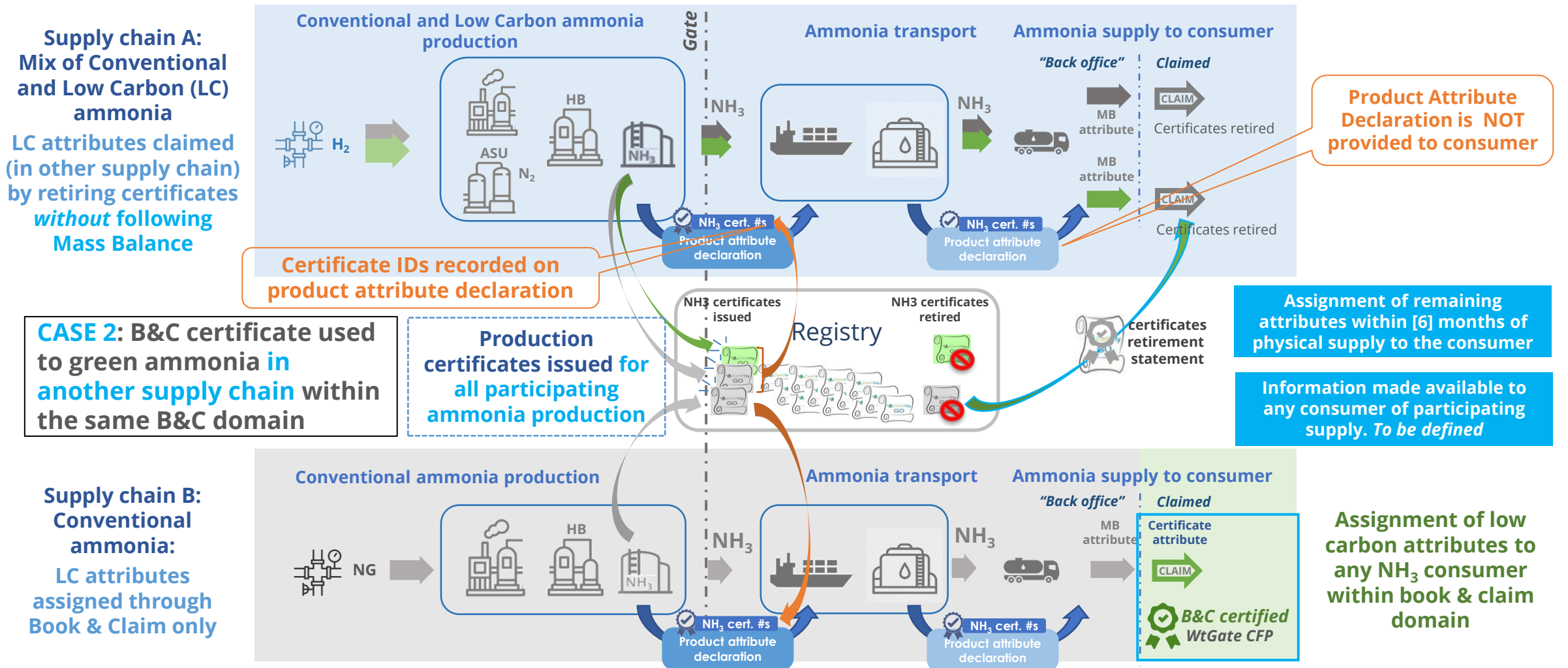
AEA scheme CoC model: Disclosure of Attributes by Retiring Certificates

Case 2: Disclosure without following mass balance – Step 2: Assignment of LC attributes



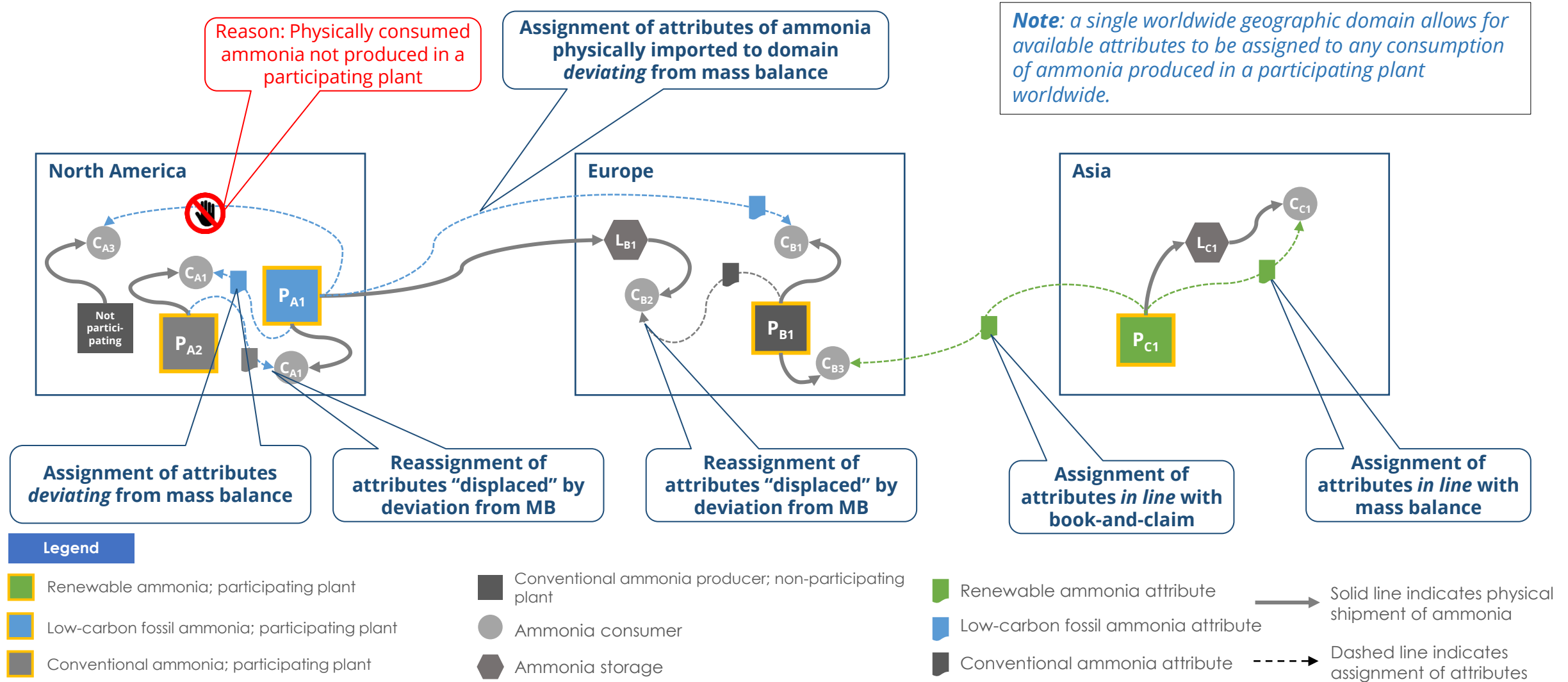
AEA scheme CoC model: With Disclosure of Attributes by Retiring Certificates

Case 2: Disclosure without following mass balance - Step 3: Assignment of remaining attributes



Assignment of product attributes to consumption

Examples of **allowed** and **unallowed** assignments with a global domain



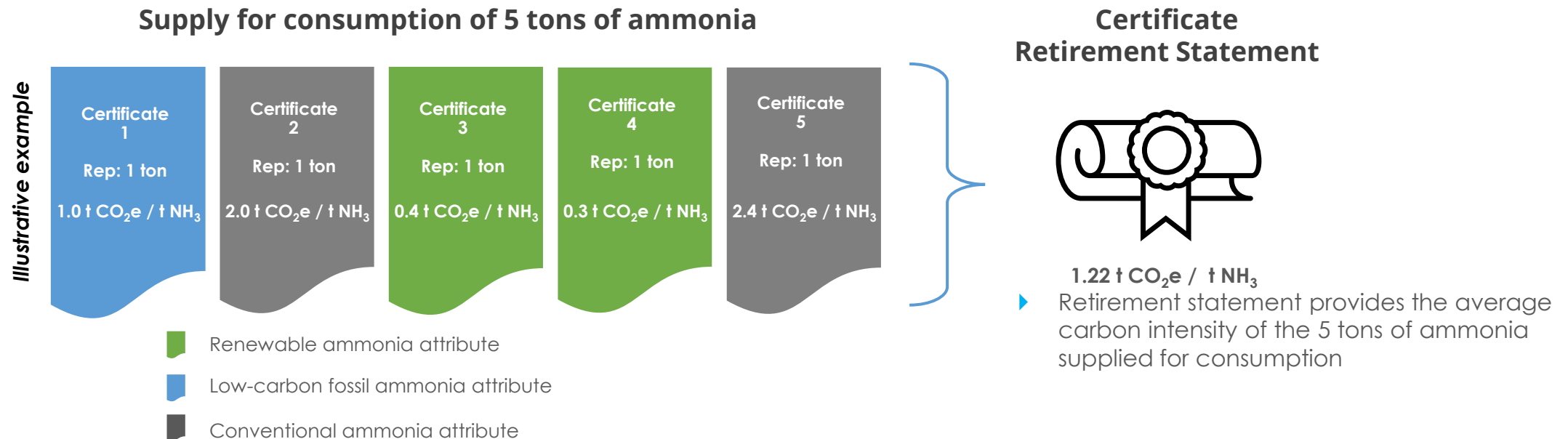
3

Certificate Blending

Option: Blending of Ammonia Production Certificates

Retirement statements provide an average CFP based on a string of varying CFP certificates

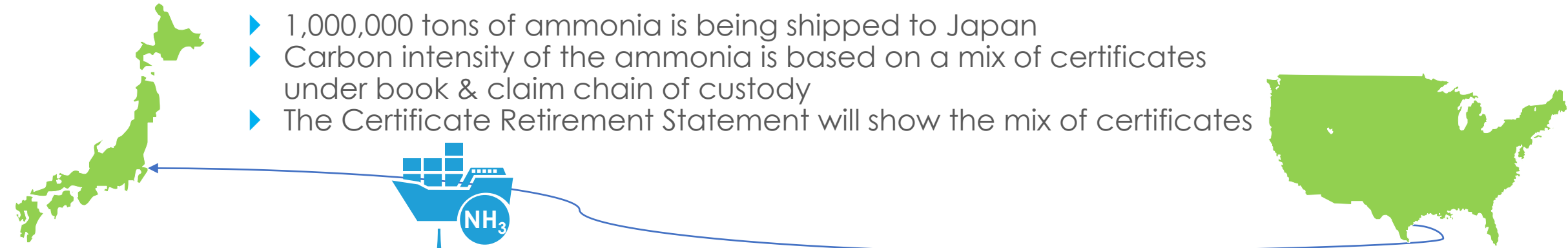
- ▶ The Mass Balance system does not allow blending of batches with different attributes.
- ▶ However, where attributes are assigned without following Mass Balance, available certificates in the registry can be selected to achieve a targeted average carbon intensity, reflected in the Certificate Retirement Statement.
- ▶ If a consumer is interested in claiming consumption of product having a specific origin, then only certificates for product having that origin can be jointly retired.
- ▶ If a label has been introduced to qualify product, e.g., as low carbon, then to claim delivery of product having that low carbon label, only certificates for low carbon products can be jointly retired.



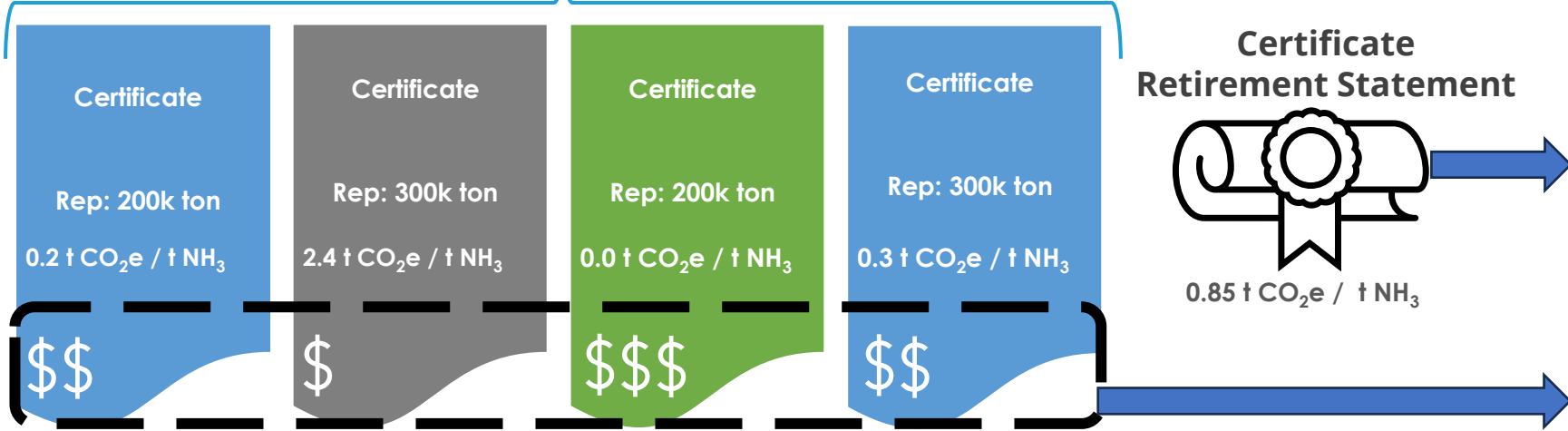
Example of Shipping Ammonia with Mixed Certificates

Mixing certificates of different CIs can achieve a lower weighted average CI ammonia

- ▶ 1,000,000 tons of ammonia is being shipped to Japan
- ▶ Carbon intensity of the ammonia is based on a mix of certificates under book & claim chain of custody
- ▶ The Certificate Retirement Statement will show the mix of certificates



Illustrative example



- ▶ Weighted average of all the certificates provides a **CI of 0.85 t CO₂e / t NH₃** for 1,000,000 tons of NH₃

- ▶ How will a lower carbon product be priced and marketed differently than a higher carbon intensity ammonia?

- Renewable ammonia attribute
- Low-carbon fossil ammonia attribute
- Conventional ammonia attribute

