Why coal → SNG is problematic

1. **Carbon intensity is intrinsic**
   - Coal gasification starts with **high carbon-to-hydrogen ratios**
   - Even with good efficiency, CO_2 generation is unavoidable
   - Without *permanent* capture and disposal, lifecycle emissions are worse than those of natural gas
2. **System logic is backwards**
   - Carbon is treated as a **fuel to be consumed**, not a carrier
   - Large fractions of carbon are discarded as CO_2 during gasification, shift, and cleanup
   - Methanation only "polishes" the downstream chemistry — it cannot fix upstream carbon loss
3. **CCS does not solve the core issue**
   - CCS adds cost, complexity, and long-term liability
   - It addresses *symptoms* (emissions), not the *cause* (open carbon loop)
   - Storage availability and permanence remain non-trivial risks
4. **Policy-driven, not system-optimal**
   - Coal-to-SNG plants in China were built for:
     - energy security
     - stranded coal utilisation
     - regional air-quality improvement
   - They were **never climate-optimal solutions**, only transitional ones

Why was it still licensed

From a licensor's perspective, the logic was:

- Coal was abundant and cheap
- Gas infrastructure already existed
- SNG enabled cleaner end-use combustion
- Methanation technology itself worked extremely well

So the **chemistry succeeded**, but the **system failed**.

The key distinction (important)

- **Methanation is not the problem**
- **Coal-derived syngas is the problem**

That distinction matters because it preserves the value of methanation **when paired with the right upstream logic**.

In other words:

Coal-to-SNG failed because carbon was treated as a consumable fuel.

Carbon recycling works because carbon is treated as a reusable carrier.