Scenario Selection Report: Macro-Projecting Automotive Emissions

1. Chosen Combination

Data Provider: IPCC (via CMIP6).

Model/Scenario: IMAGE / SSP1-19.

2. Motivation for "The Fit"

The choice of the IMAGE model under the SSP1-19 scenario is based on its ability to provide granular sector-specific data that closely aligns with the primary emission drivers identified in the company data for Geely and Volkswagen.

A. Mapping Key Emission Categories Analysis of the car_emission_2023.csv file shows that emissions are heavily concentrated in three areas, which we can map to the SSP/CMIP6 variables:

Use of Sold Products (Scope 3, Cat. 11): This is the largest category for both companies (e.g., ~299M tCO2 for Volkswagen).

Model Match: The IMAGE model provides a specific "CMIP6 Emissions|CO2|Transportation Sector" variable. This is the most direct macro-scale proxy for the emissions generated by the vehicle fleet in use.

Purchased Goods and Services (Scope 3, Cat. 1): This represents a massive upstream footprint (e.g., ~89M tCO2 for Volkswagen).

Model Match: We can use "CMIP6 Emissions|CO2|Industrial Sector" as a proxy for the manufacturing of steel, aluminum, and batteries required for vehicle production.

Scope 1 (Direct Emissions): These are direct manufacturing and facility emissions.

Model Match: This is covered by the combination of "Energy Sector" and "Industrial Sector" emissions within the IMAGE model.

B. **Regional Coverage**

The exercise data focuses on companies with primary operations in Asia (HKG/Geely) and OECD/Europe (DEU/Volkswagen).

The SSP CMIP6 dataset provides regional breakdowns for BRA (Brazil), CHN (China), MEX (Mexico), and global regions like R5.2OECD and R5.2LAM. This allows us to project Geely's behavior onto the "CHN" or "ASIA" macro-regions and Volkswagen's onto the "OECD" region.

C. **Scenario Logic (The "What-If")**

SSP1-19 (Sustainability/Low Challenges) is the best "What-if" benchmark for companies like Geely and Volkswagen that are reporting high production of electric and hybrid vehicles (e.g., Geely produced 310,000 electric cars out of 1.6M total).

Because SSP1-19 represents a rapid transition to low-carbon technology, it provides the necessary "macro" environment to see what happens if the world adopted the aggressive electrification and efficiency targets these companies are beginning to implement.

3. Proposed Proxy Mappings for Discussion

Since a "perfect" automotive-only sector does not exist in the macro models, the following mappings are proposed for the projection:

Company Category	Proposed Model Proxy	Justification
Use of Sold Products	`Emissions	CO2
Purchased Goods	`Emissions	CO2
Scope 2 (Electricity)	`Emissions	CO2