Improving Projections of Global Oil and Gas Supply

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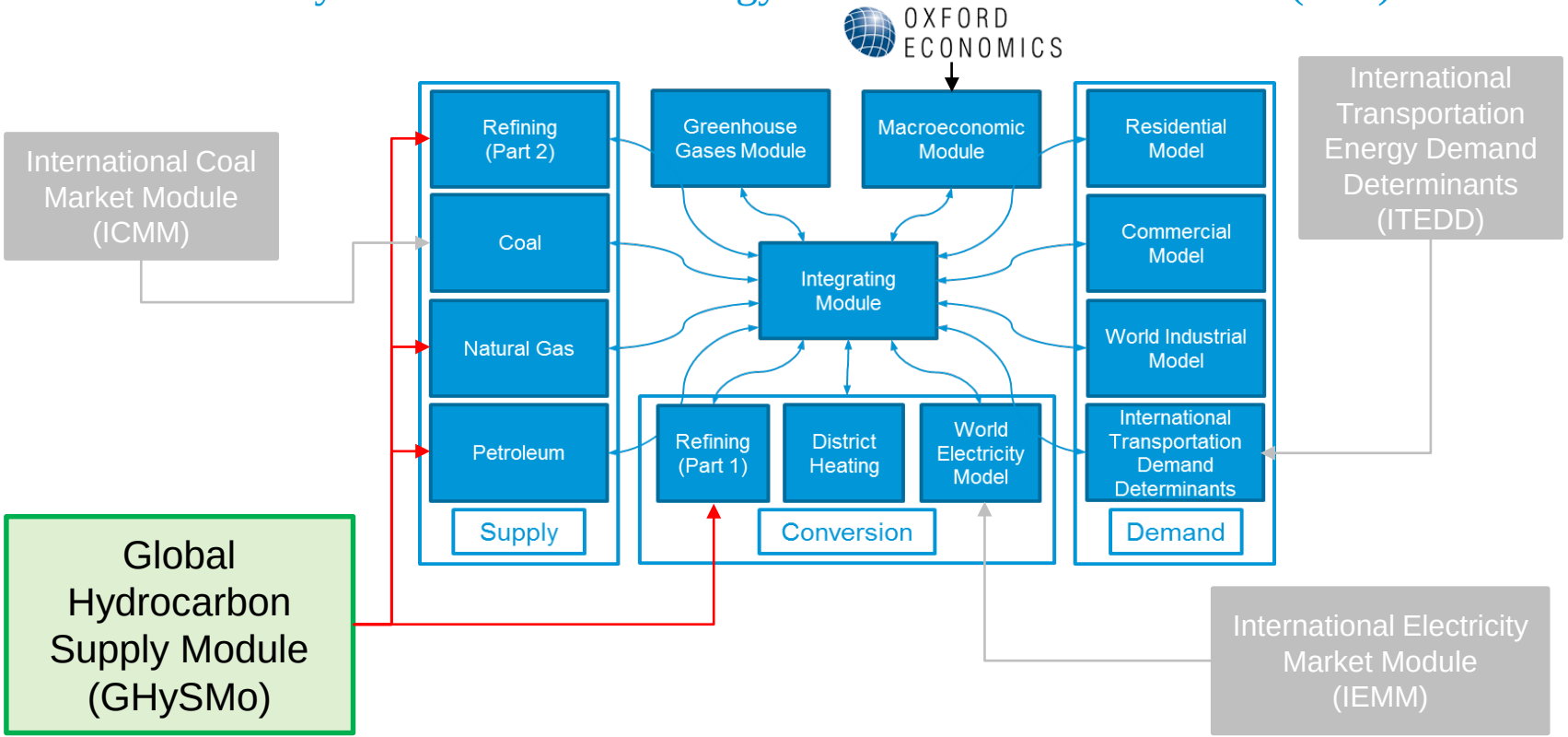
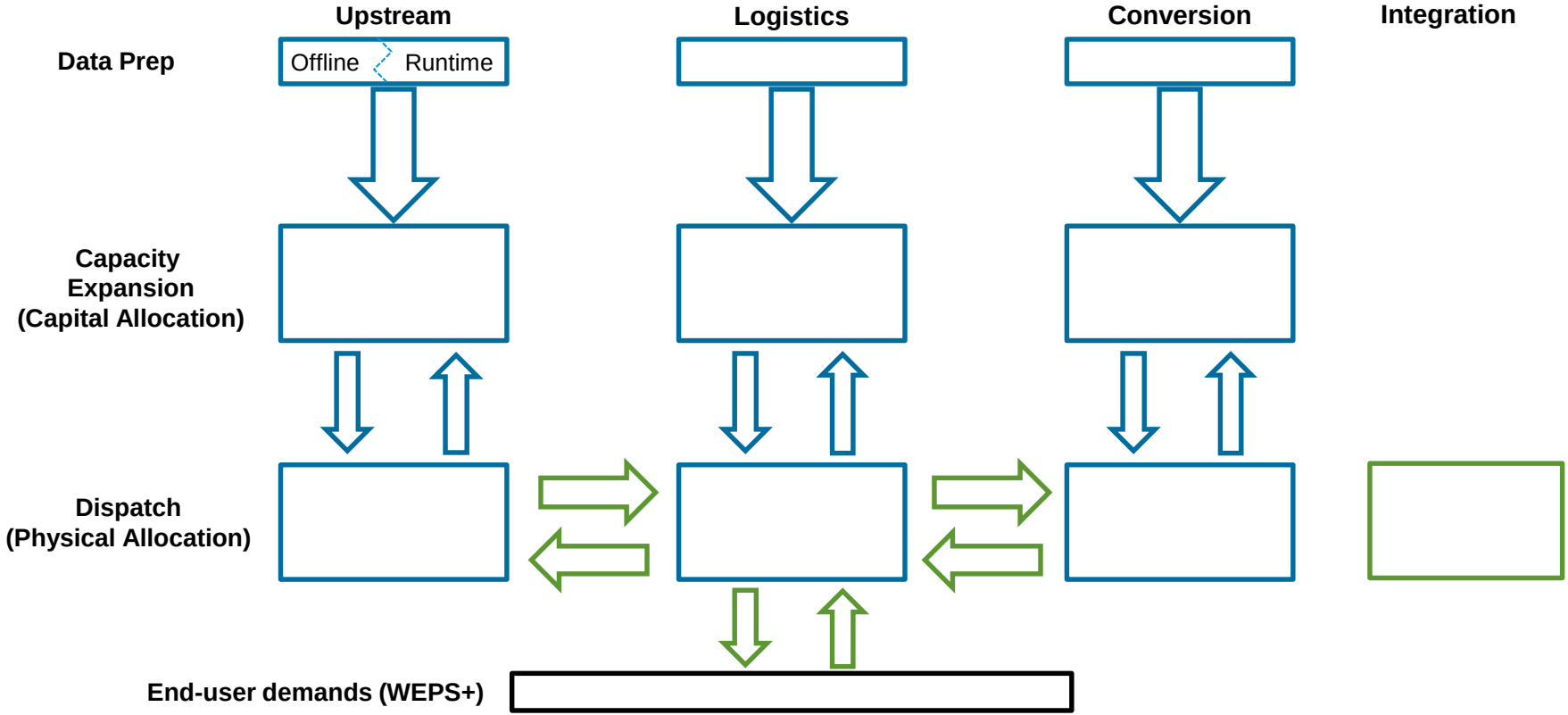
The Global Hydrocarbon Supply Model (GHySMo) is an important addition to the international analysis toolkit at U.S. Energy Information Administration (EIA)



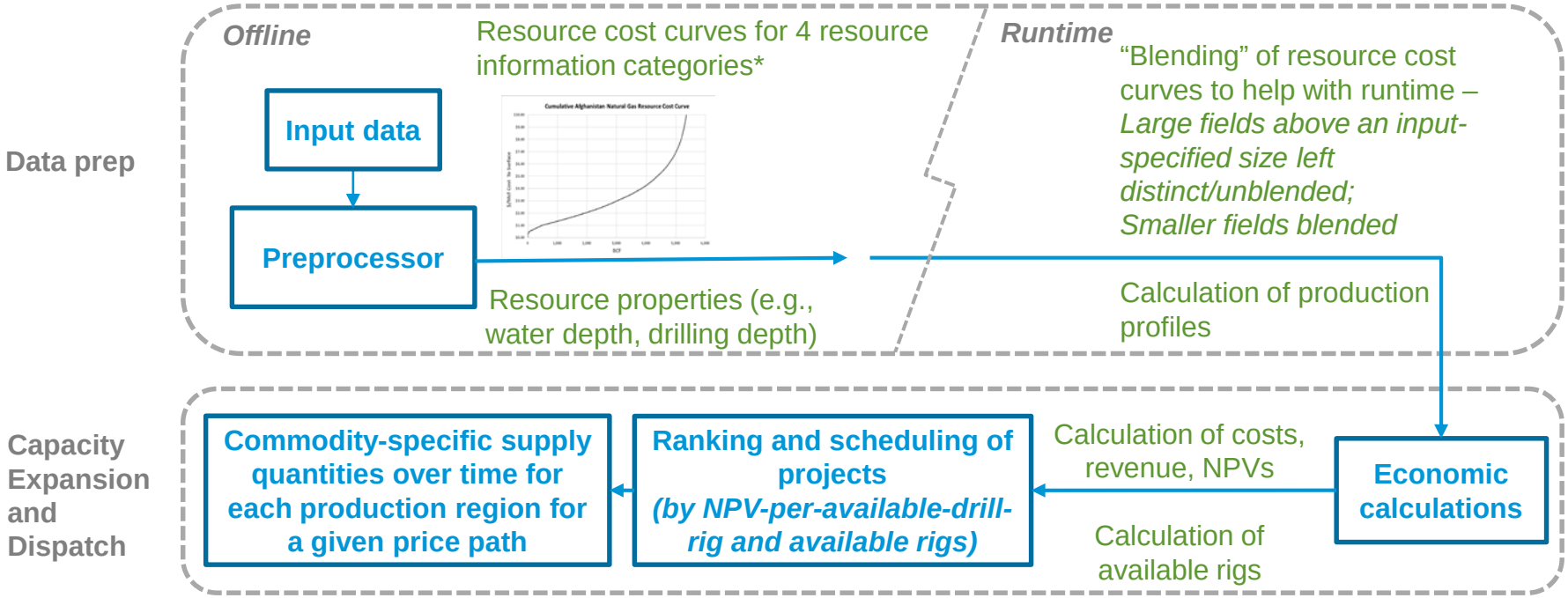
GHySMo captures the entire supply chain from upstream to downstream



Highlights of Global Hydrocarbons Supply Model (GHySMo)
Upstream model structure

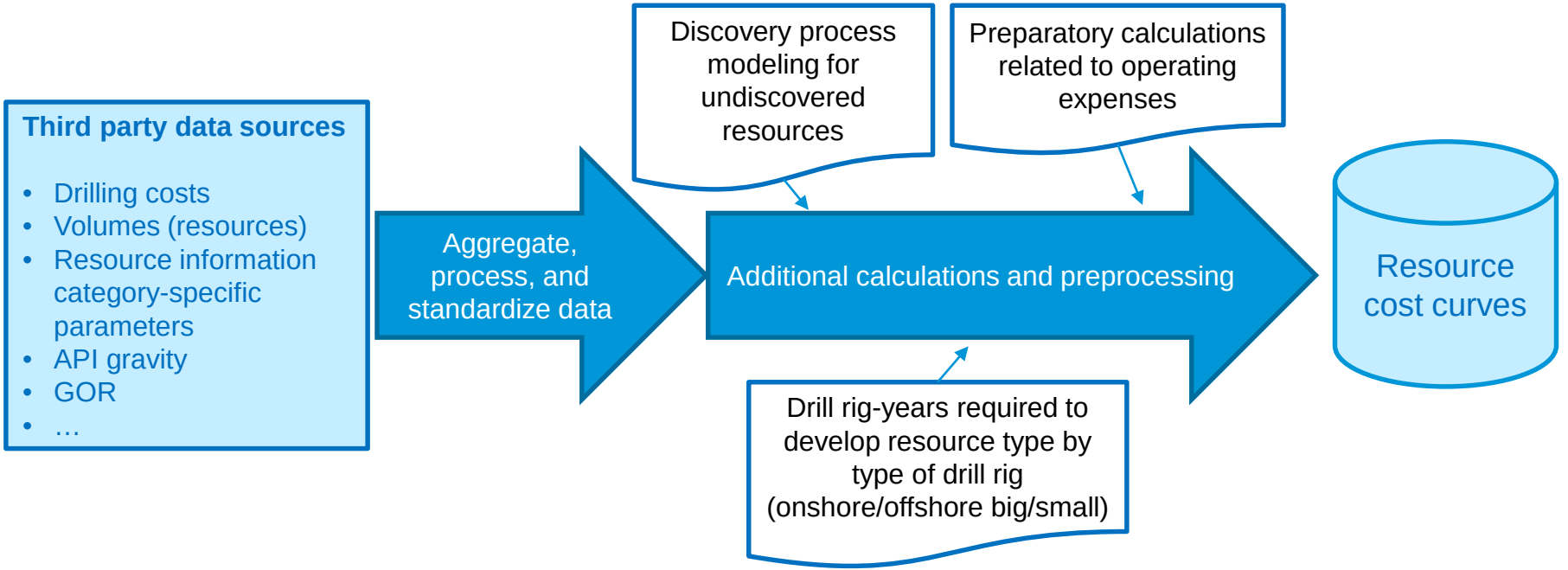
- Model incorporates resource data for whole world down to country-basin level
- Model data is separate from model algorithms
- Model represents co-production of liquids and natural gas
- Model can deliver multiple “worlds” representing uncertainties in the parameters used to estimate resources and drilling/completion costs
- User has flexibility in topology/regionality, and in commodity types
- Model represents geopolitical risks through discount rates by country and year

Upstream model overview – Functional representation & data flow



**The 4 categories are: (1) existing production (EP); (2) reserve growth (RG); (3) undiscovered resources (YF); (4) continuous/unconventional*

First half of the upstream model data prep is an offline preprocessor

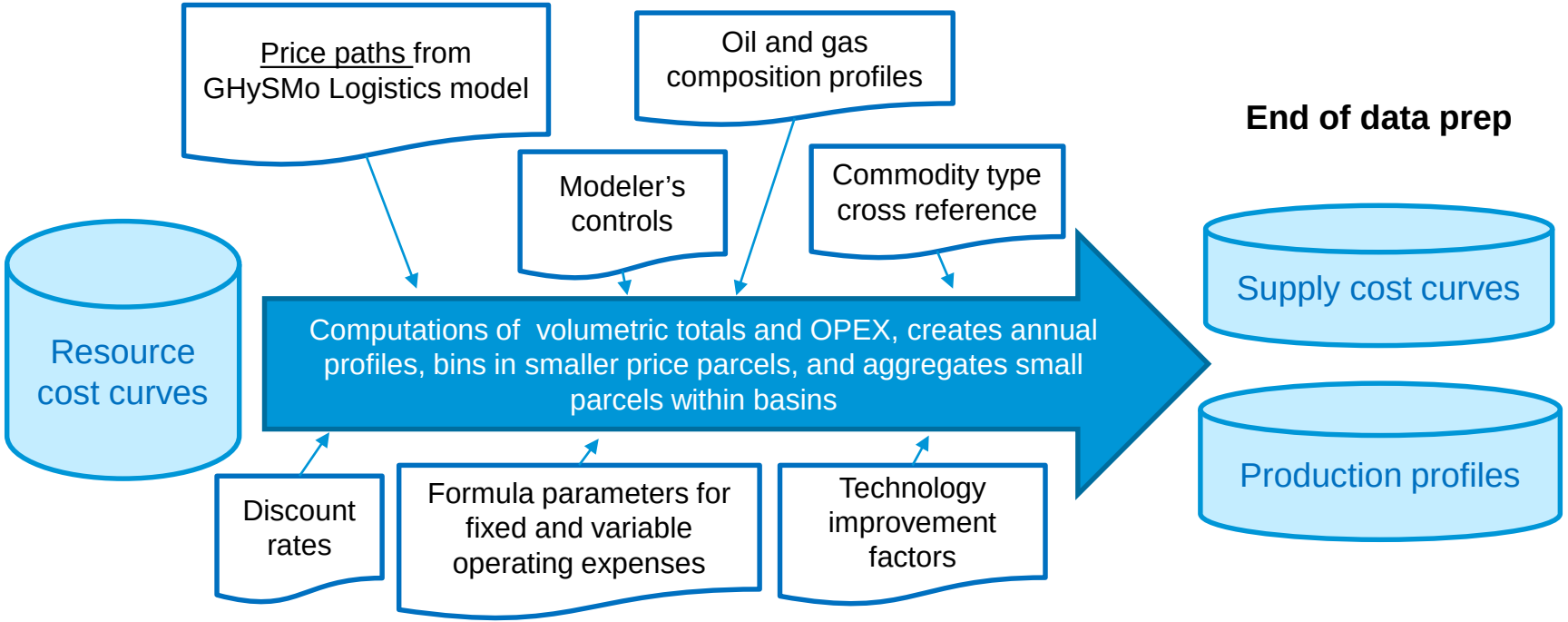


Resource information is organized into major categories

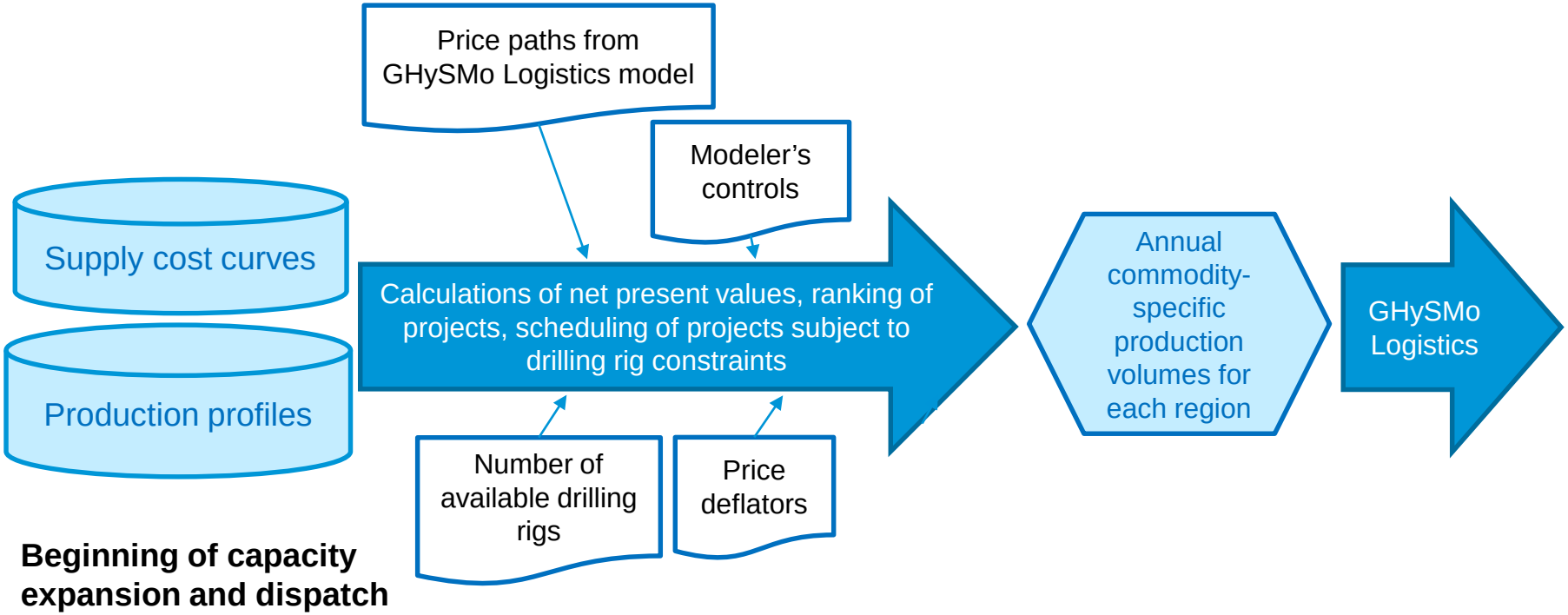
- Four current resource information categories
  - Existing production
  - Reserve (field) growth
  - Undiscovered resources / yet to find (similar to undiscovered technically recoverable resources)
  - Tight/shale resources (based on US analogs)

- Structure of resource information categories is such that resources within the above groups or additional ones can be added or incorporated within existing structure
  - Hydrates
  - Oil shale

At runtime, price paths are applied to generate supply cost curves and production profiles…

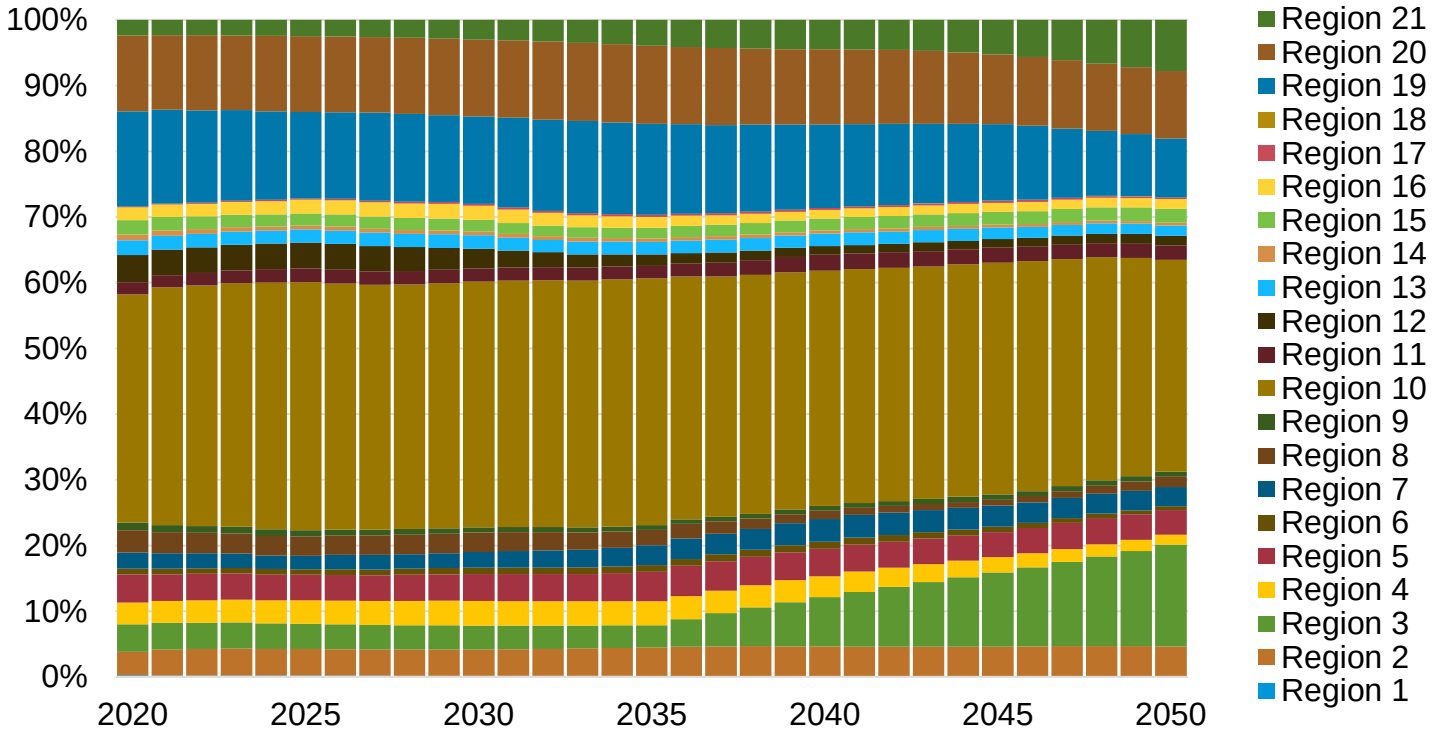


…which are then dispatched as annual production volumes



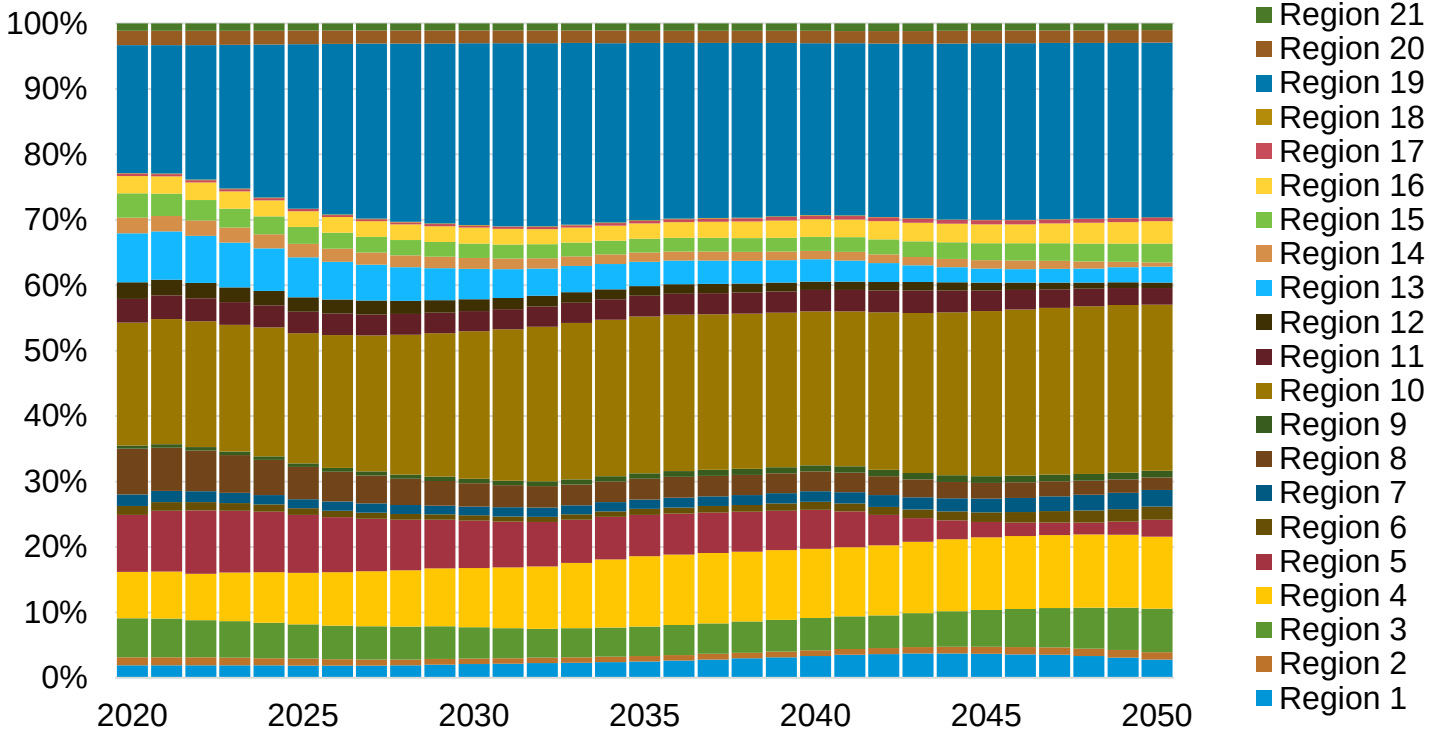
Beginning of capacity expansion and dispatch

Preliminary results – regional shares of annual total crude oil production for 21 regions



Source: EIA GHySMo upstream model test results

Preliminary results – regional shares of annual total natural gas production for 21 regions



Source: EIA GHySMo upstream model test results