

SEI Asia Centre

Training on Low Emissions Analysis Platform

Day 2: 20 October 2021

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SWEDISH INTERNATIONAL
DEVELOPMENT COOPERATION AGENCY

Workshop registration

Please register your attendance daily

Participants need to register for at least 3 days
to be eligible for an attendance certificate

Registration link day 2

<https://tinyurl.com/SEIAsiaLEAPtraining-1450>

Password: Day02#

Workshop connection information

Web meetings

<https://tinyurl.com/SEIAsiaLEAPtraining>

Zoom meeting ID: 872 2041 5222

Zoom passcode: 353649

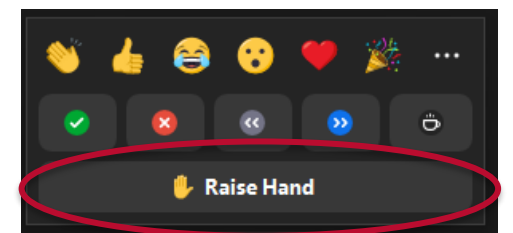
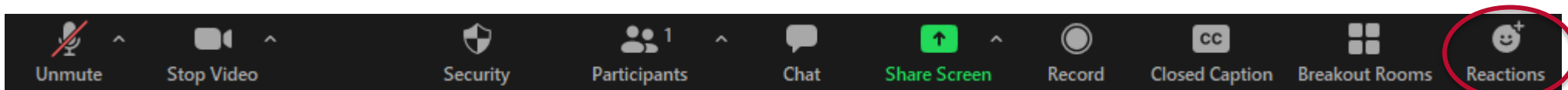
Shared files

<https://tinyurl.com/SEIAsiaLEAPMaterials>

Password: seiasia1021

Zoom etiquette

- Please:
 - **Enter your name in Zoom** so meeting hosts can identify you in participant lists
 - **Mute yourself when not speaking**
 - Use your camera if possible
 - If you have a question, **raise your hand in Zoom**



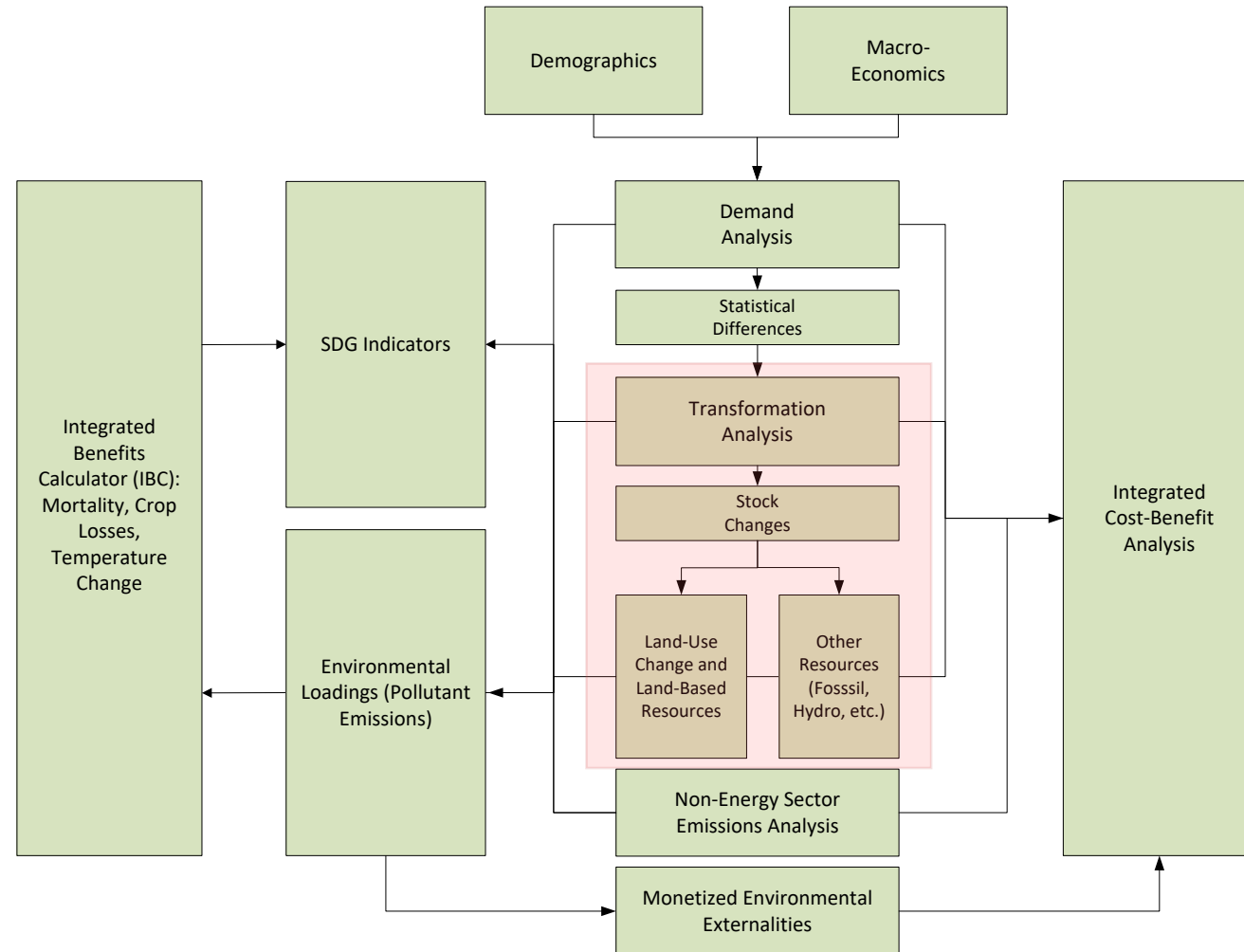
Workshop overview

- **Day 1:** Introduction to LEAP and energy demand modeling
- **Day 2:** Energy supply and emissions modeling
- **Day 3:** Cost-benefit analysis and optimization modeling
- **Day 4:** Linking LEAP and WEAP and other advanced topics

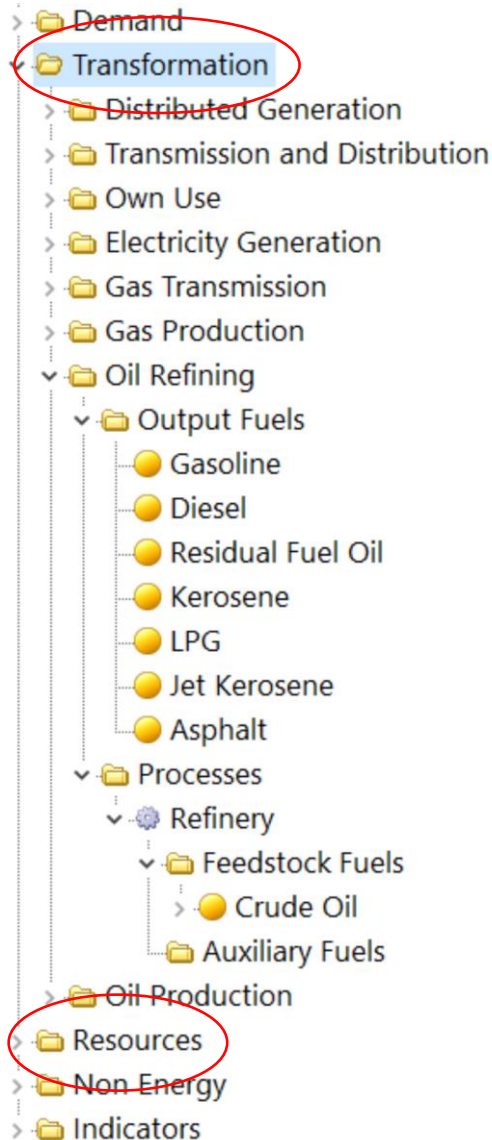
Modeling energy supply with LEAP



Structure of a representative LEAP analysis

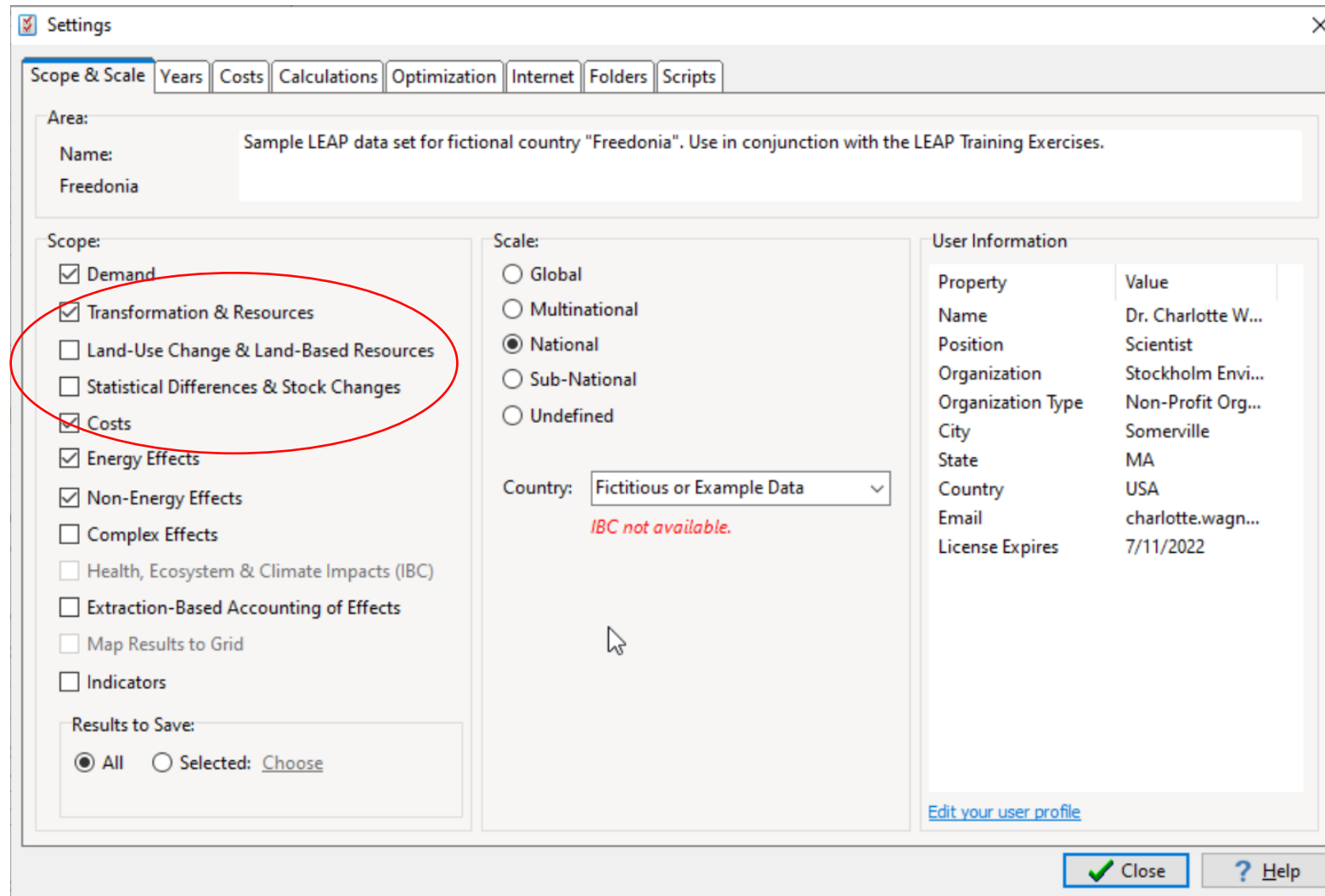


Supply modeling overview



- LEAP supports **modeling all links in the energy supply chain**, from **resource extraction** to **energy trade, energy conversion**, and **delivery to end users**
- **Demand-driven**, engineering-based simulation
- Two main branches in LEAP tree: **Resources** and **Transformation**
 - Resources – Extraction of primary energy resources, imports and exports
 - Transformation – Conversion of one fuel (energy carrier) to another; transport, transmission, and distribution of fuels
- **Total primary energy supply**, primary resource **reserves** (non-renewable) and **annual yields** (renewable), imports and exports tracked in Resources
- Transformation structure: “**modules**” (energy-producing sectors), each containing one or more “**processes**”
 - Processes use feedstock (input) fuels to produce output fuels
- Transformation modeling allows for simulation of **process capacity: expansion and dispatch**
 - Choice of two overall methodologies: **rules-based simulation** and **optimization**
- **Cost-benefit and emissions accounting** can be integrated throughout supply model

Enabling supply modeling



Settings

Scope & Scale | Years | Costs | Calculations | Optimization | Internet | Folders | Scripts

Area:
Name: Sample LEAP data set for fictional country "Freedonia". Use in conjunction with the LEAP Training Exercises.
Freedonia

Scope:

- ☒ Demand
- ☒ Transformation & Resources
- ☐ Land-Use Change & Land-Based Resources
- ☐ Statistical Differences & Stock Changes
- ☒ Costs
- ☒ Energy Effects
- ☒ Non-Energy Effects
- ☐ Complex Effects
- ☐ Health, Ecosystem & Climate Impacts (IBC)
- ☐ Extraction-Based Accounting of Effects
- ☐ Map Results to Grid
- ☐ Indicators

Results to Save:
☒ All ☐ Selected: [Choose](#)

Scale:

- ☐ Global
- ☐ Multinational
- ☒ National
- ☐ Sub-National
- ☐ Undefined

Country: Fictitious or Example Data
IBC not available.

User Information

| Property | Value |
|-------------------|--------------------|
| Name | Dr. Charlotte W... |
| Position | Scientist |
| Organization | Stockholm Envi... |
| Organization Type | Non-Profit Org... |
| City | Somerville |
| State | MA |
| Country | USA |
| Email | charlotte.wagn... |
| License Expires | 7/11/2022 |

[Edit your user profile](#)

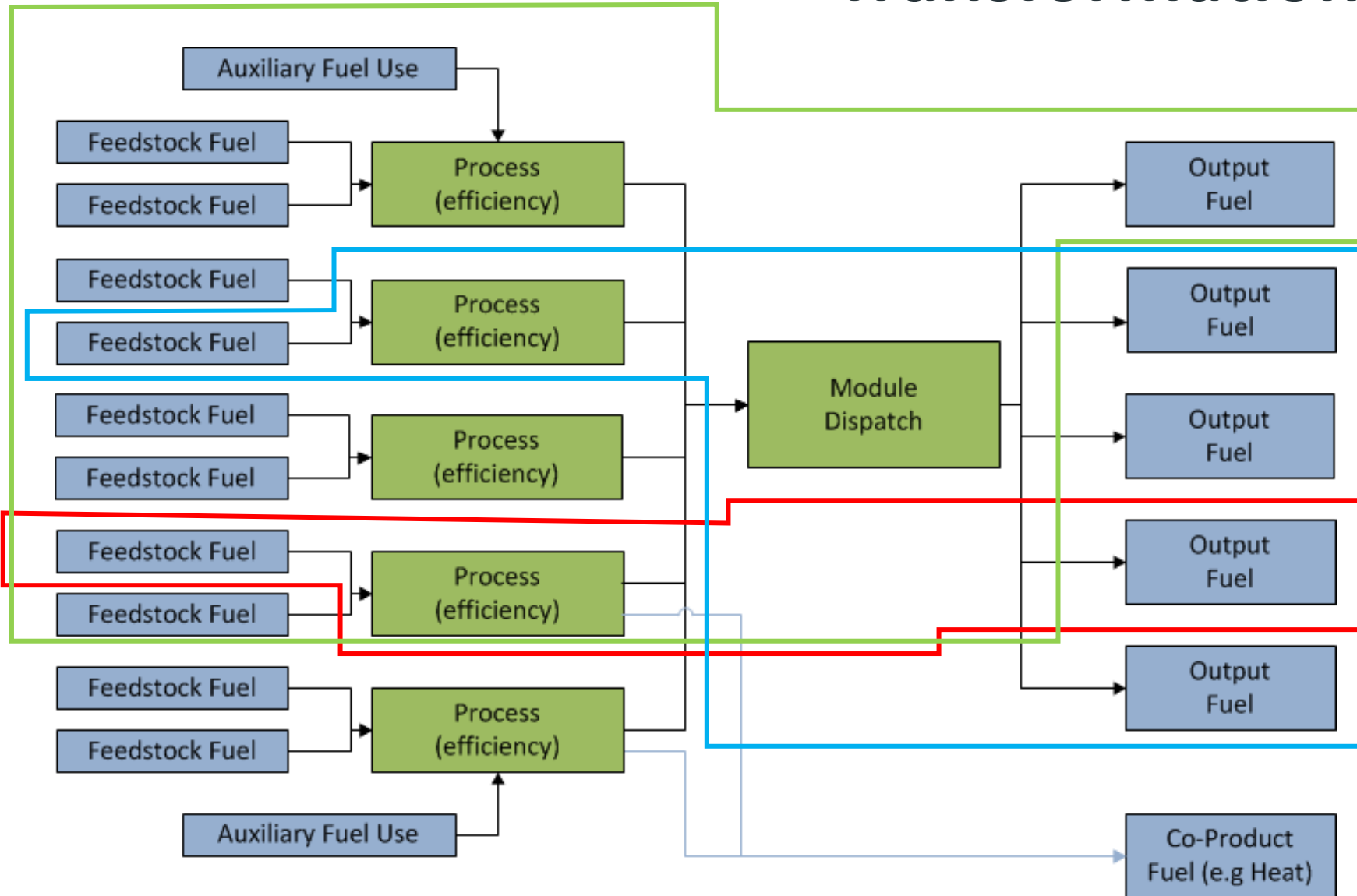
☒ Close ☐ Help

- Resources
 - Primary
 - Coal Anthracite
 - Coal Lignite
 - Hydro
 - Coal Bituminous
 - Wind
 - Solar
 - Wood
 - Biomass
 - Secondary
 - Diesel
 - Imported Electricity
 - Unmet Load
 - Lubricants
 - Charcoal
 - Jet Kerosene
 - Gasoline
 - LPG
 - Residual Fuel Oil
 - Electricity

- Resources
 - Primary
 - Coal Anthracite
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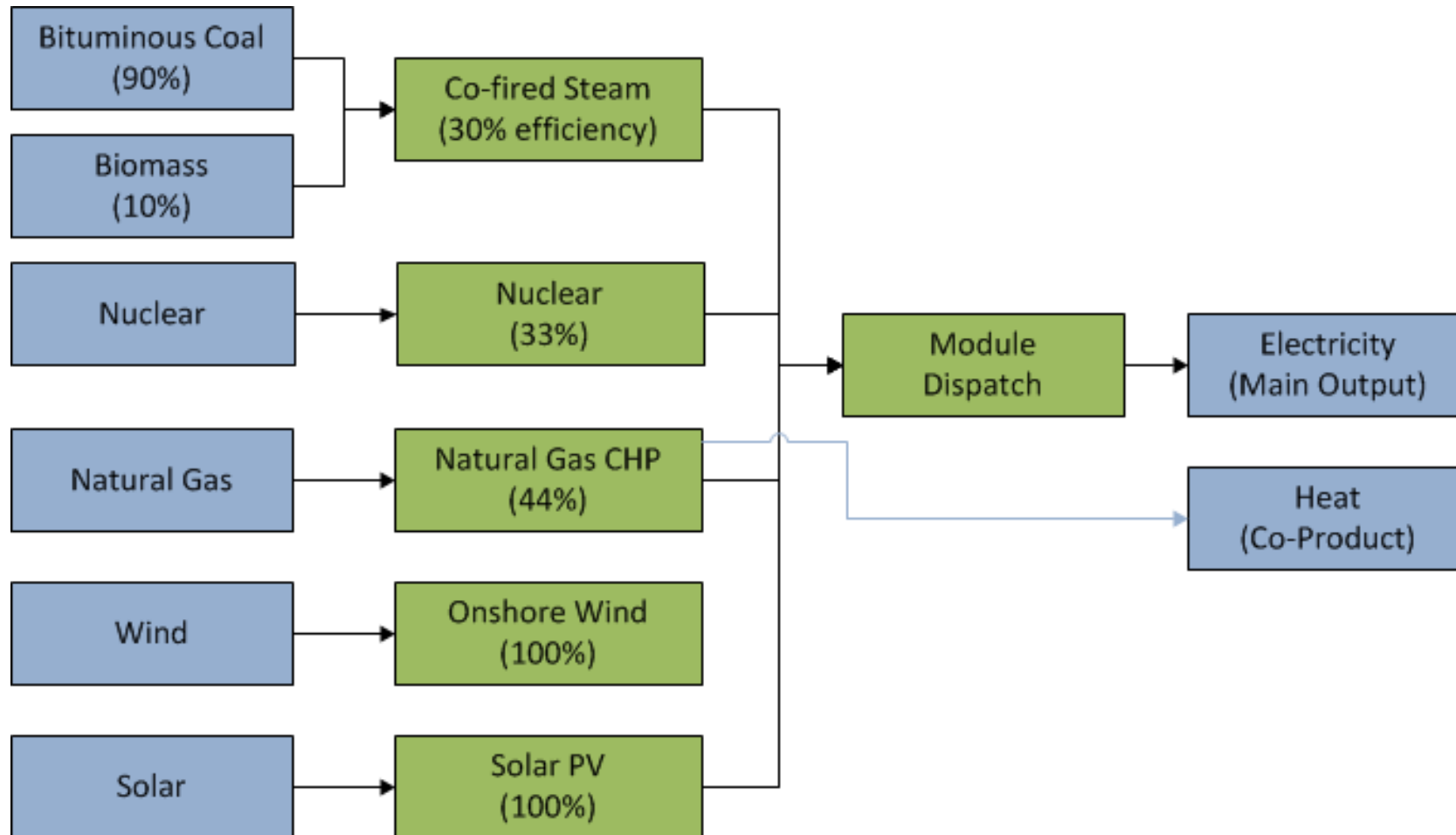
[illegible][illegible]

Transformation module layout

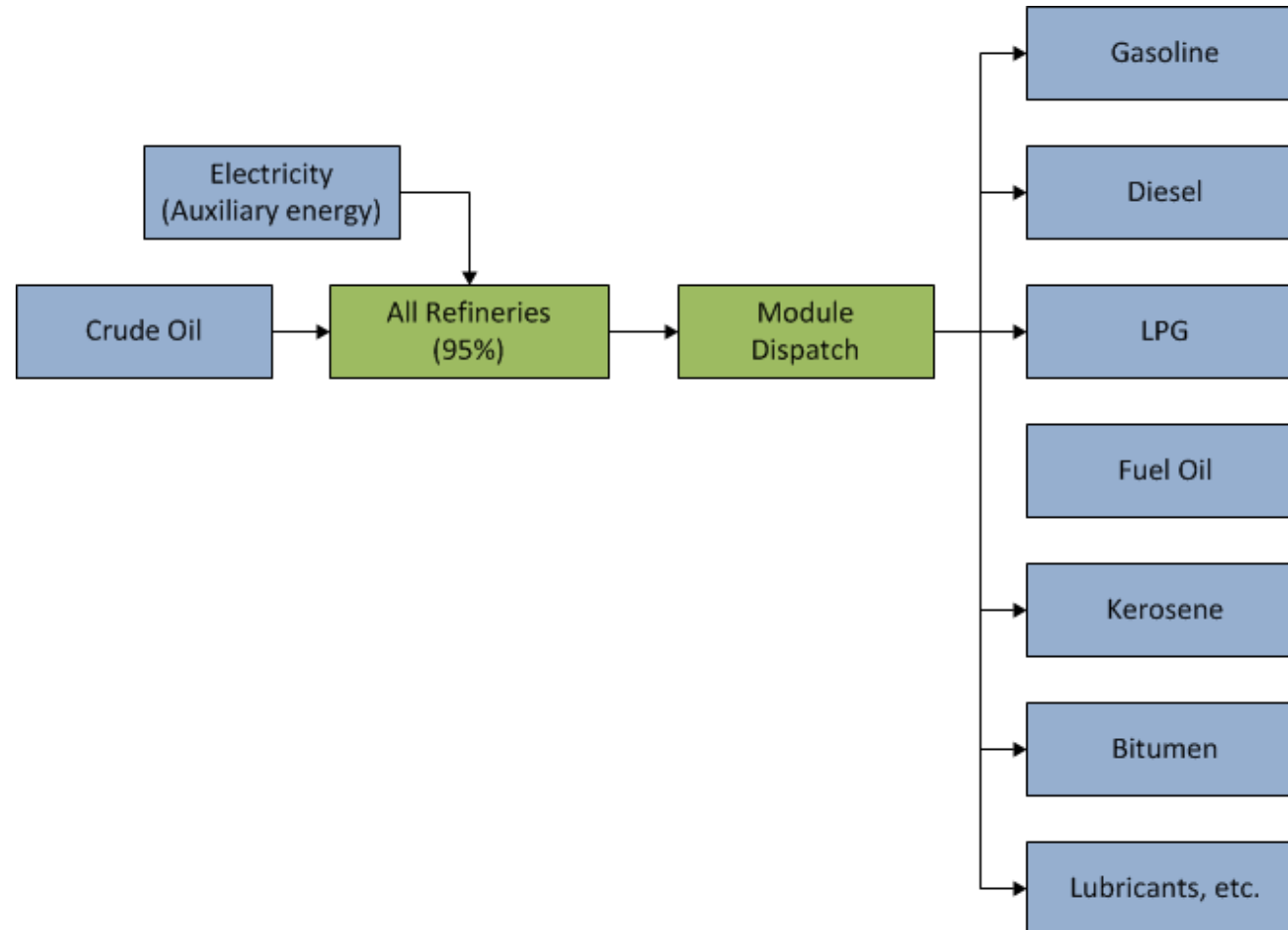


- Simple (e.g., transmission lines)
- Multi-output (e.g., petroleum refining)
- Multi-process (e.g., electricity generation)

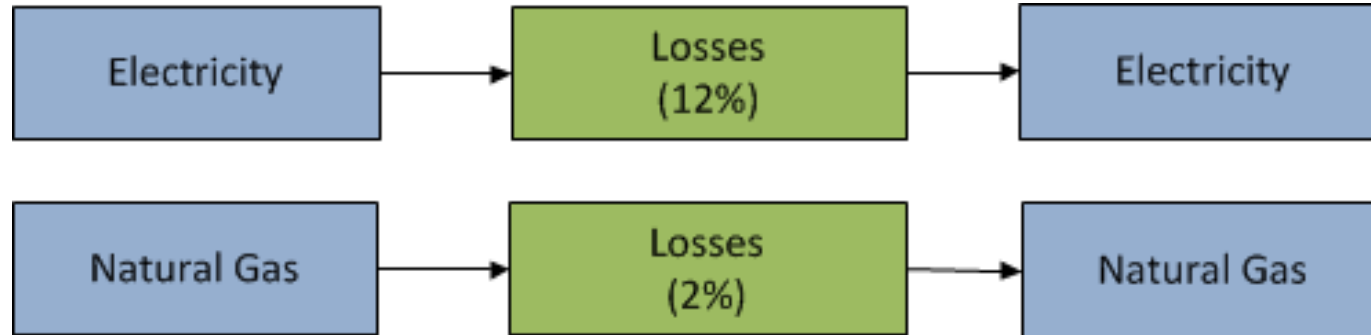
An electricity generation module



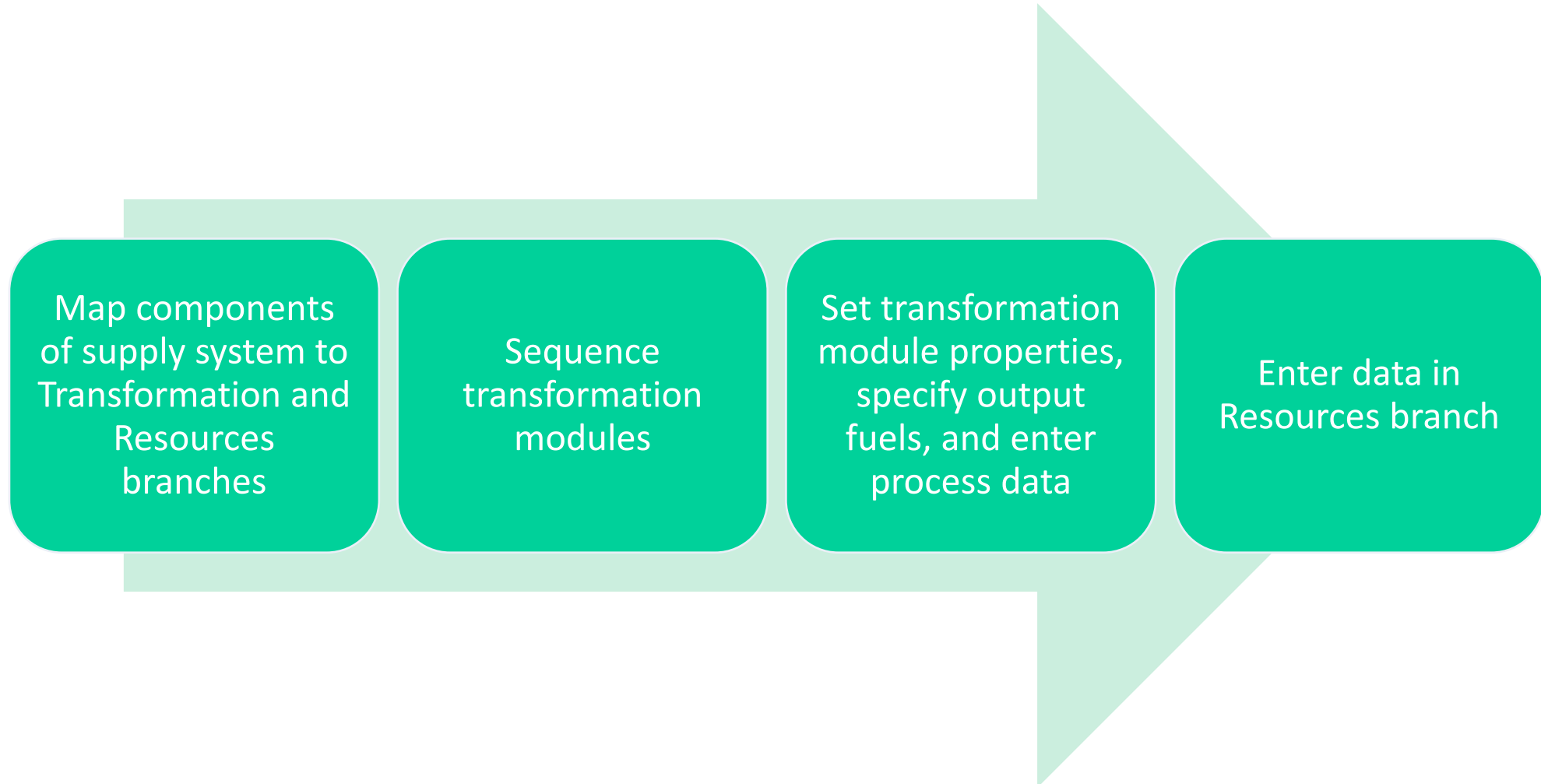
A petroleum refining module



Simple, non-dispatched transformation modules



Steps for a supply analysis in LEAP

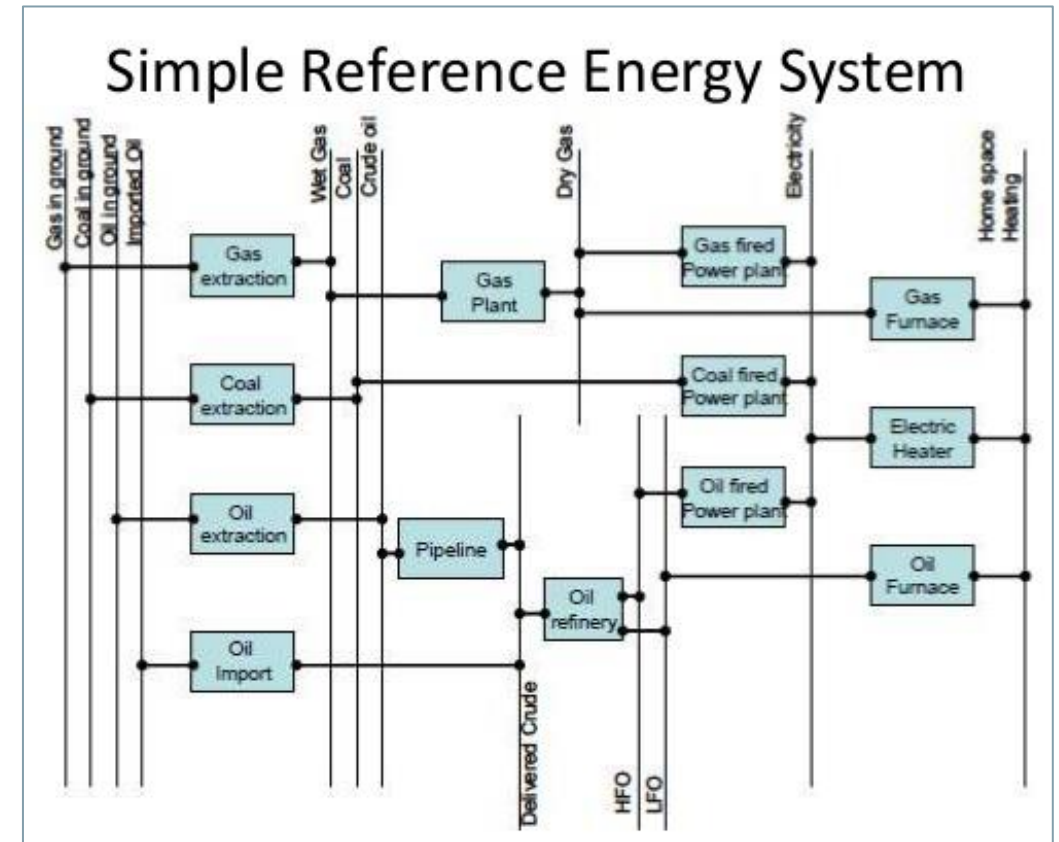


Mapping supply system components

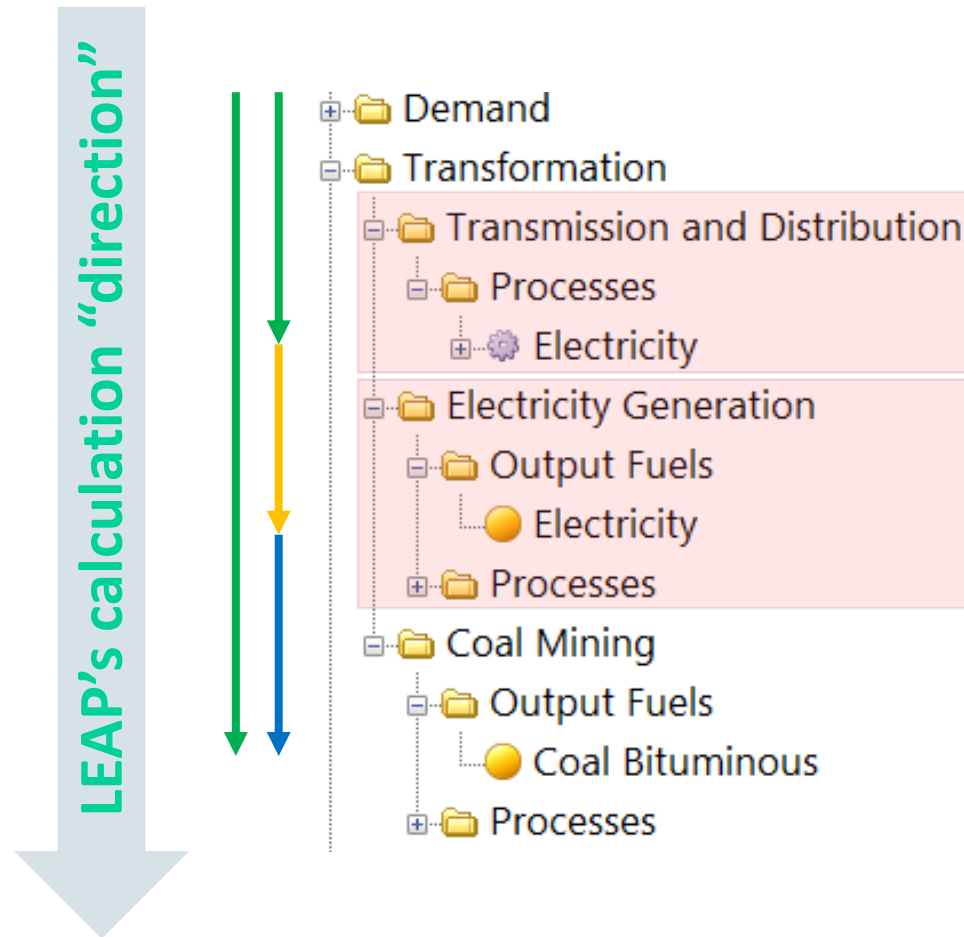
- Ensure every supply source and activity is appropriately represented in LEAP
- Key question: **system boundary**

Transformation module or Resources branch?

- **Transformation** – use to model energy conversion, energy losses, production capacity, dispatch of multiple production options, intra-annual variation in demand & supply, disaggregated production costs (e.g., capital, O&M)
- **Resources** – use to model production of primary energy resources or required fuel imports and exports where none of Transformation conditions apply



Module ordering



Energy requirements are imposed on transformation modules from higher-level branches, starting with final energy demand

Modules satisfy all requirements imposed on them, subject to capacity limits

Multiple modules can produce same fuel

Module properties

The screenshot shows the LEAP: Freedonia software interface. The 'Properties' dialog is open for the 'Electricity Generation' module. The dialog has a 'Name' field containing 'Electricity Generation'. Below this, there are checkboxes for 'Simple non-dispatched module: one output fuel per process.', 'Types of data to include:', 'Costs', 'Capacities', 'System Load Curve (required if dispatching by cost or merit order)', 'Planning Reserve Margin (if unchecked will be calculated endogenously)', 'Coproduct: Non Energy', and 'Output shares (otherwise outputs in proportion to requirements)'. At the bottom, there are radio buttons for 'Enter efficiency data as: Efficiencies', 'Losses', and 'Heat rates'. The 'Order' is set to 1. The 'OK' button is highlighted with a green checkmark.

LEAP: Freedonia

Area Edit View Analysis Tags General Tree Chart Advanced Help

New Open Save Email Backup Find Settings Tags Scenarios Fuels Effects Units What's This?

Analysis

Results

Energy Balance

Summaries

Overviews

Technology Database

Notes

Transformation

Transmission and Distribution

Electricity Generation

Output Fuel

Processes

Charcoal Production

Oil Refining

Coal Mining

Resources

Primary

Natural Gas

Wind

Crude Oil

Coal Bituminous

Wood

Hydro

Secondary

Electricity

Gasoline

Lubricants

Aviation

Tags: + - Settings F3

Properties Alt+P

Add Ctrl+Ins

Add Multiple Effects

Delete "Electricity Generation" Ctrl+Del

Delete All Below

View effect in TED database

Refresh

Copy Ctrl+C

Copy Tree Path to Clipboard

Paste Ctrl+V

Unlocked

Show Area Branch

Select Visible Branches

Hide "Electricity Generation" and all branches below.

Tags

Move

Sort Branches

Scenario Expressions

Insert Branches From Other Area

Create/Update Branches from Excel

Auto-Expand

Expand "Electricity Generation" and All Below

Expand All

Collapse All

Outline Level

Find

Branch: Transformation\Electricity Generation...

Branch: All Branches Variable: Module Costs Scenario: BAS: Baseline

Module Costs Planning Reserve Margin Optimize System Peak Load Shape All Variables

Units: U.S. Dollar

Module Costs: Costs incurred for the module as a whole and not otherwise included in costs specified

| Branch | 2010 Value | Expression |
|------------------------|------------|------------|
| Electricity Generation | 0.00 | 0 |

Chart Table Builder Notes Elaboration Help

Electricity Generation: Module Costs (USD)

USD 0

2010 2013 2018 2023 2028 2033 2038

All years

2020.1.0.19 (64-Bit) Area: Freedonia Analysis Registered to: "jason.veysey@sei-us.org" until June 16, 2021 B:27 V:875 S:2 R:1 O:1 Edit properties of transformation module branch "Elec"

Transformation Module Properties (ID=27)

Name: Electricity Generation

☐ Simple non-dispatched module: one output fuel per process.

Types of data to include:

☒ Costs

☒ Capacities

☒ System Load Curve (required if dispatching by cost or merit order)

☒ Planning Reserve Margin (if unchecked will be calculated endogenously)

☐ Coproduct: Non Energy

☐ Output shares (otherwise outputs in proportion to requirements).

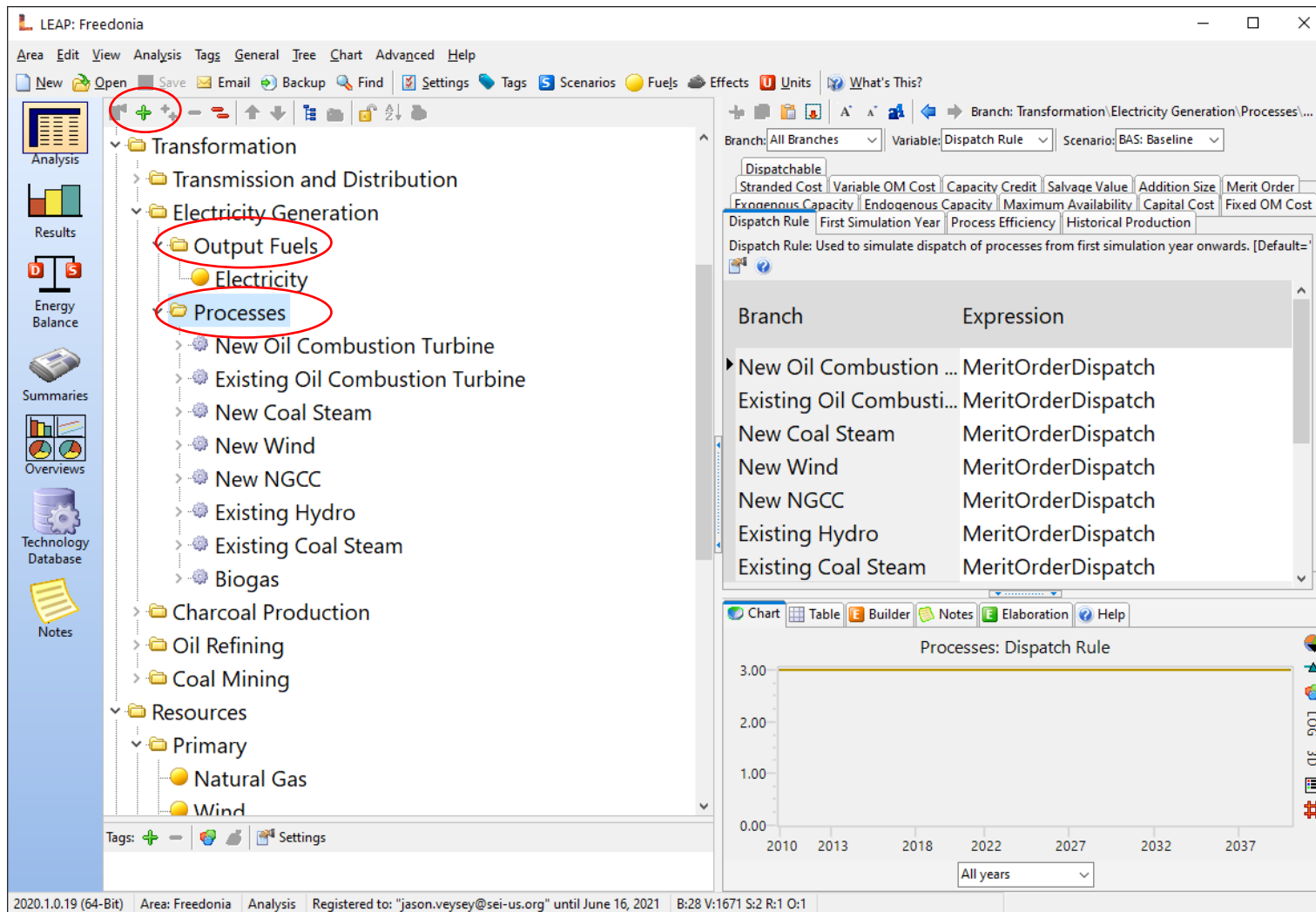
Enter efficiency data as:

☒ Efficiencies ☐ Losses ☐ Heat rates

Order: 1

OK Cancel Help

Module outputs and processes



LEAP automatically creates categories (folder branches) for output fuels and processes

User decides which outputs and processes to add to categories – i.e., what's going to be modeled

Modeling process capacity

Two major issues to consider:



```
graph TD; A[Two major issues to consider:] --> B[Capacity expansion]; A --> C[Dispatch];
```

Capacity expansion

- How much capacity to build and when? (MW)

Dispatch

- Once built, how should capacity be operated? (MWh)

Capacity modeling methods

- **Two main methods** for modeling capacity expansion and process dispatch in LEAP
 - **Rules-based simulation** => user defines **prioritization rules**
 - **Optimization** => user defines cost and performance parameters, model finds **least-cost solution**
- Optimization is more data-intensive and difficult to calibrate, but it expands functional possibilities – e.g., **energy storage** and **transmission power flow**

Rules-based capacity expansion

- **Exogenous capacity** – assumed to exist in specified years
- **Endogenous capacity** – prioritized options that LEAP may build if needed to maintain reserve margin
 - User specifies reserve margin target and order and addition size for endogenous capacity options

| Addition Order | Build Order | Process | Addition Size Expression |
|----------------|-------------|------------------------------|--------------------------|
| ▶ | 1 | 0 New Coal Steam | 500 |
| | 2 | 0 New Oil Combustion Turbine | 300 |

Reserve margin:
*available capacity when
system is at peak load*

Rules-based capacity expansion

- **Exogenous capacity** – assumed to exist in specified years
- **Endogenous capacity** – prioritized options that LEAP may build if needed
 - User sets reserve margin for endogenous capacity options

Reserve margin

$$\frac{\sum(\text{capacity} \times \text{capacity credit}) - \text{peak load}}{\text{peak load}} \times 100$$

| Addition Order | Build Order | Process | Addition Size Expression |
|----------------|-------------|----------------------------|--------------------------|
| ▶ 1 | 0 | New Coal Steam | 500 |
| 2 | 0 | New Oil Combustion Turbine | 300 |

Reserve margin:
*available capacity when
system is at peak load*

Rules-based process dispatch

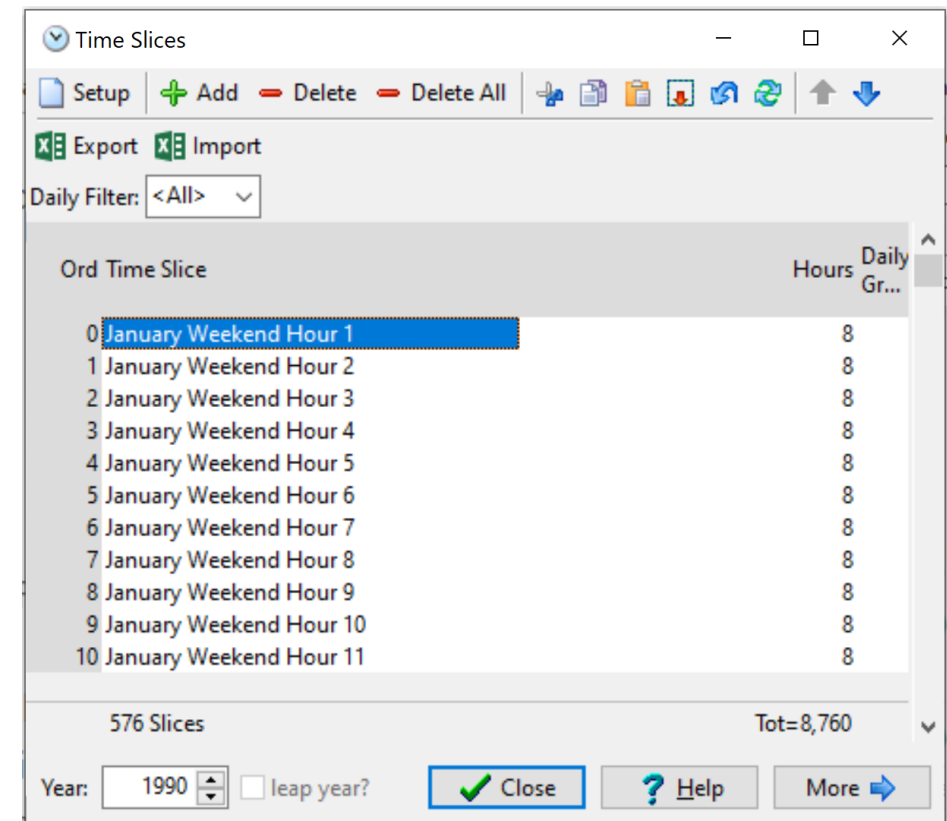
- Before **first simulation year** – **historical production**
- In and after first simulation year – **dispatch rule**
 - Merit order – user-assigned priorities
 - Full capacity – 100% of available capacity (capacity x maximum availability)
 - Percent share – % of module output requirements
 - Running cost – in order of variable O&M + fuel cost
 - Proportional to capacity – output shares determined by available capacity

| Branch: | All Branches | Variable: | First Simulation | Scenario: | BAS: Baseline |
|---|-----------------------|--------------------|-----------------------|----------------|---------------|
| Dispatch Rule | First Simulation Year | Process Efficiency | Historical Production | Exogenous Capa | |
| First Simulation Year: First year in which LEAP uses process dispatch rules. Before this year, dispatch | | | | | |
| Branch | | | | | 2010 E |
| | | | | | Value |
| ► New Oil Combustion Tu... | | | | | 2,011.00 F |
| Existing Oil Combustion... | | | | | 2,011.00 F |
| New Coal Steam | | | | | 2,011.00 F |

Dispatch in and after first simulation year attempts to meet demand (MWh) and load (MW) in each year and time slice, given available capacity

Time slicing

- Time slices **divide the year into sub-annual periods**
- Used to model **additional temporal detail** in supply and demand of particular fuels (e.g., electricity)
- **One set of time slices per model** – configure in General -> Time Slices
- **Various variables can be time sliced** (e.g., maximum availability, merit order, key assumptions)
- **Module output requirements can also be time sliced**
 - Exogenous – load shape attached to module
 - Endogenous – load shape attached to each final energy demand, LEAP sums demand shapes
- If module requirements are not time sliced, dispatch is for an entire year at a time



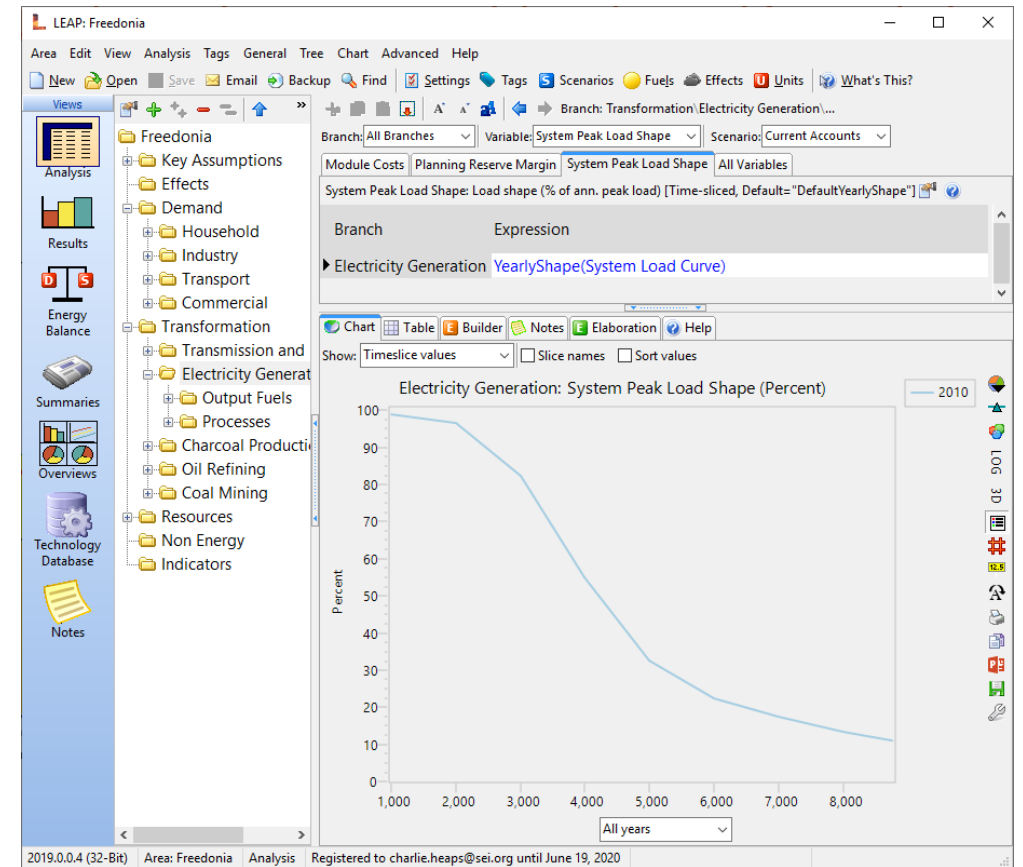
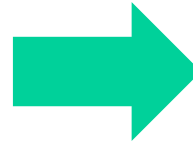
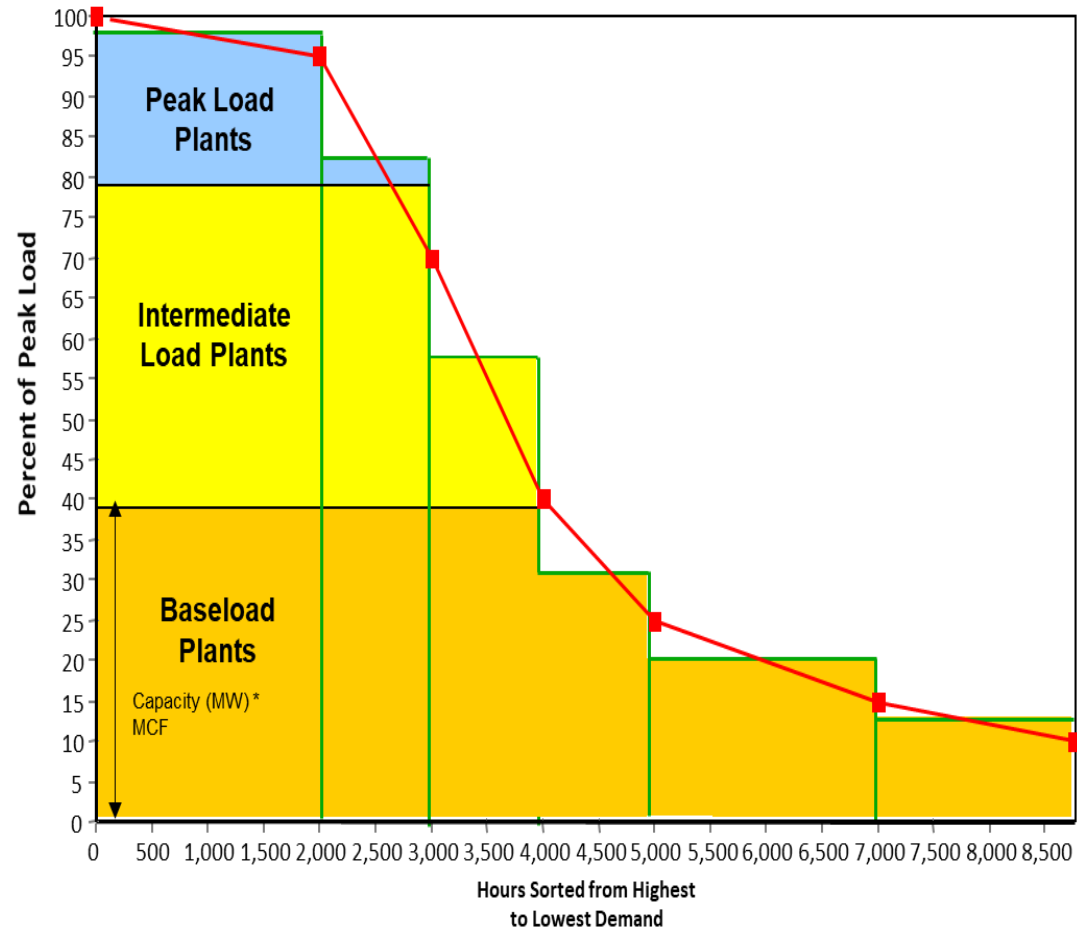
Time slice options

- LEAP streamlines creation of various time slice configurations
- If time-sliced inputs are entered with hourly resolution, LEAP aggregates them by time slice
 - Load shapes, process maximum availabilities, etc.
- Time slice configuration can then be modified, and LEAP will automatically re-aggregate all time-sliced inputs => this makes it **extremely easy to change time slices**

The screenshot shows the 'Setup Time Slices' dialog box with the following configuration:

- ☐ Simple: no seasonal or daily data. Slice duration: 1000 hours
- This will create 8 slices each with 1000 hours duration plus one 760 hour slice.
- Slice names:
 - Based on: Hours
 - Template: Hours 0000 to 1000
 - Example: Hours 0000 to 1000
- ☒ Detailed: seasonal, weekly and daily data.
- Configure** (dropdown menu):
 - Whole Year (1)
 - 2 Seasons: Wet, Dry (2)
 - 4 Seasons: Spring, Summer, Fall, Winter (4)
 - 4 Quarters (4)
 - 12 Months (12)
 - 53 Weeks (53)
 - 365 Days (365)
 - 8760 Hours (8760)
- No Daily Detail (1)** (dropdown menu):
 - Week Days & Weekend Days (2)
 - Weekdays, Saturdays & Sundays (3)
 - Seven Days of the Week (7)
- No Hourly Detail (1)** (dropdown menu):
 - 2 Hourly Periods: Day, Night (2)
 - 4 Hourly Periods: Morning, Day, Evening, Night (4)
 - 24 Hours (24)

Load shapes and dispatch



A quantitative example

- Two time slices: winter (40% of year) and summer (60% of year)
- Annual demand = 100 GWh
- Load shape: 70% of demand in winter, 30% in summer
- Time sliced demands
 - Winter = $70\% \times 100 \text{ GWh} = 70 \text{ GWh}$
 - Summer = $30\% \times 100 \text{ GWh} = 30 \text{ GWh}$
- Time sliced loads
 - Winter = $70 \text{ GWh} / (8760\text{h} \times 40\%) = 20.0 \text{ MW}$
 - Summer = $30 \text{ GWh} / (8760\text{h} \times 60\%) = 5.7 \text{ MW}$
- Peak load = 20.0 MW

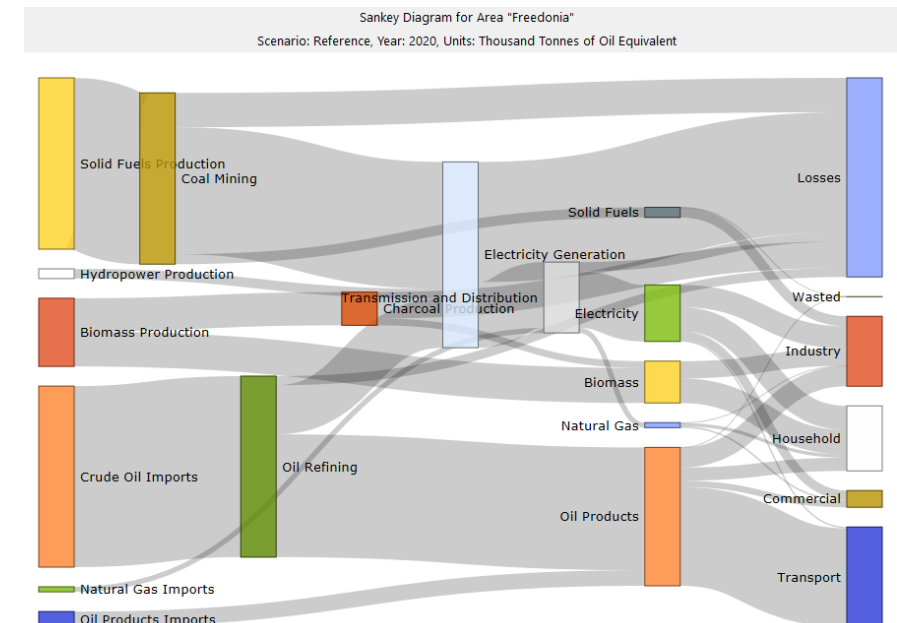
Putting demand & supply together: energy balances

- Energy demand and supply results are combined in LEAP's integrated framework
- Results can be displayed as **standard energy balance tables**
- Balances can be viewed for any year, scenario, or region in different units
- Balance columns can be switched among fuels, fuel groupings, years, and regions
- Balance rows are Demand and Transformation sectors/modules. Can optionally show sub-sectoral results
- Balances can be viewed in table, chart, and Sankey diagram formats

Energy Balance for Area "Freedonia"

Scenario: Reference, Year: 2020, Units: Thousand Tonnes of Oil Equivalent

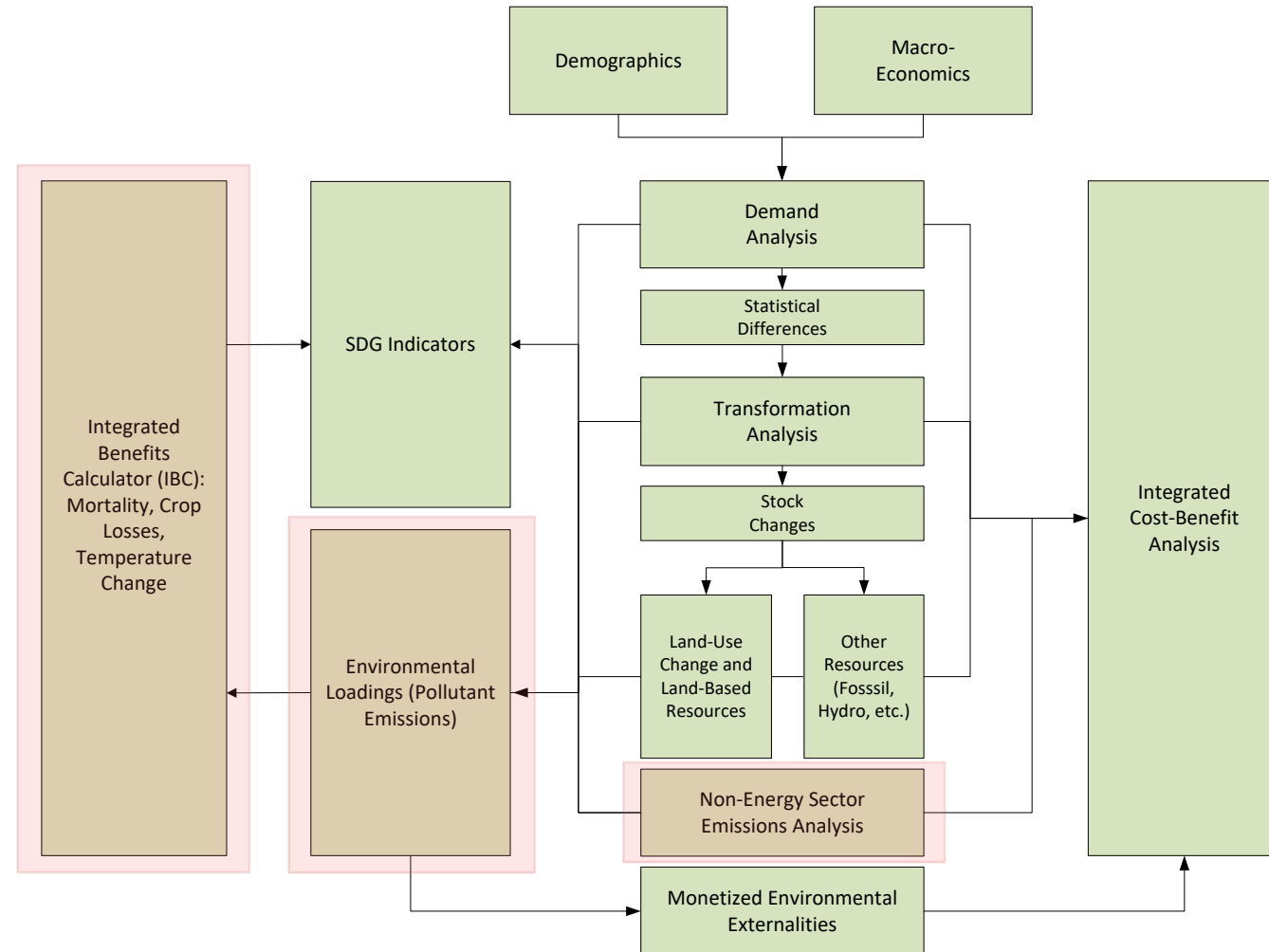
| | Solid Fuels | Natural Gas | Crude Oil | Hydropower | Biomass | Electricity | Oil Products | Total |
|-------------------------------|-------------|-------------|-----------|------------|---------|-------------|--------------|--------|
| Production | 5,685 | - | - | 321 | 2,263 | - | - | 8,269 |
| Imports | - | 170 | 6,006 | - | - | - | 517 | 6,693 |
| Exports | - | - | - | - | - | - | - | - |
| Total Primary Supply | 5,685 | 170 | 6,006 | 321 | 2,263 | - | 517 | 14,962 |
| Coal Mining | -1,137 | - | - | - | - | - | - | -1,137 |
| Oil Refining | - | - | -6,006 | - | - | - | 5,705 | -300 |
| Charcoal Production | - | - | - | - | -874 | - | - | -874 |
| Electricity Generation | -4,215 | - | - | -321 | - | 2,182 | -1,632 | -3,986 |
| Transmission and Distribution | - | -3 | - | - | - | -306 | - | -309 |
| Total Transformation | -5,352 | -3 | -6,006 | -321 | -874 | 1,877 | 4,073 | -6,606 |
| Household | - | 108 | - | - | 815 | 797 | 436 | 2,157 |
| Industry | 332 | 10 | - | - | 573 | 736 | 667 | 2,320 |
| Transport | - | - | - | - | - | 46 | 3,280 | 3,326 |
| Commercial | - | 49 | - | - | - | 297 | 207 | 554 |
| Total Demand | 332 | 167 | - | - | 1,389 | 1,877 | 4,590 | 8,356 |
| Unmet Requirements | 0 | - | - | - | - | 0 | 0 | 0 |



Modeling emissions with LEAP



Structure of a representative LEAP analysis



Enabling emissions modeling

Settings

Scope & Scale | Years | Costs | Calculations | Optimization | Internet | Folders | Scripts

Area:
Name: Sample LEAP data set for fictional country "Freedonia". Use in conjunction with the LEAP Training Exercises.
Freedonia

Scope:

- ☒ Demand
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- ☒ Non-Energy Effects
- ☐ Complex Effects
- ☐ Health, Ecosystem & Climate Impacts (IBC)
- ☐ Extraction-Based Accounting of Effects
- ☐ Map Results to Grid
- ☐ Indicators

Results to Save:
☒ All ☐ Selected: [Choose](#)

Scale:

- ☐ Global
- ☐ Multinational
- ☒ National
- ☐ Sub-National
- ☐ Undefined

Country: [Fictitious or Example Data](#)
IBC not available.

User Information: Not Available

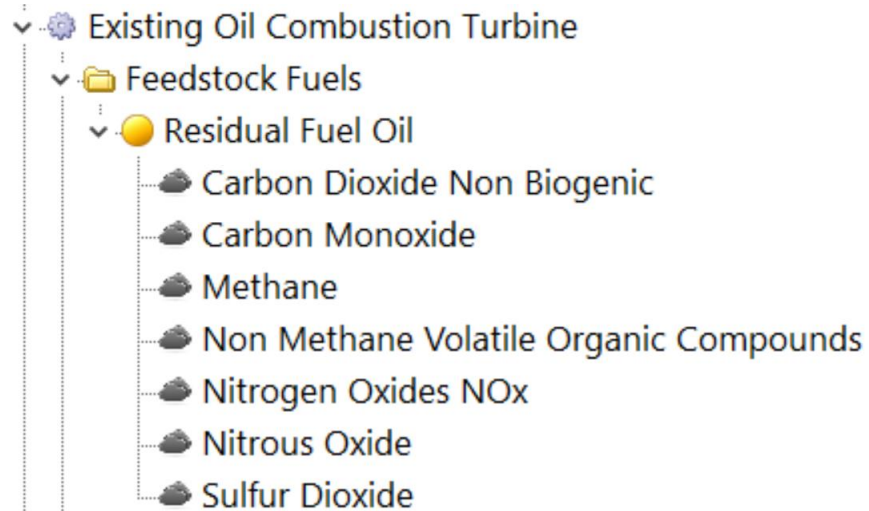
| Property | Value |
|----------|-------|
|----------|-------|

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☒ Close ☐ Help

Energy-related emissions

- **Energy-related emissions** in LEAP are based on **energy production or consumption** and **emission factors**
- Can specify factors for any greenhouse gas (GHG) or pollutant
 - Factors can be entered in any physical unit and denominated by units of energy consumption, energy production, or distance traveled for transport (e.g., kg/tonne coal consumed, grams/mile traveled)
 - Expressions for factors can reference chemical composition of fuels
- LEAP includes default IPCC Tier 1 emission factors in its Technology Database

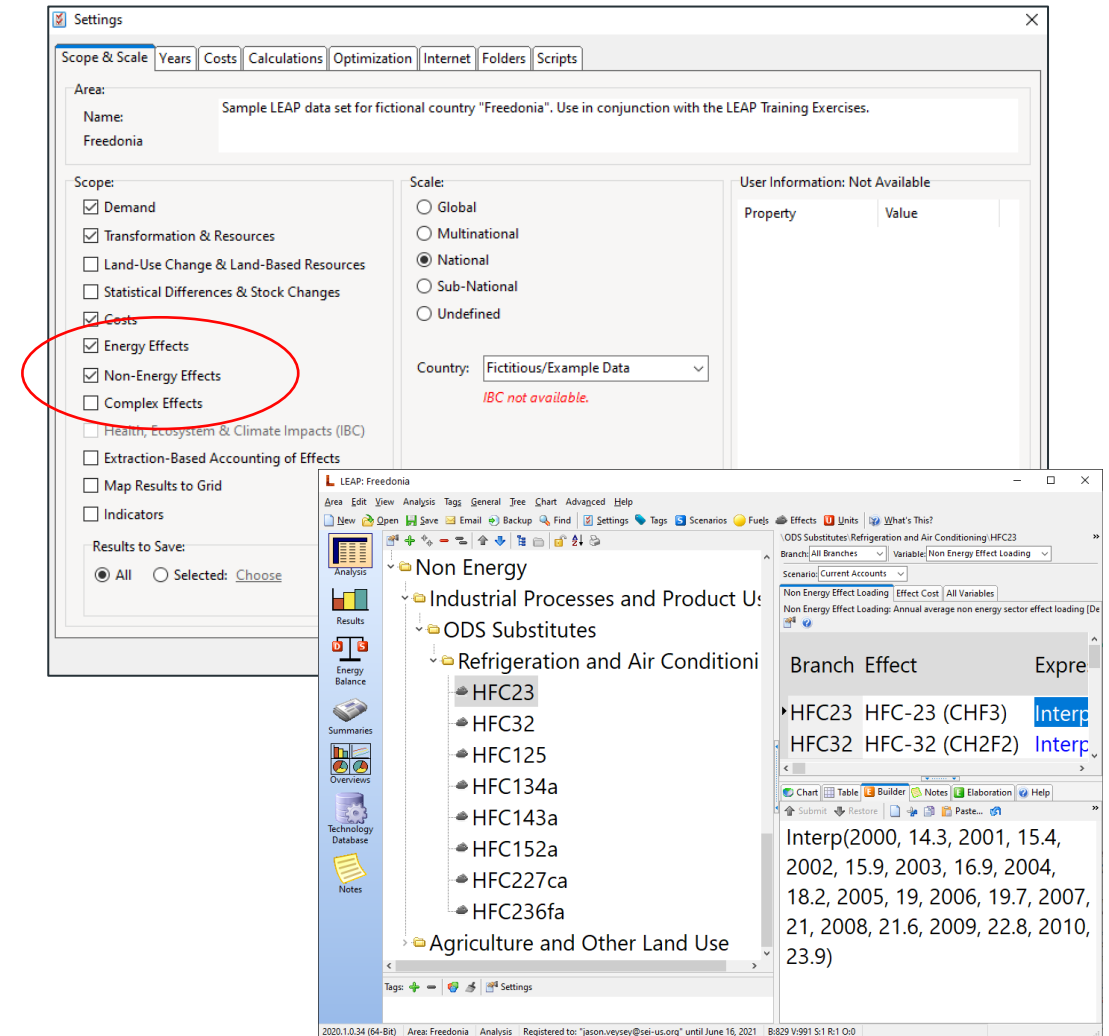


The screenshot shows the 'Environmental Loading' dialog box with the 'All Variables' tab selected. The title bar reads 'Environmental Loading' and the subtitle is 'Environmental Loading: Environmental Loading Factor (Pollutants per unit of energy consumption)'. The dialog contains a table with the following data:

| Effect | Expression | Units | Per.. | Method |
|--|--|------------|------------|--------------------------|
| Carbon Dioxide Non Biogenic | $20 * \text{FractionOxidized} * (\text{co2/c})$ | Tonne | Terajoule | Per unit energy consumed |
| Carbon Monoxide | 10 | Kilogramme | Terajoule | Per unit energy consumed |
| Methane | 2 | Kilogramme | Terajoule | Per unit energy consumed |
| Non Methane Volatile Organic Compounds | 5 | Kilogramme | Terajoule | Per unit energy consumed |
| Nitrogen Oxides NOx | 200 | Kilogramme | Terajoule | Per unit energy consumed |
| Nitrous Oxide | 0.6 | Kilogramme | Terajoule | Per unit energy consumed |
| Sulfur Dioxide | $\text{SulfurContent} * (1 - \text{SulfurRetention}) * (\text{so2/s})$ | Kilogramme | Kilogramme | Per unit energy consumed |

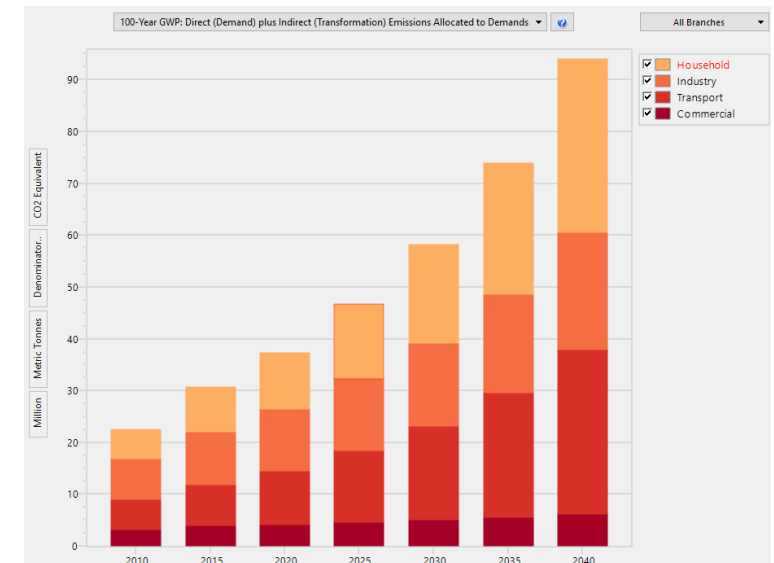
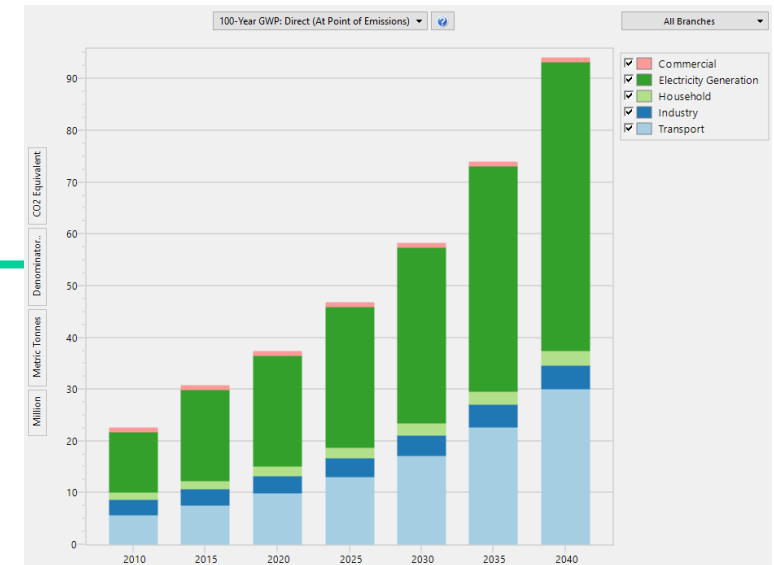
Non-energy emissions

- LEAP models can optionally include emissions from non-energy sources
- This allows modeling of economy-wide emissions
- **Non-energy emissions based on user-defined expressions** (i.e., formulas that return total annual emissions)
- Expressions can reference other model variables (e.g., key assumptions) to ensure consistency across sectors

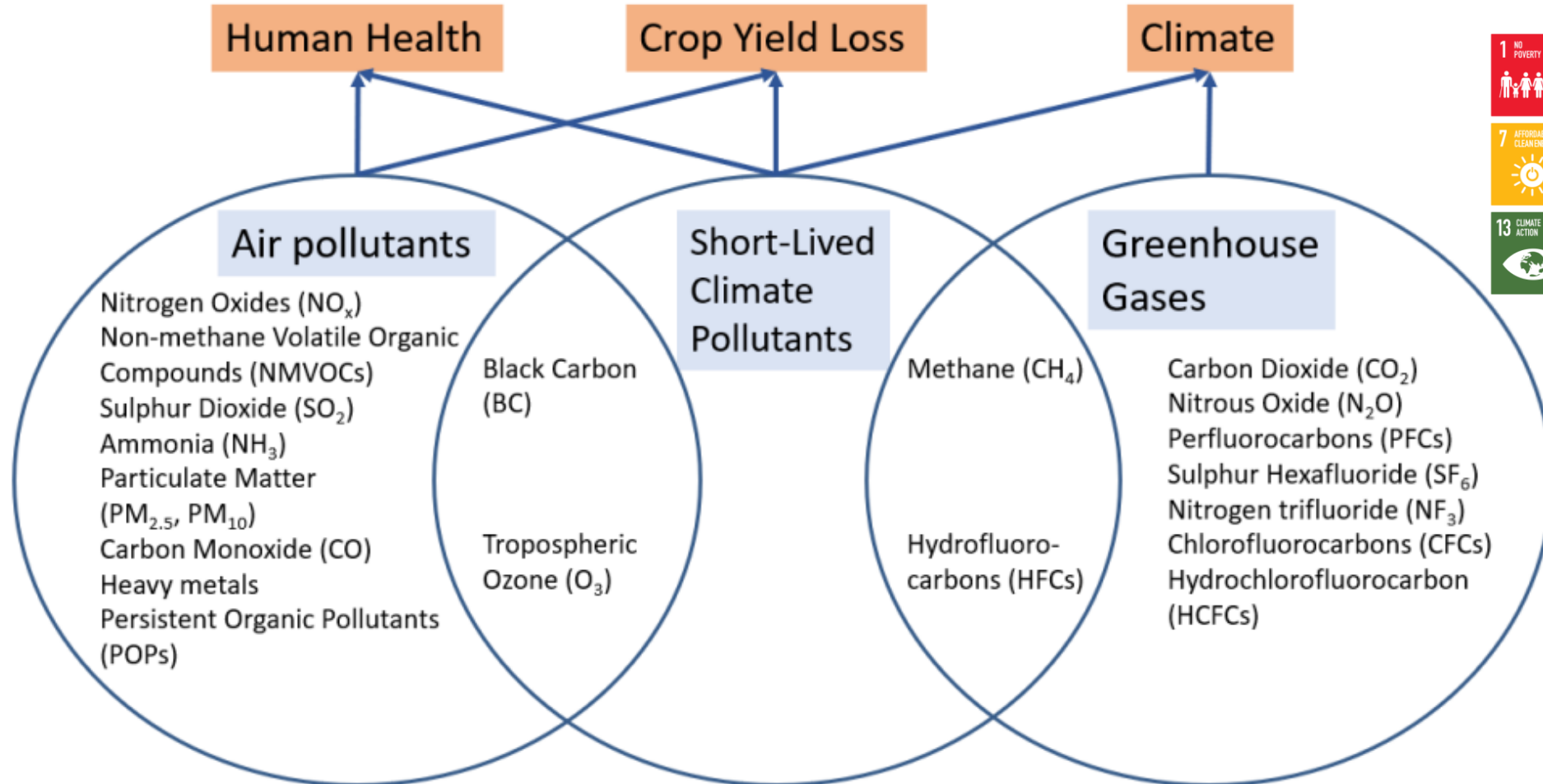


Emission results

- Results can be shown for **individual pollutants** or summed to show **overall global warming potential (GWP)**
- LEAP includes GWP conversion factors from all IPCC assessment reports
- **Direct emissions** from demand, supply, and non-energy branches can be displayed by branch, fuel, year, and other dimensions
- For demand branches, **indirect GHG emissions** (supply-side emissions attributable to final energy demands) can also be calculated
- In national models, projected air pollution emissions can be used in LEAP's Integrated Benefits Calculator (LEAP-IBC) to quantify impacts on human health, agriculture, and temperature



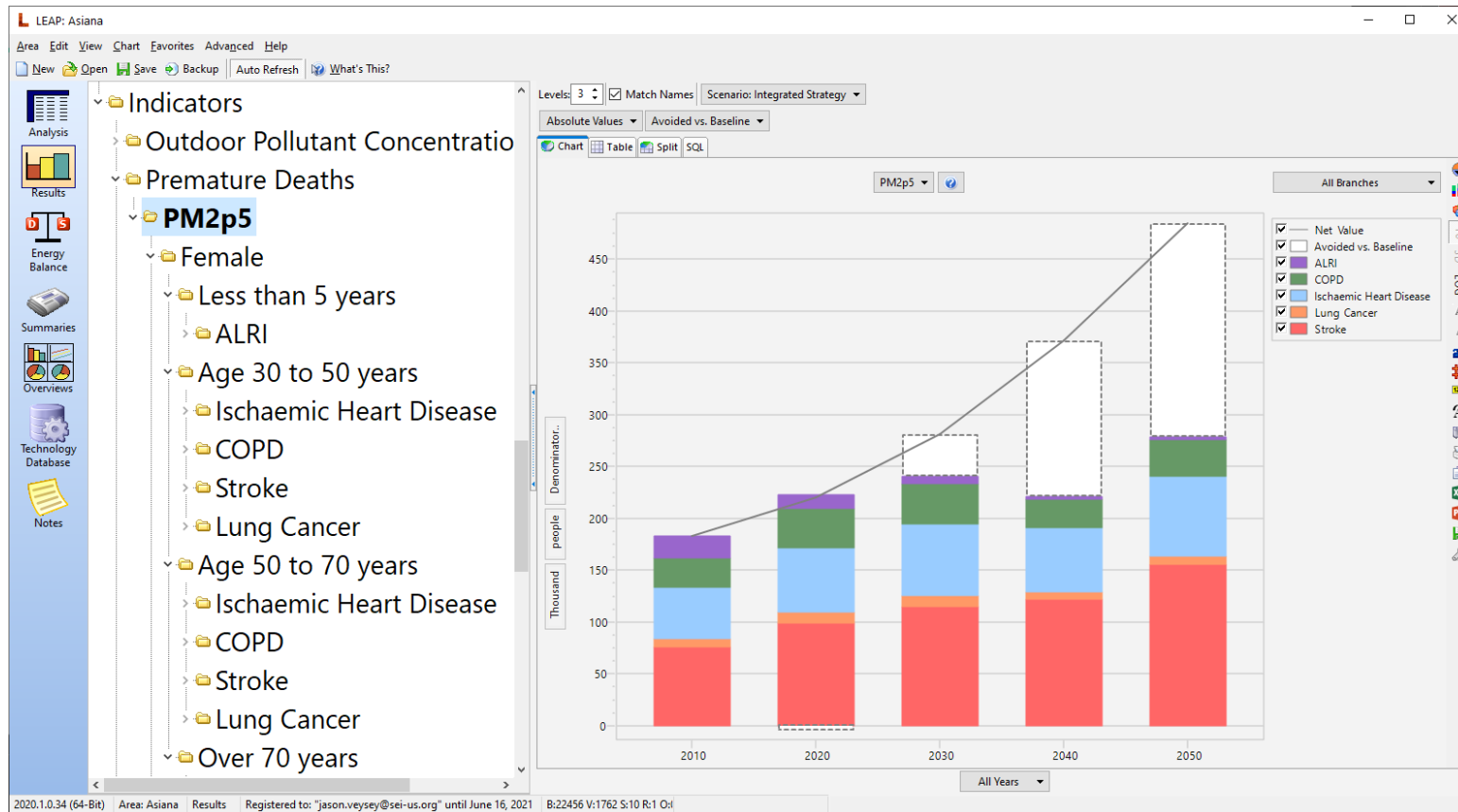
Motivation for LEAP-IBC: Integrated climate and air pollution assessments



LEAP-IBC calculation pathway



LEAP-IBC results

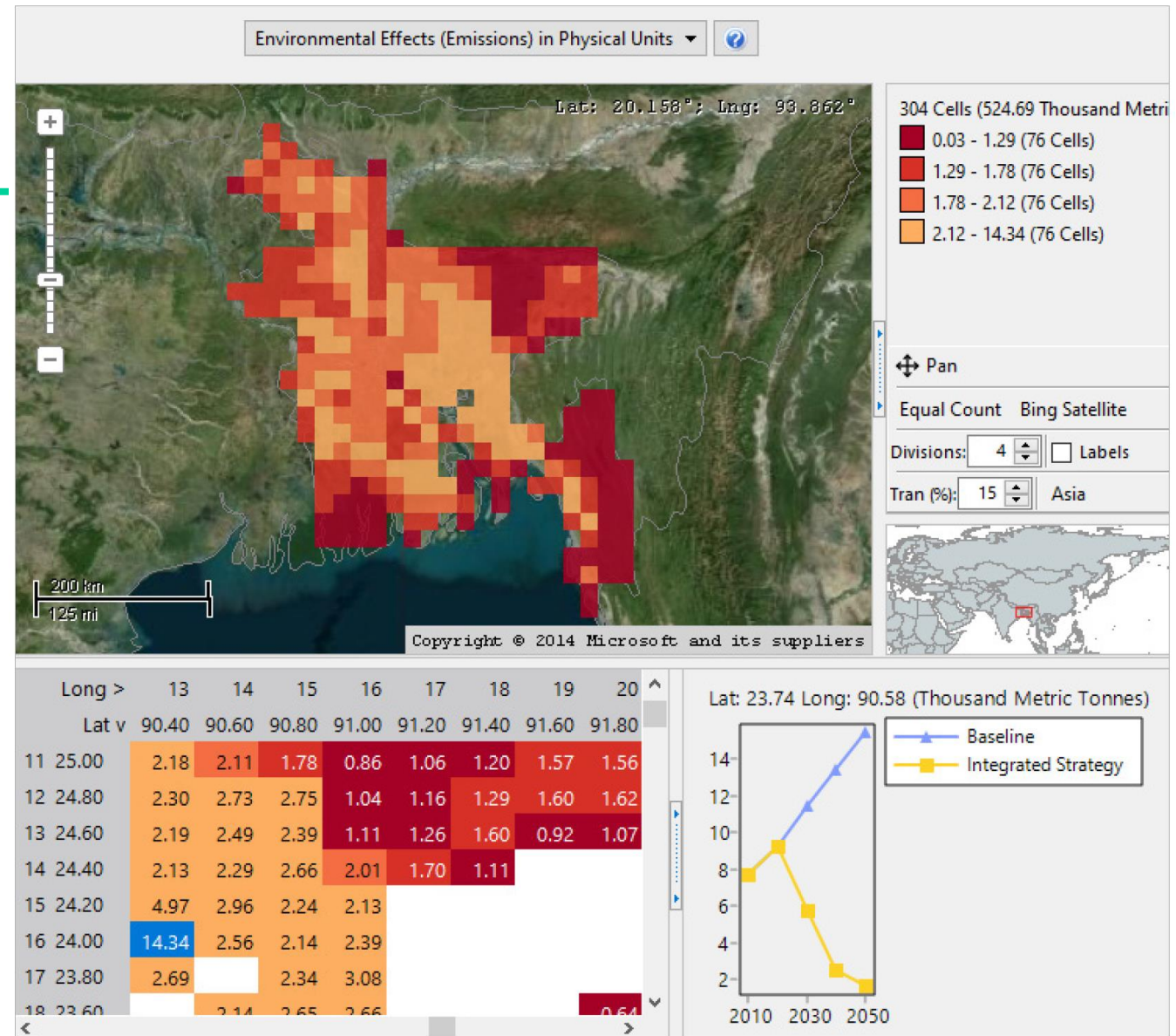


Key results include:

- **Air pollutant concentrations** by origin (natural background, national emissions, rest of world emissions)
- **Premature deaths** and years of life lost by pollutant, sex, age, disease, indoor vs. outdoor exposure, pollutant origin
- **Global temperature change** due to national emissions by pollutant
- **Economic costs of premature mortality**
- **Crop losses** due to pollutant concentrations (major cereal crops)

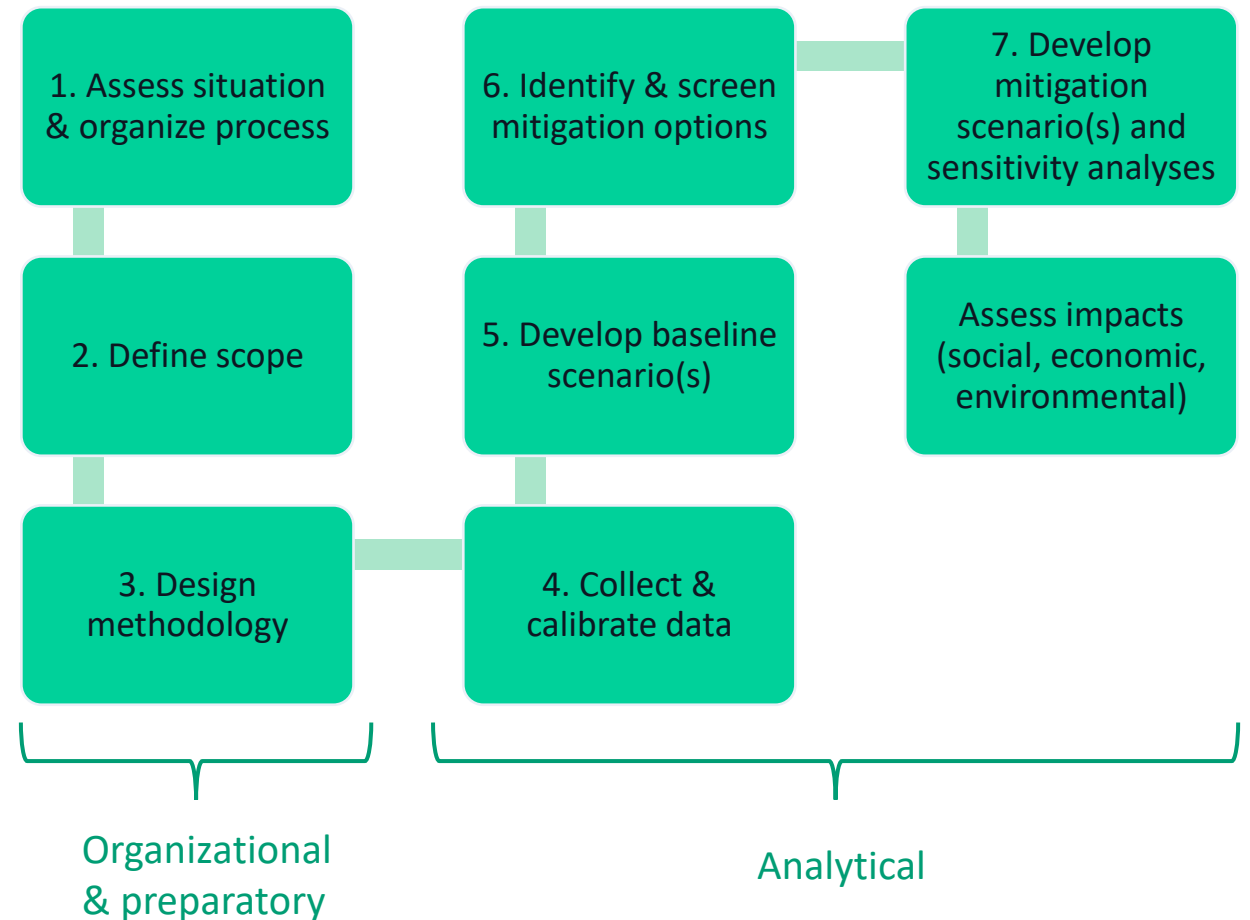
Mapping emissions

- In addition to using charts and tables to analyze emission results, users can optionally display them on maps
- This feature is useful for identifying **emerging emission hotspots** and for tracking and monitoring progress on **reducing emission burdens faced by different communities**

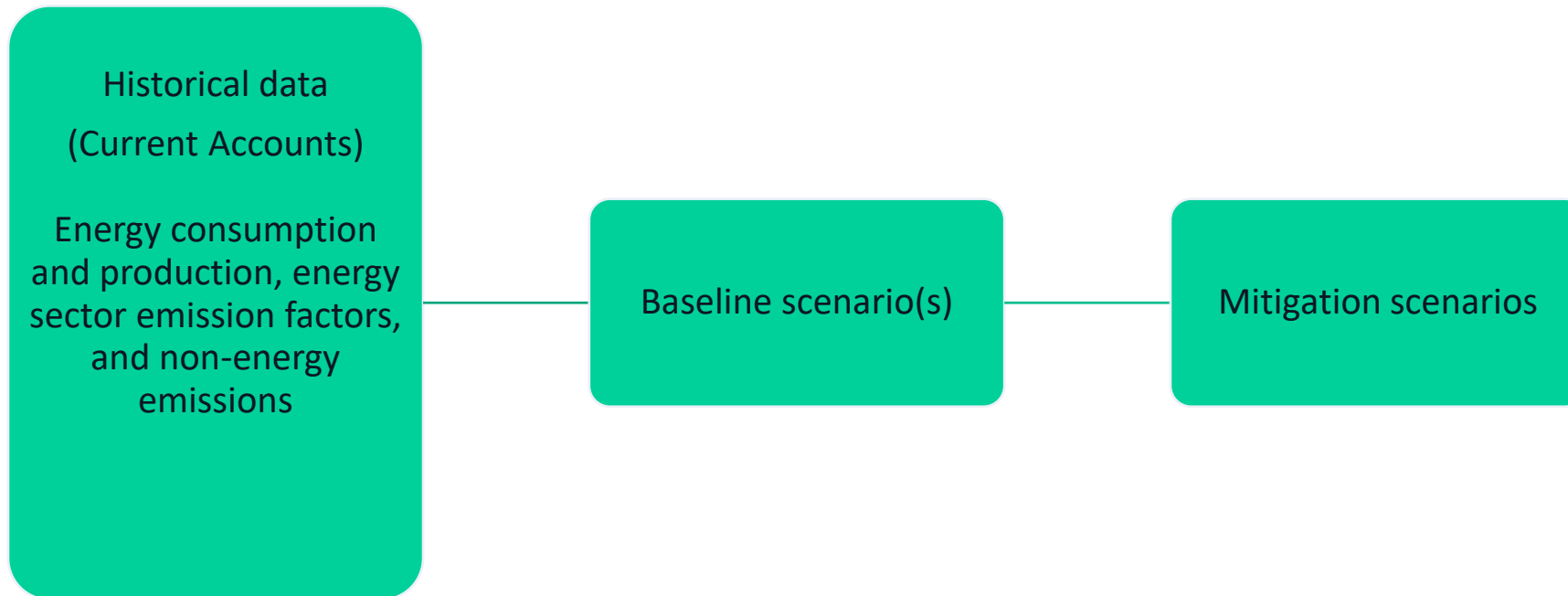


Emission mitigation assessment

- LEAP modeling can play a valuable role in emission mitigation assessment
- Supports analytical steps in assessment process, allowing quantification of impacts of mitigation strategies
- **LEAP's scenario-based architecture** aligns well with typical assessment framework: **comparing mitigation options to a baseline**



Using LEAP for mitigation assessment



Baseline scenarios

- Baseline scenarios are often termed “business-as-usual (BAU)” scenarios, but **BAU needs to be carefully defined**
 - Does it include anticipated future changes? Does it include policies recently enacted? Recently announced? Does it only include policies not specifically aimed at reducing emissions?
 - There is no single commonly accepted definition
- In principle, a **baseline scenario should provide a plausible and consistent description of future developments in the absence of explicit new mitigation policies**
 - Not a forecast of what will happen: future is inherently unpredictable
- Development of a baseline scenario is a critically important analytical and policy task
 - **Influences magnitude of emission benefits and relative cost of mitigation strategies**
 - It can be useful to have multiple baseline scenarios, e.g., with and without existing policies (to reveal their emission benefits)
- Not simply an extrapolation of past trends, a baseline scenario requires data and assumptions regarding factors such as:
 - Macroeconomic and demographic projections (e.g., population and GDP growth)
 - Structural shifts in the economy (e.g., relative growth of agricultural, industrial, and services sectors)
 - Planned investments and existing policies in individual sectors (e.g., power supply plans)
 - Evolution of technologies and practices, including saturation effects, fuel switching, and adoption rates of new technologies (e.g., share of households with air conditioning; use of combined heat and power in steel industry)

Developing mitigation scenarios

- Mitigation scenarios reflect a future in which **explicit policies and measures are adopted to reduce the sources (or enhance the sinks) of emissions**
- Mitigation scenarios should take into account:
 - Specific national and regional development priorities, objectives, and circumstances
 - Common but differentiated responsibilities of countries
- Mitigation scenarios should not simply reflect current plans. Instead, they should assess what would plausibly be achievable based on the goals of the scenario

Possible framing of scenarios

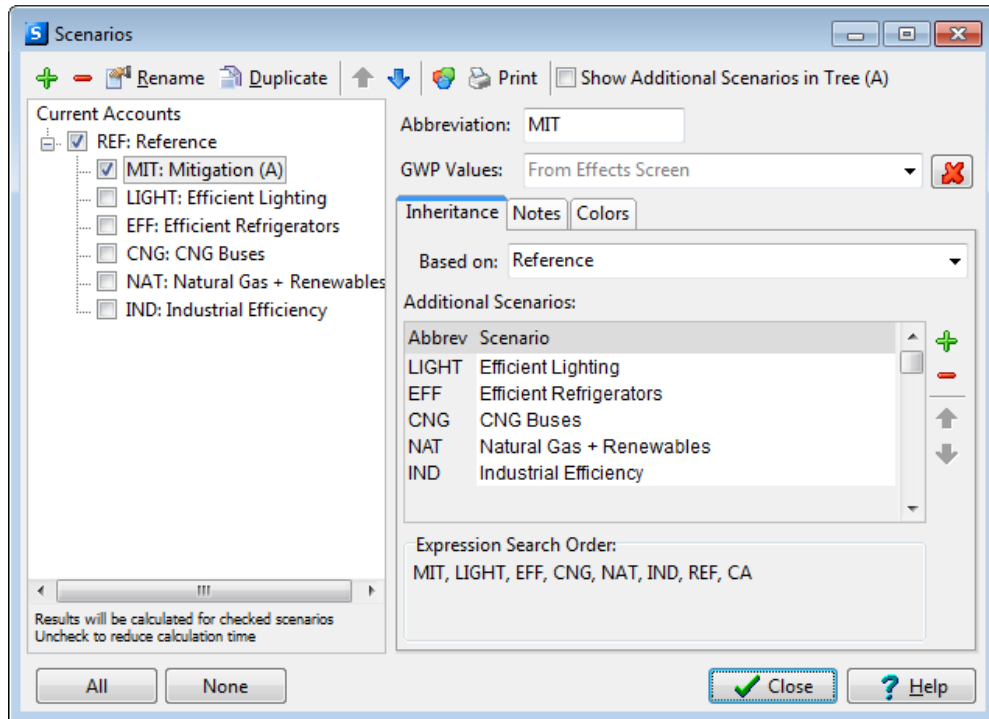
An emission reduction target

Specific options or technologies: included based on perceived technical and/or political feasibility

All options up to a certain cost per unit of emissions reduction (equivalent to a carbon tax)

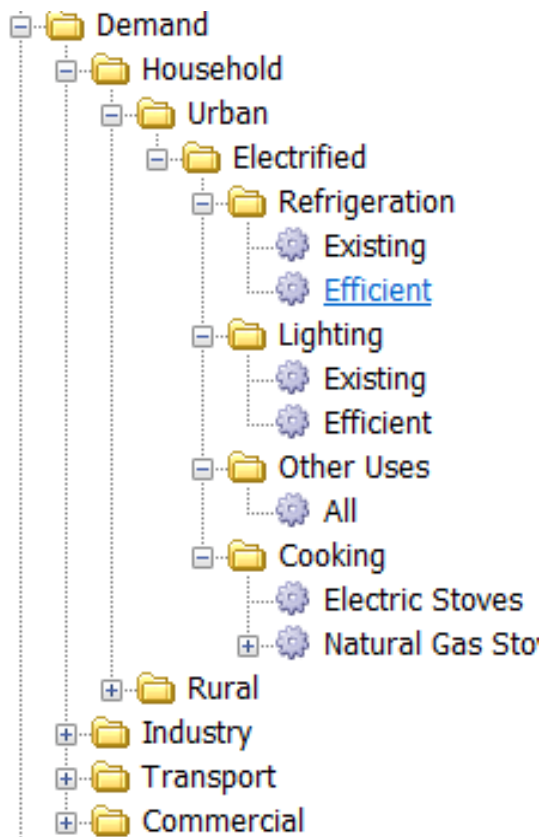
“No regrets” (cost-effective) options only

Implementing mitigation scenarios in LEAP

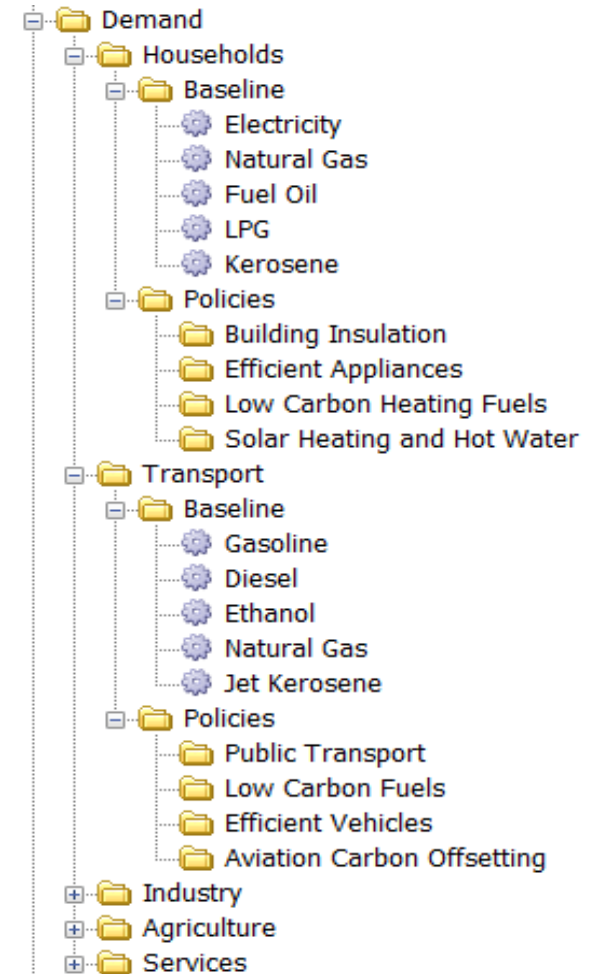


*A common approach: measure-specific
“mini” scenarios combined into overall
mitigation strategies*

Bottom-up / end-use

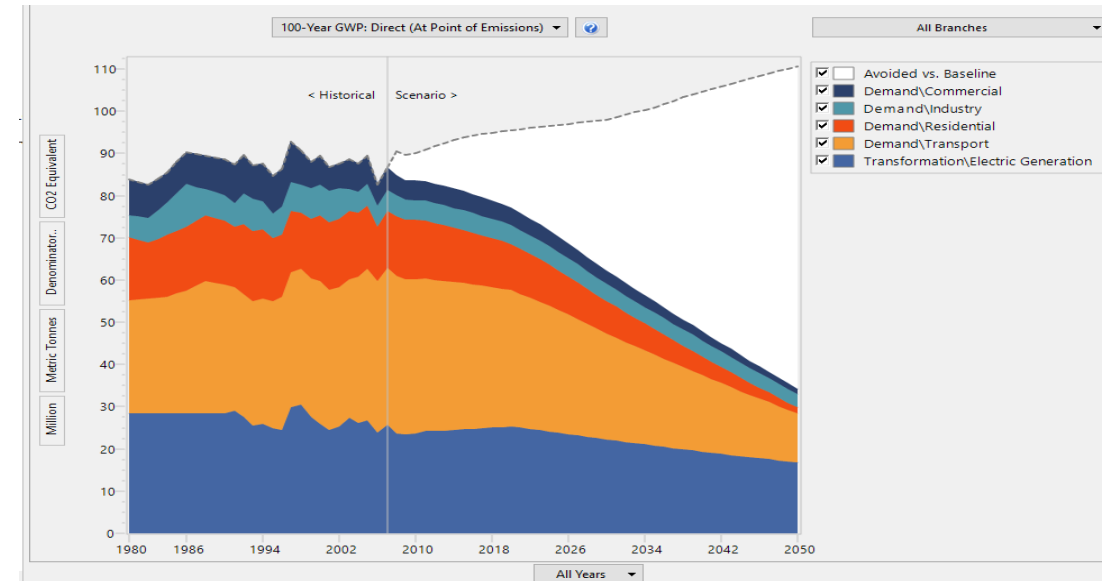


Hybrid / decoupled



Assessing impact of mitigation scenarios

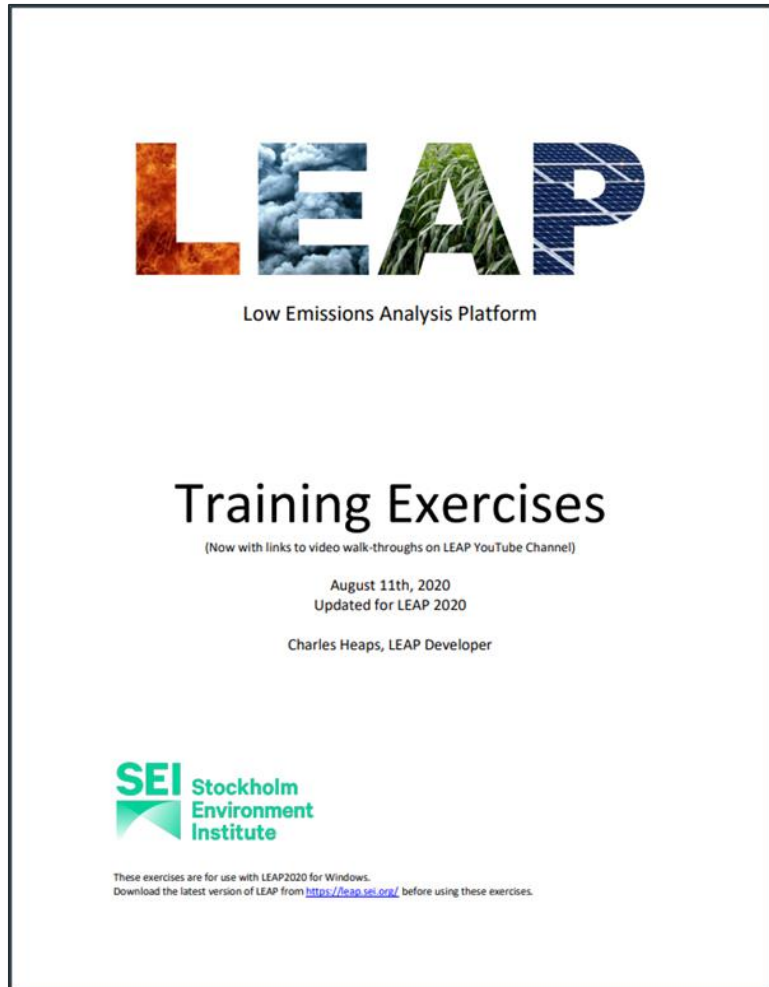
- Scenarios can be compared in terms of:
 - Emission savings
 - Impacts on energy security
 - Social impacts (e.g., development benefits or drawbacks)
 - Costs
 - Technical feasibility of options
 - Political plausibility
 - ...
- LEAP facilitates such comparisons in Results view



Exercise 2: Energy supply and emissions modeling

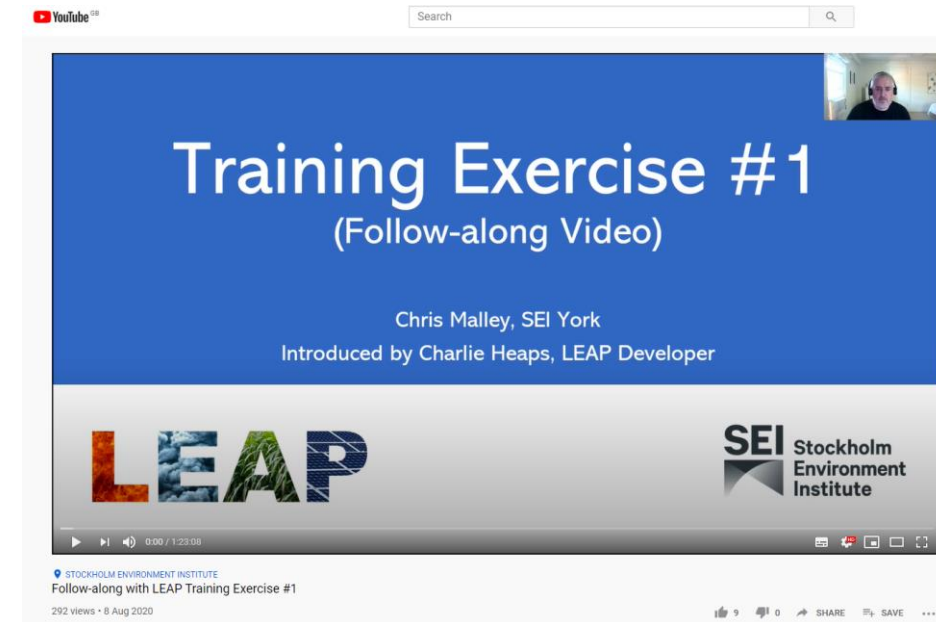


Freedonia



exercise_1_2_3 - LEAPTrainingExerciseEnglish2020.pdf

Workshop Exercises 1 and 2: Chapter 1 in Training Exercises document



<https://www.youtube.com/watch?v=cW87lWDABgc>

Freedonia

Exercise 2

**1.1. Overview of
Freedonia**

1.2. Settings

1.3. Demand

1.3.1. Data structures

1.3.2. Current Accounts

1.3.3. Viewing Results

1.3.4. Reference Scenario

1.4. Transformation

1.4.1. Transmission and
Distribution

1.4.2. Electricity
Generation

1.4.3. Viewing Results

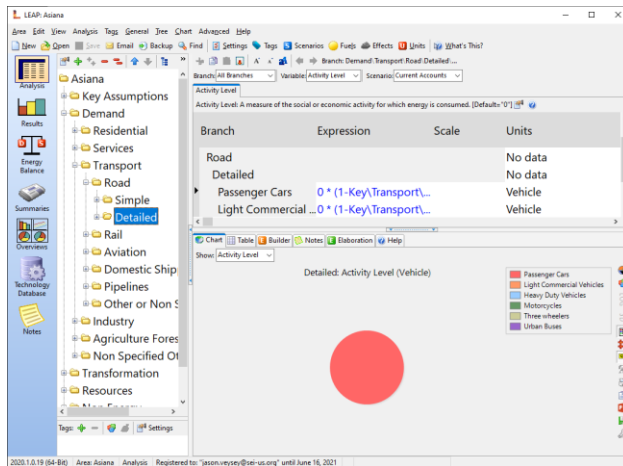
1.5 Emissions

1.5.1. Viewing Results

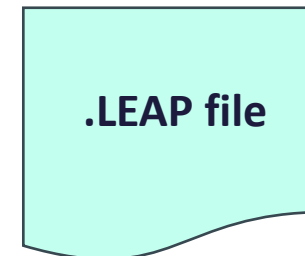
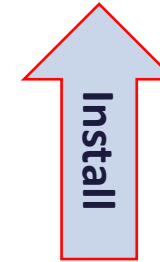
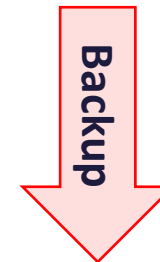
**1.6. A Second
Scenario: Demand-
Side Management**

1.6.1. DSM Scenario
Results

Saving and sharing models



One folder with multiple files per area



One zipped file per area

Installing an area from a .LEAP file overwrites what's in local LEAP areas repository

Be careful, you can lose work!