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Collaboration on Energy and
Environmental Markets



Australian Government
Department of Climate Change, Energy,
the Environment and Water



Pacific
Community
Communauté
du Pacifique

 **USP**
THE UNIVERSITY OF THE
SOUTH PACIFIC



The Energy Transition Model (ETM)

to model multi-sectoral energy transitions across energy supply chains in PICTs



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ENERGY MODELLING PRINCIPLES

Energy Supply Chain

RESOURCES



CONVERSION



DELIVERY



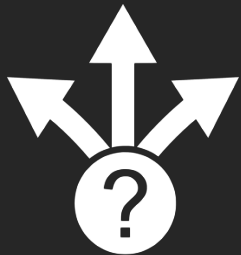
CONSUMPTION

MODELLING: simplified & organised model structures to represent every step of the supply chain



Accurately represent future scenarios

Provide flexible options to forecast demand and the uptake of specific technologies



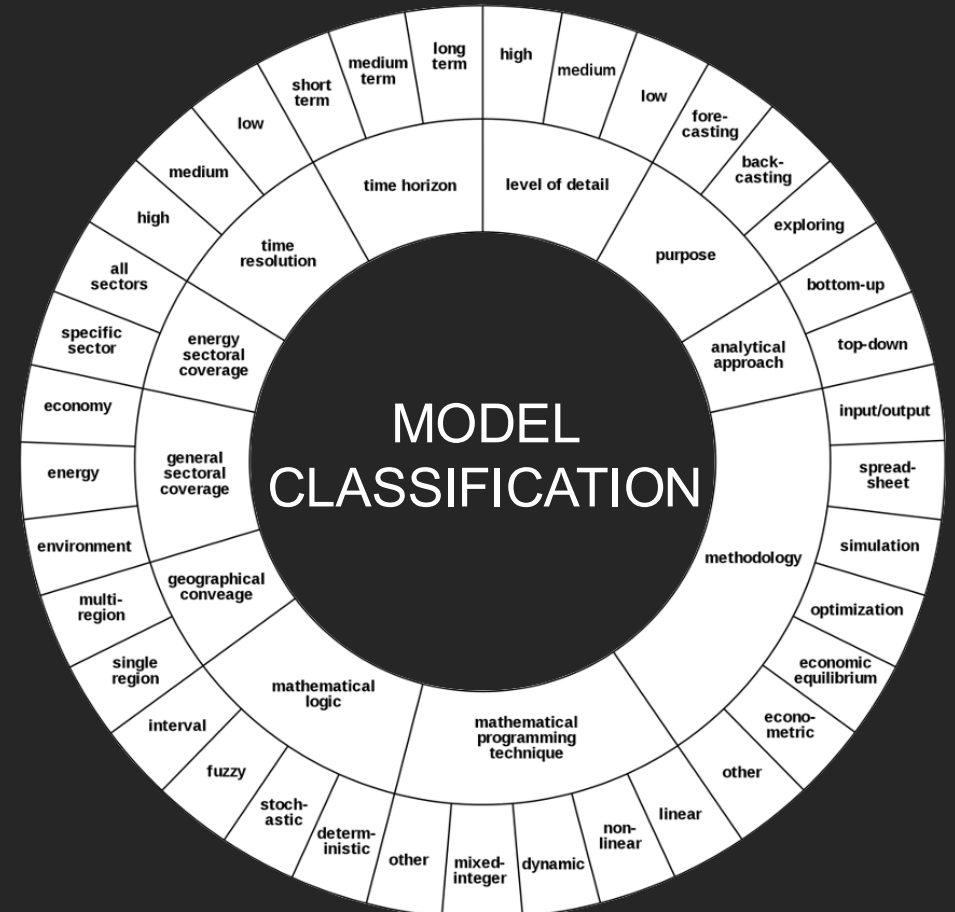
Assist with energy planning & policy making

Assess the outcomes of specific technologies and trends to make better decisions regarding capacity and policy mechanisms



Track progress against strategic targets

Determine how likely an energy system is to meet current targets relating to specific technologies and emissions



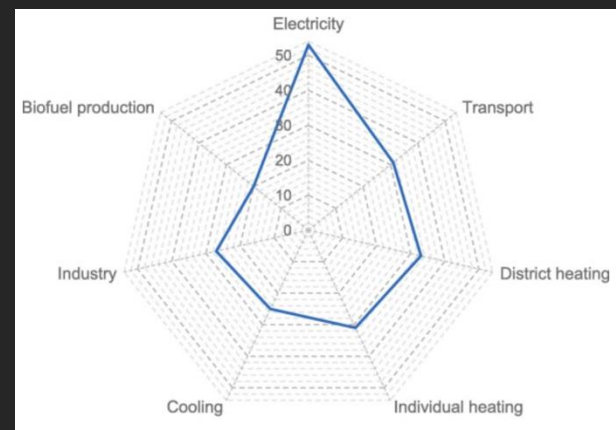
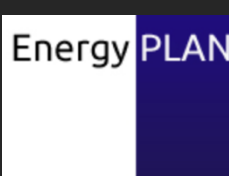
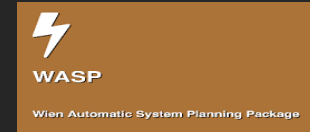
REVIEW

of available modelling tools to investigate energy transitions

Challenges encountered

- Lack of energy data for the Pacific
- Modelling options do not reflect Pacific energy challenges
- Complex user input requirements
- Limited case study applications to test practicality for planning
- Restricted system compatibility
- Barriers to accessibility
- Developed without stakeholder consultation
- Lack of adaptable dashboards
- Requirement of extensive specialised training
- Selective outputs

Some examples...



Model family	Examples	Primary focus
Energy system optimization models	MARKAL, TIMES, MESSAGE, OSeMOSYS	Normative scenarios
Energy system simulation models	LEAP, NEMS, PRIMES	Forecasts, predictions
Power systems and electricity market models	WASP, PLEXOS, ELMOD, EMCAS	Operational decisions, business planning
Qualitative and mixed-methods scenarios	DECC 2050 pathways, Stabilization wedges	Narrative scenarios

From 'Energy systems modelling for twenty-first century energy challenges' (Pfenninger et al., 2014)

MODEL SCORING

Vanuatu Case Study
multi-sectoral tools

TOOL	Key Model Factors						SCORE
	Intuitive Interface	Integrated Database	In-built Training	Simulation-based	Pragmatic Outputs	Open-source	
OSeMOSYS	X	~	X	✓	✓	✓	3.5
TIMES	X	X	X	✓	✓	✓	3
Energy Transition Model (ETM)	✓	✓	✓	✓	✓	✓	6
Global Energy and Climate Model (GEC)	N/A	X	X	✓	✓	X	2
LEAP	X	X	~	✓	✓	~	3
PLEXOS	X	✓	X	✓	✓	X	3
MESSAGE	X	X	X	✓	✓	~	2.5
PRIMES	N/A	X	X	X	✓	X	1
EnergyPLAN	X	X	X	✓	✓	✓	3
ENPEP-BALANCE	X	X	~	~	~	✓	2.5

Energy Transition Model (ETM)



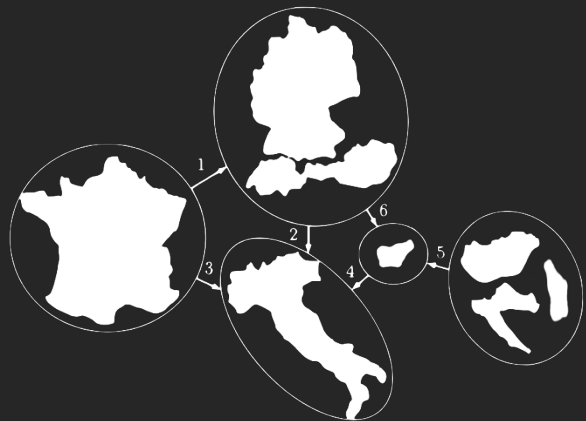
ENERGY TRANSITION MODEL
Independent, Comprehensive and Fact-based

Quintel

Open-source multi-sectoral simulation model with interactive dashboard to produce future energy scenarios and transition plans

<https://energytransitionmodel.com/>

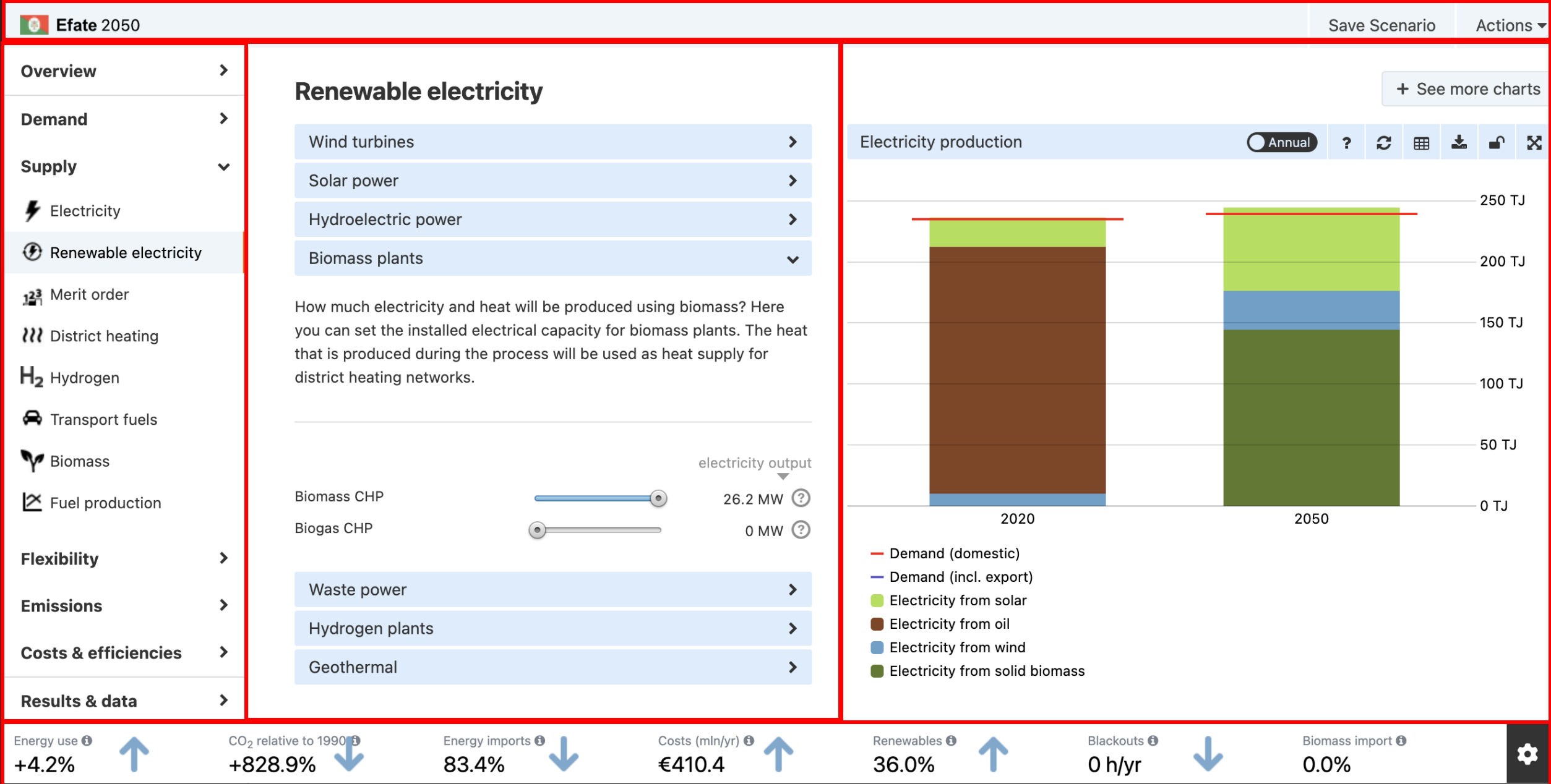
Available for 28 countries (EU + Singapore)



- Adaptable for Pacific
- Extensively tested
- Interactive interface
- Minimal training required
- Multiple output formats (reports, data, infographics)

Key characteristics

- Copper-plate model (the “island assumption”)
- Includes an open-source dataset manager to blend tools with databases
- Considers aspects of the energy supply chain that are crucial to the Pacific (e.g. imports, security of supply)
- Auto-adjustment for balance consistency (e.g. industry)
- Extensive documentation available
- Widely used in EU for policy making and strategic plan development with success
- Interactive and adaptable interface
- Minimal training required and highly adept to being used for technical/planning capacity development
- Supports detailed analyses regarding capacity expansion, grid stability, technology deployment, infrastructure requirements, and decarbonisation
- Integration with variety of Python and Excel tools
- Ease of maintenance via data collection framework
- Multiple output formats (charts, reports, raw data, infographics)



Renewable electricity

- Wind turbines
- Solar power
- Hydroelectric power
- Biomass plants

How much electricity and heat will be produced using biomass? Here you can set the installed electrical capacity for biomass plants. The heat that is produced during the process will be used as heat supply for district heating networks.

Biomass CHP26.2 MW

Biogas CHP0 MW

- Waste power
- Hydrogen plants
- Geothermal

Electricity production

Annual

?

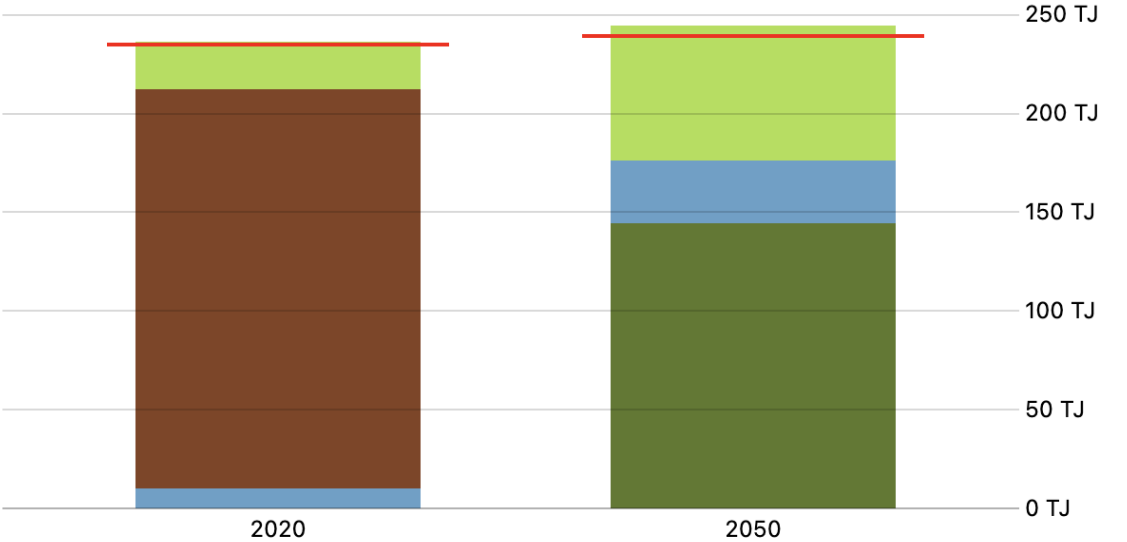
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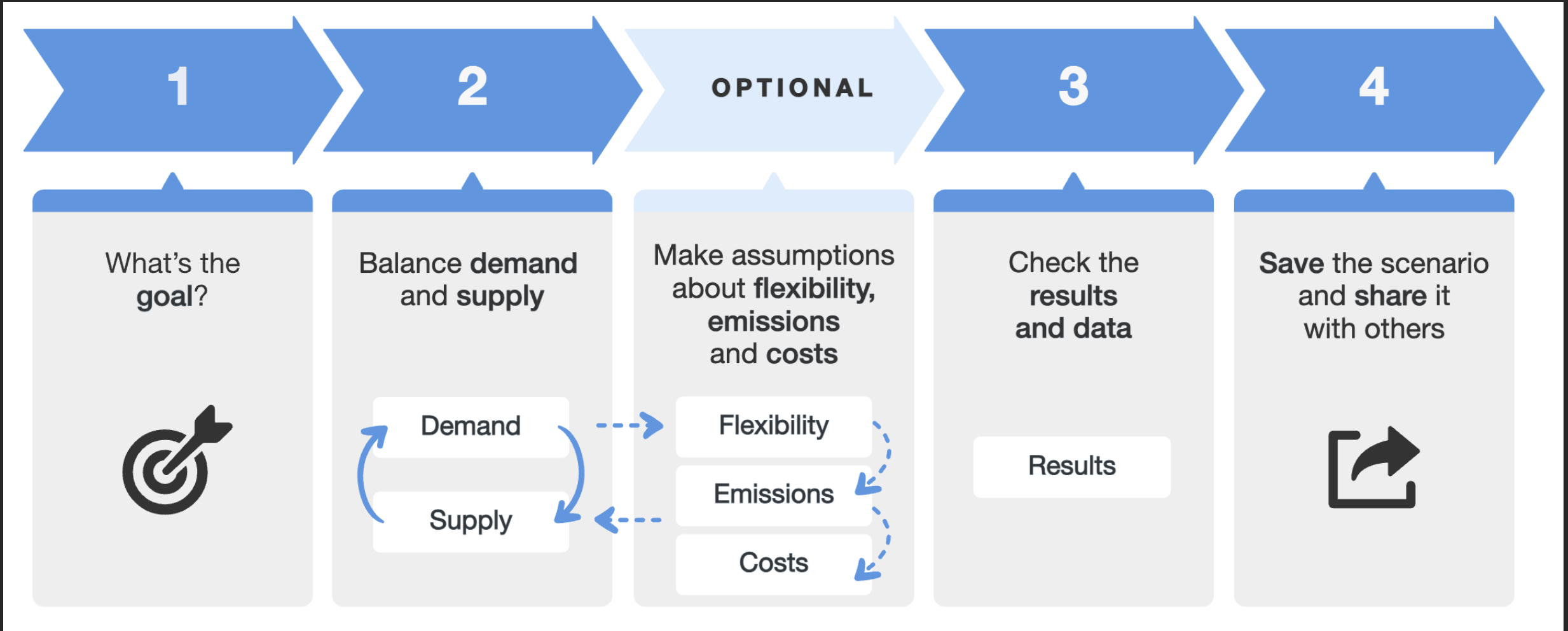
⬇️

🔒

✖️



SCENARIO CREATION WORKFLOW



Efate 2050

Save Scenario

Actions

Overview

Demand

Households

24%

Buildings

2%

Transport

70%

Industry

3%

Agriculture

0%

Other

0%

Supply

Flexibility

Emissions

Costs & efficiencies

Results & data

Welcome!

How does the Energy Transition Model work?

The ETM helps you explore future energy scenarios for a region of your choice. The model is easy to use by following these steps:

- Before you start, think about the goal of your scenario, then you know what to focus on.
- The menu on the left displays all sectors that either use (**Demand**) or produce energy (**Supply**). For each sector you can use sliders to indicate what you think the future will be like. You can easily undo your changes by resetting your slider, so just play around! For example, you can start with **space heating in households** or explore **transport and mobility**.

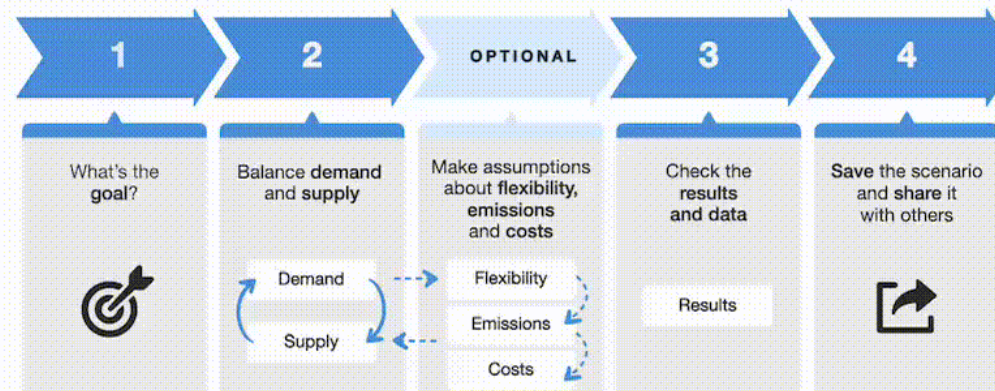
*Optional: advanced users can use the **Flexibility** section to match demand and supply on specific timescales, the **Emissions** section for assumptions on other greenhouse gas emissions or CCUS and the **Costs & efficiencies** section for cost assumptions or efficiency adjustments.*

- The ETM will immediately show you the result of your actions: at the bottom of your screen, indicators show the impact on the entire system (e.g. CO₂ reduction, energy savings, costs). On the right, charts display specific information for each section of the model. If you lock the chart it will remain visible as you navigate through the model. You can add charts by clicking "see more charts" (top right).

For a more complete overview of results you can take a look at the scenario report under the header **Results & data**. You can always return to a certain part of the model to make more changes.

- You can share your scenario with others by saving your scenario:

Workflow



Energy use

-0.2%

CO₂ relative to 1990

+874.3%

Energy imports

92.5%

Costs (mln/yr)

€393

Renewables

21.4%

Blackouts

n/a

Biomass import

0.0%



DEMO - EFATE

AVAILABLE OUTPUTS

Charts & tables

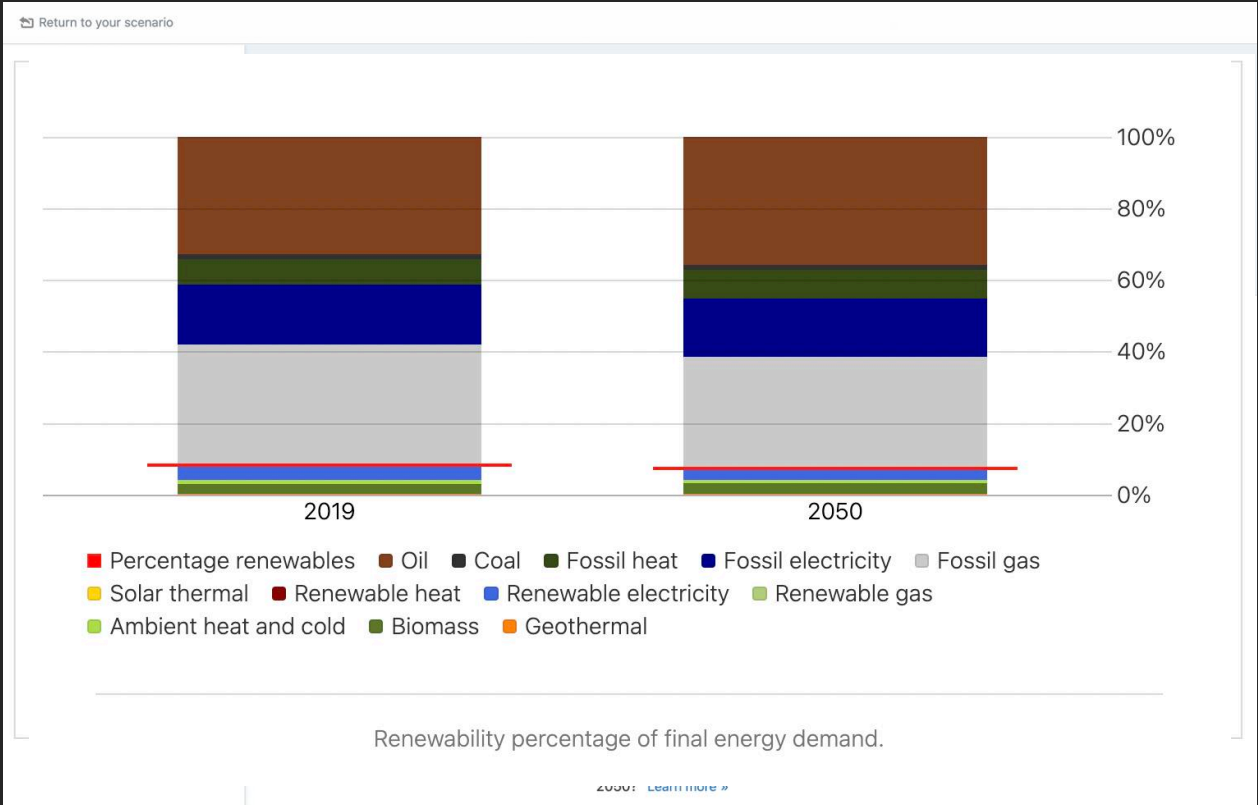
Electricity network capacity and peaks

	Peak load, present (MW)	Usable capacity, present (MW)	Peak load, future (MW)	Usable capacity, future (MW)	Required additional network (MW)
LV net	7,455.19	9,940.25	8,425.02	9,940.25	0
LV MV transformer	7,455.19	9,940.25	8,425.02	9,940.25	0
MV net	7,902.66	10,536.88	10,350.26	10,536.88	0
MV HV transformer	7,902.66	10,536.88	10,350.26	10,536.88	0
HV net	10,437.07	13,916.09	12,286.85	13,916.09	0
Interconnection net	-	0	0	0	0
Offshore net	-	0	0.85	1	1

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

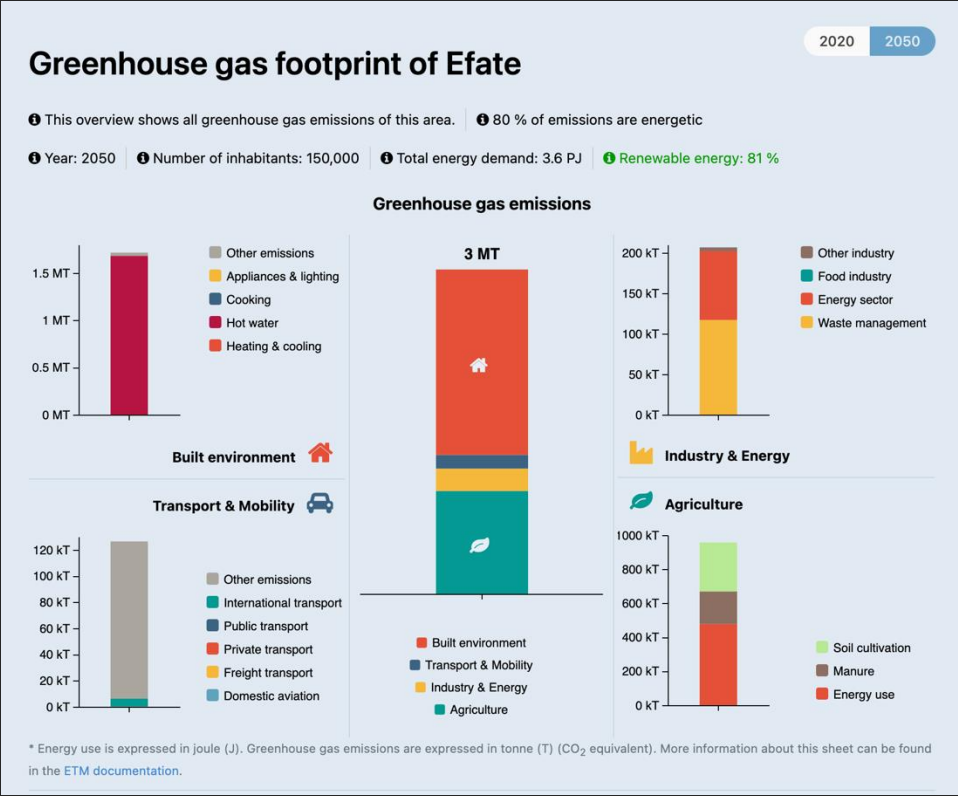
- Total supply to grid
- Battery charge
- Direct supply to grid
- Curtailed
- Battery discharge to grid

Scenario report

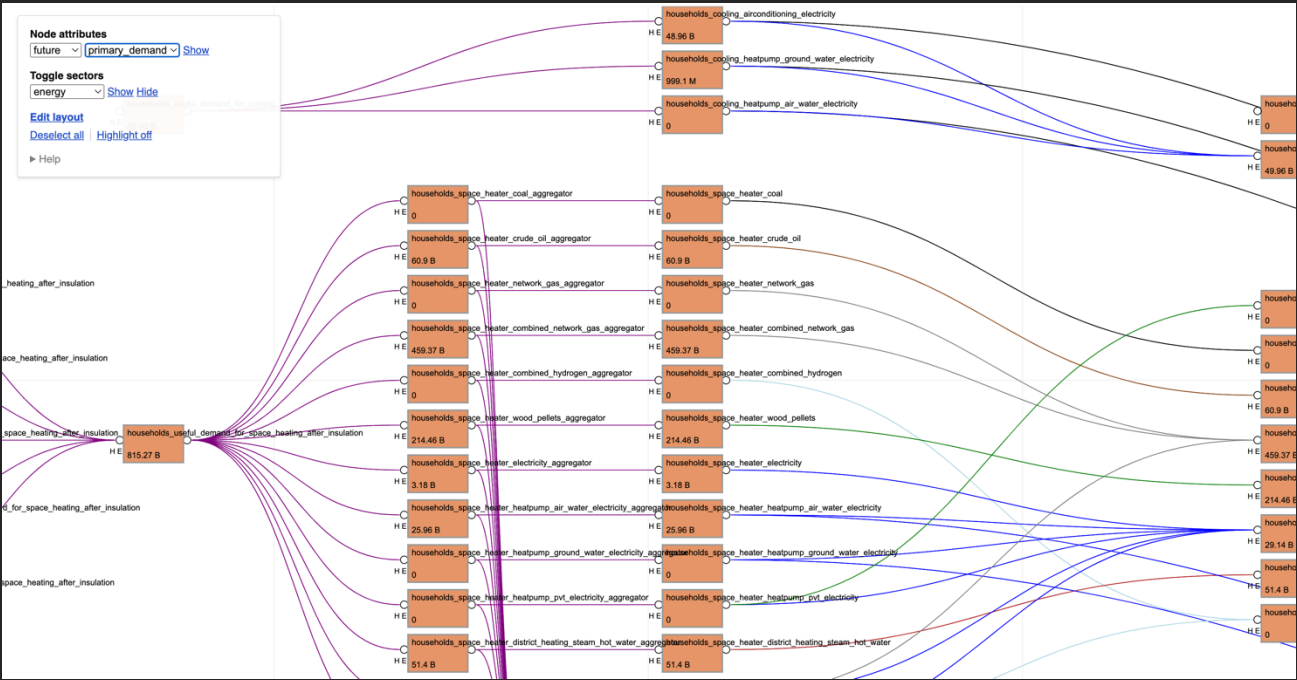


AVAILABLE OUTPUTS

Greenhouse gas footprint infographic



Detailed energy & emissions flows



SCENARIO MANAGEMENT

My Scenarios

My Scenarios

My Transition Paths

Trash

100% Electric Vehicles + Clean Shipping

100% Electric Vehicles + Clean Shipping

Efate 2040 Last updated 29 June, 2024 15:05

Public

Options

Copy link

Decarbonising transport scenario

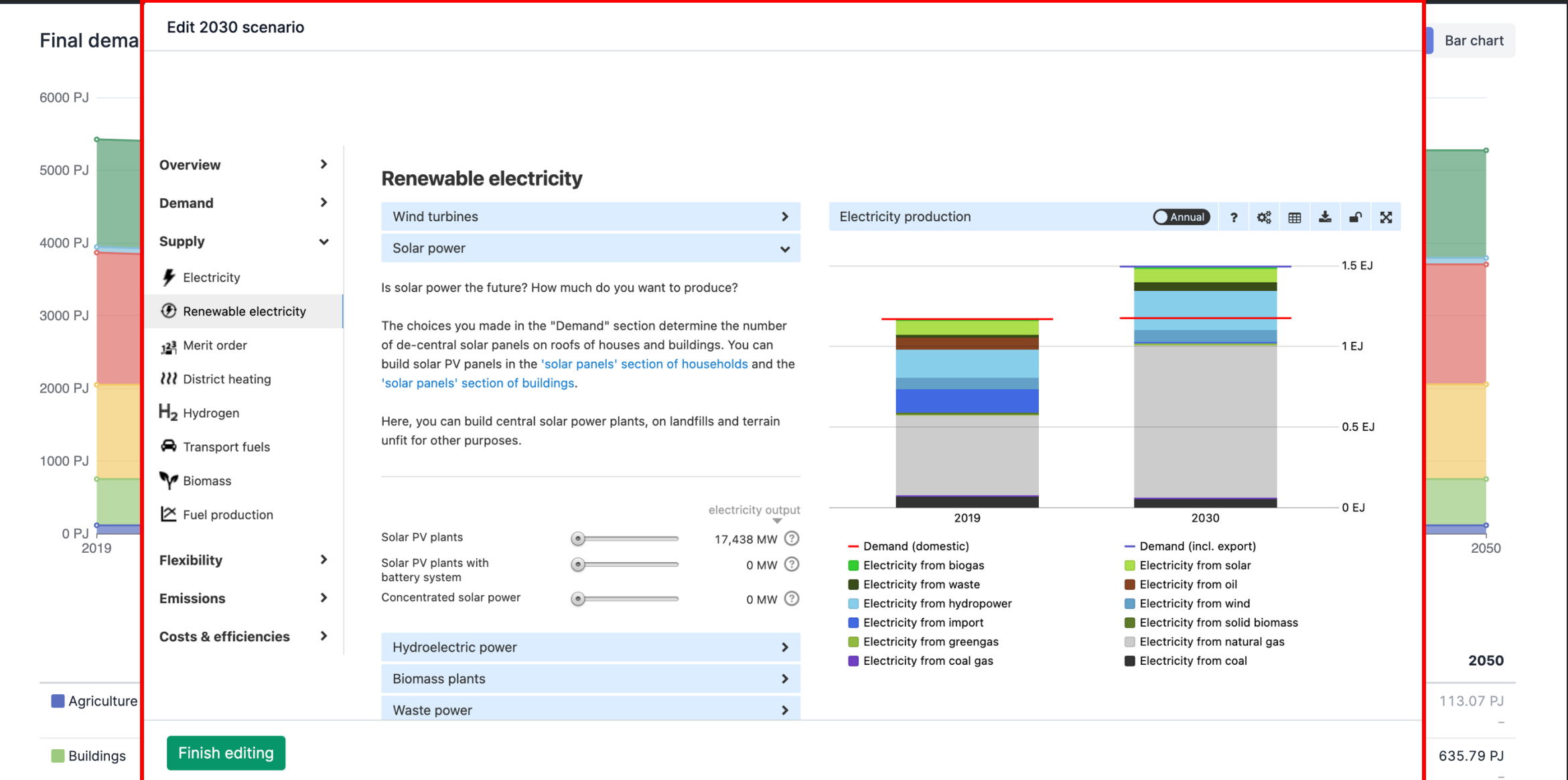
Default

Efate 2050 • Last updated 17 days ago

← Back to my scenarios

Continue with this scenario

TRANSITION PATHWAYS



Energy Transition Model

Dataset Manager

Information

English

LOG IN

+

-

R

East New Britain

Autonomous Region of Bougainville

Arawa

Choiseul

Western

Milne Bay

Coral Sea Islands

Default curves

Weather year curves

Efate

Created by Quintel

General

Households

Buildings

Transport

Agriculture

Industry

Other energy demand

Energy production

Hourly curves

Default curves

Weather year curves

The ETM calculates the hourly production and demand of gas, electricity, heat and hydrogen. Hourly profiles are required for this calculation. On this page you can find the curves that are used by default in the ETM and that correspond with the starting year. As you can see below, there are different types of profiles: supply and demand profiles. Often the same profiles are used for a region within a country as the country itself. Do you want to use other profiles in your ETM scenario? This is possible and you can do this in the ETM on the page [Flexibility -> Modify profiles](#).

Supply - Electricity

Hydropower (river)

Solar PV

Solar PV

datasets/VUNHS_efate/curves/weather/default/solar_pv_profile_1.csv

Version history

26 June 2024, KoenvanB

Update pv roof surface area households & buildings for RES11 (#3064)

* Update pv roof surface area households & buildings

* Update RES11 database and delete wrong RES11_nI2019 database

Wind coastal

Wind inland

Wind offshore

Supply - Heat

Geothermal heat

Solar thermal

Demand - Buildings

Appliances

Map

Information

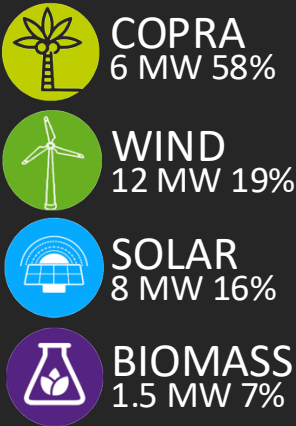
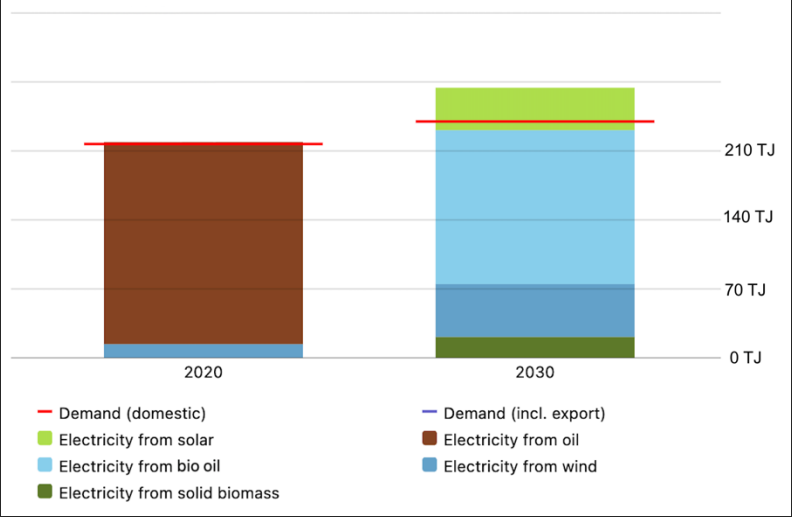
English

LOG IN

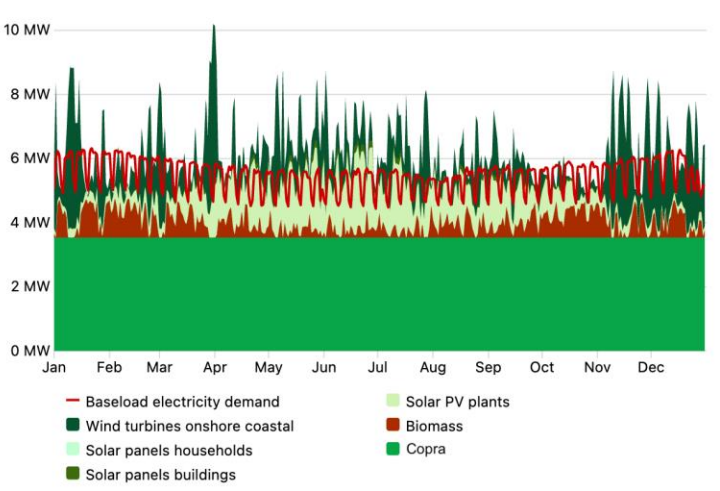
Scenario Examples

100% Renewable Electricity by 2030 - Efaté

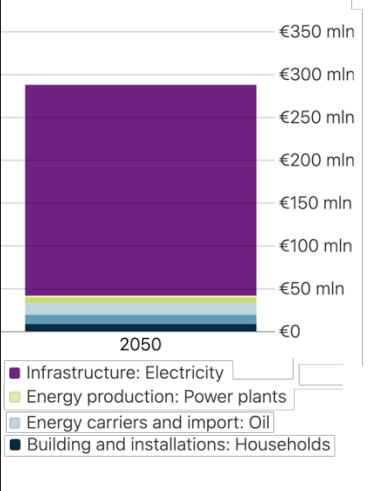
Annual Electricity Production



Hourly Supply-Demand Matching

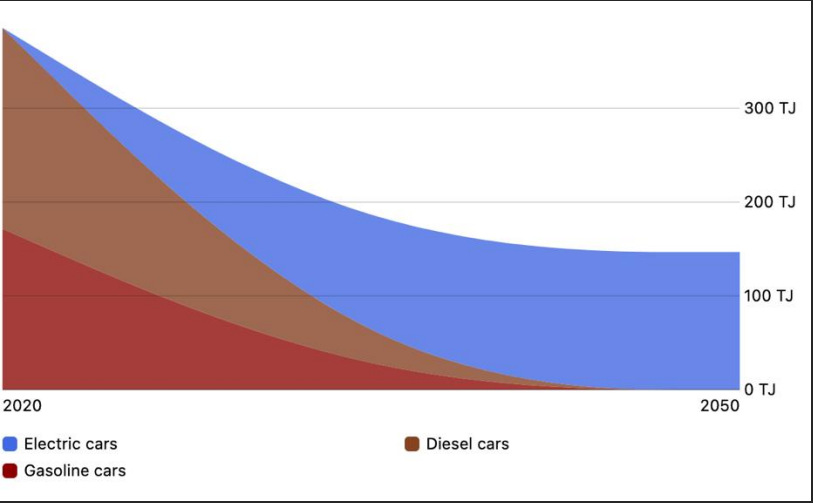


Required Investment

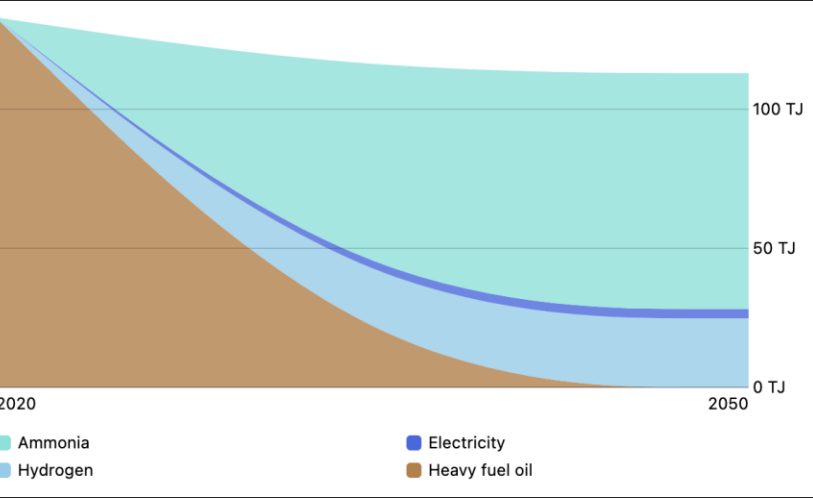


And extending into 2050...

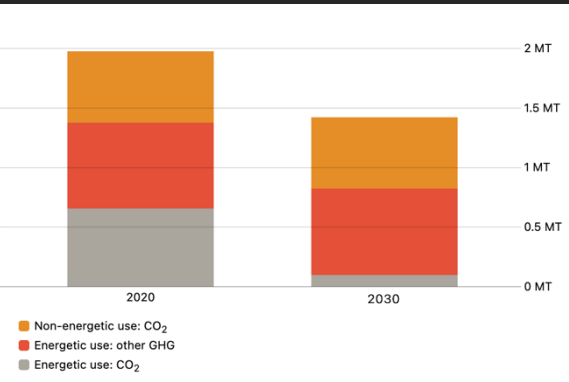
Final demand for cars by technology



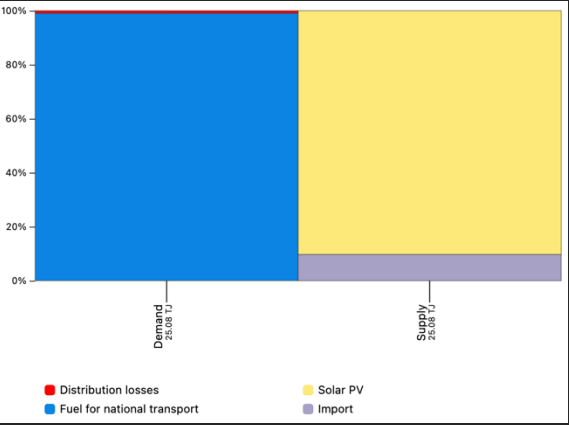
Final demand for domestic navigation by carrier



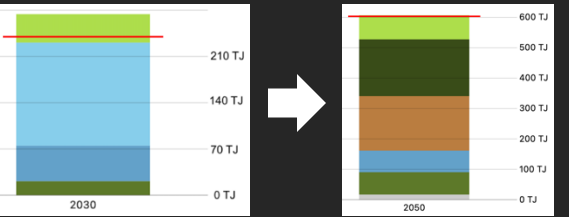
Total emissions



Hydrogen supply & demand



+ 10MW per RE, including geothermal & waste incineration



APPLICATIONS FOR PICTs



Policy Development

Assist in developing effective energy policies and goals to support energy transitions



Geographic Fragmentation

Reflect multi-island context of Vanuatu and develop strategies for independent islands to form a national strategy



Energy Independence

Identify opportunities reduce need for imports and expand local energy resource utilisation + REGIONAL STRATEGY



Resilience & Security

Understand implications and opportunities associated with carrying out key energy transitions and experiencing disastrous weather



Data Centralisation

Opportunity to adopt a proven data collection framework to track national/state energy production, conversion, and consumption



Economic Development

Identify opportunities to expand economy/infrastructure in conjunction with energy sector and create a regional trade network in the Pacific

DATA COLLECTION PROCESS

Vanuatu Case Study



EFAT
EUNELCO



ESPIRITU
SANTO



MALEKULA
VANPOWER



TANNA
VANPOWER

Keys	Value
Residences	
households_final_demand_for_space_heating_network_gas_households_space_heater_combined_network_gas_parent_share	0
households_final_demand_for_space_heating_network_gas_households_space_heater_network_gas_parent_share	0
households_final_demand_for_space_heating_network_gas_households_space_heater_hybrid_heatpump_air_water_electricity_pare	0
households_final_demand_for_space_heating_electricity_households_space_heater_electricity_parent_share	0
households_final_demand_for_space_heating_electricity_households_space_heater_heatpump_air_water_electricity_parent_share	0
households_final_demand_for_space_heating_electricity_households_space_heater_hybrid_heatpump_air_water_electricity_parent_	0
households_final_demand_for_space_heating_electricity_households_space_heater_heatpump_ground_water_electricity_parent_sha	0
households_final_demand_for_cooking_electricity_households_cooker_halogen_electricity_parent_share	0
households_final_demand_for_cooking_electricity_households_cooker_induction_electricity_parent_share	0
households_final_demand_for_cooking_electricity_households_cooker_resistive_electricity_parent_share	0
households_final_demand_for_lighting_electricity_households_lighting_incandescent_electricity_parent_share	0
households_final_demand_for_lighting_electricity_households_lighting_efficient_fluorescent_electricity_parent_share	0
households_final_demand_for_lighting_electricity_households_lighting_led_electricity_parent_share	0
households_final_demand_for_appliances_electricity_households_appliances_clothes_dryer_electricity_parent_share	0
households_final_demand_for_appliances_electricity_households_appliances_computer_media_electricity_parent_share	0
households_final_demand_for_appliances_electricity_households_appliances_dishwasher_electricity_parent_share	0
households_final_demand_for_appliances_electricity_households_appliances_fridge_freezer_electricity_parent_share	0
households_final_demand_for_appliances_electricity_households_appliances_television_electricity_parent_share	0
households_final_demand_for_appliances_electricity_households_appliances_vacuum_cleaner_electricity_parent_share	0
households_final_demand_for_appliances_electricity_households_appliances_washing_machine_electricity_parent_share	0
households_final_demand_for_appliances_electricity_households_appliances_other_electricity_parent_share	0
households_final_demand_for_cooling_electricity_households_cooling_airconditioning_electricity_parent_share	0
households_final_demand_for_cooling_electricity_households_cooling_heatpump_ground_water_electricity_parent_share	0
households_final_demand_for_cooling_electricity_households_cooling_heatpump_air_water_electricity_parent_share	0
number_of_residences	0
input_percentage_of_terraced_houses	0
input_percentage_of_apartments	0
input_percentage_of_detached_houses	0
input_percentage_of_semi_detached_houses	0
input_percentage_of_corner_houses	0
input_households_terraced_houses_heat_demand_reduction	0
input_households_apartments_heat_demand_reduction	0
input_households_detached_houses_heat_demand_reduction	0
input_households_semi_detached_houses_heat_demand_reduction	0
input_households_corner_houses_heat_demand_reduction	0
heat_share_of_apartments_with_block_heating	0

Workbook distribution to key stakeholders (utilities, ministries & departments, authorities)

“keys” = model variables

DATA COLLECTION PROCESS



EFAT
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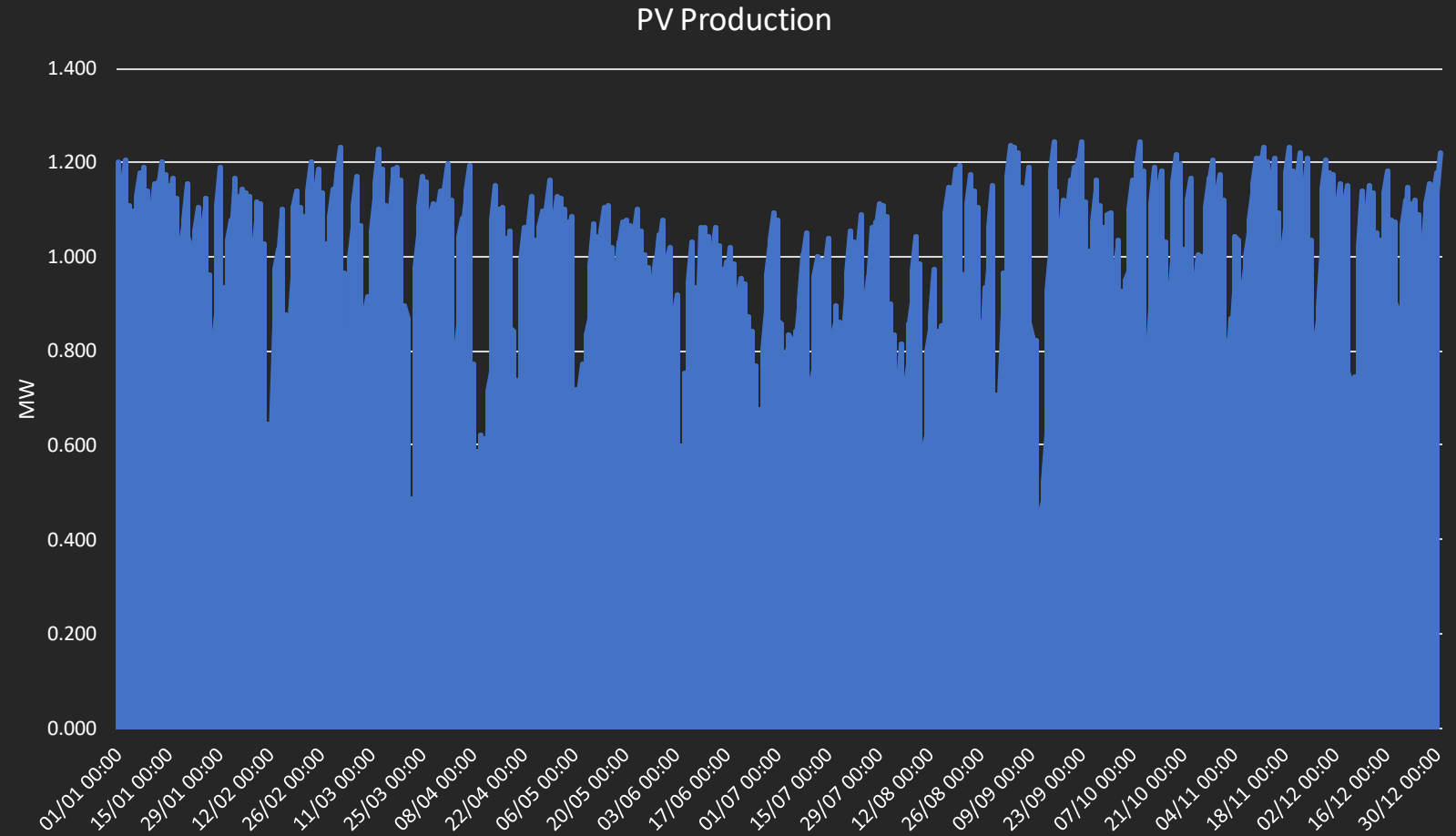
ESPIRITU
SANTO



MALEKULA
VANPOWER



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Workbook distribution to key stakeholders
(utilities, ministries & departments, authorities)

“keys” = model variables

DATA COLLECTION PROCESS



EFAT
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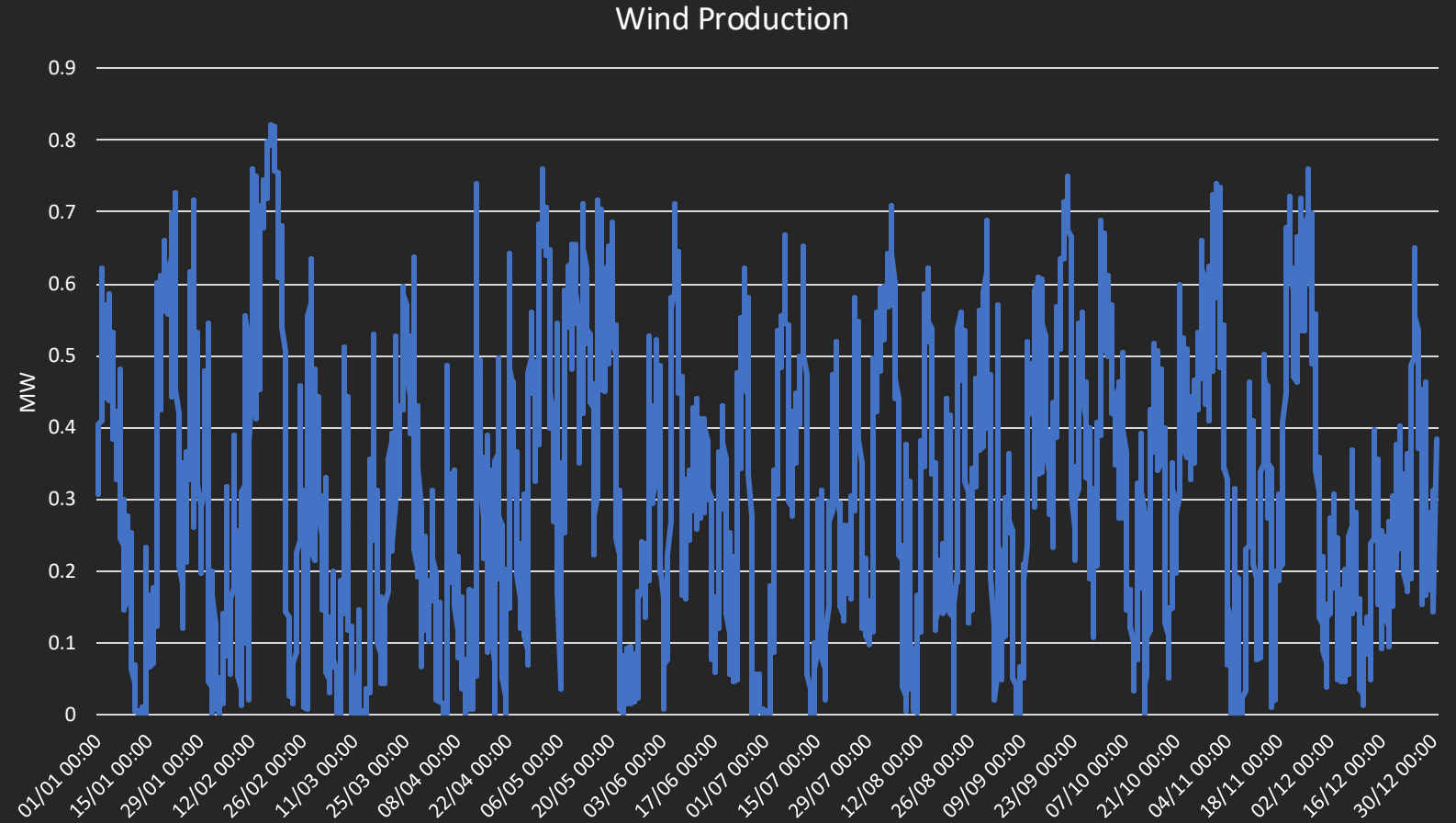
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DATA COLLECTION PROCESS



EFAT
UNELCO



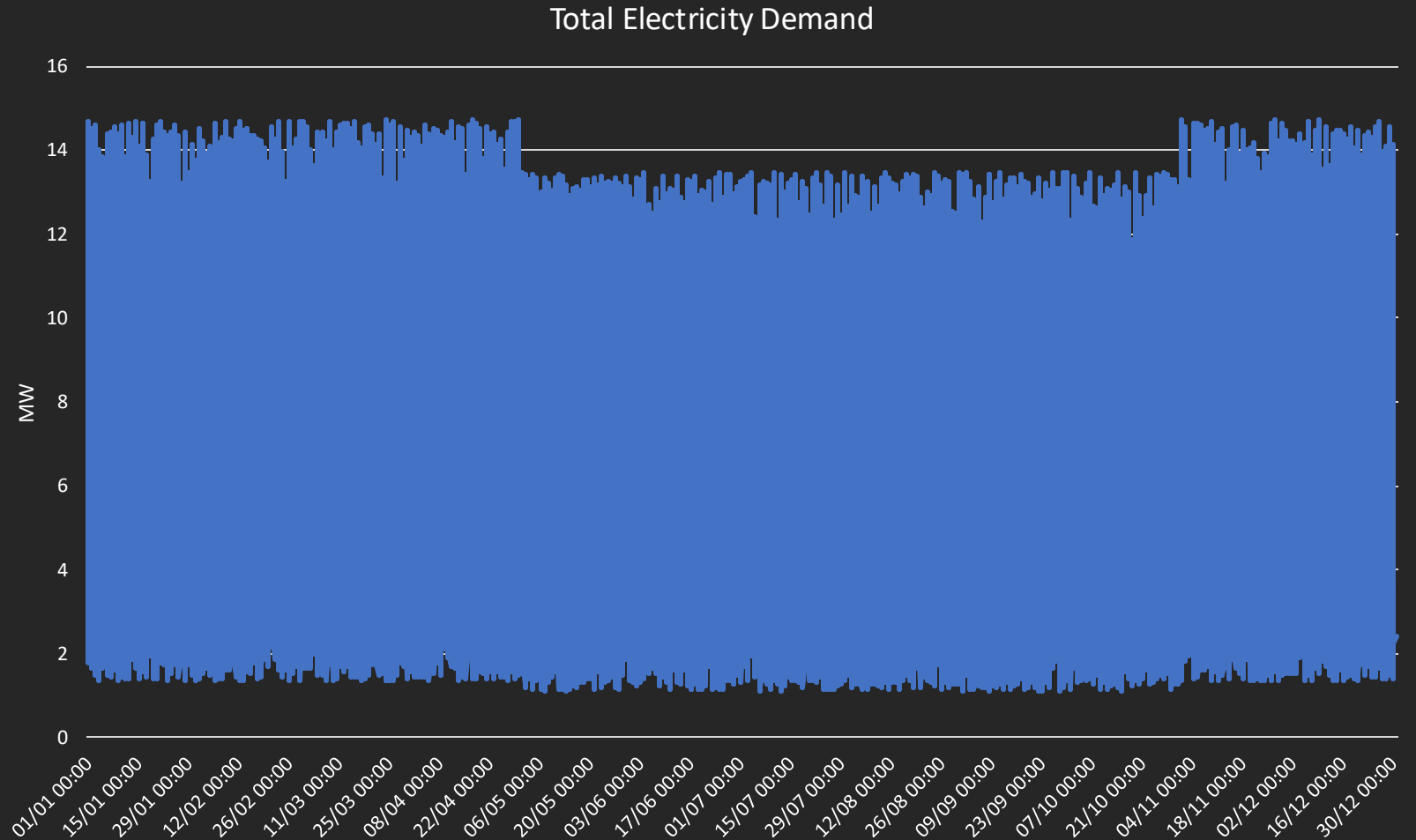
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EFAT
EUNELCO



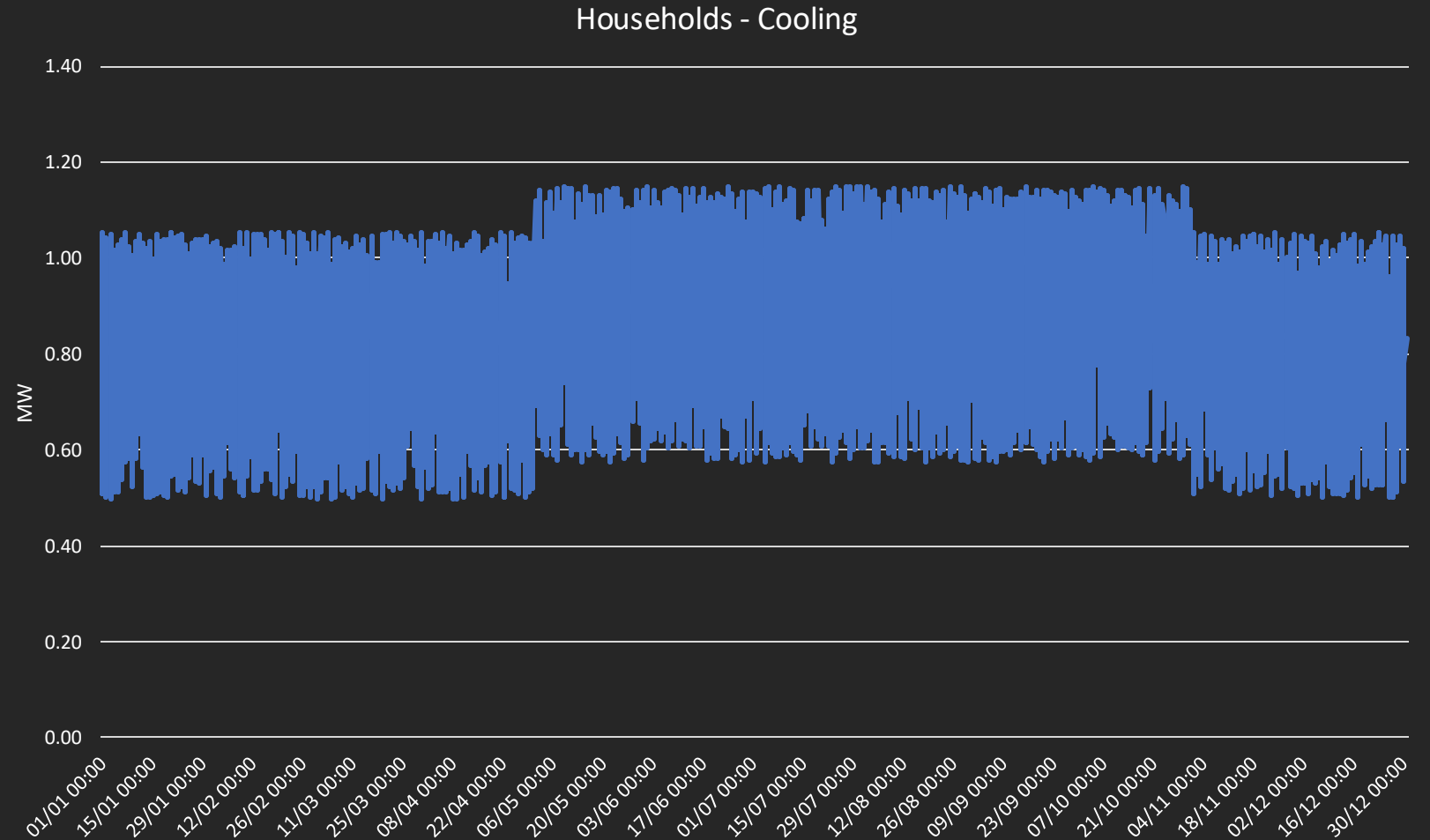
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Workbook distribution to key stakeholders
(utilities, ministries & departments, authorities)

“keys” = model variables

DATA COLLECTION STATUS

Assumption-based Model Variables by Data Collection Workbook Category

(ideally -> 0%)

Energy Balance	Residences	Services	Transport	Industry	Supply	Fuel mix	Resources	General	Infrastructure	Hourly curves
----------------	------------	----------	-----------	----------	--------	----------	-----------	---------	----------------	---------------

47%

32%

50%

25%

0%

0%

86%

27%

27%

34%

62%

Weighted Average: 26% (212/806)

EFAT
NELCO

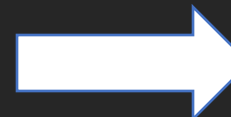
ESPIRITU
SANTO

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VANPOWER

Date	TIME	P												Total Kw			
		GEN # 1			GEN # 2			GEN # 4			GEN # 5				T1	T2	T3
		P	P	P	P	P	P	P	P	P	P	P	P		P	P	P
		KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	
1/1/2023	0100H	0	0	0	0	236	0	300	250	600						1386	
1/1/2023	0200H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1/1/2023	0300H	0	538	320	213	208	0	0	0	0	0	0	0	0	0	1274	
1/1/2023	0400H	0	0	0	380	0	300	250	550							1480	
1/1/2023	0500H	0	0	0	159	0	300	250	550							1259	
1/1/2023	0600H	0	0	0	143	0	300	250	500							1193	
1/1/2023	0700H	0	0	0	139	0	300	250	500							1189	
1/1/2023	0800H	0	0	0	142	0	300	250	500							1192	
1/1/2023	0900H	0	0	0	149	0	300	250	500							1199	
1/1/2023	1000H	0	0	0	196	0	300	250	500							1246	
1/1/2023	1100H	0	0	0	118	0	300	250	400							1068	
1/1/2023	1200H	0	0	0	177	0	300	250	400							1127	
1/1/2023	1300H	0	0	0	136	0	300	250	400							1086	
1/1/2023	1400H	0	0	0	135	0	300	250	400							1085	
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1/1/2023	1900H	0	0	0	0	322	300	250	500							1372	
1/1/2023	2000H	0	0	0	0	326	300	250	500							1376	
1/1/2023	2100H	0	0	0	0	340	300	250	500							1390	
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1/1/2023	2400H	0	0	0	0	290	300	250	500							1340	
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2/1/2023	0300H	0	0	0	0	200	300	250	450							1200	
2/1/2023	0400H	0	0	0	0	180	300	250	450							1180	
2/1/2023	0500H	0	0	0	0	190	300	250	450							1190	
2/1/2023	0600H	0	0	0	0	190	300	250	350							1090	
2/1/2023	0700H	0	0	0	0	200	300	250	350							1100	
2/1/2023	0800H	0	0	0	0	215	300	250	400							1165	
2/1/2023	0900H	0	0	0	0	230	300	250	400							1180	
2/1/2023	1000H	0	0	0	0	235	300	250	450							1235	
2/1/2023	1100H	0	0	0	0	260	300	250	450							1260	
2/1/2023	1200H	0	0	0	0	230	300	250	450							1230	
2/1/2023	1300H	0	0	0	0	210	300	250	450							1210	

(1000Kwh / x 1000 Kwh)					Refer to Table 3	
RESIDENCES		Port Vila	Luganville	Malekula	Tanna	
YEAR	2018	56,923	6,940	685	993	
	2019	66,035	10,477	1,053	1,413	
	2020	60,821	9,828	1,009	1,401	
	2021	53,447	11,172	835	1,161	
	2022	62,873	11,169	1,033	1,367	
	2023	57,304	10,808	1,165	1,463	
Imports cleared for Home Consumption					Refer to Table 3	
Year		Petrol	Diesel	Kerosene		
	2018	10271	54785	8		
	2019	7924	38576	1857		
	2020	12363	63614	7		
	2021	14072	67023	96		
	2022	8922	49805	1927		
	2023	15914	78292	NA		
Imports Cleared for Home Consumption, in Value (In Millions vatu)					Refer to Table 6.6	
Year		Crude Materials ex Mineral Fuels	Oil, fats & W Basic manufac	Machines and Transport Equipment		
	2018	2510	4888	148	5074	9742
	2019	707	5359	147	4983	8503
	2020	637	2946	133	4801	7068
	2021	754	4198	219	5254	8579
	2022	445	7442	129	4391	7966
	2023	918	7382	244	6392	12984



89 #5.1: Total hourly electricity demand profile on Efate	Feedback	Next Step
89 #6.2: Hourly electricity demand profiles for industrial loads on Efate (agriculture, food processing, telecommunications, etc.)	UNESCO provided land use data and maps of 2013. UNEP report outlines the energy consumption by Major town. Outline in MY12 a short check on the shared forest. UNESCO provided land profile for 2022 and part of 2023 including the non power station. Need to discuss with Tanager for the Substation data.	
89 #6.3: Hourly electricity demand profiles for all substation on Efate.	89 #6.4: Hourly electricity demand profiles for households on Efate (ideally split between appliances, cooling, space heating, lighting, cooking, and water heating).	Meeting with Tanager/UNA
89 #6.5: Hourly electricity demand profiles for non-residential services/building on Efate (ideally split between appliances, cooling, space heating, lighting, cooking, and water heating)	89 #6.6: Hourly electricity demand profiles for any electric vehicles charging on Efate (ideally split between home charging, out of home charging, fast charging, smart charging, and regular charging)	Meeting with Tanager/UNA
89 #6.7: Annual energy and non-energy solid biomass fuel demand for residences, non-residential buildings, and industries (agriculture, food processing, in Ti on Efate)	89 #6.8: Annual residential rooftop PV input from households and non-residential buildings into the grid in Ti on Efate	Meeting with Tanager/UNAChuan Swan Shop for his Private Charging Station
89 #6.9: Annual gasoline and diesel consumption for land transport in Ti on Efate	89 #6.10: Annual heavy fuel oil consumption for marine transport and local shipping in Ti on Efate	Discuss this with Statistics Office
89 #6.11: Annual electricity consumption in Ti from industrial loads on Efate (agriculture, food processing, telecommunications, etc.)	89 #6.12: Annual fuel consumption for domestic medium in Ti on Efate	Discuss this with Statistics Office
89 #6.13: Annual electricity, gas, oil, and biomass consumption in Ti for household energy use on Efate, split into appliances, cooling, lighting, space heating, cooking, and water heating	89 #6.14: Technology split for space/heating in households using electricity in % of total on Efate, split between high efficiency gas boilers, regular gas boilers, and hybrid heatpumps	Discuss this with Statistics Office
89 #6.15: Technology split for space/heating in households using electricity in % of total on Efate, split between gas boilers, regular gas boilers, and hybrid heatpumps	89 #6.16: Technology split for cooling in households using electricity in % of total on Efate, split between fan coil units, air conditioners, and air source electric heat pumps	
89 #6.17: Technology split for lighting in households using electricity in % of total on Efate, split between incandescent, fluorescent, and LEDs	89 #6.18: Technology split for cooling in households using electricity in % of total on Efate, split between fan coil units, air conditioners, and air source electric heat pumps	
89 #6.19: Technology split for lighting in non-residential buildings using electricity in % of total on Efate, split between incandescent, fluorescent, and LEDs	89 #6.20: Number of non-residential buildings on Efate	
89 #6.21: Number of non-residential buildings on Efate	89 #6.22: Number of total vehicle registrations for cars, buses, trucks, motorcycles, and vans on Efate	
89 #6.23: Typical number of kilometers travelled by a single vehicle for cars, buses, trucks, motorcycles, and vans on Efate	89 #6.24: Annual non-energy product use for land transport in Ti on Efate (agriculture, food processing, telecommunications, etc.)	
89 #6.25: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.26: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.27: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.28: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.29: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.30: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.31: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.32: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.33: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.34: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.35: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.36: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.37: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.38: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.39: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.40: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.41: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.42: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.43: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.44: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.45: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.46: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.47: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.48: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.49: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.50: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.51: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.52: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.53: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.54: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.55: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.56: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.57: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.58: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.59: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.60: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.61: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.62: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.63: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.64: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.65: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.66: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.67: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.68: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.69: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.70: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.71: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.72: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
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89 #6.77: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.78: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
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89 #6.85: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.86: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.87: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.88: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.89: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.90: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.91: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.92: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.93: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.94: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.95: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.96: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.97: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.98: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	
89 #6.99: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	89 #6.100: Oil types used in all fuel heaters for households, non-residential buildings, agriculture, and industry in % of total on Efate, split between diesel, kerosene, aviation, and other fuels	

ETHELPER – DEPLOYMENT

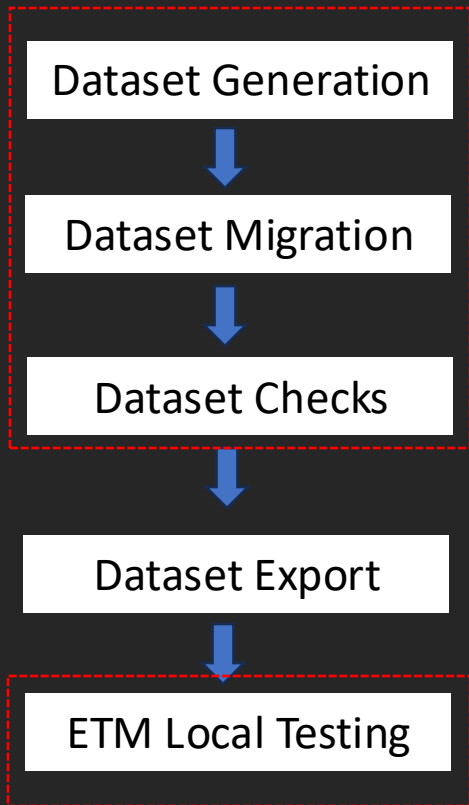
ASSISTANCE

Download on GitHub – <https://github.com/EdoardoSantagata/ethelper>

Key requirements: Python3, Internet Browser (Google Chrome, MS Edge, etc.)

The screenshot shows the GitHub repository page for 'ethelper' by EdoardoSantagata. The repository is public and has 2 branches and 0 tags. The main branch is selected. The repository description is 'Front-end to streamline ETM dataset development and deployment process.' The repository contains files: config, icons, output, presets, variables, LICENSE, README.md, and ethelper.py. The README.md file is open, showing the overview of the tool. The overview states: 'Welcome to ETHelper - Dataset Generator and Local Tester for the Energy Transition Model (ETM). ETHelper is a front-end application which streamlines some of the key development processes for using the Energy Transition Model (ETM) (available at <https://github.com/quintel>). It allows users to create datasets inside etlocal and export migrations directly to etsource for use in the tool. It also automatically sets up a local run of the ETM (etengine + etmodel).' The repository also shows 9 commits, 0 stars, 1 watching, and 0 forks. The releases section shows no releases published. The packages section shows no packages published. The languages section shows Python 100.0%.

Workflow



DISCUSSION QUESTIONS

What key multi-sectoral modelling outputs are crucial to inform decision-making and planning for utilities? How should these outputs travel across governance levels?

How can utilities improve data collection and information sharing? What sort of engagement exists with other energy-consuming economic sectors?

How important do you think a multi-sectoral approach is for the energy transition?

SLIDO: 1303867





Australian Government

**Department of Climate Change, Energy,
the Environment and Water**

A tropical sunset scene with a palm tree silhouette against a colorful sky and ocean. The sky transitions from a deep blue at the top to a warm orange and yellow near the horizon, with scattered white clouds. The ocean is visible in the distance, and the foreground is filled with dark, silhouetted foliage and a prominent palm tree leaning towards the right.

Thank you!

Tankyu! Merci! Faafetai!
Tubwa! Vinaka! Malo!
Komŋŋool! Whakawhetai
ki a koe! Fakafetai fāfetai!
Si Yu'os Ma'āse'!

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