

2. Preparing the APEC Energy Demand and Supply Outlook 10th Edition

APERC Workshop

The 72nd Meeting of the APEC Energy Working Group (EWG72)
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Outline



Quick review of the 9th Edition



Scenarios for the 10th Edition



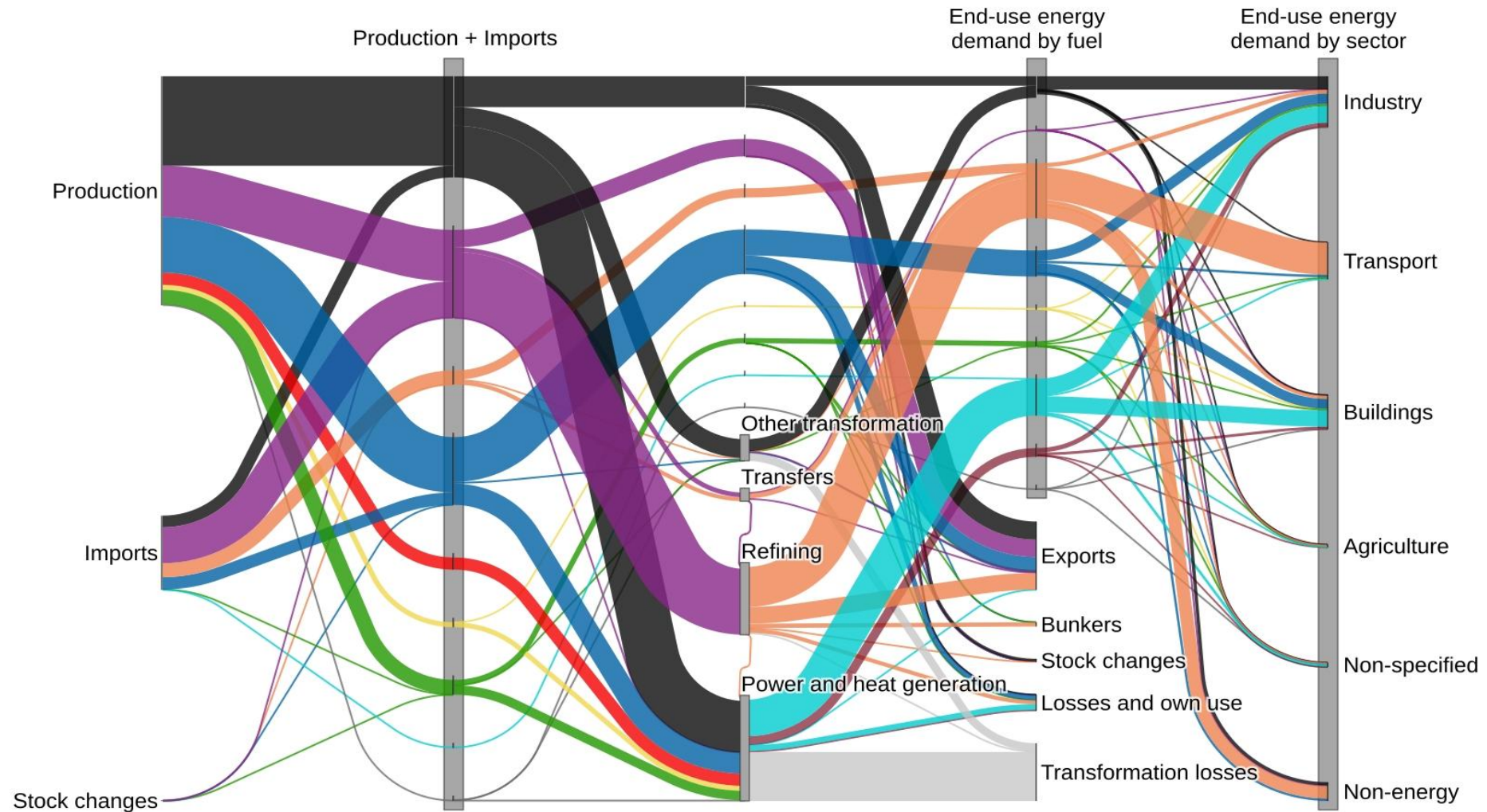
Changes for the 10th Edition



SECTION 1

Quick review of the 9th Edition

APEC Energy Flows (2022)

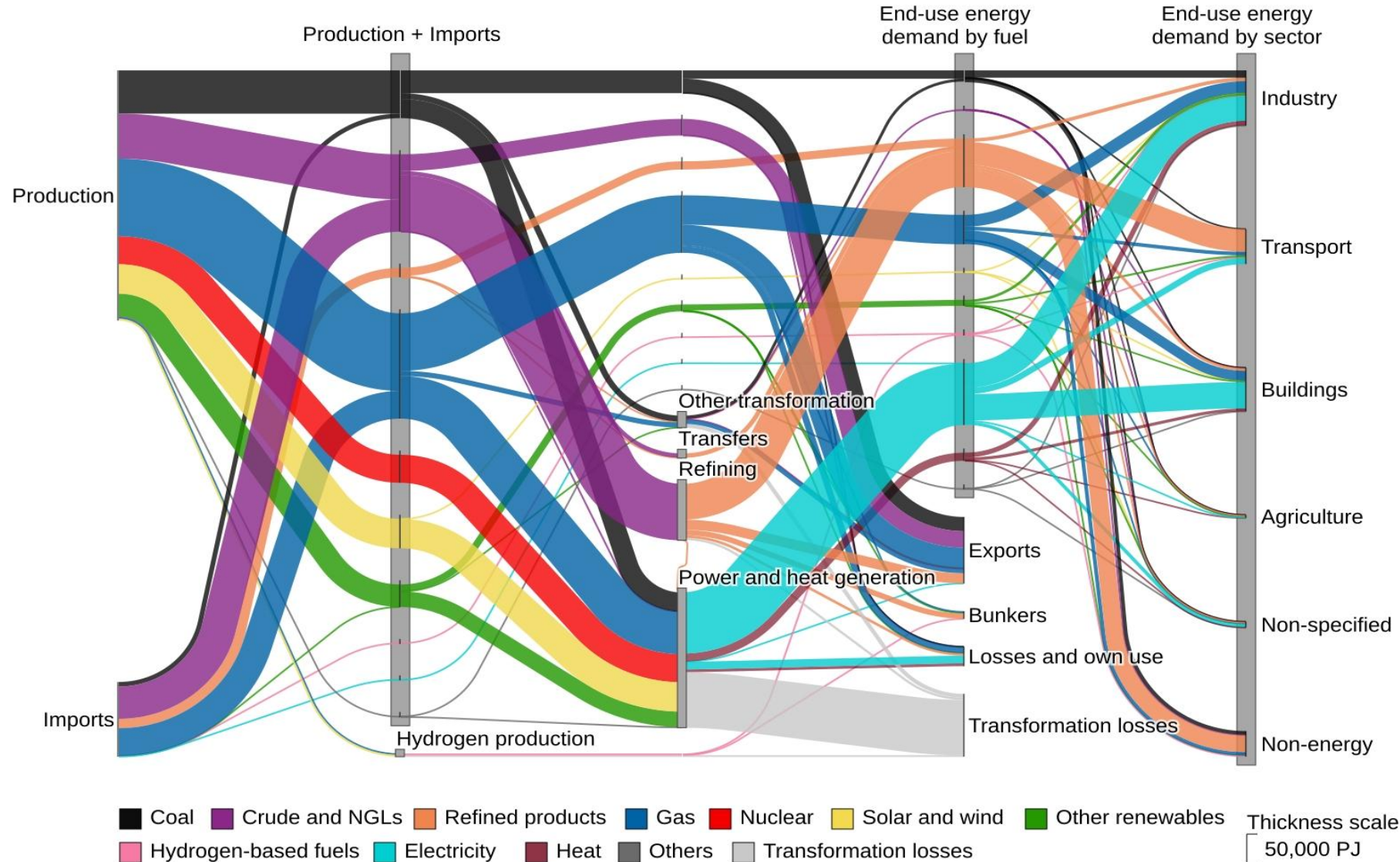


Coal Crude and NGLs Refined products Gas Nuclear Solar and wind
 Other renewables Electricity Heat Others Transformation losses

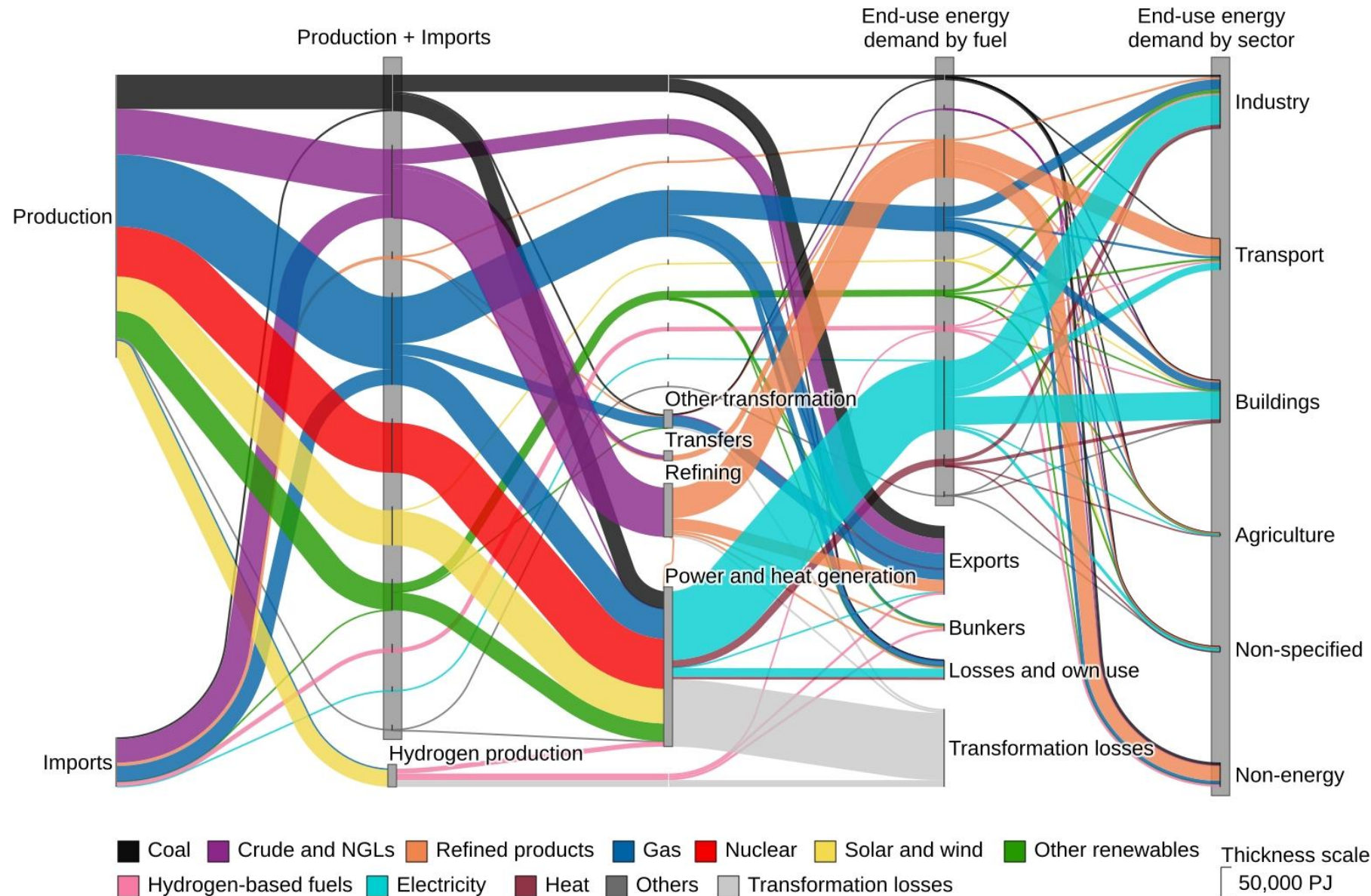
Thickness scale
50,000 PJ

Note: 50,000 PJ =
24 million B/D crude oil
equivalent

APEC Energy Flows (2060, Reference Scenario)



APEC Energy Flows (2060, Target Scenario)





SECTION 2

Scenarios for the 10th Edition

Scenarios for the 10th APEC Energy Outlook

The 10th Outlook will present **two scenarios** that illustrate how the APEC energy system could evolve over the coming decades.



Baseline Scenario (BASE)

Reflects APERC's assessment of how the APEC energy system is likely to evolve if existing policy settings, market conditions, and technology adoption trends continue.

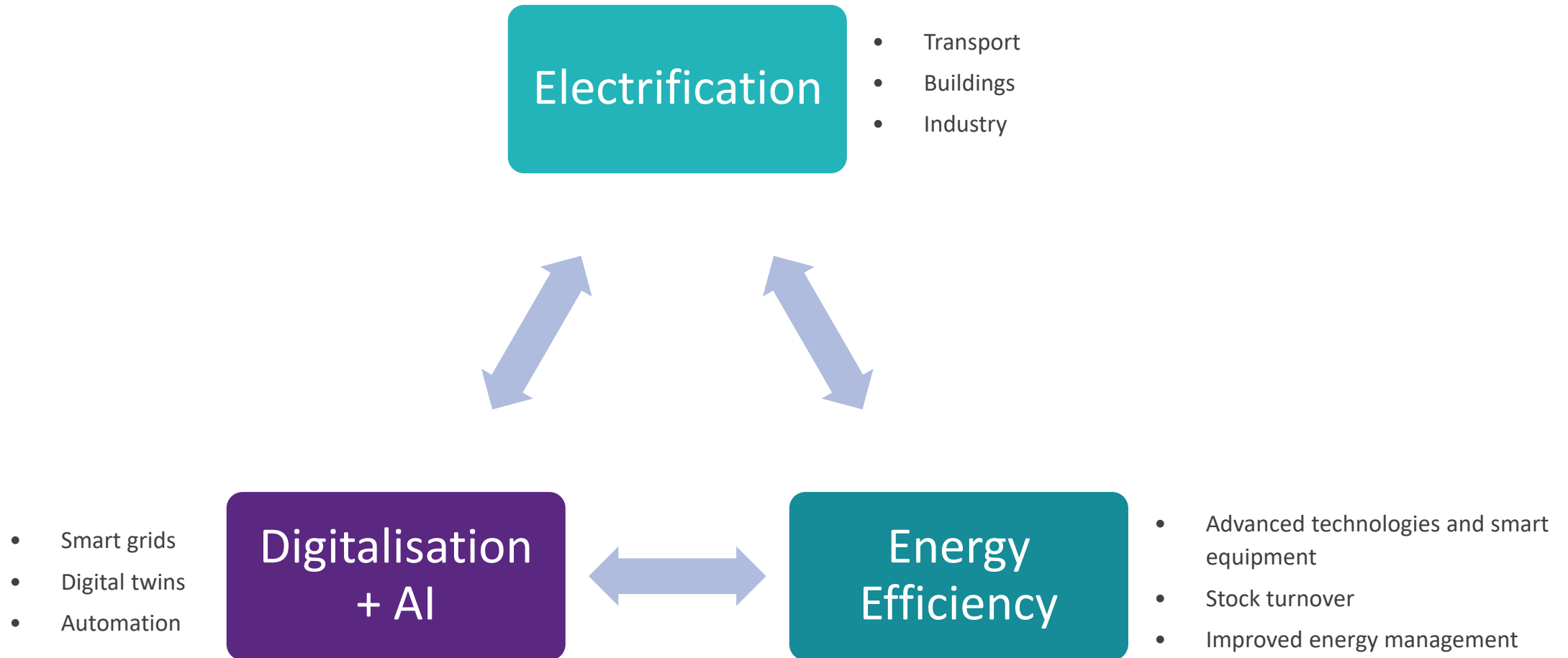


Electrification, Efficiency & Digitalisation + AI (EED+AI)

Explores how accelerated electrification, energy efficiency, digitalisation, and AI could reshape energy demand, system flexibility, and the overall energy transition.

Key drivers shaping the future energy system

These interconnected trends are reshaping how energy is produced, delivered, and consumed across APEC:



Energy efficiency across the energy system

Efficiency improves energy productivity across every sector, reducing demand growth and supporting the broader energy transition.

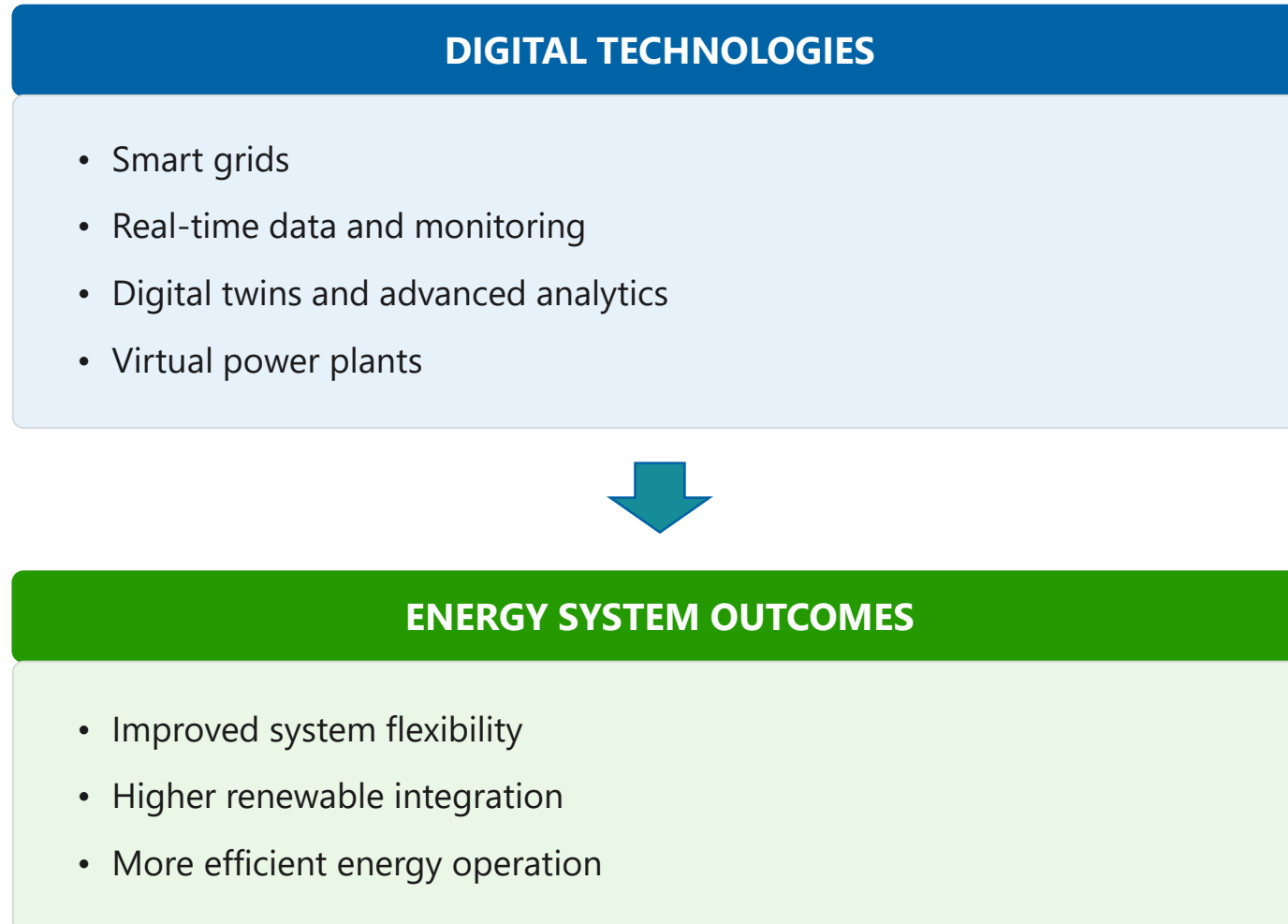
Sector	Efficiency improvements	Energy system impact
Buildings	Efficient equipment, heat pumps, better insulation	Lower electricity and fuel demand
Transport	More efficient vehicles, including EVs	Reduced fuel consumption
Industry	Process optimisation, waste heat recovery	Lower industrial energy intensity
Power	Reduced losses, smarter operation	Lower generation requirements

What enables future efficiency gains?

- Replacement of equipment at the end of its service life
- Deployment of best available technologies
- Faster turnover of vehicles, appliances, and industrial equipment
- Strong efficiency standards and building codes

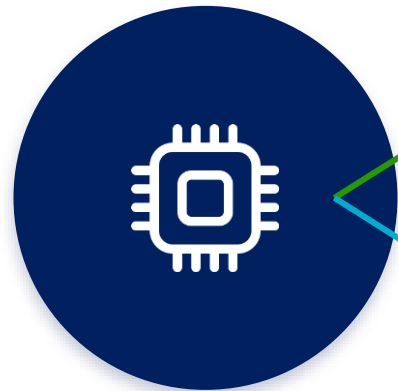
Digitalisation improves energy system operation

Digital technologies collectively enhance the performance and flexibility of the energy system.



AI's impact on the energy system

Artificial intelligence is transforming the energy system in two key ways:



AI



Improving energy system performance

AI enables significant new levels of energy efficiency in most end-use technologies and smarter grid operations — predictive maintenance, demand forecasting, and real-time optimisation.



Increasing electricity demand

Global AI electricity demand: ~485 TWh in 2025, projected to reach almost 950 TWh by 2030 (IEA).

Comparing the two scenarios

Expected outcomes differ between the BASE and EED+AI scenarios:

Dimension	Baseline	EED+AI
Electrification	Moderate	Accelerated
Energy efficiency	Incremental	Rapid
Renewable deployment	Strong	Dominant
Electricity demand	Moderate growth	Strong growth
Final energy demand	Continued growth and later plateaus	Slower growth or earlier peak
Emissions	Gradual decline	Faster decline

EED+AI represents a more rapid transition pathway driven by faster technology adoption and system transformation.



SECTION 3

Changes for the 10th Outlook

What's new in the 10th edition?

The 10th edition introduces several important changes to enhance the Outlook's quality, relevance, and usability, ensuring it remains timely, transparent, and fit for addressing emerging energy challenges.

New Scenario

**Shorter Publication
Timeline**

**Updated Historical
Base Year**

**Modernised Modelling
Framework**

Timeline

For the first time, APERC aims to publish the Outlook on a two-year cycle, rather than the traditional three-year cycle.

Previous cycle

3 years

10th Outlook cycle

2 years



WHY A SHORTER CYCLE?



Improves the timeliness of the Outlook



Better captures rapidly evolving issues such as AI and digitalisation



Incorporates recent energy market developments more quickly



Better aligns APERC with other leading international energy outlook publications

Base year

The historical base year for the 10th Outlook is **2024**.

This is dependent upon the timely submission of energy data from APEC economies to the Energy Statistics and Training (ESTO) team within APERC.

2024

A 2024 BASE YEAR WILL

Provide the latest official data from the 21 APEC economies

Reflect the latest energy transition trends

Improve calibration of future projections

Increase the policy relevance of the Outlook

Capture post-pandemic structural changes

Improve comparability with other international outlooks

Improving the modelling framework

The 10th Outlook introduces two major improvements to the modelling process:



1. Standardising the modelling platform



2. Creating a collaborative modelling framework

Together, these changes will improve consistency, transparency, collaboration, and knowledge retention.

1. Standardising the modelling platform

CHALLENGES IN OUTLOOK 9

Researchers used multiple modelling approaches:

OSeMOSYS

Python

Julia

Excel

- Limited consistency across sectors
- Difficult knowledge transfer between researchers
- Significant rebuilding required when researchers rotated out of APERC



OUTLOOK 10 APPROACH



Low Emissions Analysis Platform (LEAP)

All modelling will transition to a single, unified platform.

LEAP is an internationally recognised energy modelling platform developed by the Stockholm Environment Institute, widely used by governments, research institutions, utilities, and international organisations worldwide.

Benefits of using LEAP

Transitioning to a single modelling platform will deliver several benefits:

01

Consistency

- Common framework across sectors
- Improved data management

02

Transparency

- Better documentation
- Improved reproducibility

03

Efficiency

- Less time rebuilding models
- More time for analysis

04

Continuity

- Simplifies model maintenance
- Better knowledge transfer

05

Collaboration

- Researchers working on a common platform
- Better integration across the modelling team

2. A more collaborative modelling process

The first modelling improvement focused specifically on the modelling team, while this improvement applies across the entire research team:

OUTLOOK 9

- Dedicated modelling team developed the models
- Other researchers received Excel output files
- Limited visibility into model assumptions and methodologies



OUTLOOK 10

All researchers participate directly in the modelling process. Demand and transformation sector modellers develop the core model, while economy researchers:

- Develop economy-specific assumptions
- Review projections & model behaviour
- Interpret modelling results

EXPECTED OUTCOMES



Increased transparency



Reduced “black box”
modelling



Stronger ownership of
results



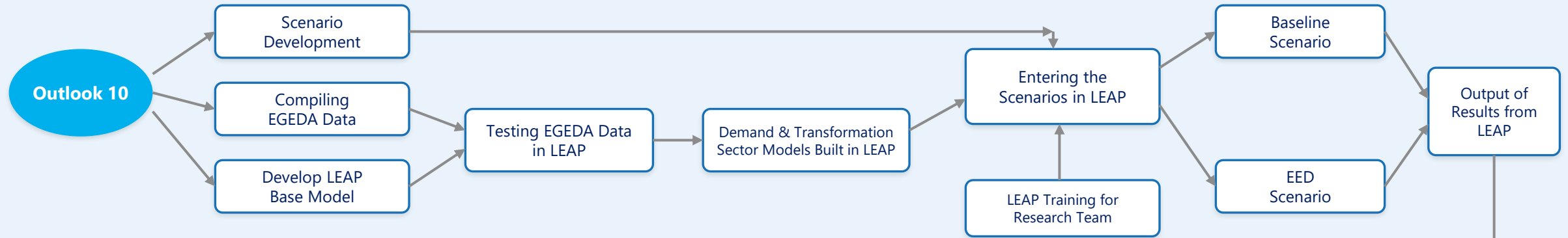
Higher-quality economy
chapters



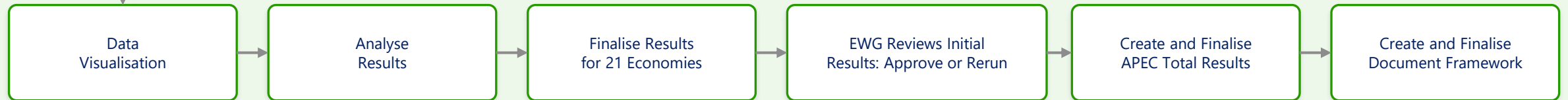
Greater modelling capability
/ capacity building

10th Outlook Process

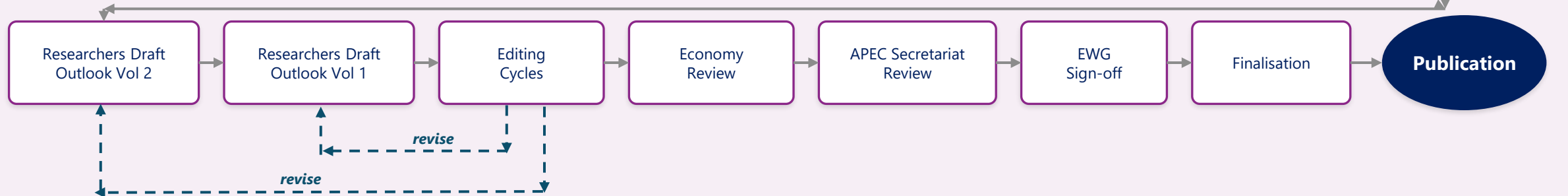
PHASE 1 · SCENARIO & MODEL SET-UP



PHASE 2 · ANALYSIS & TECHNICAL REVIEW



PHASE 3 · DRAFTING & PUBLICATION



Thank you for your kind attention.

<https://aperc.or.jp>

