# Outlook Detailed Results Tables

## Introduction

The Detailed Results Tables available on APERC’s website provide a detailed compilation of *Outlook – 5th Edition* results for each APEC member economy and for APEC as a whole in Excel format. Two sets of files are provided, one for the business-as-usual (BAU) scenario and one for the “High Gas” scenario. For each scenario, there is a separate file for each economy and for the APEC-wide results. Within each file, there are ten sheets, as described below.

 APERC is pleased to provide results at this high level of detail, which we believe breaks new ground for disclosure of energy model results. Users should, however, bear in mind that both the historical and projected numbers shown vary in quality. Numbers that are large and/or contribute meaningfully to the overall outlook for an economy have generally been reviewed carefully. However, as a rule, the more detailed the result and the smaller the relative size of the number, the less confidence one should place in it.

In each table, values that come directly from APERC’s models or from historical data are shown as simple numerical values. In the case of values that are calculated from other values in the Detailed Results Tables, the formulas used have been preserved. This allows users to see how the numbers in the Detailed Results Tables relate to each other. Because of these formulas are self-explanatory, no attempt is made here to explain how numbers in the Detailed Results Tables relate to each other.

In general, all energy statistics are given in million tonnes oil equivalent (mtoe). As a convenience, in the Electricity Generation sheet, electricity outputs are also shown in Terawatt Hours (TWh). The conversion tables on p. xi of both volumes of the *Outlook – 5th Edition* may be used to convert these to other units. See also the International Energy Agency’s on-line unit converter at <http://www.iea.org/stats/unit.asp>.

## Terminology

* “Coal” includes all coals, both primary and derived fuels, and peat.
* “Oil” includes both unrefined liquids and refined oil products. Unrefined liquids would include crude oil, natural gas liquids, and other refinery feedstocks. Refined oil products include refinery gas, ethane, LPG, and other petroleum products. Liquid biofuels are counted as new renewable energy (NRE), not oil, even when they are sold mixed with petroleum products.
* “Gas” includes natural gas and gas works gas.
* “Hydro” includes both large and small hydro.
* New renewable energy (“NRE”) includes biomass, liquid biofuels, geothermal, wind, solar, industrial waste, municipal waste, and all other renewable energy except hydro, which is considered separately.
* “Electricity” generally includes only electricity produced for sale; it generally would not include electricity that is produced and consumed “behind the meter”.

## The Data Tables

Each file includes 10 data sheets, as described below.

### **The Summary Table**

 The Summary table shows a complete energy balance table for the economy or for APEC as a whole.

* “Net Imports” is imports minus exports; hence, if the economy is a net exporter, this figure will be shown as negative.
* “International Transportation”, including international aviation fuel and international marine fuel, are counted as a negative production rather than a demand. The reason is that this energy cannot be considered as the consumption of any specific economy. The values shown for each economy represent fuel purchased in each economy for use in international transportation.
* “Stock Change” is shown for historical years only. It is assumed to be zero in our projections going forward.
* “Electricity and Heat Generation” shows the fuels used to produce heat and electricity as negative numbers, while the electricity and heat produced are shown as positive numbers. The total value for “Electricity and Heat Generation” is the difference between the fuels consumed and the electricity and heat produced, and therefore represents the transformation losses.
* “Fuel for Refineries and Own Use” represents the fuel used in refineries and in fuel production and processing (energy industry own use).
* “Hydrogen Generation” shows the electricity and natural gas used to produce hydrogen as negative numbers, while the hydrogen produced is shown as positive numbers. The total value for “Hydrogen Generation” is the difference between the electricity and natural gas consumed and the hydrogen produced, and therefore represents the transformation losses. In the APERC model, hydrogen is produced only as fuel for hydrogen vehicles.
* “Statistical Discrepancies” are shown for historical years only. They are assumed to be zero in our projections going forward.
* “Industry” includes mining other than mining for coal and other fuels (which are included in “Fuel for Refineries and Own Use”) and construction; energy used by industry for off-site transport is included in “Domestic Transportation” or “International Transportation”.
* “Domestic Transportation” includes only domestic transportation; as noted above, “International Transportation” is counted separately as a negative production.
* “Residential, Commercial, and Agriculture” includes residential, commercial, agriculture, forestry, fishing, and all other public services.
* “Non-Energy” includes fuels used as raw materials rather than consumed as fuels, such as petrochemical feedstocks.

### **Electricity Generation**

This sheet is divided into three parts. The top part shows results for all electricity generation. The middle part shows results for electricity-only plants. The bottom part shows results for combined heat and power plants.

* Electricity Generation Input Fuel – Because historical statistics do not allow us to separate fuel used for production of electricity from fuel used for production of heat in combined heat and power plants, no historical data is shown for Electricity Generation Input Fuel for all electricity generation and for combined heat and power plants. Historical data is shown for electricity-only plants. Historical data is shown in the Summary Table for electricity and heat generation combined.

**Heat Generation**

This sheet is blank, or nearly blank for some economies, as not all economies have commercial sales of heat. As with the electricity generation sheet, this sheet is divided into three parts. The top part shows results for all heat generation. The middle part shows results for heat-only plants. The bottom part shows results for combined heat and power plants.

* Heat Generation Input Fuel –Because historical statistics do not allow us to separate fuel used for production of heat from fuel used for production of electricity in combined heat and power plants, no historical data is shown for Heat Generation Input Fuel for all heat generation and for combined heat and power plants. Historical data is shown for heat-only plants. Historical data is shown in the Summary Table for electricity and heat generation combined.

### **Hydrogen Generation**

This sheet is blank, or nearly blank for some economies, as hydrogen is used in our model only by hydrogen vehicles, and the demand for hydrogen in some economies is projected to be very low

### **Industry Demand**

For some economies, results are shown for six energy-intensive industries plus “All Other Industry”. However, data on energy demand by industry is not available for all economies. For these economies, results may be shown only for “All Other Industry” or for certain industries and “All Other Industry”.

### **Transport Demand**

The top part of this sheet shows energy demand by mode of transport and fuel. The bottom part of the sheet has three tables showing results from APERC’s Light Vehicle Fleet Model.

In the “Light Vehicle Energy Demand by Fuel and Vehicle Type” table, the same vehicle may appear under several different fuels. For example, the value shown under “Oil”, “Conventional Gasoline – New” represents the demand for oil products by conventional gasoline vehicles that were not imported used. The value shown under “NRE”, “Conventional Gasoline – New” represents the demand for biofuels by conventional vehicles that were not imported used. These fuels may be mixed together in the vehicle’s tank, but we report them separately in order to allow production to consumption tracking of each fuel. Plug-In Hybrid Vehicles appear under “Oil”, “NRE”, and “Electricity”, as they can consume all three fuels.

The “Light Vehicle Fleet Composition by Vehicle Type” table shows all vehicles in the fleet in the given year regardless of year of manufacture/import. The “Light Vehicle Initial Vehicle Sales by Vehicle Type” shows only initial sales in the given year. For vehicles that are imported used, the vehicles are counted as sold in the year they were imported, not the year they were manufactured.

### **Residential, Commercial, and Agricultural Demand**

* ”Commercial Demand” includes government and public services, such as schools, hospitals, and other public facilities such as street lighting, as well as office buildings, retail stores, hotels, and restaurants.

### **Direct CO2 Emissions**

This table shows CO2 emissions from fuel combustion in Million Tonnes CO2. For consistency, both historical and projected values are APERC’s modelled values; for this reason the historical values may differ from official estimates. See the sidebar “Modeling CO2 Emissions” in the *Outlook – 5th Edition* Chapter 16 for a discussion of how these values are obtained.

Because historical statistics do not allow us to separate fuel used for production of electricity from fuel used for production of heat in combined heat and power plants, no historical data is shown for Heat Generation Emissions; for historical years, these are included in Electricity Generation Emissions.

### **Allocated CO2 Emissions**

In the Direct CO2 Emissions table discussed above, emissions are credited to whatever sector actually emitted them, including electricity generation, heat generation, and hydrogen generation. In the Allocated CO2 Emissions table, electricity, heat, and hydrogen generation emissions are allocated to the final consumption sector that consumed the electricity, heat, and hydrogen. Emissions from electricity, heat, and hydrogen are still listed separately under each consumption sector.

Because historical statistics do not allow us to separate fuel used for production of electricity from fuel used for production of heat in combined heat and power plants, no historical data is shown for Heat Emissions; for historical years, these are included in Electricity Emissions.

## dATA SOURCES

For all economies except Papua New Guinea, historical energy data is from International Energy Agency’s (IEA) *World Energy Statistics 2011*. It is reproduced here with the kind permission of the IEA and is ©2011 IEA/OECD. For Papua New Guinea, the historical data is from the APEC Energy Database.

For more information on data sources, see the discussion of “Historical Data Sources and
Key Assumptions” in the *Outlook – 5th Edition* Chapter 3.