

Exercise 9.1: Energy Efficiency Indicators

Your division at the Energy Ministry of Statiland is responsible for processing and analysing energy end use trends. This is to support policy development efforts for energy efficiency programs in Statiland.

Your director asked you to fill out the Energy Efficiency template for the IEA and to calculate some key indicators. Statiland has been collecting end-use energy data for quite some time. Most of the template has been pre-filled by your colleague and you are asked to fill-in some missing information (red boxes with green background). In addition the director would like to know how Statiland is using energy relative to the European region.

The IEA template is separated into different worksheets:

- **The Macroeconomic Data**: Contains key activity variables such as population size, number of dwellings, annual heating degree days (HDD) and Value added information to be used in the industry worksheet calculations
- **Commodities**: shows key industries and volumes of their outputs. To be used to calculate indicators in the industry worksheet.
- **Industry**: Most of the information has been pre-filled except for the key indicators that need to be calculated. Please note the different approaches when calculating energy intensity for industry by using GDP value added and physical output.
- **Services**: The spreadsheet first summarizes the total energy consumption by fuel for the sector based on the end-use entries below. Statiland had end-use information on space heating, space cooling, lighting and other building energy use. Please note that non-building energy use such as street lighting should not be added to the building energy component when calculating the building floor area indicator.
- **Residential**: In this worksheet there are two tables with totals for the sector. It is to illustrate that currently the IEA receives data submission from two different sources that can show two different set of data. The first table (1) illustrates data as it was submitted through the Annual Questionnaires which are used to construct the IEA energy balances. While the second table (2) illustrates totals as submitted through the IEA energy efficiency table. The challenge for the IEA is to reconcile the two sources and to understand why differences exist.

The Residential worksheet shows detailed energy consumption by end use such as space heating, space cooling, water heating, cooking, lighting, refrigerators, television and other electronics. The list is not exhaustive but is meant to illustrate the type of data that IEA collects.

- **Transportation:** Is separated into *Transport_activity Data* worksheet and *Transport_energy data* worksheet. Activity data worksheet includes detailed breakdown for passenger and for freight transport modes. Key information included here passenger-kilometres for passenger transport and tonne-kilometres by mode for freight transport. In addition the table also includes total vehicle kilometres by mode which can be valuable when having to calculate on-road vehicle efficiency (in Litres per 100 kms).

The transport energy worksheet shows energy consumption by energy-source for each mode for passenger and freight transport.

- **Exercise Notes:** Contains notes that can be helpful in the exercise such as list of the all the indicators and how they are calculated.

Exercise 9.2: Energy Efficiency Indicators

In the exercise you have just completed, you worked on a simplified version of the IEA energy efficiency indicators template and started to familiarise yourself with energy efficiency indicators.

In this second exercise, you are given a copy of a complete energy efficiency indicators template of a fictitious country with most of the data available for the years 1990 to 2008 (and in some instances up to 2009). In this exercise, you work for the organisation that is responsible for filling in the template in this country.

1. You are asked to propose one (or possibly several) solution(s) for the following issues:

- a. Missing data points**

- a) The number of total and occupied dwellings used to be published every year by the Central Statistical Office of your country. Unfortunately, due to budget cuts, in the year 2000 the government decided to run the residential survey from which these data were obtained only every 4 years. The national statistical office does not publish any data for the intervening years. How would you estimate the missing data for the years up to 2009?
- b) The data for the rubber and plastic products industry is only available from 1998 onwards. Try to understand where the consumption of this industry branch was reported in the previous years and which time series you would estimate and how in order to produce consistent time series over time.
- c) The energy consumption of construction is not available from the energy balances for 2008 and 2009. How would you estimate it?

- b. Inconsistencies**

- a) The reported consumption of combustible renewables and waste in the cement industry is higher than the reported consumption for the whole of the non-metallic mineral industry. How would you solve this inconsistency?
2. A colleague has also informed you that there appear to be some problems with the data for the transport sector. For instance, the energy intensity of total passenger transport appears very high. Could you look at the data and identify the problems?