



ELECTRICITY PRODUCERS

The aim is to control the electricity produced and consumed in a given country. It is based on the following hypotheses.

There are basic **producers** of electricity that are identified by a name, of which we are interested in their average production, maximum production and date of entry into operation. These basic producers are in one of the following categories: **Hydroelectric, Solar, Nuclear or Thermal**. From a hydroelectric power plant we are interested to know its occupation, maximum capacity and number of turbines. From a solar power plant we are interested to know the total area of solar panels, the annual average hours of sunshine and type (photovoltaic or thermodynamic). From a nuclear power plant, we are interested to know the number of reactors it has, the volume of plutonium consumed and the amount of nuclear waste it produces. From a thermal power plant, we are interested to know the number of furnaces it has, the volume of coal consumed and the volume of its gas emissions.

For reasons of national security, it is important to control the plutonium supplied by a nuclear power plant. This control refers to the amount of plutonium it buys from each of its potential **suppliers** (name and country), and carried by certain **carriers** (name and registration). It should be noted that the same supplier may sell plutonium to different nuclear power plants and that in each supply there may be more than one carrier.

Each day, producers deliver the energy produced to one or more primary **stations**, which can receive a different amount of energy from each of these producers on a daily basis. Producers always deliver the total of their production. The primary stations are identified by their name and have a number of low to high voltage transformers and are the head of one or more distribution networks.

A distribution **network** is identified by a network number and can only have one primary station as a header. Ownership of a network can be shared by several power **companies** and each power company is identified by its name.

Excess energy in one network can be sent to another network. The total volume of energy exchanged between two networks is recorded.

A network is made up of a series of **lines**, each line is identified by a sequence number within the network number and has a certain length. The smallest of the possible lines will supply at least two substations.

A **substation** is covered by only one line and distributes to one or more service areas. The **provinces** (code and name) are divided into these service areas, although there can be no service



EXERCISE

areas that belong to more than one province. Each **service area** can be serviced by more than one substation.

In each service area it is desired to record the average consumption and the number of final **consumers** in each of the following categories: individuals, companies and institutions.

Design the entity-relationship diagram.