

Some workers carry the accounting a step further to the level of *tertiary energy*, the energy which actually performs useful work at the point of application. For example, electricity consumed in a home is utilized in part to provide lighting. The efficiency of a light bulb in converting electricity into radiant energy (light) is normally less than 5%. Thus the secondary energy delivered to the light bulb results in a conversion to useful work, or tertiary energy, of only a few per cent. In a contrasting illustration, electricity used in home heating is almost 100% efficient in the conversion of electrical to thermal energy; in this application the secondary and tertiary energy values are nearly equal.

If one wants to account for the actual work accomplished in our society from the beginning to the end of the energy system, then it is necessary to consider energy consumption at the tertiary level. In this Report, however, we will only be taking energy demand to the level of secondary energy, or the point of end use.

A complication arises in the accounting process for electrical energy. At a modern, thermal-electric generating station, approximately three units of heat are required to manufacture one unit of electricity (that is, the efficiency of energy conversion is 35% or less). At a

hydro-electric station, the energy contained in the falling water may be converted into electricity with an efficiency in excess of 90%. How then should a country value electrical energy — by its true energy content (3,600 kilojoules to the kilowatt-hour), or by the quantity of thermal energy required to generate it at a thermal-electric station (approximately 10,500 kilojoules to the kilowatt-hour)? If one adopts the higher energy value for all electrical generation including hydro, as is EMR's custom, then one calculates that hydro-electricity supplies nearly 25% of Canada's primary energy. Using the true energy value for electricity, one finds that hydro-electricity only represents about 11% of primary energy production.

We have chosen in this Report to value hydro-electricity by its true energy content. Thus our values for Canada's total energy consumption will be lower than EMR's figures and hydro-electricity will be accorded a smaller share of Canada's primary energy mix. We have decided to use true energy values, based usually on Statistics Canada data, because we consider them to provide a clearer picture of our national energy system. Such differences in the reporting of energy statistics point out the need for care in using data from a variety of sources.