

Climate Change

3. BUILDING SECTOR

3.1 ELECTRICITY CONSUMPTION IN THE RESIDENTIAL AND COMMERCIAL SECTORS

The residential and commercial sectors consumed, in 1994, 30% of the final energy consumption which is 30×10^6 Gj, and in turn produced 1737 Gg of CO₂.

By analyzing the electricity structure and consumption for both residential and commercial sectors, we found out that the most consuming equipment which represent 80% of the total electricity consumption are :

- Electric heaters for space heating 31%
- Electric hot water for sanitary purposes : 22%
- Air conditioning : 13%
- Lighting : 8,5%
- Refrigerator : 6%

Since there are no specific policies for the management of demand in Lebanon, the energy efficiency in the residential and commercial sectors is slightly and slowly improved by the introduction of some efficient equipment due to the dynamic of the market but with different payback times, penetration rate and incremental costs.

Following the basic data for the base year 1994, we foresee an increase in demand in the electricity for the residential and commercial sectors at short term (year 2000), medium term (year 2015), and long term (year 2040) in case of:

- A- no specific rational management of the demand side being adopted: business as usual "base case" .
- B- mitigation policies: the options proposed are concerned with the development of solar domestic hot water systems, energy efficient refrigerators and compact fluorescent lamps .

Comparing the adopted different scenarios under the assumptions of GDP increase of 3% and 6% ,, we found out the following (See Table 6):

- 1) A reduction in the energy consumption around the year 2040 of at least 20% between "low base case" and low mitigation case" – GDP increase 3% - and consequently an equal reduction of CO₂ emissions.
- 2) A reduction in the energy consumption around the year 2040 of at least 25% between "high base case" and "high mitigation case" – GDP increase 6% - and consequently an equal reduction of CO₂ emission.

Table 6. Comparison of mitigation with base case scenarios.

Low case scenarios, 10⁶ Gj	1994	2000	2005	2015	2040
Low base case	14.20	29.10	37.54	50.54	87.58
Low mitigation case	14.20	29.02	35.93	46.18	69.02
Energy consumption decrease	0.00	0.08	1.61	4.36	18.56
Approx. Co2 emission decrease (Gg)	0.00	4.88	98.21	265.96	1132.16
High case scenarios, 10⁶ Gj	1994	2000	2005	2015	2040
High base case	14.20	31.70	42.27	65.28	195.41
High mitigation case	14.20	31.63	39.77	58.06	147.86
Energy consumption decrease	0.00	0.07	2.50	7.22	47.55
Approx. Co2 emission decrease (Gg)	0.00	4.27	152.50	440.42	2900.55

The two main barriers for the quick development of the previously mentioned options in Lebanon are:

1. The high prices of the equipment on the local market.
2. The relatively low cost of the electricity.

These two main barriers lead often to high payback times (8 years for the solar domestic hot water system, 15 years for the efficient refrigerator, etc..).

Consequently, steps to be adopted for accelerating the diffusion of options in question are:

At short and medium terms:

- 1) Adjustment of the electricity prices to reflect the real production cost.
- 2) Establishment of a quality control system such as certificates and labels of quality in order to better guide the consumer.
- 3) Training of technicians on energy saving issues and especially in the solar domestic hot water equipment.
- 4) Development of new customs policies and laws in favor of the performing equipment instead of the consuming one.
- 5) Awareness campaigns.

At long term:

- 1) Establishment of quality norms.
- 2) Development of local industries especially solar domestic hot water and efficient refrigerators.
- 3) Development of a loan system for credit sales on energy performing equipment at low rates for the industrials, contractors and consumers.
- 4) Establishment of regulations in the residential and commercial sectors for installing solar domestic hot water systems.
- 5) Integration in the energy pricing the notion of the "environmental cost".