

2023 Student Design Competition: Utility and Service Life Overview

General

The purpose of this document is to setup the utility rate structures and elements of the energy economy used in the system selection competition for life cycle costing. It should be noted that the stated situation and numbers may not reflect the reality of the actual energy situation or rates in this region. Regardless, teams should use the values below for the 2023 Design Competition.

Utilities

Commercial rates in Egyptian pounds are as follows for low voltage, 50 hertz power:

- Day Rate Period 06:00 to 17:00 – 1.25 LE/kWh
- Peak Rate Period 17:00 to 22:00 – 1.41 LE/kWh
- Night Rate Period 22:00 to 06:00 – 1.14 LE/kWh

There are no seasonal rate periods nor demand charges.

Purchase guarantee renewables:

Egypt has been one of the fastest-growing African countries to install solar and wind energy since 2017, and as of Q1 2020, the total renewable energy installed capacity was approximately 6 GW. The government has a vast array of renewable energy projects in the pipeline that are expected to make Egypt overtake South Africa and become the largest renewable energy market in Africa.

The government has formulated plans under its National Renewable Energy Strategy to increase the share of renewable energy in the national energy mix to 20% by 2022 and further double it to 42% by 2035.

The Ministry of Electric and Renewable Energy has laid out several regulations for the diversification of the energy mix and prioritizes the implementation of renewable energy projects to generate electricity. The government has shifted from a competitive bidding process to an auction-based process for large-scale solar PV and wind projects, which is expected to drive the market during the forecast period.

- Wind power plant, 1.6 LE/kWh
- Solar power plant, 2.09 LE/kWh
- Hydro power, 2.51 LE/kWh

Natural gas is available at 39.82 LE/therm at 5 PSI from the main at the street. The water and sewer rate is a flat consumption rate of 62.55 LE/cubic meter.

Utility rate structures shall be expected to rise at the following rates of escalation:

- Electrical cost will rise at the annual rate of 2.5%
- Natural Gas cost will rise at the annual rate of 1.5%
- Water and Sewer will rise at the annual rate of 2.2%

Building Service Life

The Building is considered a “Long Life” service building and therefore is defined by ASHRAE Standard 189.1 (latest addition) to have an expected minimum service life of 50 years. All building decisions related to the building composition, building structural elements, building systems, and building operation shall include a 50-year life cycle study as the building owner expects a sustainable approach to all building design, construction and operational elements. Student teams shall include this basis with all building analysis. To complete the life cycle study, the building owner expects the following elements to be included with any analysis.

- General Inflation rate for future cost items (replacement items, maintenance and anticipated future costs) will be 3%
- Owner’s Rate of Return for monetary decisions (this is to be used for bringing future costs back to present net worth dollars) will be 4%.

The Life Cycle Analysis shall illustrate a 50-year study and bring all costs back to a total present value sum for each alternative so the building owner understands in present dollars which alternatives represent the best life cycle value.