

# 2020 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 2020 Design Competition.

## Utilities

Tata Power Company (TPC) decreased the residential consumer's rate on natural gas, electricity and district heating services by 22 % over the past four years to give relief to the household income. These price cuts were applied to households and small users only. These cuts have caused higher prices for commercial and industrial users excluded from the cuts. This is likely to have repercussions on the investment climate in the energy sector in the future.

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

- Day Rate Period 06:00 to 16:00 - 19.25 US\$ cent/kWh
- Peak Rate Period 16:00 to 22:00 - 23.50 US\$ cent/kWh
- Night Rate Period 22:00 to 06:00 - 15.75 US\$ cent/kWh

There are no seasonal rate periods nor demand charges.

Purchase guarantee renewables:

The share of renewable energy in India's energy system has increased significantly in the last decade, and growth has increased in recent years. Increased use of biomass for heat and power production has been the main driver of growth in renewables. However solar, wind and geothermal water heating and power is gaining in installations. The Indian electrical grid has an installed capacity of 344.69 GW and will need to raise that to 450GW by 2020. The country has set a higher national target of 20%. In 2018, India replaced its feed-in tariff system with a new renewable energy support scheme to help meet its 2020 targets. Where renewables are on-site a minimum buy back rate has been set at for commercial rates at:

- Wind power plant, US\$ cent/kWh - 11.3
- Biomass energy plant (including landfill gas), US\$ cent/kWh 16.5
- Solar power plant, US\$ cent/kWh 15.5

Natural gas is available at US\$0.686/ therm or US\$0.0232/ kWh or US\$6.86/ MBTU's at 5 PSI from the main at the street. The water and sewer rate is a flat consumption rate of US\$3.56/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 3.9%
- Natural Gas cost will rise at the annual rate of 2.75%
- Water and Sewer will rise at the annual rate of 3.2%

## 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.