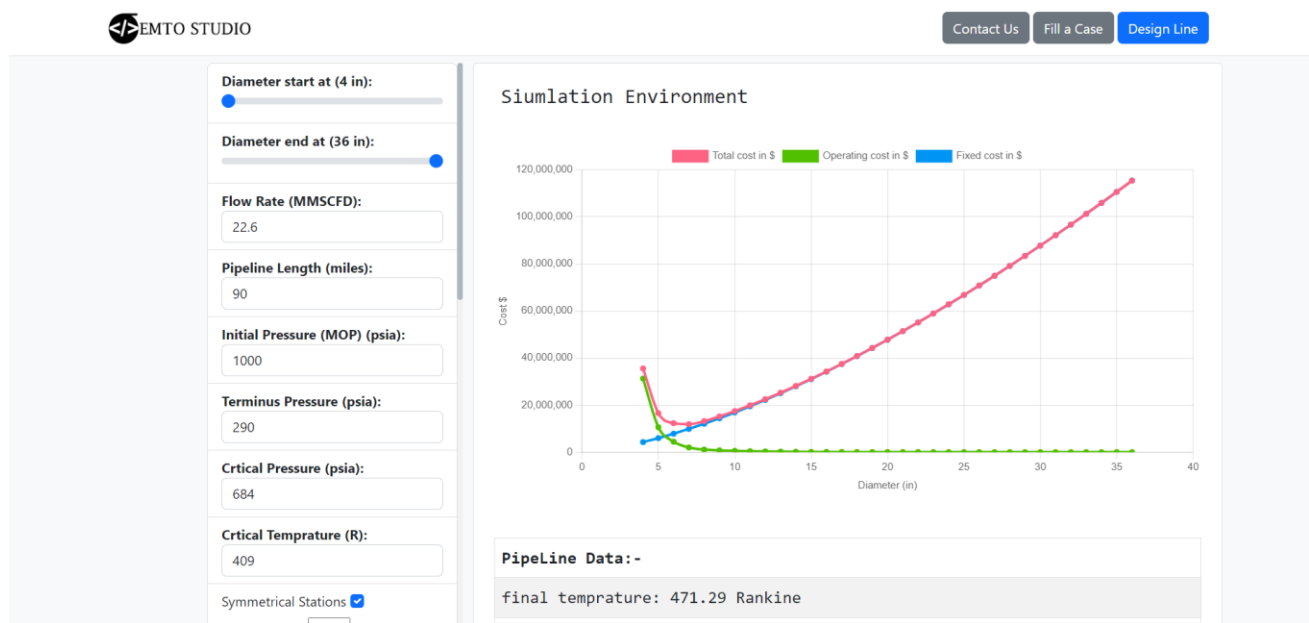# DOCUMENTATION

"Femto Natural Gas Designer" is a web-based software to design a natural gas pipeline with minimum cost.

Reach The APP

App Interface

Main APP UI

>>First click "Fill a Case" button to fill the input fields with a previously proper case prepared by us.

Left Side Menu

Left side menu contain all input fields

>>**Diameter Range:** Select maximum and minimum diameter to be studied, you can change range to study specific diameter.

>>**Flow Rate:** insert Flow rate value in MMSCFD unit.

>> **Pipeline Length**: insert the total length of the line.

>>**Initial Pressure:** Usually is set to be the maximum operating pressure that the pipe material can afford as using high initial pressure is more cost saver than using multiple stations.

>>**Terminus Pressure:** it is the final pressure at the end of the line or the end of compression stations, it is usually determined by gas sale agreement GSA.

>>**Critical Pressure:** Critical pressure of the gas determined by the gas components.

>>**Critical Temperature:** Critical temperature of transported gas determined by gas components

>> **Symmetrical Stations Check Box:** if you have checked this box, the initial pressure will be adjusted, so all required compression stations will be identical in term of input and output pressure and locations.

>>**Accuracy Select Button:** this button is responsible for the accuracy of symmetry in (psi) unit if you select 1 psi accuracy, it will be considered that compression stations are identical if initial pressure is difference isn't exceeding 1 psi and so on.

>>**Initial Temperature:** is the initial temperature of transported gas known by gas supplier.

>>**Gas specific gravity:** is the specific gravity of transported gas determined by partial gravities of gas components.

>>**Pipeline efficiency:** value assumed by the designer to express friction in the pipeline, the better the finish of the pipes, the higher the efficiency of the pipeline.

Mathematical model used in this app equations use a simplified form of the friction factor relationship and account for pipe roughness implicitly through the use of an

"Efficiency Factor". Generally, a pipeline efficiency factor of 0.9 is considered reasonable.

>>Base Temperature: according to STP.

>>Base Pressure: according to STP.

>>Electricity Price: electricity price in $ per horsepower

>>Electricity price growth factor: it will be higher than 1 like 1.1 or 1.2 if the electricity price is not assumed to be constant over the design life.

>>Heat Ratio: The heat capacity ratio is heat capacity at constant pressure (C_P) to heat capacity at constant volume (C_v)

>>Compressor efficiency: fraction lower than the unity according to purchased compressor.

>>Working hours during year: working hour during the year and usually equal to 8520 hr.
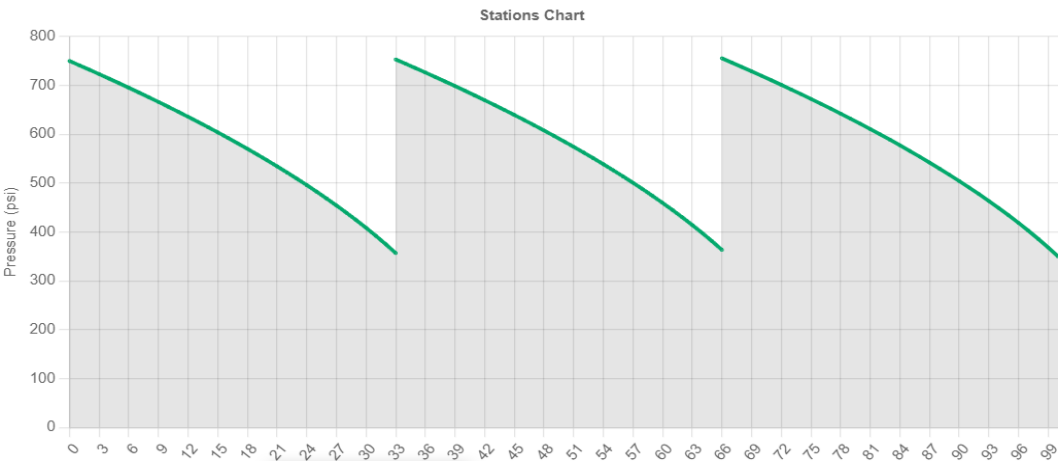
>>Design Life: selected by the designer according to the expected life of the project.

>>Pipeline price: it is in $/foot and is magnified according to diameter size.

Design Button

After filling the fields click the "Design Line" Button, it positioned in the top right of nav menu.

Hydraulic Gradients chart

Stations Chart

Compression Stations table

Contact Us | Fill a Case | Design Line

Distance (Miles)

Station #1

Suction Pressure = **350** psi
Discharge Pressure = **750** psi

the station is at **0.00** miles from start point

Station #2

Suction Pressure = **350** psi
Discharge Pressure = **750** psi

the station is at **33.36** miles from start point

Station #3

Suction Pressure = **350.00** psi
Discharge Pressure = **749.25** psi

the station is at **66.72** miles from start point