Nitrogen, oxygen, and argon are the basic components of air. These components are separated according to the difference in their boiling temperatures and their components are liquefied by the cryogenic method. Cryogenics is the science of very low temperatures. Conventionally, the field of cryogenics deals with temperatures below 120 K. Cryogenic air separation is the main method for separating air into its components. Nitrogen is used in the chemical industry, frozen food, medical purposes, particle accelerators, colliders, synchrotrons, metal processing technology, etc. This study examined a real nitrogen liquefaction unit. The nitrogen liquefaction unit was integrated with an air separation unit. Nitrogen provided by air separation created the source for the liquefaction unit. Energy and exergy analyses of the studied nitrogen liquefaction unit were performed. For numerical calculations and graphics, Equation Engineering Solver software was used. In the results of thermodynamic calculations, exergy efficiency was calculated as 36%, COPactual 0.2801, and COPrev 0.77. Furthermore, the heat exchanger block in nitrogen liquefaction unit was formed from HE-71, HE-72, and HE-73. For each heat exchanger, the exergy efficiency was calculated. Exergy efficiency values were 0.55, 0.81, and 0.89, respectively.