True, Reactive, Apparent, and Deformed Power

Low power factors in several circuits indicate high reactive power draw, which is undesirable.
A classical example of reactive power is demonstrated using a transformer, which draws significant current without a load on the output.
The concept of apparent power is introduced, consisting of true power (useful work done) and reactive power (not useful).
The oscillation of power between an inductor and the source illustrates how reactive power does not equate to true consumption. Despite no true power being used, reactive currents still flow through wires, necessitating thicker wiring to handle both true and reactive currents.
Traditional resistors only consume positive power due to aligned current and voltage polarities; inductive loads like transformers require solutions for their reactive nature.
To mitigate reactive power from transformers, adding resistive loads can help balance out the system.
A small synchronous motor from a microwave demonstrates inductive phase shifts while drawing specific volt-amperes and watts.
Capacitors are proposed as solutions to decrease reactive power by creating leading phase shifts that counteract inductive effects. By connecting capacitors to AC voltage sources, they create oscillating functions similar to inductors but lead instead of lagging. A calculation reveals that a specific capacitor value can effectively cancel out inductive reactive powers when connected properly.