The objectives of the Sustainable Energy for All (SE4ALL), a United Nations (UN) global initiative, are to achieve, by 2030: 1) universal access to modern energy services; 2) a doubling of the global rate of improvement in energy efficiency; and 3) a doubling of the share of renewable energy in the global energy mix (United Nations, 2011; SE4ALL, 2013a). The purpose of this study is to determine to what extent the energy efficiency objective supports the other two objectives, and to what extent the SE4ALL objectives support the climate target of limiting the global mean temperature increase to 2° C over pre-industrial times. To accomplish this, pathways are constructed for each objective, which then form the basis for a scenario analysis using the Energy Technology System Analysis Program TIMES Integrated Assessment Model (ETSAP-TIAM). We find that, in general, the energy efficiency objective is reinforced by the renewable energy objective, but not by the universal access objective. Achieving the energy efficiency objective is made cheaper (in terms of the net present value of investment costs) when the renewable energy target is also achieved. However, achieving both the renewable energy and energy efficiency targets require more investment than achieving the renewable energy objective alone. Furthermore, we find that the universal access objective requires much more investment in the residential sectors of developing regions of the world, and makes the meeting the other two objectives more expensive. Meeting any of the objectives also requires increased investment in the transportation sector. While achieving the SE4ALL objectives does not limit warming to 2° C on its own, it makes a substantial contribution toward that goal, particularly if the renewable energy and energy efficiency objectives are met.