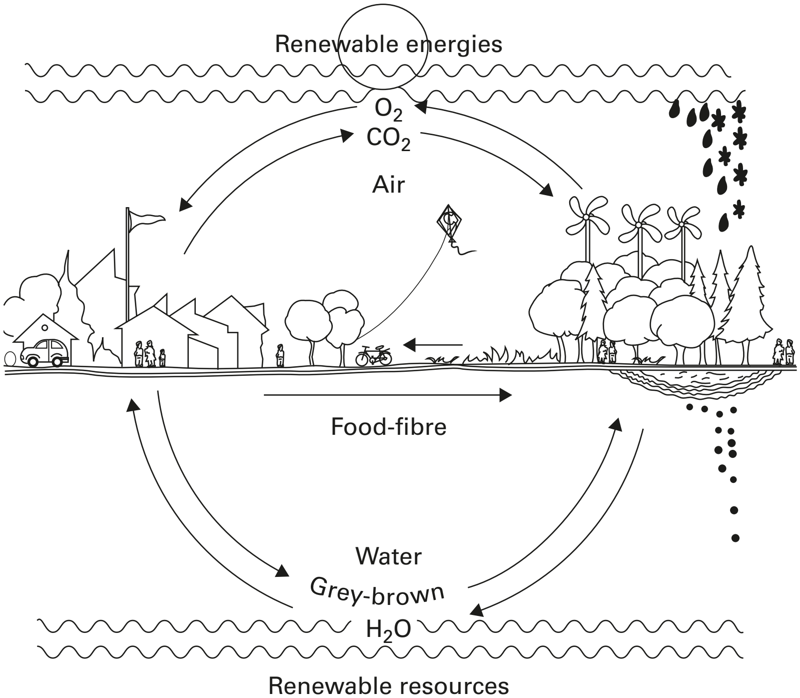

Figure 12.5
Pullman's ecological systems diagram.

In quantitative terms, the related ecological exchanges between the selected human–environmental systems of air, water, food and fibre (land), and energy for the community are modelled and measured to establish indicators for sustainability (Figure 12.6). For each ecological interchange, the four left-hand rows in the bar graph illustrate the relative quantities of the following:

1. **The existing use of each resource**
2. **The non-renewable and renewable supply of each resource from the site**

3–4. **The proposed sustainable use and estimated per cent of conservation required to place each human–environmental system in balance**

The method demonstrates the interaction of each system and that 40–70% conservation is required to place each variable and its human–environmental exchange in a sustainable balance. Also, the method conveys surprise that air represented by the carbon dioxide to oxygen (CO_2 to O_2) exchange achieved through photosynthesis is one of the most overlooked yet fundamentally critical of all the systems. Without balancing our CO_2 to O_2 cycle, global warming will continue to increase.

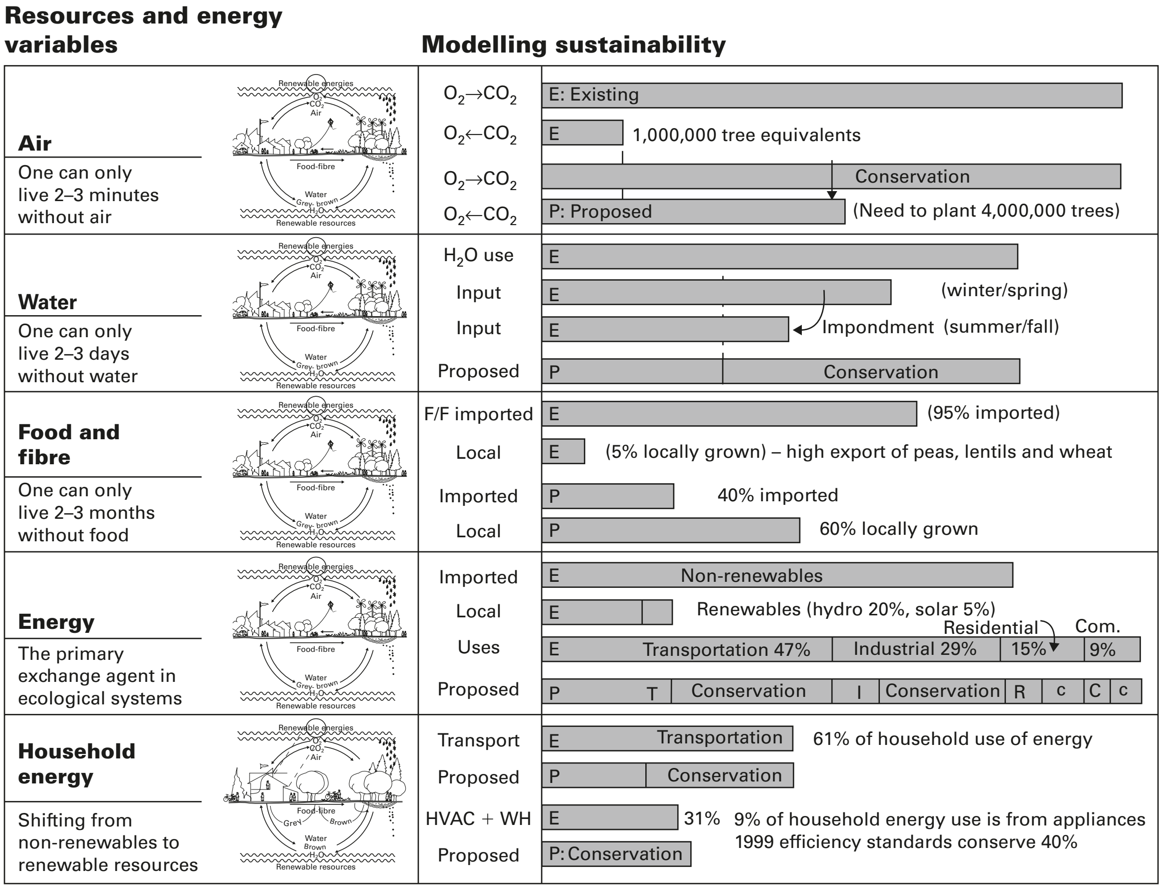

Figure 12.6
Pullman's modelling and analysis of its human–environmental systems. (HVAC = Heating Ventilating and Air-Conditioning; WH = Water Heating.)

The study also demonstrates the integrated use of these modelling methods and sustainable design strategies in the revitalization of this existing community, enhancing its human, economic, social, and environmental quality. A useful ecological organizing technique, 'levels-of-integration,' is used carefully to reanimate Pullman and balance its fundamental human–environmental systems. A summary of these integrated levels of design regeneration (region, city, neighbourhoods, site/clusters, and buildings) is illustrated in the following annotated outline.

A Regional level strategies

Regional level strategies provided a critical opportunity to balance selected human–environmental interchanges. The existing urban