Post-petroleum design: Practices and principles

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ABSTRACT: As the global supply of oil dwindles and concerns about its use rise, designers are searching for alternatives. An increasing number are choosing to reduce the amount of petrochemicals used in their raw materials, manufacturing processes and product distribution. Some are achieving significant reductions in petrochemical use throughout the entire product lifecycle. By interviewing over 40 industrial designers and architects practicing “post-petroleum design,” the author found that significant reductions in petrochemical use often begin with design. The design intent of the industrial designer or architect in many cases establishes the goal of minimal petrochemical use, which is then achieved through material acquisition, manufacturing, distribution and recycling.

Qualitative analysis of the design processes and their lifecycle repercussions as revealed in the interviews exposed six recurring practices characterizing post-petroleum design: the use of renewable resources, recyclable materials, non-toxic materials, low-energy manufacturing and distribution processes, low-carbon manufacturing and distribution processes, and local artisanry. Of even greater significance is the observation that these six practices often appeared to be manifestations of five post-petroleum design principles: energy flows, cycles, resource balancing, resilience and interdependence. These are, perhaps not coincidentally, also principles of living systems, and this resemblance is further explored in the paper.

The results of this study of post-petroleum design will be of value to architects and their educators in two ways. First, the analysis of interviews with architects reveals specific principles and practices for reducing petrochemical use in architecture. Second, the analysis of interviews with the designers and manufacturers of post-petroleum products and materials, which can be specified by architects, opens new approaches to green building. This study also addresses obstacles to post-petroleum design, including environmental, social, economic and design challenges. And it includes a look forward to emerging post-petroleum practices such as landfill mining, industrial recycling, and the increasing use of nanomaterials and biomaterials.