

Sustainable Supply Chain

The vulnerability of an enterprise to changes in material access may be reduced by bypassing as many links in the supply chain as possible. This would also reduce expenses from transportation, regulations, and multiple tiers of middle men.

Three strategies for reducing dependence upon distant resources come to mind: (a) Phase into products that use a higher percentage of locally available materials. (b) Create new products or enterprises based upon local materials. (c) Increase the variety of materials available locally.

How do we develop a local supply chain? This will vary from region to region, based upon what nature and landfills might provide. Consider the resources within the southern half of California's Central Valley.

In the central valley we have plenty of sunshine, biomass, and land for growing things. Solar electric is increasingly used, and this is terrific. For many farmers, almost a third of their expenses have been the cost of energy to pump water from ever-increasing depths. Also, the proliferation of solar electric panels upon commercial and residential structures has been a monumental step in reducing the carbon footprint of fossil fuels.

A less exploited feature of sunshine is its thermal opportunities. In many cases a third of the total energy (counting both gas and electric) used in residential structures goes to heating water. This can be nicely managed by the heat-capturing variety of solar panels. There are also industrial processes such as the drying of agricultural products, that might be served. Another aspect of solar is that it can be concentrated to provide a whole additional range of possibilities. This is already exploited by some power plants to drive heat powered engines to produce electricity.

We may have to be a little more creative in applying the biomass resource, yet the potential remains. A number of years ago I designed an extremely efficient style of wood stove that produces no visible smoke and very little pollution. I made a larger version of this for a farmer friend so he could dispose of his annual pile of prunings.

Besides no longer needing to rent a chipper, this stove produces less smoke, and he can do the work at his own convenience without having to make multiple trips to the rental agency. But the real potential lies in the energy this stove produces. Millions of gallons of propane are used every year in the central valley for agricultural processes. If the energy produced by the annual tonnage of prunings were applied to these thermal processes, the energy and cost savings would be monumental. The expense and environmental mayhem caused by the mining, refining, and transporting of this fossil fuel would also be eliminated. Perhaps even more attractive than the extreme cost savings is that the renewable nature of this bio fuel (the prunings), would give it a net-zero carbon footprint.

A more sophisticated application for this biomass would be processing it for compounds that are normally derived from petroleum. The motor fuels, solvents, and chemical compounds produced from local biomass would further localize supply chains.

If homes and other structures were set into the ground a few feet, their internal temperatures would be more stable, less insulating material would be required, and less energy would be needed for heating and cooling.

Mining the sporadic layers of clay between the aquifers, combined with the available thermal resources of solar and biomass, could produce an endless supply of bricks and other specialized components for building and other purposes.

Another technology to be explored and developed would be to directly fuse sand into useful shapes as demonstrated in the video at <https://www.youtube.com/watch?v=ptUj8JRAYu8>. This particular

technology plays an important role in a book titled “Arland” (book 2 of a fiction trilogy).
<https://www.lulu.com/shop/william-huff/arland/paperback/product-23471631.html> .