



## What the things we use are made of

The list below shows a range of goods, services and infrastructure that play a significant part in 21<sup>st</sup> century human activity, particularly in prosperous, economically-developed countries. Many of these economic benefits rely on large-scale exploitation of natural resources. The list shows the principal materials and other physical resources from which specific goods and services are derived.

A small number of natural material and energy resources, and a few categories of bulk artificial materials, underpin provision of many of the goods and services. These are summarised on the final page of this document.

### Buildings

**stone, mud** — minerals, energy

**brick, concrete, steel, glass** — minerals, chemicals, water, energy

**timber, bamboo, straw, mud** — biomass, energy

### Clothing

**cotton and other plants** — biomass, chemicals, water, energy

**synthetics** — petrochemicals, water, energy

**rayon** — biomass (wood), chemicals, water, energy

**wool** — biomass, chemicals, water, energy

### Electronics & domestic appliances

**plastics** — oil, energy, other fossil fuel, (potential alternative synthesis routes)

**metals** — minerals, energy (and chemicals)

### Fertilizers

**natural compost, manure, guano** — biomass

**artificial** — petrochemicals, chemicals, minerals, water, energy

### Food & drink

**crops** — land, water, air, fertilizer, energy

**meat** — land, water, biomass (other animal feed)

**fish** — water resources, biomass

Furniture, etc.	<p><b>timber</b> — biomass, chemicals, land, water, air, fertilizer, energy</p> <p><b>plastics</b> — petrochemicals, chemicals, water, energy</p> <p><b>metals</b> — minerals, chemicals, water, energy</p>
Healthcare	<p><b>pharmaceuticals</b> — chemicals, minerals, biomass, water, energy</p> <p><b>buildings</b> — minerals, chemicals, water, energy</p> <p><b>electronics</b> — minerals, chemicals, petrochemicals, energy</p> <p><b>clothing, etc.</b> — biomass, chemicals, water, energy</p>
High-value artefacts	<p><b>jewellery, etc.</b> — minerals, biomass, synthetic materials</p>
Machinery	<p><b>metals</b> — minerals, chemicals, water, energy</p> <p><b>plastics</b> — petrochemicals, chemicals, water, energy</p>
Military infrastructure	<p><b>Buildings, etc.</b> — minerals, chemicals, water, energy</p>
Military machinery & electronics	<p><b>metals</b> — minerals, chemicals, water, energy</p> <p><b>plastics</b> — petrochemicals, chemicals, water, energy</p>
Paper & board	<p><b>timber</b> — biomass, chemicals, minerals (e.g. fillers), water, energy</p>
Sports, leisure & media	<p><b>metals</b> — minerals, chemicals, water, energy</p> <p><b>plastics</b> — petrochemicals, chemicals, water, energy</p> <p><b>timber</b> — biomass, chemicals, water, energy</p>
Transport infrastructure	<p><b>stone</b> — minerals, energy</p> <p><b>concrete, brick, tarmac, steel, other metals</b> — minerals, water, energy</p> <p><b>plastics</b> — petrochemicals, chemicals, water, energy</p> <p><b>timber</b> — biomass, chemicals, energy</p>
Tools	<p><b>metals</b> — minerals, chemicals, water, energy</p> <p><b>plastics</b> — petrochemicals, chemicals, water, energy</p> <p><b>wood</b> — biomass, chemicals, energy</p>

### *Main bulk artificial materials*

**steel & other metals** — minerals, water, chemicals, energy

**concrete** — minerals, water, chemicals, energy

**chemicals** — minerals, water, air, biomass, energy

**petrochemicals** — oil, other fossil fuels\*, water, energy

\* *technology to synthesise these materials from renewable raw materials may be developed*

### *Underlying material resources*

- **water** — product of geological, biological and climatic processes
- **biomass** — derived from living or recently-living things, generally renewable but not unlimited
- **minerals** — solid material of geological origin, generally non-renewable

### *Energy*

Energy is derived from a variety of sources:

- **Fossil fuels** are the principal energy source in most industrialized countries, principally oil, natural gas and coal
- Significant amounts of **nuclear power and hydro power** are generated in a few countries
- Large amounts of **biomass, wood and other plant material** are used, but generally on a small scale except where there is a large forest-products industry
- Use of other forms of **renewable energy** is increasingly being developed — e.g. wind, solar power, tidal and wave energy, etc., but *renewable* is not synonymous with *unlimited*

Read more about [minerals](#).