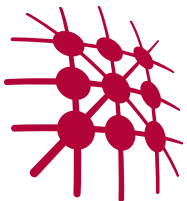
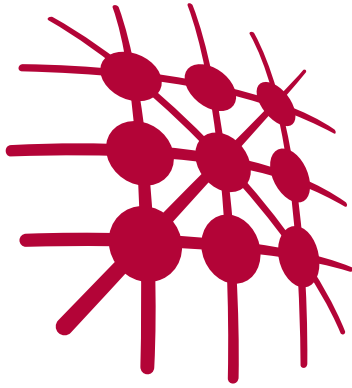




Snapshot of the World 2017



MILLIONS
OF MARKETS



MILLIONS OF MARKETS

Through advanced technological breakthroughs, the United States becomes highly self-reliant in terms of energy, agriculture, manufacturing, and other needs. There is increased migration towards smaller urban areas that are supported by nearby regional innovation hubs that can manufacture highly customized goods.

The last three decades have been witness to tremendous technological advances and social changes that have led to a high level of regional self-reliance in matters of energy, health, food production and manufacturing. Not only has the United States as a whole become highly self-sufficient, individual regions and cities have also become much more self-sustaining. The primary drivers of these changes were technical breakthroughs that are collectively referred to now as the “Three Pillars.”

The first pillar is abundant and low cost energy. Advances in drilling techniques and improved seismic testing enabled the economical location, capture, and production of tremendous quantities of natural gas from the massive shale formations across the United States. Renewable energy sources, such as solar and wind power, have also increased the total United States energy production. The net effect is some of the world’s cheapest, safest, and most stable electricity production. The lower cost of producing electricity contributed to the almost universal adoption of first hybrid and then electronic vehicles.

The second pillar is the widespread use of intelligent manufacturing to include 3D printing, flexible robotics,

and other advanced manufacturing techniques. These advances enabled the production of small to medium batches of a wide variety of products at reasonable costs. Essentially, the cost advantages of leveraging economies of scale that dominated manufacturing throughout the last several decades of the 20th century were replaced for many products by the ability to cheaply produce a wide range of highly customized products. While manufacturing has not advanced to the stage of “home replicators” that local Maker enthusiasts once envisioned, it has led to the development of regional manufacturing hubs across the country. These manufacturing facilities are close to consumption centers and are fueling the expectations of consumers for the rapid creation and delivery of highly personalized goods. A key innovation that transformed the manufacturing industry was the separation of the digital design from the physical production process. This has in turn lead to the creation of a new industry sector of pure digital design firms that develop and sell small-run or custom designs.

The third technological advancement was the wide spread adoption and use of virtualization. Working and shopping from home – or from any other location –

has become the standard rather than the exception for many people. Most households order products and services directly from the home and receive them there as well. On-line shopping with prompt delivery to residences has largely replaced physical stores. People still go shopping in person – but the retail experience has evolved into an event rather than just a way to acquire physical products – similar to how movie theaters adapted when home entertainment systems were introduced. As goods and services have become more mobile than people, there is less physical commuting to work. Ironically, the level of travel for pleasure has increased since a large percentage of the workforce can work from any location.

A social change that has emerged over the last several decades is the increase in social interaction – both virtually and in-person. It appears that while people can now work and live totally isolated from other humans, very few actually do. Instead, there has been a groundswell migration towards “livable cities” of a moderate size where people can enjoy the benefits of interacting with others in an urban setting without the overwhelming congestion and other drawbacks of an impersonal mega-city. As these mid-sized cities continue to grow, however, pockets of exceptionally high-density residential and commercial space are being created that mimic some of the problems and challenges faced by mega-cities – albeit at a smaller scale.

In this widely fragmented, yet highly connected, society, small and mid-sized cities are growing at a faster rate than the megacities. Local governments compete with each other to attract investments to create “innovation clusters” that feature a mix of technology, manufacturing, and distribution facilities.

Technological advancements and cheaper energy have ushered in a new age of affluence: average household income has increased, personal consumption has soared and standards of living have improved. It is not a technology-utopia, however. The income gap has widened between the traditional “blue collar”, “white collar”, and the newly established “no collar” creative

class. Many traditional jobs have been displaced and those workers struggle to find new vocations. This is especially true for older workers who are not as able to adapt to the newer technology. Government programs and regulations at the Federal, and more commonly, state and local levels have been introduced to minimize this gap – with limited success.

Also, while new agricultural techniques, mainly genetically modified fruits, vegetables, fish, and livestock have significantly increased the quantity and variety of food products available to consumers; there has been a significant amount of resistance from some sectors of the population. Food considered “Absolutely Organic” is generally available, but at a much higher cost. There are also still lingering suspicions in some parts of society over the safety of hydraulic fracking for natural gas.

In this fast-paced environment, the optimal production site is closer to consumption centers. The affluent and savvy buyers of this world demand products customized to their needs and tastes. While American consumers prefer locally produced goods, they are not inherently against foreign products, provided they meet their high expectations of personalization and delivery speed.

Trade between countries is still active, but for the first time in history, the value of imported and exported services exceeds that of goods. The United States is a net exporting country when considering services, such as digital designs. Physical trade still occurs, but at a lower level and in different forms. For example, global trade of raw materials has increased while transportation of finished goods has decreased. Raw materials and components are transformed into goods when and where demanded by the final consumer. Also, intellectual property that is used within most local manufacturing is traded freely across the globe although there are some risks concerning theft of these “recipes” and instructions in certain areas of the world. ■

AVERAGE "VALUE ADD DISTANCE" FOR SELECTED PRODUCTS & SERVICES

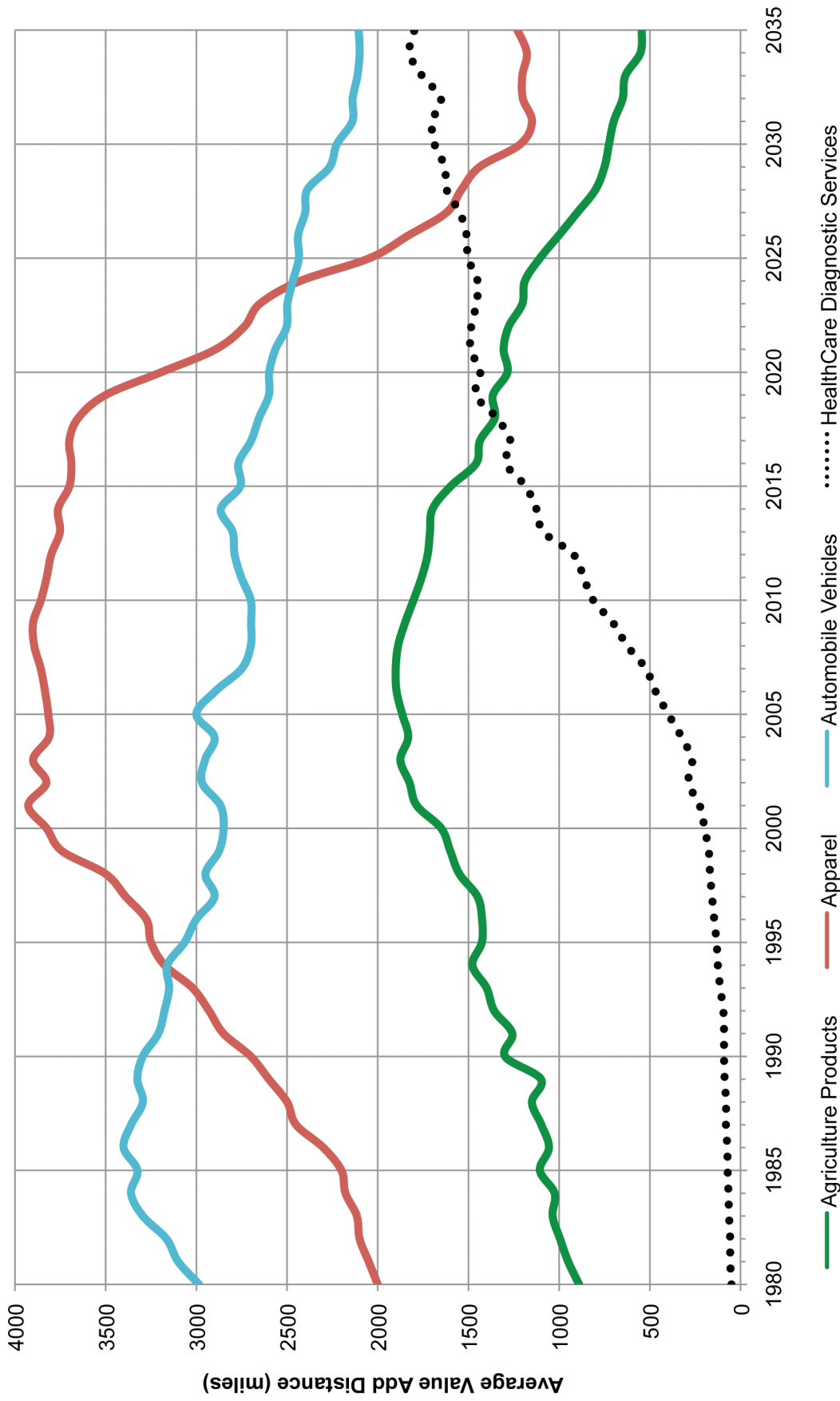


Figure 1. The average "value-add distance" (AVAD) for many products dropped precipitously over the last 20 years. Defined as the distance from point of consumption to where half the value was added to a product or service, AVAD captures the level of proximity of production to consumption. As energy costs dropped and manufacturing techniques improved, regionalized production clusters emerged near large population centers.

U.S. GROSS DOMESTIC PRODUCT (GDP) AND SPEND

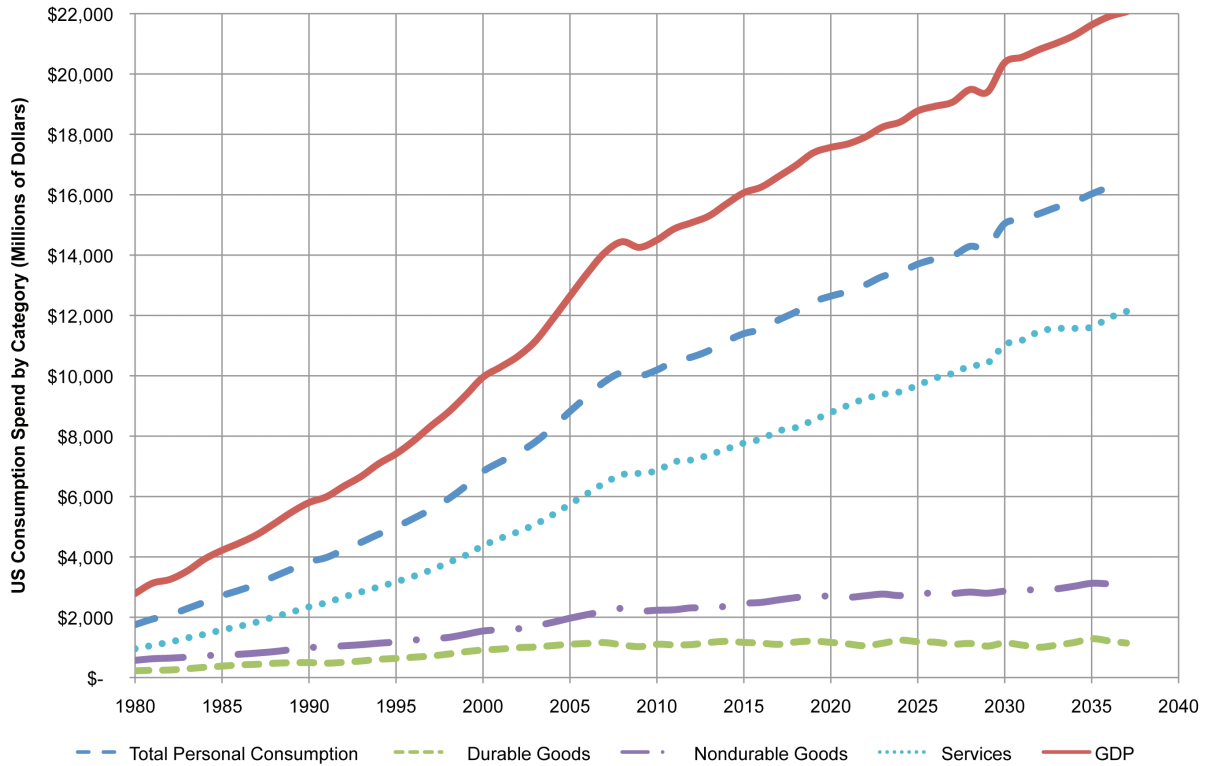


Figure 2. The US Gross Domestic Product (GDP) has continued to rise over the last several decades along with the total consumption expenditures. Expenditures on services has continued to increase while durable good expenditures has remained flat.

IMPORTS AND EXPORTS AS PERCENTAGE OF GDP

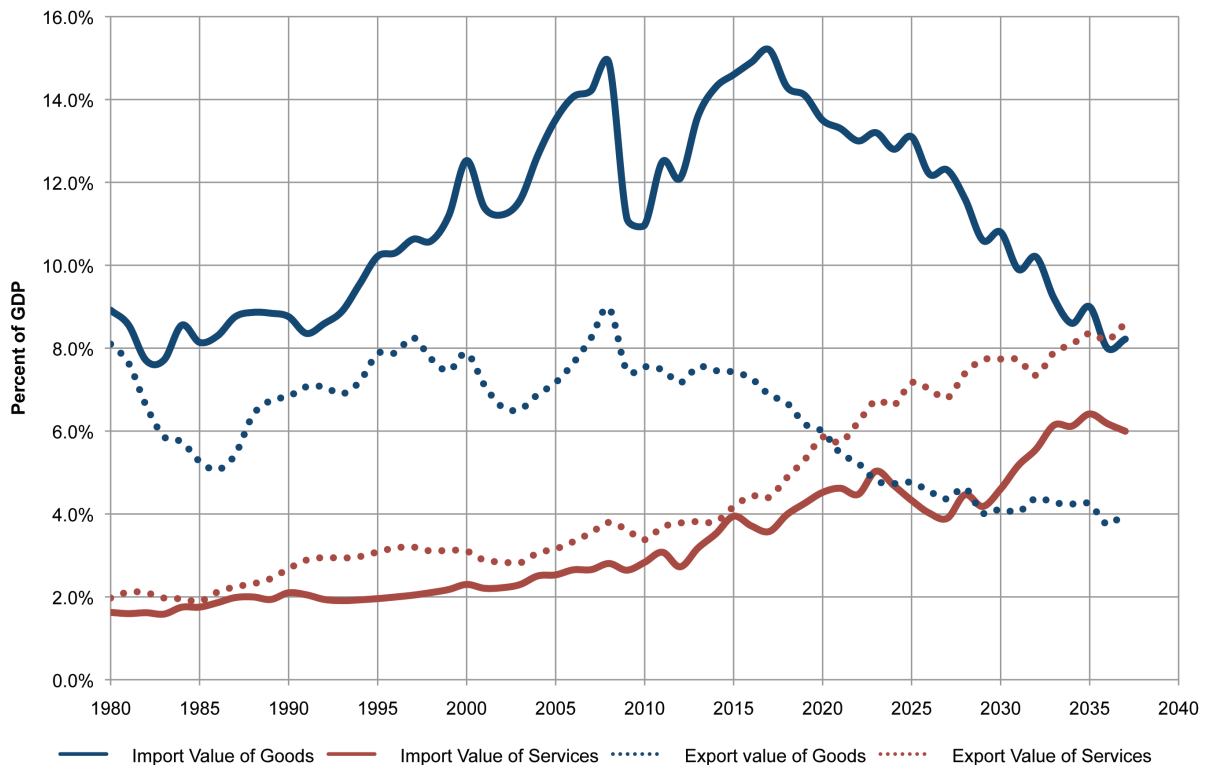


Figure 3. The value of goods as a percentage of the US GDP, both as imports and exports, has dropped considerably over the last 15 years. Most finished goods are produced or at least assembled domestically. The value of services, both imported and exported, has grown over the same period.

PERCENT OF ENERGY CONSUMPTION BY SOURCE

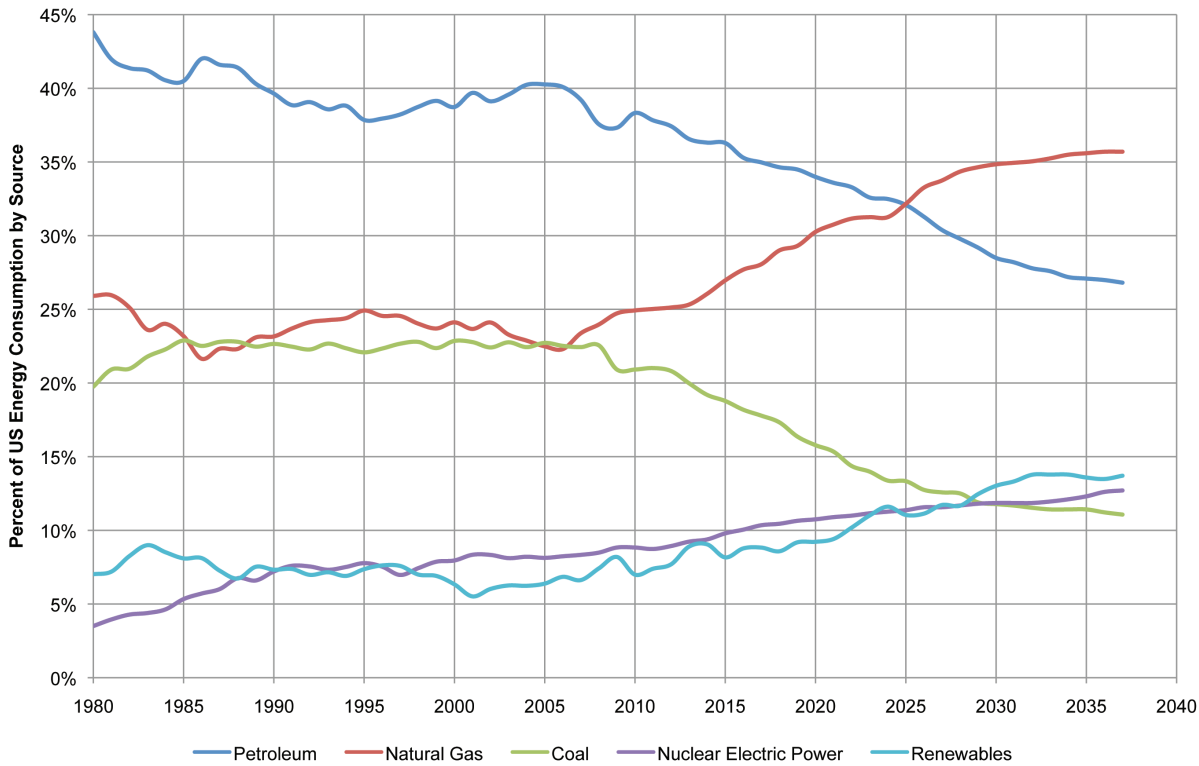


Figure 4. The dramatic increase of cheap domestic natural gas had led to dramatic decreases in the use of petroleum as well as coal. Renewables have finally surpassed nuclear power after staying on par for several decades. Both surpassed coal in the late 2020's.

AVERAGE US ENERGY COST ACROSS ALL SOURCES

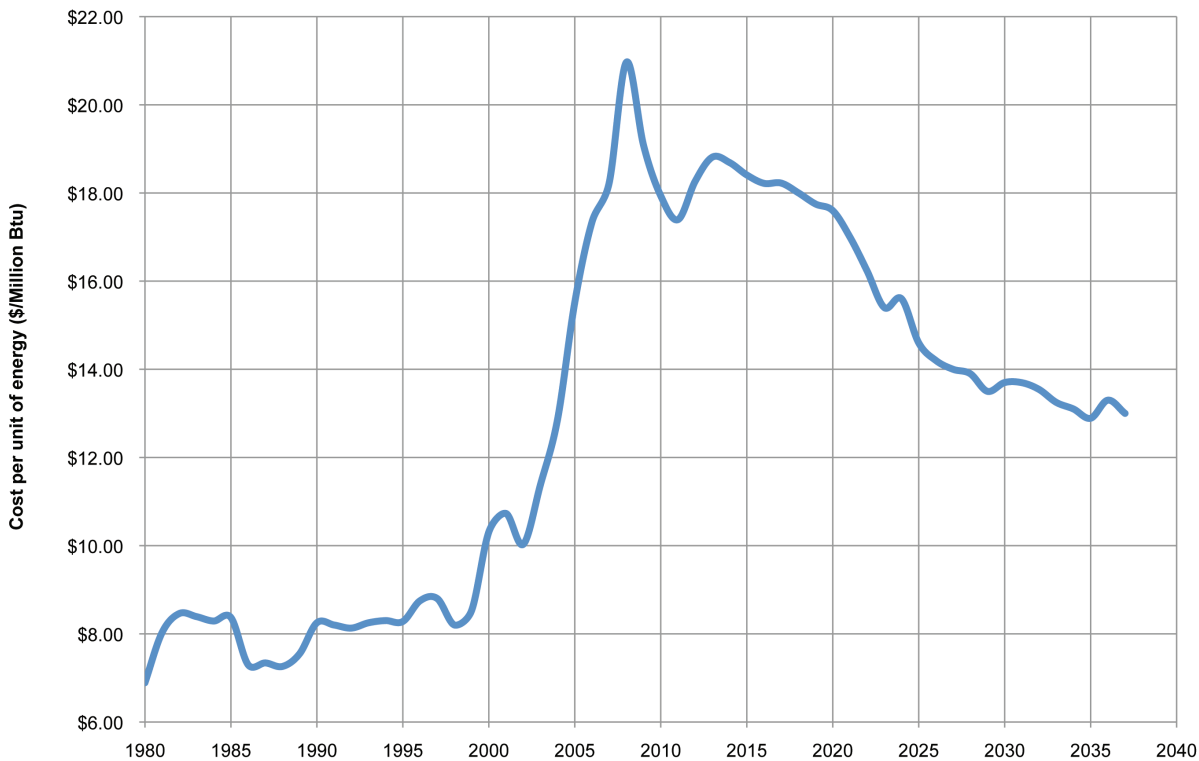


Figure 5. The cost of energy peaked in the US in 2008. The increase in domestic natural gas production as well as technological breakthroughs for producing renewable energy has driven total energy costs down over the last twenty years.

US URBAN POPULATION GROWTH BY CITY SIZE

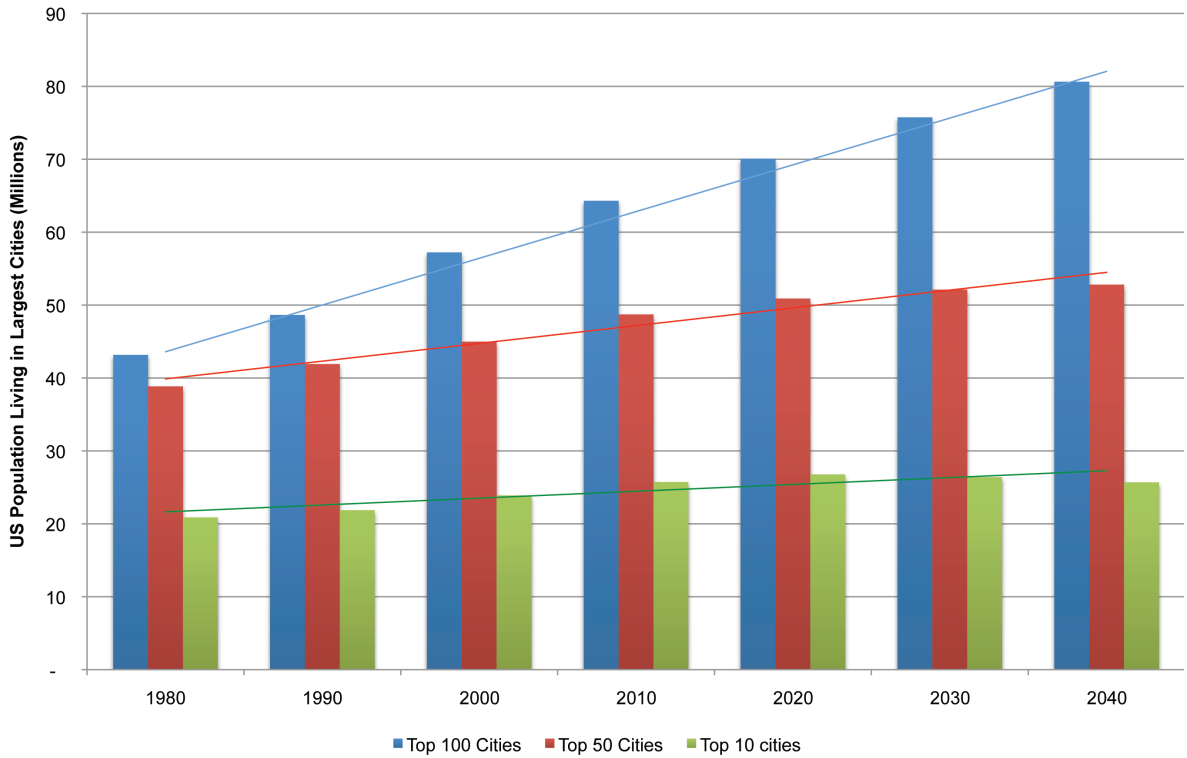


Figure 6. The top ten cities in the US continue to grow, but at a much lower rate than the top-100 or mid-sized cities. Urban living is very much in demand and is possible in a wider variety of cities now that production is more dispersed and regionalized.

SHARES OF US HOUSEHOLD INCOME BY QUINTILES

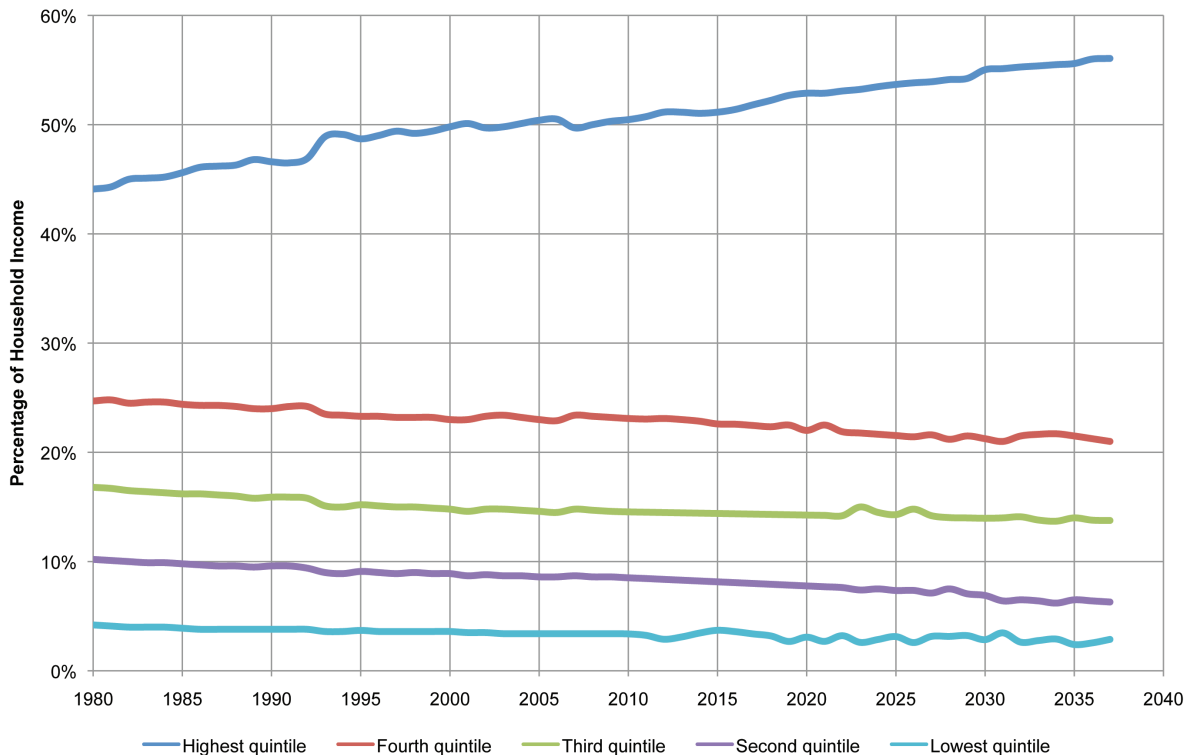


Figure 7. The percentage of the household income earned by the top 20% of US households has grown from 50% in 2010 to almost 60% today. Over this same period, the lowest quintile has stayed almost constant at ~3%. The relation between the quintiles illustrates the income inequality in the United States.

WORK AND COMMUTING STATISTICS

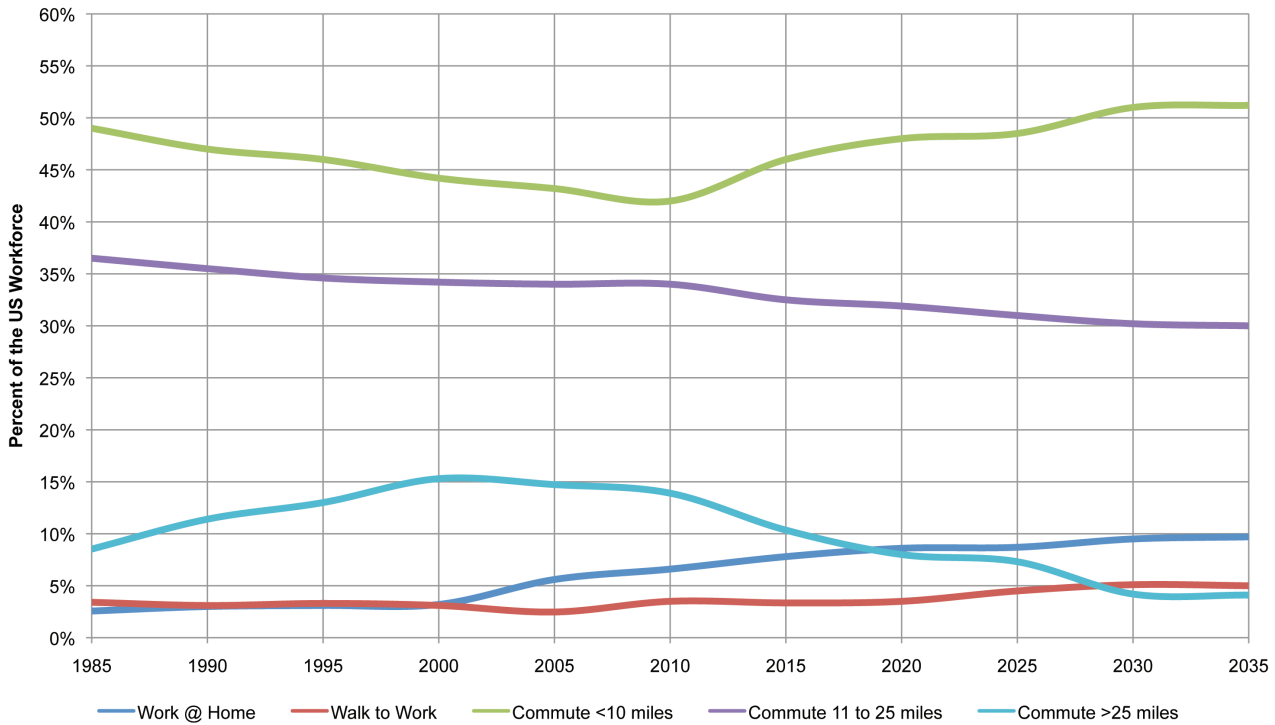


Figure 8. The average commuting distance to work peaked around 2000 at 26 miles each way and has steadily declined since. The percentage of the workforce operating primarily out of their own home has increased steadily since 2000, but is still less than 10% of the workforce.

NUMBER OF US PATENT APPLICATIONS AND GRANTS BY TYPE

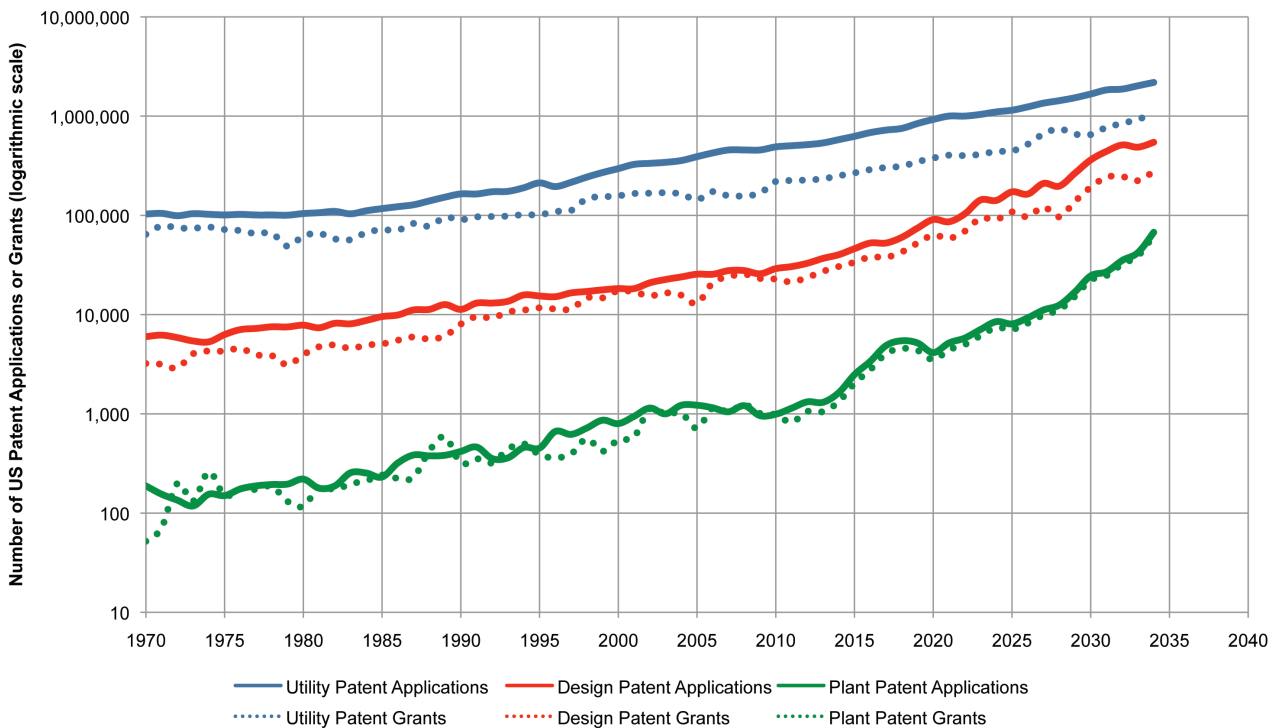


Figure 9. The importance of protecting intellectual property has grown dramatically over the last 40 years. While the number of utility patents (the traditional patents of invention) applied and granted has been consistent, the number of applications for design patents (issued for ornamental design for an article of manufacture) and plant patents (issued for newly invented or discovered plants, seeds, etc.) has skyrocketed. The granting of the design patents is not keeping pace, however, with the number of applications. (Note that this is a logarithmic scale.)



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MILLIONS OF MARKETS SCENARIO RECAP

How would you characterize the future of Millions of Markets in terms of . . .

- | | | | |
|---------------------------------|------------------------------|---------------------------------|-------------------------------|
| Level of Global Trade | <input type="checkbox"/> Low | <input type="checkbox"/> Medium | <input type="checkbox"/> High |
| Availability of Resources | <input type="checkbox"/> Low | <input type="checkbox"/> Medium | <input type="checkbox"/> High |
| Cost of Energy | <input type="checkbox"/> Low | <input type="checkbox"/> Medium | <input type="checkbox"/> High |
| Commodity Price Volatility | <input type="checkbox"/> Low | <input type="checkbox"/> Medium | <input type="checkbox"/> High |
| Environmental Awareness | <input type="checkbox"/> Low | <input type="checkbox"/> Medium | <input type="checkbox"/> High |
| Migration Between Countries | <input type="checkbox"/> Low | <input type="checkbox"/> Medium | <input type="checkbox"/> High |
| Currency Fluctuation | <input type="checkbox"/> Low | <input type="checkbox"/> Medium | <input type="checkbox"/> High |
| Reach of Government Regulations | <input type="checkbox"/> Low | <input type="checkbox"/> Medium | <input type="checkbox"/> High |

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