Energy demand is a complex subject influenced by a multitude of factors. Understanding these factors is crucial for policymakers, energy providers, and researchers to develop effective strategies for managing energy resources. This literature review focuses on four key variables affecting energy demand: population, temperature, public holidays, and the price of energy. By examining the existing research, this review aims to provide a comprehensive understanding of how these factors influence energy consumption patterns.

Temperature is widely recognized as a significant determinant of energy demand. Numerous studies have established a strong relationship between temperature and energy consumption, particularly in the residential sector (Auffhammer et al., 2017; EIA, 2019). Heating and cooling systems account for a large proportion of residential energy usage, and their operation is directly influenced by external temperatures (EIA, 2020).

Climate change is expected to exacerbate the relationship between temperature and energy demand, as global temperatures continue to rise (Auffhammer et al., 2017). This will lead to increased cooling demand during hotter periods and decreased heating demand during milder winters, with implications for energy infrastructure and capacity planning (Isaac & van Vuuren, 2009).

Public holidays have been found to influence energy demand, particularly in the commercial and industrial sectors (Bessec & Fouquau, 2008). On public holidays, businesses and factories typically reduce their operations or close entirely, leading to decreased energy.

However, the impact of public holidays on residential energy demand is less clear. Some studies suggest that energy consumption may increase due to increased leisure activities and more time spent at home, while others find no significant effect (Bessec & Fouquau, 2008).

The overall impact of public holidays on energy demand is likely to depend on the specific holiday, the country or region in question, and the energy consumption habits of its population. Further research is needed to understand these nuances and develop appropriate demand-side management strategies for public holidays.

The price of energy is another critical factor affecting energy demand. The economic theory suggests that an increase in energy prices will lead to a decrease in energy consumption, as consumers and businesses seek to reduce their expenditures (Adeyemi & Hunt, 2014).

Empirical evidence supports this theory, with numerous studies finding a negative relationship between energy prices and demand (Adeyemi & Hunt, 2014; Labandeira et al., 2017). However, the magnitude of the price elasticity of demand (i.e., the responsiveness of demand to price changes) varies across studies, sectors, and countries (Adeyemi & Hunt, 2014).

Price-based demand-side management strategies, such as dynamic pricing or time-of-use tariffs, have been used to encourage more efficient energy usage and reduce peak demand (Labandeira et al., 2017). However, the effectiveness of these policies depends on consumers' ability and willingness to respond to price signals, which can be influenced by factors such as income, awareness, and access to enabling technologies (e.g., smart meters) (Farrell & Lyons, 2014).

Population growth is a key driver of energy demand, as an increasing number of people require more energy for various purposes such as heating, cooling, transportation, and industrial processes (Wolfram et al., 2012). However, the relationship between population growth and energy demand is not always straightforward, and other factors such as technological advancements, economic development, and changes in consumption patterns can influence energy demand (O'Neill et al., 2012).

Technological advancements have played a crucial role in improving energy efficiency across various sectors, leading to a reduction in energy consumption per capita (IEA, 2020). This can partially explain the decreasing energy demand despite increasing population in some regions. For example, advances in building insulation, lighting, and appliances have significantly reduced energy consumption in the residential sector (IEA, 2020).

Furthermore, improvements in industrial processes and energy management systems have contributed to increased energy efficiency in the industrial sector (Worrell et al., 2010). The adoption of renewable energy technologies, such as solar and wind power, has also contributed to a shift in energy demand patterns (Bhattacharya et al., 2016).

Economic development influences energy demand through changes in industrial and consumption patterns. As countries become more developed, their economies often shift from energy-intensive industries, such as manufacturing, to less energy-intensive sectors, such as services (York, 2012). This structural change in the economy can lead to a reduction in overall energy demand.

Moreover, economic development is often accompanied by improvements in living standards, leading to changes in energy consumption patterns. For instance, increased disposable income may drive the adoption of more energy-efficient appliances and vehicles (Girod & de Haan, 2010).

Changes in consumption patterns can also influence energy demand. For example, growing awareness of environmental issues and climate change has led to an increase in the adoption of energy-saving practices and behaviors among households (Karlin et al., 2014). This includes actions such as turning off lights when not in use, using public transportation, or adopting energy-efficient appliances.

Additionally, shifts in urban planning and transportation policies, such as promoting public transportation, cycling, and walking, can contribute to decreased energy demand by reducing the reliance on private vehicles (Newman & Kenworthy, 1999).

Governments in NSW have implemented an energy saving scheme which started in 2009 and will run through to 2050. These incentives provide businesses and households with financial incentives to improve energy efficient equipment and appliances.

The building standards have also been altered to ensure all new built homes have a high enery rating and in turn this decreases the demand for power even though the population is still growing.

(https://www.nsw.gov.au/media-releases/sustainable-building-reforms#:~:text=The%20new%20standard%20cuts%20thermal,of%20the%20State%20during%20summer)

"The new standard cuts thermal energy use by at least 20 per cent and will save homeowners on power bills. The changes can save considerable amounts of energy helping to make new homes more comfortable, particularly in the hotter areas of the State during summer."

(https://energyconsumersaustralia.com.au/news/how-increases-in-energy-prices-are-impacting-consumers)

"The CRG report found that almost three quarters of people (73%) have taken action to reduce their bills over the last few years, with those who are financially stressed even more likely to act"

All these factors are influencing the demand for energy to not increase with population growth.