

Virginia Energy Generation

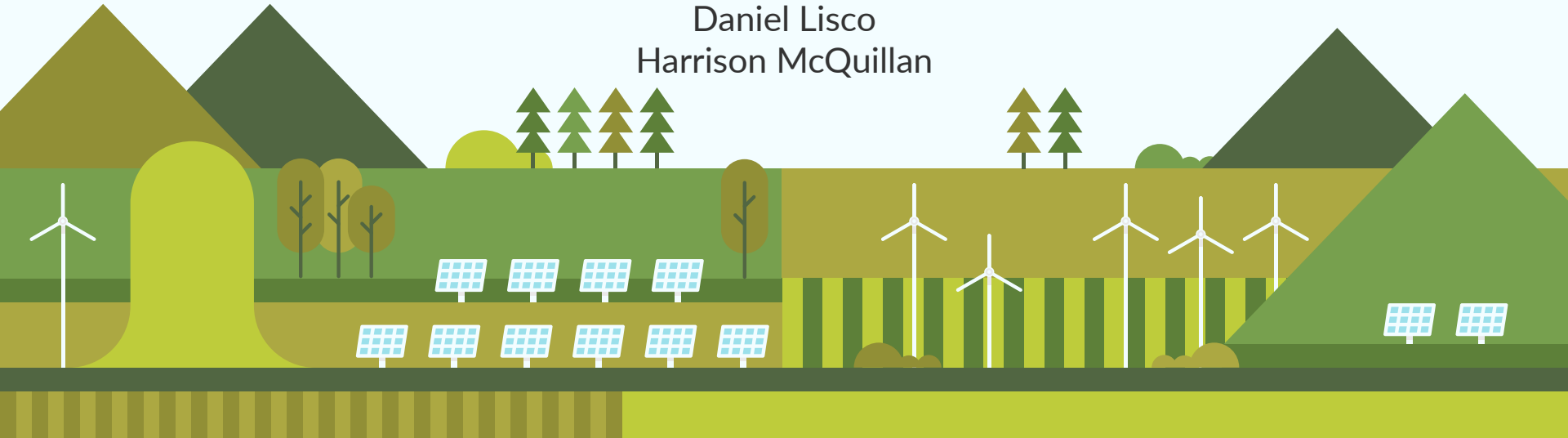
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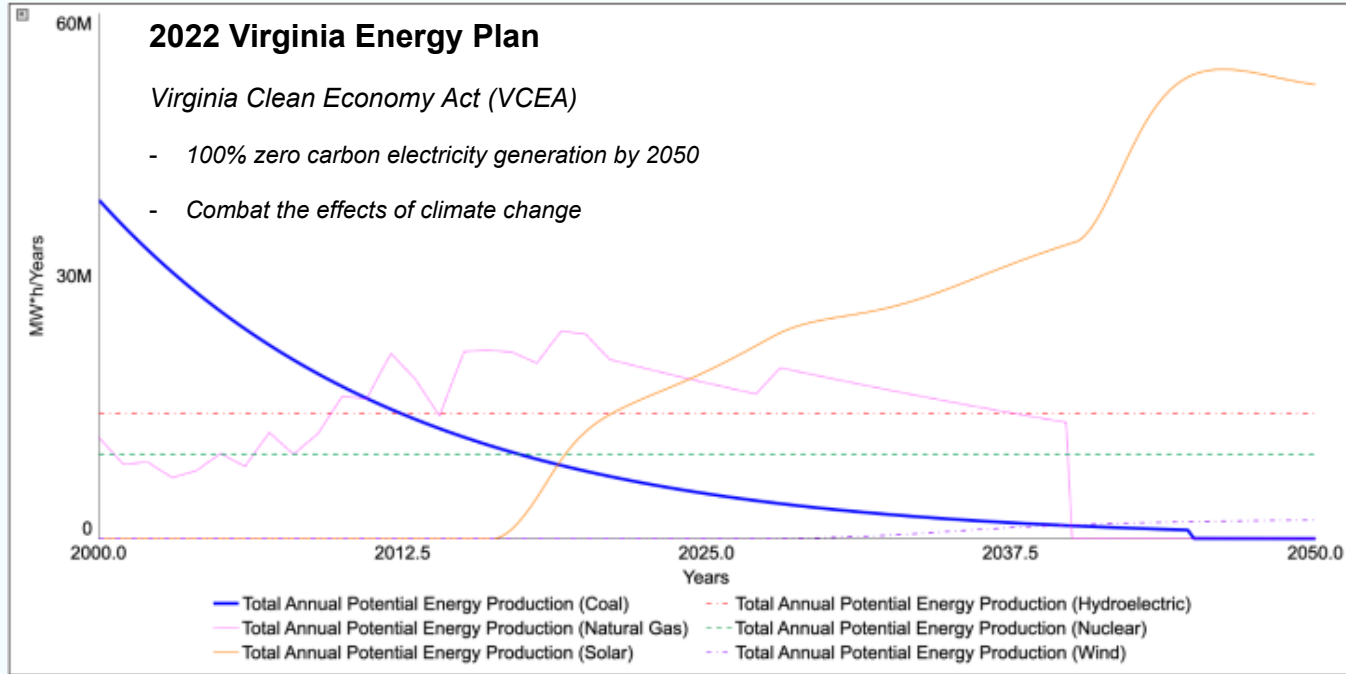
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Introduction

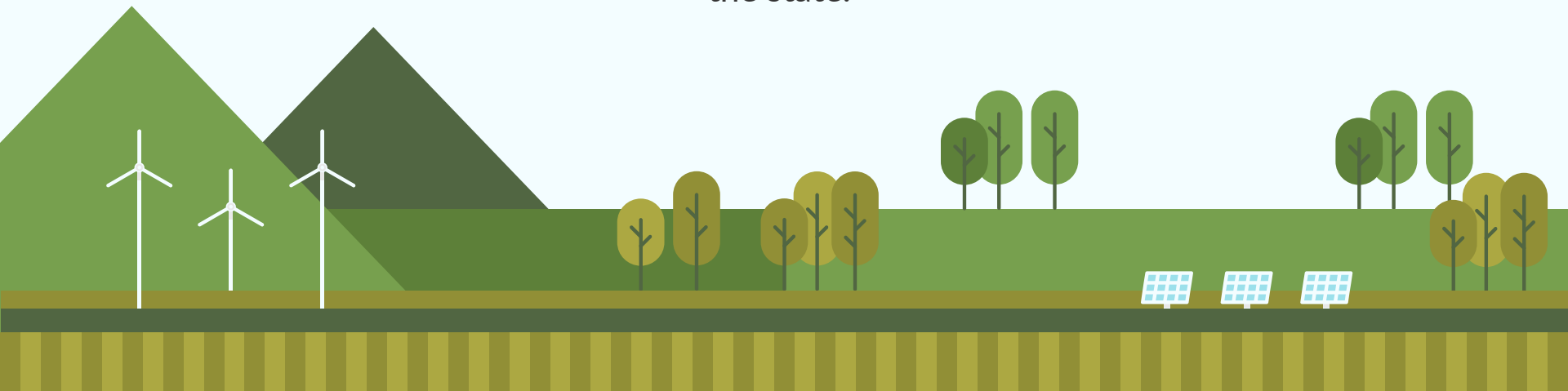


01

Problem Statement

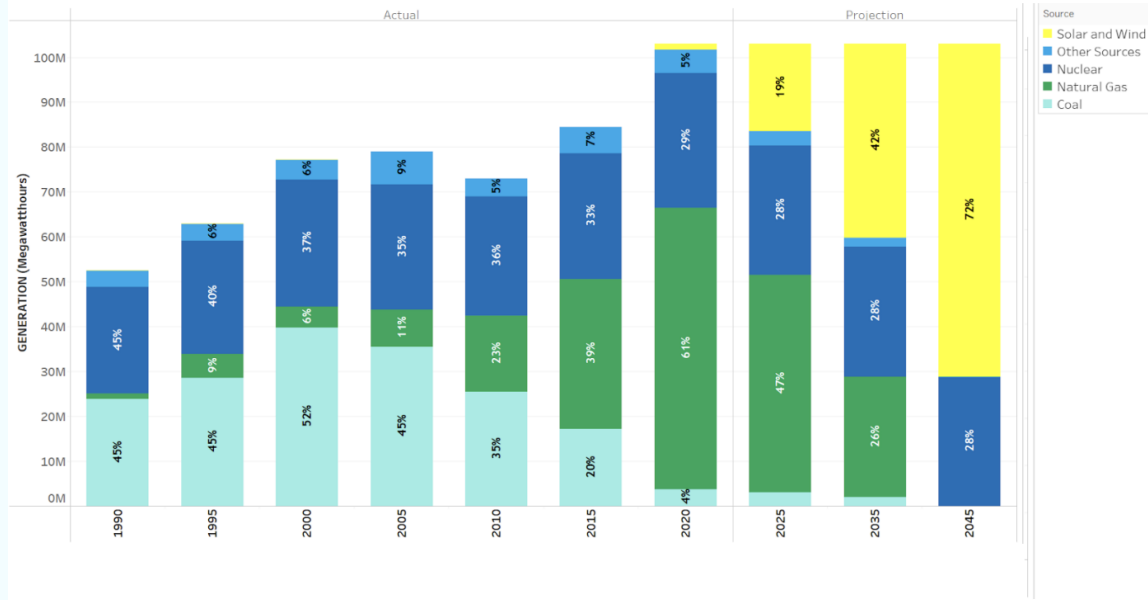


“Virginia faces the dual challenge of satisfying its growing energy needs while transitioning away from fossil fuels towards renewable sources. This transition is imperative for achieving the goal of 100% zero-carbon electricity generation by 2050 while maintaining a dependable energy supply. Effectively navigating this shift is pivotal for reducing carbon emissions and fostering a sustainable energy future for the state.”



Background

Figure 9. Virginia Total Annual Energy Generation by Source and Future Portfolio Growth²⁰



Virginia Department of Energy. (n.d.). *The commonwealth of virginia's 2022 energy plan*. The Commonwealth of Virginia. https://energy.virginia.gov/energy-efficiency/documents/2022_Virginia_Energy_Plan.pdf (Original work published 2022)

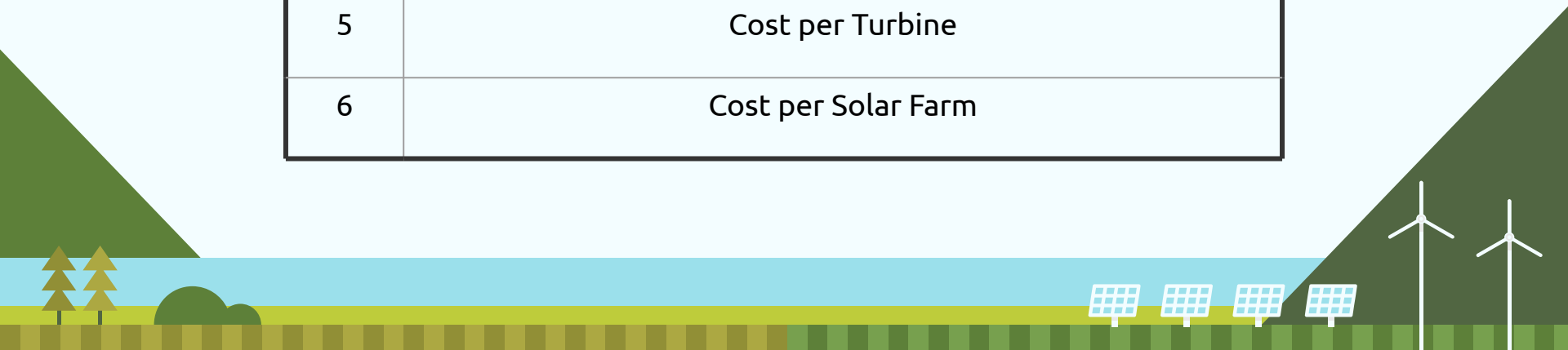
Key Variables

1	Total Annual Potential Energy Production (Solar)
2	Total Annual Potential Energy Production (Wind)
3	Total Annual Potential Energy Production (Natural Gas)
4	Demand to Supply Ratio
5	Acre

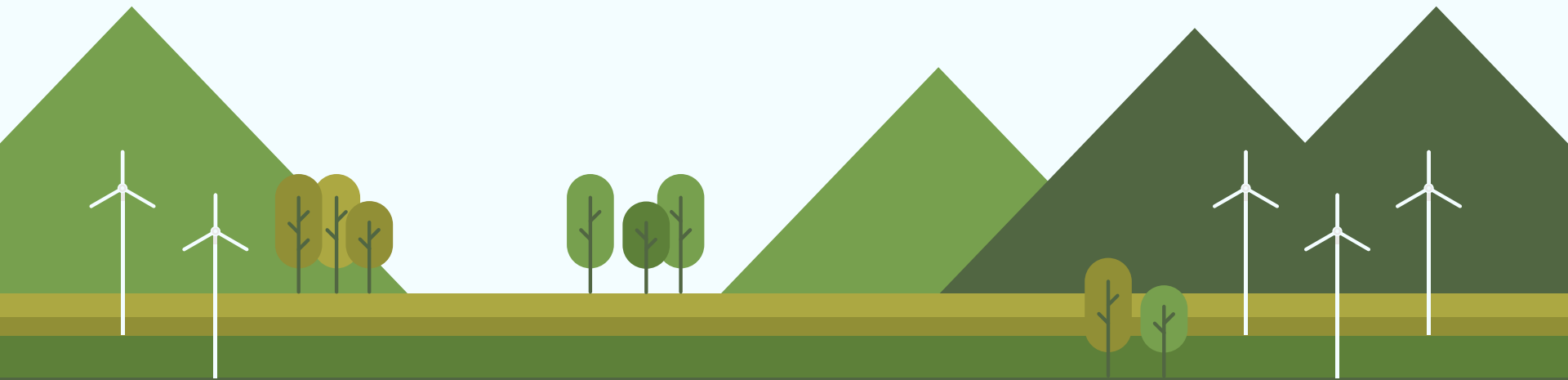


Key Policies

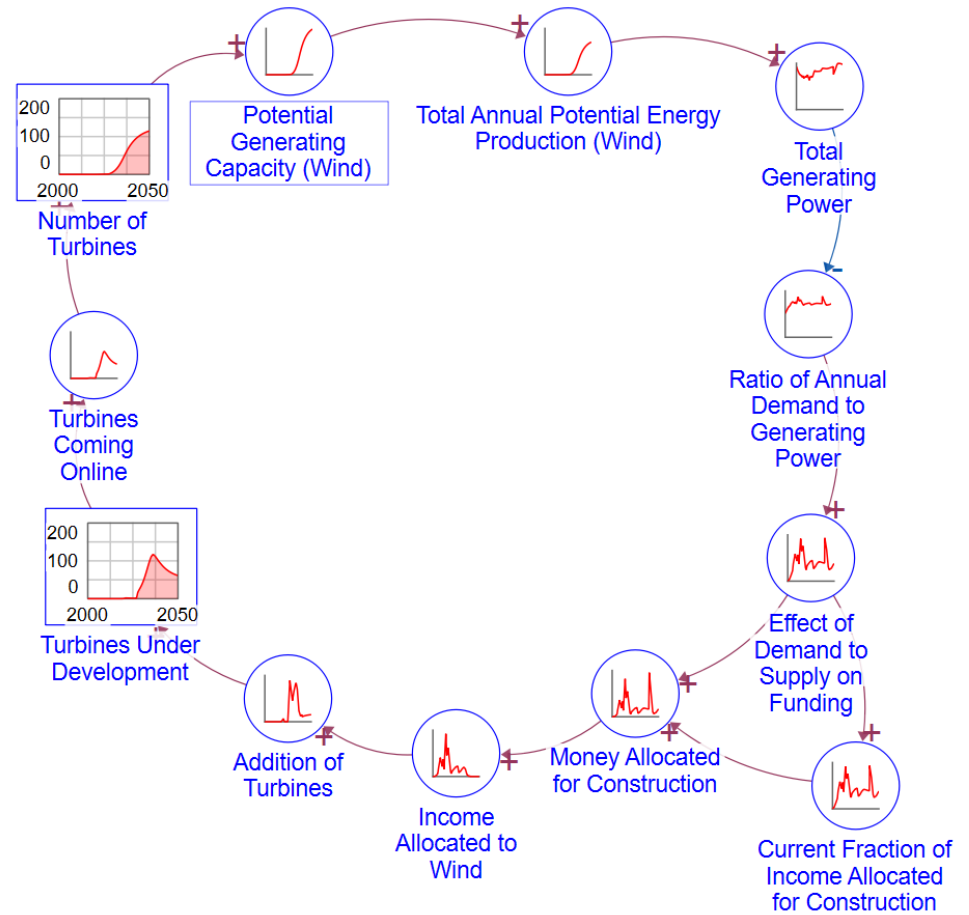
1	Income Allocated to Wind
2	Income Allocated to Solar
3	Switching Natural Gas off in 2040
4	Change Maximum Wind Turbines (176 – 350)
5	Cost per Turbine
6	Cost per Solar Farm



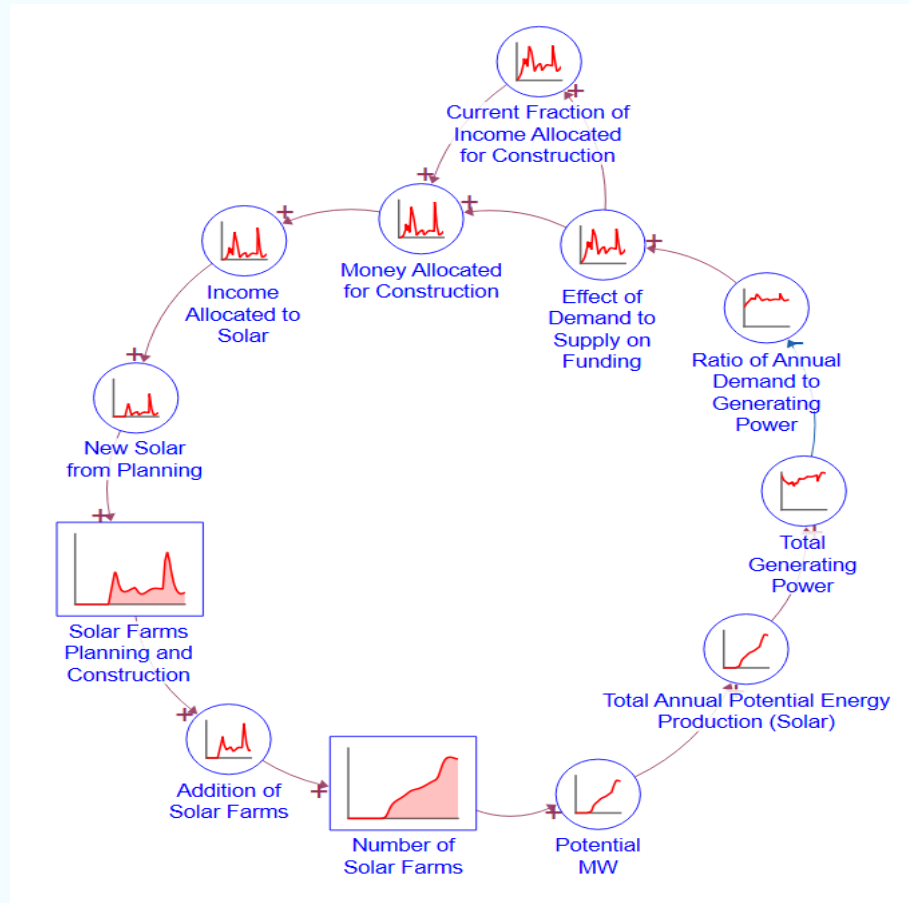
Model Demonstration



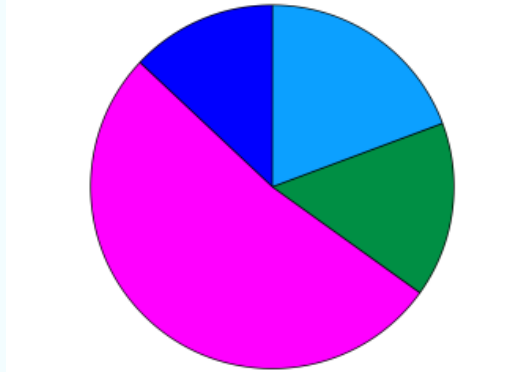
Wind Feedback Loop



Solar Feedback Loop

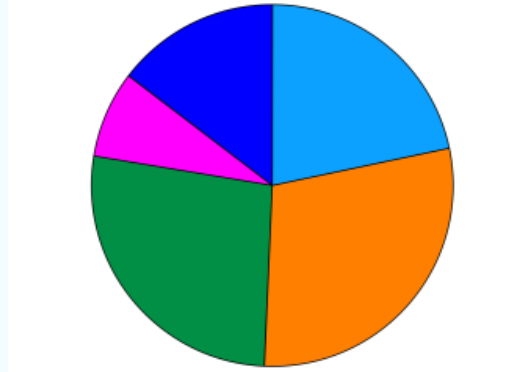


Predicted Outcome



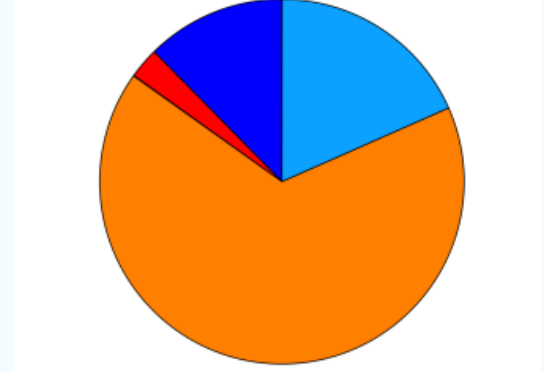
- Total Annual Potential Energy Production (Nuclear)
- Total Annual Potential Energy Production (Wind)
- Total Annual Potential Energy Production (Coal)
- Total Annual Potential Energy Production (Natural Gas)
- Total Annual Potential Energy Production (Solar)
- Total Annual Potential Energy Production (Hydroelectric)

2000



- Total Annual Potential Energy Production (Nuclear)
- Total Annual Potential Energy Production (Wind)
- Total Annual Potential Energy Production (Coal)
- Total Annual Potential Energy Production (Natural Gas)
- Total Annual Potential Energy Production (Solar)
- Total Annual Potential Energy Production (Hydroelectric)

2025



- Total Annual Potential Energy Production (Nuclear)
- Total Annual Potential Energy Production (Wind)
- Total Annual Potential Energy Production (Coal)
- Total Annual Potential Energy Production (Natural Gas)
- Total Annual Potential Energy Production (Solar)
- Total Annual Potential Energy Production (Hydroelectric)

2050



Conclusion

Feasible transition?

- Shutting down natural gas by 2040
- Land for solar panels
- Realistic income allocation amount towards the renewable energy source projects over the years



Q&A

