

# The Planeteers



## Renewable Energy Needs to Combat Climate Change



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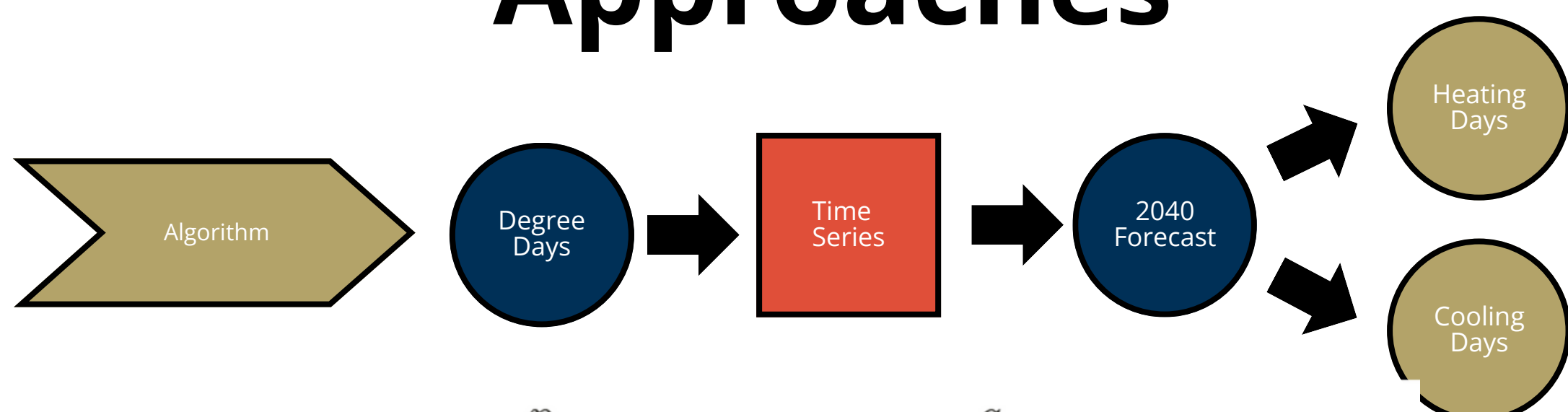
### Problem

As the population and average temperature across the world changes we, humans, will consume more cooling/ heating energy.

### Why it Matters

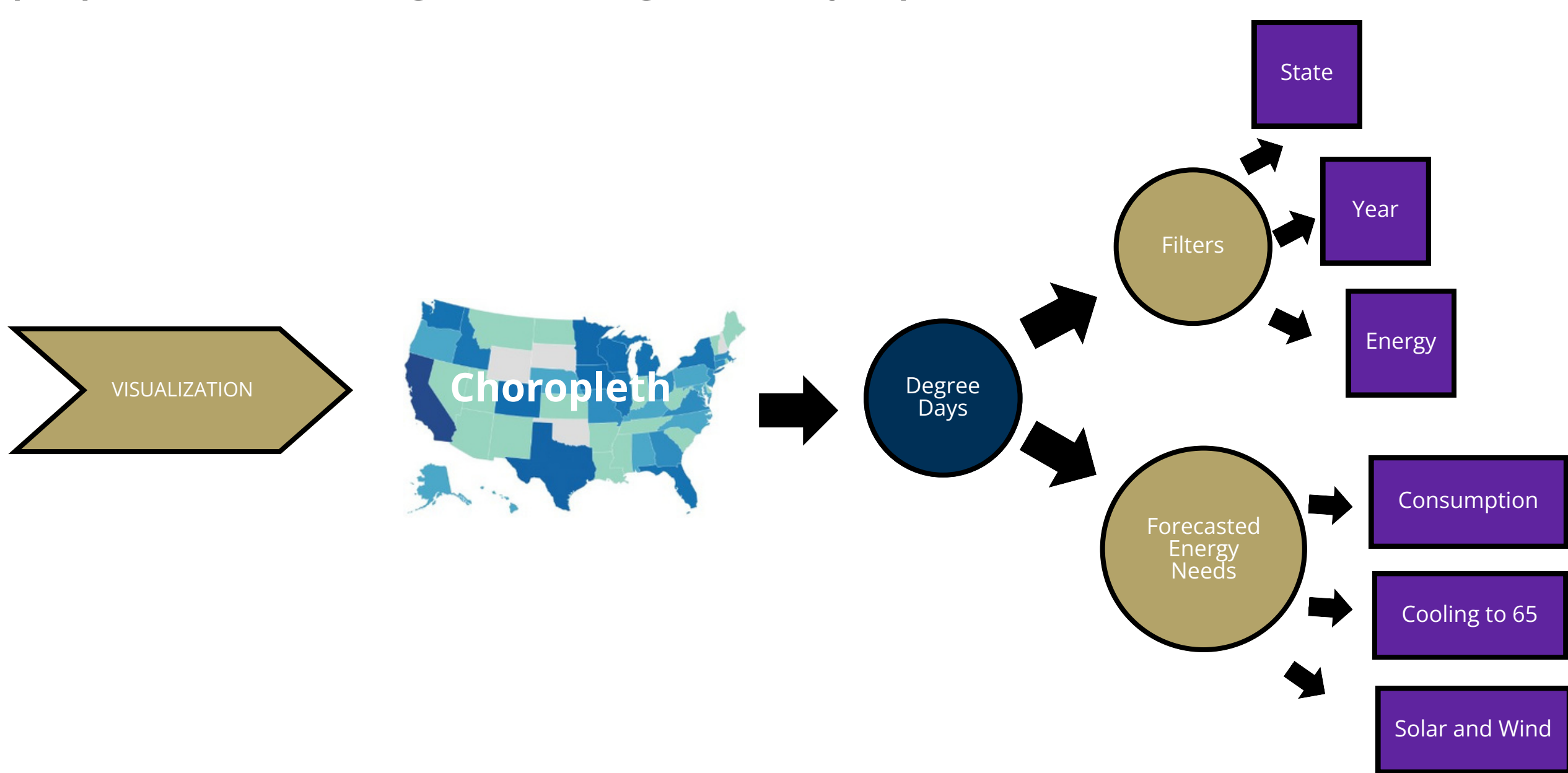
Greater production and consumption of traditional energies are not viable for the future. As consumption of energies such as oil increases so does global temperatures. Thus, a forecast of future energy needs and how renewable energies can serve those needs will be evaluated.

### Approaches



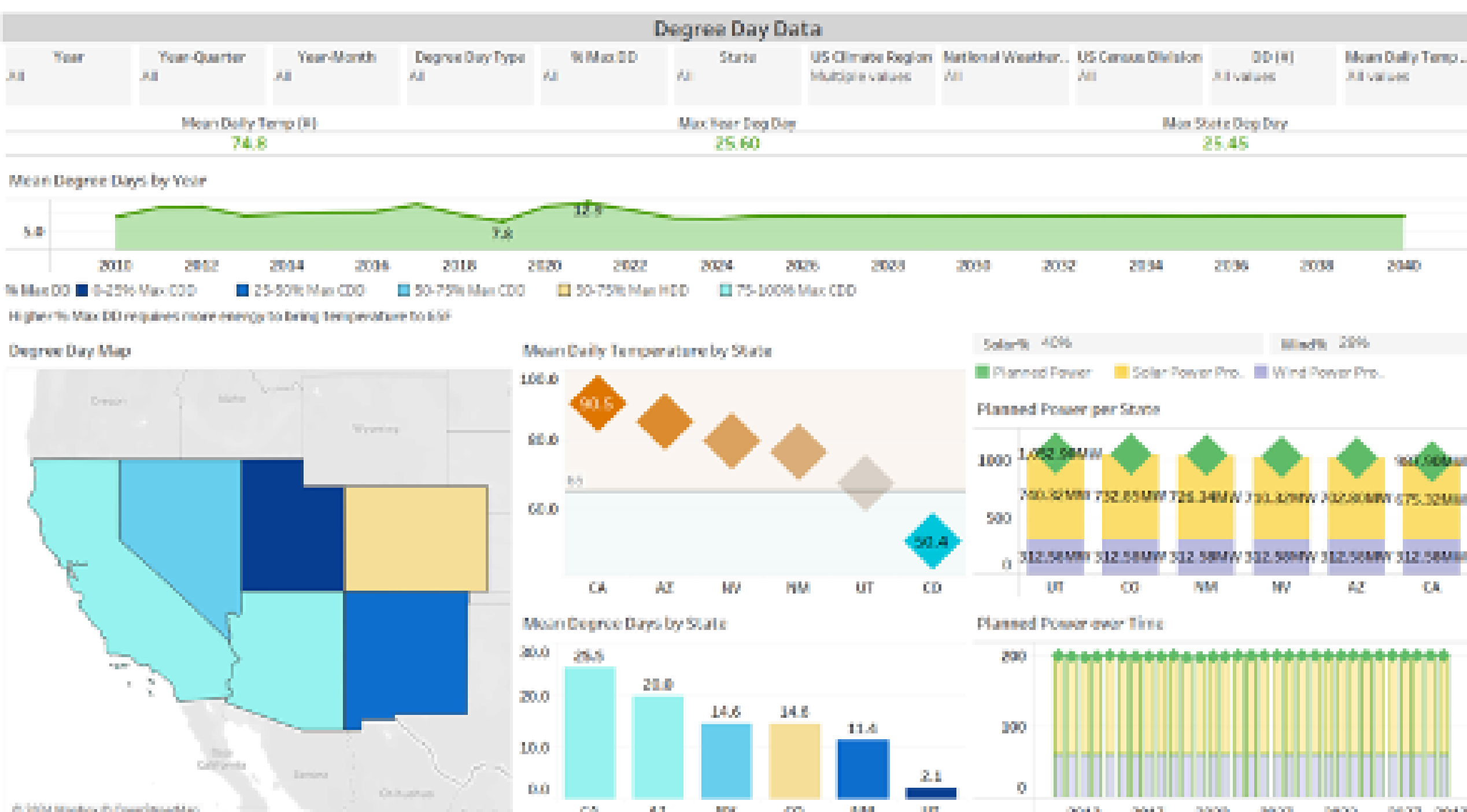
$$\Delta^d T_t = c + \sum_{i=1}^p \phi_i \Delta^d T_{t-i} + \sum_{j=1}^q \theta_j \varepsilon_{t-j} + \varepsilon_t$$

Using ARIMA's time-series model, the resulting data predicted temperatures which were then used to create monthly population-weighted degree days per state.



Utilizing Tableau, the forecasted values were plotted and visualized to see the impact over the years. Each component can also be used as a filter object. Higher powered renewable energy plants would be placed in lighter colored regions.

### Dashboard



### Data

- 1 Temperature and Population State by Tables
- 2 National Centers for Environmental Information  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
Daily temperatures years 2010-2024
- 3 Scraping and DataGrip
- 4 Maximum temperatures each state 2010-2024
- 5 Energy data per state up to year 2040

### Evaluation

70% Train and Evaluation → 30% Test

MSE  $\frac{1}{n} \sum_{i=1}^n (y_i - \hat{y}_i)^2$

AIC  $2k - 2 \ln \hat{L}$

≈

Training: MSE: 18.10    Testing: MSE: 21.17    AIC: 556.92

AZ	CA
US Climate Region: Southwest	US Climate Region: West
Consumes 610,152.10MW	Consumes 2,890,252.06MW
Needs Additional 1,015.38MW	Needs Additional 987.90MW
Solar-Wind Combo (User Selection) 40% Solar Power and 28% Wind Power	Solar-Wind Combo (User Selection) 40% Solar Power and 28% Wind Power
141 Solar Farms of 702.80MW 153 Wind Farms of 312.58MW	697 Solar Farms of 675.32MW 725 Wind Farms of 312.58MW
85.0F to 65F 20.0 Cooling Degrees 75-100% Max CDD	90.5F to 65F 25.5 Cooling Degrees 75-100% Max CDD