

Protecting Children From Wildfire Smoke: Investing In Indoor Air Quality In California Schools

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Background

- Wildfire smoke threatens children's' health and education (figure 1)
- Heating, ventilation, and air conditioning (HVAC) systems can help ensure healthy, safe indoor air quality for children in school



Figure 1: Child affected by wildfire smoke. Image from Flickr.

- School infrastructure is **underfunded**, and lower-income families tend to have the poorest quality school facilities and the fewest dollars to invest in their facilities
- California **does not keep records** of the current status of ventilation systems in schools, which makes it difficult to plan, track, and fund needed improvements

Methodology

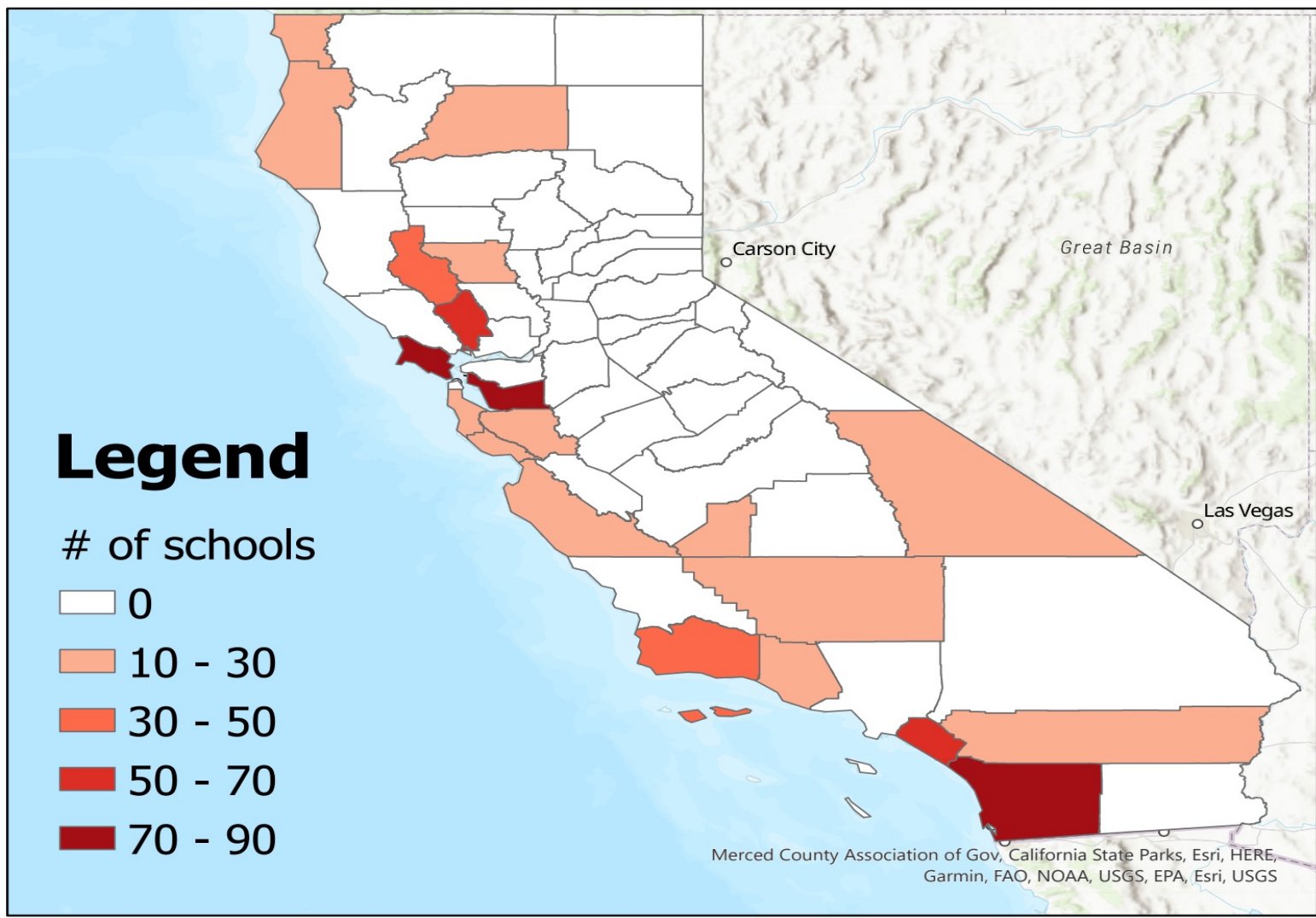


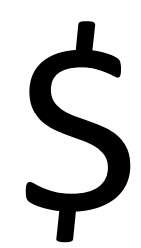
Figure 2: Geographical distribution of the number of schools in each county that I received responses from.

- I conducted research at the Sean N. Parker Center for Allergy and Asthma Research from September 2021 to March 2022
- Collected qualitative data from over 700 California public school, HVAC contractors, and experts asking about the school's HVAC systems and associated costs
- Reviewed scholarly research papers and publicly available reports

Research Questions



What is the current status of HVAC systems in K-12 California Public Schools?



What is the cost estimate of installing, maintaining, and upgrading HVAC systems in all K-12 public schools in California to maintain healthy indoor air quality?

Results



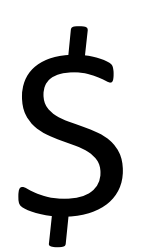
Current Status

- Nearly **2 out of 5** public schools in California do not have HVAC systems or do not have maintained or updated systems



Figure 3: In California K-12 public schools, 17% of schools do not have HVAC systems, and 22% do not have maintained or upgraded systems. Image from Flaticon.

- Over **1/2** of new HVAC systems and **4/5** of replacement HVAC systems are estimated to not be performing correctly due to poor quality installation (NEMI 2020)



Cost Estimate

- The cost estimate of installing HVAC systems to schools that do not already have will be **\$1.7 billion**.
- The cost estimate of maintaining and upgrading HVAC systems in all K-12 public schools is **\$3.5 billion annually**.

Recommendations

- ☐ The state should create a systematic inventory of HVAC systems
- ☐ The state should provide consistent facility funding
- ☐ The state should conduct concerted outreach to districts with higher vulnerabilities
- ☐ Schools should install, maintain, and upgrade HVAC systems by certified, qualified personnel with tailored recommendations for each school

Significance

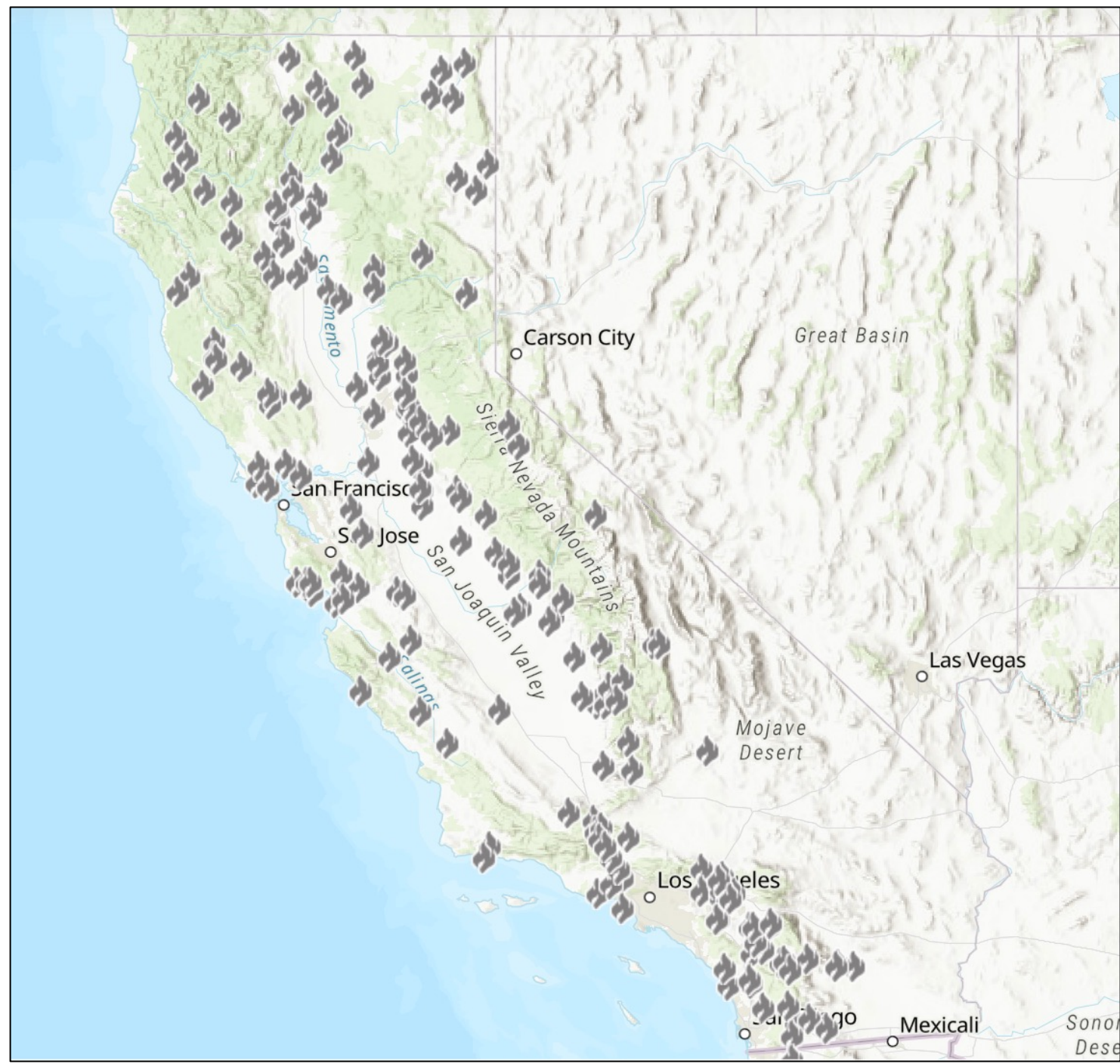


Figure 4: The flame icon indicates one wildfire incident in California in 2021. Image from CalFIRE.

- Due to climate change, wildfires are projected to increase in both severity and frequency (figure 4), which makes it imperative to install, maintain, and upgrade HVAC systems to protect children
- My findings will be used in the Green New Deal for Public Schools in California, which is targeted at state legislators

Acknowledgements

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