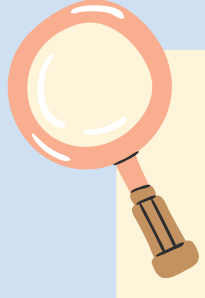


Well Pumps : An Understudied Potential for Energy Efficiency

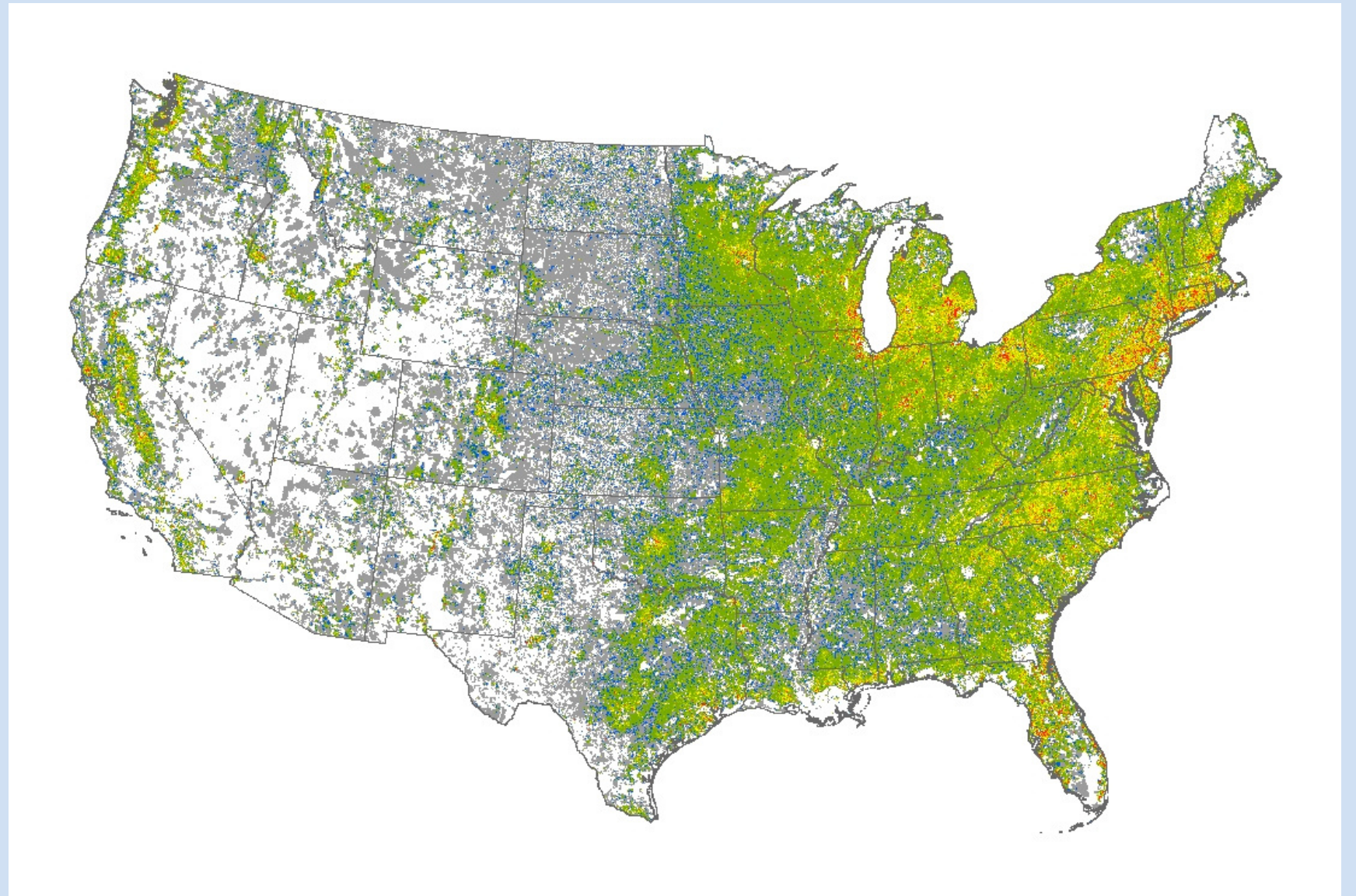
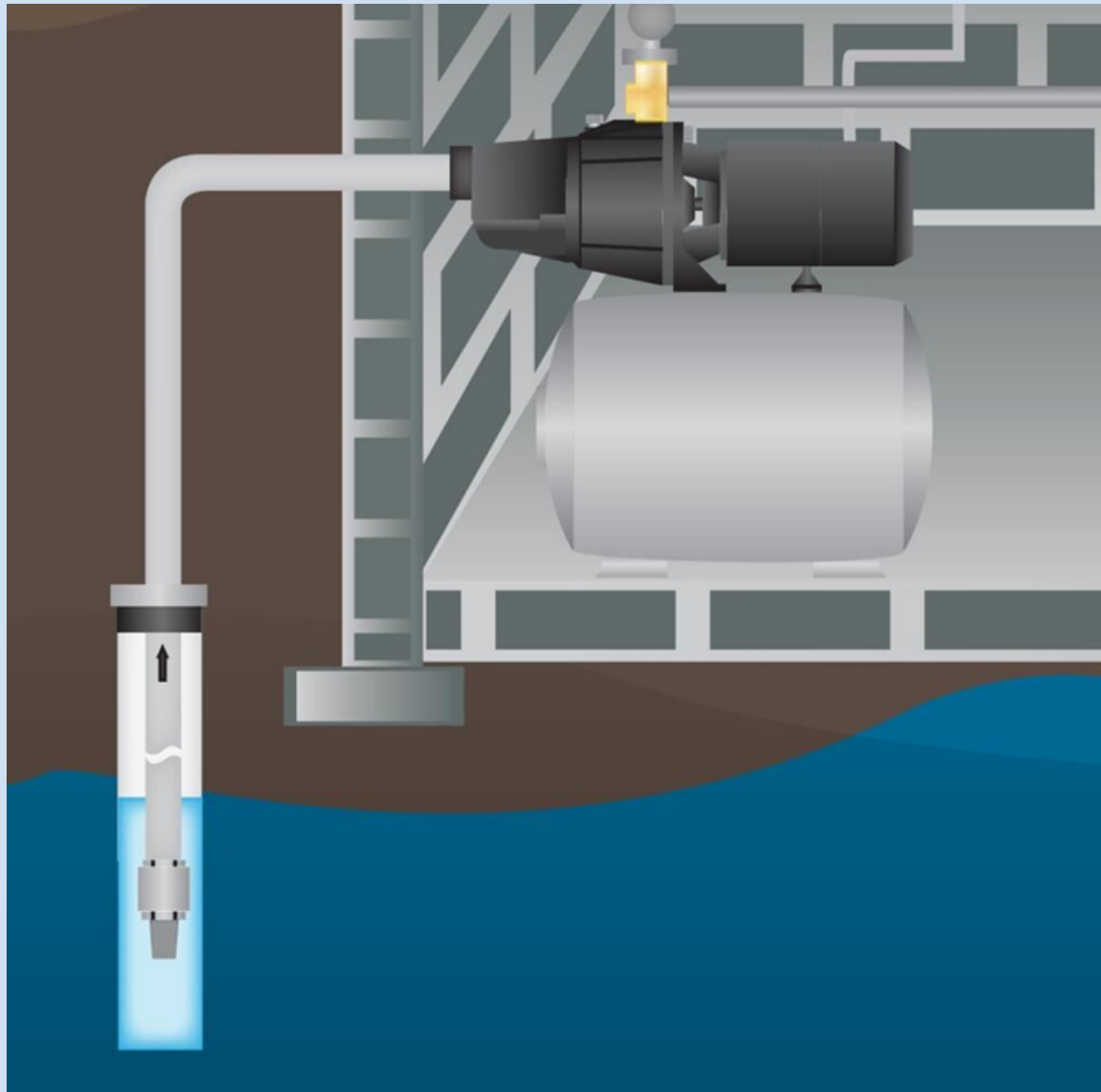


WHY?

- 15M households in the U.S
- 5 TWh/Year electricity use
- Use energy to push water
- Energy conservation is possible

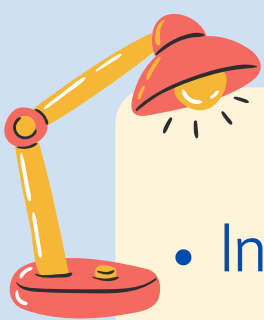
PREVALENCE IN CA

- Santa Rosa, Stockton, Fresno, Modesto and Yuba City - **70-80 wells per sq. km.**
- Santa Cruz, Elk Grove and Redding - **50-60 wells per sq. km**



CONSIDERATIONS

- Energy and environmental injustice for rural communities
- Poor water quality for disadvantaged communities that depend on water from well pumps
- Climate change and droughts are depleting aquifers, increasing water pumping energy



POTENTIAL SAVINGS

- Installation of Variable Speed Drives - **~ 7%**
- Pumping Schedule - **~ 4%**
- Standby Power - **~ 1%**
- Demand reduction/Behavioral changes - **~ 2%**

CONCLUSION

- Well pumps consume a considerable amount of energy that is only anticipated to increase with climate change and more severe droughts.
- Up to 13% of energy can be saved.



References

Fig 1 - Utilitech cast iron shallow well jet pump: 148013 in 2022: Well Jet Pump, jet pump, shallow well Jet Pump. Pinterest. (2021, December 10). Retrieved April 1, 2022, from <https://www.pinterest.com/pin/101190322900596928/>

Fig 2 - People using domestic supply wells per square kilometer. People using domestic supply wells per square kilometer | U.S. Geological Survey. (n.d.). Retrieved April 1, 2022, from <https://www.usgs.gov/media/images/people-using-domestic-supply-wells-square-kilometer>