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that matters
for life's
moments



**Requirements
for replacing
natural gas for
food processing**

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Natural Gas Use in Food Processing

- Natural gas is commonly combusted in boilers to create process steam that can be used in various food processing activities.
- Some of these activities could include cooking, evaporation, sterilization, and peeling. Steam is also used as a motive force for turbines driving pumps or compressors, or in Venturi systems to create vacuum.
- Many food production facilities are seasonal and only operate during harvest periods. Others are able to operate year-round, although they may have certain times of year that are busier to meet demand.



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Natural Gas Use in Food Processing

- Some of the sectors of the food processing industry in California that are intensive users of natural gas are tomato processing, milk and cheese manufacturing, meat processing, snack food production, plus beverage manufacturing (beer, wine, and soft drinks).
- In most of these industries, heat is a requirement for one or more steps, and natural gas has proven to be the most convenient, reliable, and economical method to supply that heat.



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What About Solar Thermal?

- Solar thermal is not widely employed by food processors as a heat source.
- There are a number of factors that come into play when trying to explain why this might be the case.
- In order for solar thermal to supplant natural gas use in food processing, it would need to offer proven and durable advantages that outweigh any potential risks or drawbacks it might carry.



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Solar Thermal Pros

- Sunlight is a free resource.
- Solar thermal does not produce any direct air or GHG emissions.
- The cost of employing solar thermal is likely to go down as improvements in design and economies of scale come into play.
- Solar thermal cost and supply is not subject to the same levels of volatility and uncertainty as fossil fuel sources.
- Utilizing solar thermal could favorably influence consumers' perceptions of a brand.



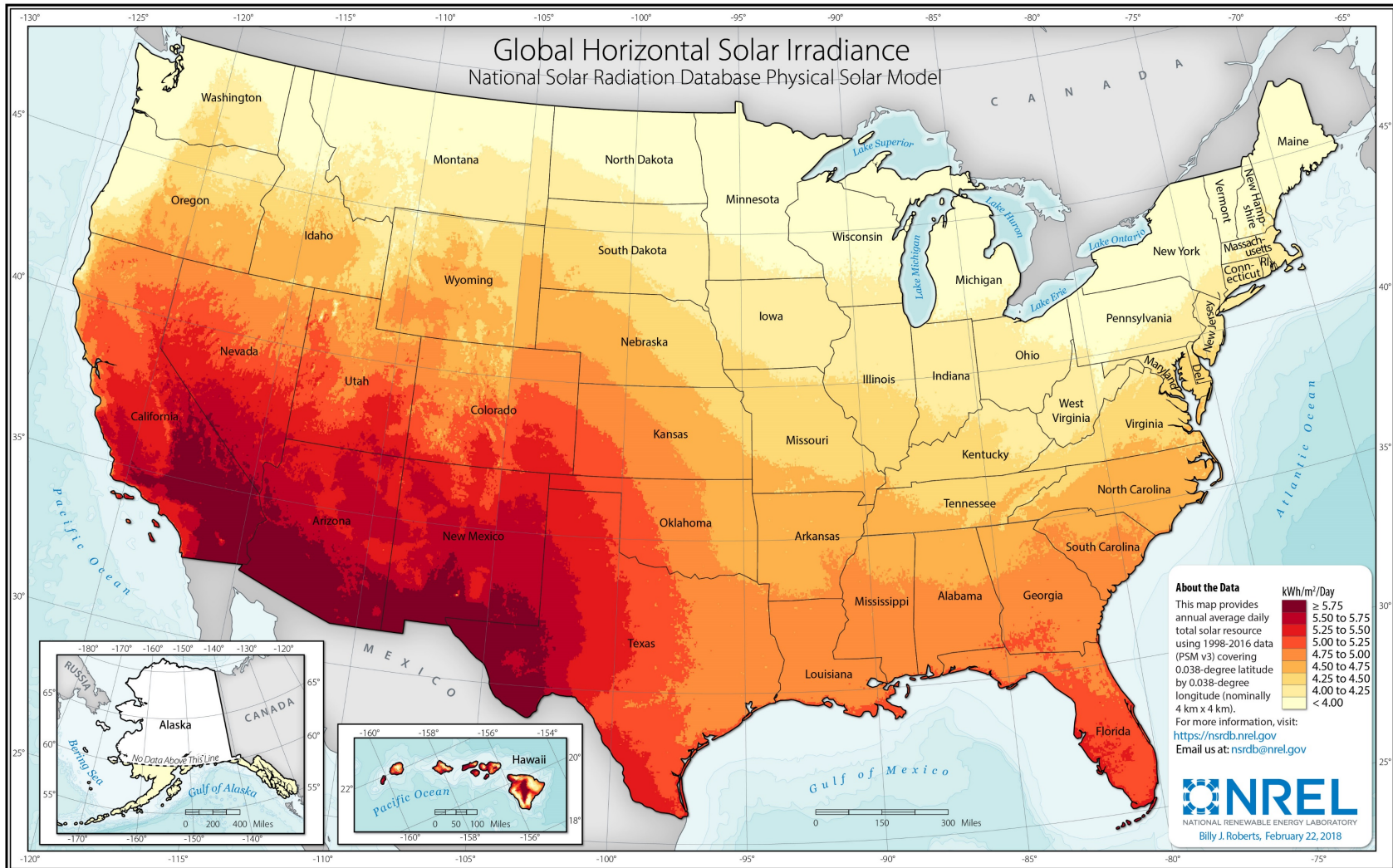
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Solar Thermal Cons

- **Systems must be installed fairly close to the end user and require somewhat large areas of land to produce appreciable quantities of steam.**
- **It is an intermittent resource, unless couple with some type of heat storage system, and solar irradiance varies with location.**
- **The process to install a system may require several years of permitting and requires a lengthy commitment on the part of the company to use that system.**
- **Natural gas prices are currently quite low and look to remain low for the foreseeable future.**



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Other factors to consider

- There are a lot of unknowns related to the economics of solar thermal versus using natural gas. Many decisionmakers are risk averse when it comes to committing to energy related projects. More information and robust case studies would be helpful to build trust in solar thermal as a viable alternative to natural gas.
- The flexibility that natural gas has to supply energy through an existing infrastructure at reasonable cost is a formidable barrier to solar thermal in many cases.
- Government incentives and advocates in industry that are willing to take some risk to see the technology advance can help improve the outlook for solar thermal now and in the future.



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