Your News : Why Climate Change Matters for Lodi, California Marisa Weinstock Despite Lodi's increased relevance as a wine hub in 2016 (Mohan, 2017), climate change threatens our wine production and quality. Climate data from the National Oceanic and Atmospheric Administration 1930 to 1960 illustrates a statistically

significant rise in minimum temperatures for October and December. This increase in minimum temperatures speaks to a rise in temperatures during the night. Climate skeptics tend to focus on global climate measurements instead of regional measurements in order to illustrate a slower climb in temperature, as the temperature does not rise at an even rate around the planet. This is due to feedback loops in the local climate that amplify warming. However, the global climate is predicted to change drastically, as well as locally. In its most recent assessment of the science, the UN's In tergovernmental Panel on Climate Change (IPCC) examined a range of emissions scenarios. In the scenario where the rise in greenhouse emissions doesn't level off until the latter part of the century, the best estimate temperature rise by 2100 came out at 4.0 degrees Celsius, with a "likely range" of 2.4–6.4 degrees Celsius (IPCC, 2007). By contrast, in a scenario where emissions were very rapidly brought down, the same study's best estimate was 1.8 degrees, with a likely range of 1.1–2.9 degrees Celsius. Due to unknowns around the sensitivity of the atmosphere in response to emissions, scientists usually provide a range of possible future temperature changes for any emissions scenario as is shown. Therefore, climate change is documented both regionally and globally. In fact, by using a high-resolution regional climate model forced by the Intergovernmental Panel on Climate Change S pecial Report on Emission Scenarios A2 greenhouse gas emission scenario, the National Academy of Sciences in the United States of America estimated in 2006 that potential premium wine grape production area in the conterminous United States could decline by up to 81% by the late 21st century due to an increase in heat (White, 2006). This will "shift wine production to warmer climate varieties and/or lower-quality wines". Warmer nights threaten wine production and quality by reducing wide diurnal temperature swings. While the heat of day promotes ripeness and sugar development (Life Cycle of a Grape) in the grapes, cool nights help the grapes to retain acidity and freshness, resulting in balanced flavors (Gershunov, 2010). While high-quality wine grapes are produced almost exclusively in a narrow climatic range characterized by a lack of both extreme heat and extreme cold, this hike in minimum temperatures shows far too much change for the grapes' success. Using the Winkler Index for vineyard suitability, which evaluates an area based on growing degree days, studies have found that there are several places in California, particularly in the Central Valley (Hall, 2010), that are already bordering on "too hot" for grapes and that further warming would be detrimental for grape growing in these regions (Jones, 2010). Andrew Hall et. al in 2010 found it was found that 78% of the vineyard sites in the Lodi AVA fall into the Winkler Index Class IV (hot), with the remaining 22% falling into Class V (very hot). Some may snicker at Lodi's recorded 0.13 degrees Fahrenheit increase in minimum temperatures per year in October and 0.18 degrees Fahrenheit increase in minimum temperature per year in September between 1930 and 1960. However, this data rejects the null hypothe sis, thereby confirming a relationship between time and temperature increase. Further description and analysis of my regional Lodi data are available here, where I attempt to offer the most replicable data possible through offering a detailed account of my methods. This coincides with my aim for the data to remain accessible and replicable to all, no matter their stance on climate change. This nullifies the logical fallacy of an appeal to ignorance. In addition, order to avoid employing an appeal to authority, which avoids direct evidence and instead claims that "experts" agree with my claims, I have made my data open to the public through my blog page. While the determination of what constitutes statistical significance is arbitrary, my climate data does, undeniably, fit within this realm. Even this in itself falsifies climate skeptics' argument for an insignificant increase in te mperature. Lodi, as well as other California wineries, are assumed to struggle not only with their local production but also in terms of their highly profitable practice of exporting abroad. Even since 2013, wine production has been assumed to move farther North throughout climate change's continued onset (Kantchev, 2013). In California, the wine industry has an overall economic impact of >$45 billion annually (Wine Institute of California). International wineries, "have much cheaper production costs than California does… In order to compete, Lodi wineries need to bring their best game," according to Robert Koch, the Wine Institute's President, and Chief Executive. Yet, given the absence of regulation on greenhouse gas emissions, Lodi may inevitably lose its standing both locally and abroad as a wine center due to lower production and quality. The only way to hold onto Lodi 's economic and cultural grasp on wine is through prioritizing the mitigation of climate change. This needs to be tackled both on individually and politically. First and foremost, winemakers can reduce their water usage in the vineyard and winery by adopting newer and more efficient technologies. Adopting more efficient irrigation systems or practicing dry farming may be necessary.

Given our Presidential administration, political action holds a greater barrier. Whether this aspect is approached through letters to your congressmen in protest of Scott Pruitt, proposing local initiatives, or creating your own local campaign, we must fight complacency in the destruction of Lodi's claim to fame and our entire state, country, and the planet as a whole. Work Cited: Mohan, Geoffrey. "Wine Exports Set a Record in 2016, Experts Say." Lodi News. N.p., 15 Feb. 2017. Web. 30 Mar. 2017. . Hall, Andrew, Gregory Jones, Andrew Duff, and Joseph Myers. "Spatial Analysis of Climate in Winegrape Growing Regions in the Western United States." American Journal of Enology and Viticulture (2010): n. pag. Web. 30 Mar. 2017. . "Projected Climate Change and Its Impacts." AR4 SYR Synthesis Report Summary for Policymakers - 3 Project Climate Change and Its Impacts. Intergovernmental Panel on Climate Change, n.d. Web. 30 Mar. 2017. . White, M. A. et al. "Extreme Heat Reduces and Shifts United States Premium Wine Production in the 21st Century." Proceedings of the National Academy of Sciences of the United States of America 103.30 (2006): 11217–11222. PMC. Web. 30 Mar. 2017. Vintners, Napa Valley. "The Life Cycle of A Grape." Napa Valley Vintners. N.p., n.d. Web. 30 Mar. 2017. . Gershunov A., D. Cayan and B. Retournaz. 2010: California Heat Waves with Impacts on Wine G rapes. In E.G. Pavia, J. Sheinbaum and J. Candela (Eds), The Ocean, the Wine, and the Valley: The Lives of Antoine Badan, Lulu Press, 205-223, ISBN 978-0-557-94026-4. Jones, G.V., Duff, A.A., Hall, A., and Myers, J.W. 2010. Spatial Analysis of Climate in Winegrape Growing Regions in the Western United States. American Journal for Enology and Viticulture 61(3): 313-326. Kantchev, Georgi. "British Wine Benefits as the Climate Changes." The New York Times. The New York Times, 13 Dec. 2013. Web. 30 Mar. 2017. . "The Wine Institute." Statistics. N.p., n.d. Web. 30 Mar. 2017. .

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