WEEKLY STATUS REPORT

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| Name: | Julian Florez |
| Week Ending Date: | June 2nd 2022 |
| Self-Assessment: | Green, ~~Yellow~~, ~~Red~~ |

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| ACTIVITIES COMPLETED THIS WEEK |
| The following activities were completed this week:   * Development of green ammonia production optimization model in line with the conceptual outline below (initially decided against incorporating a hydrogen fuel cell that can contribute to energy demand, however after reviewing yearlong model runs and seeing that hydrogen storage is used as a seasonal buffer vs daily load management-I am leaning towards including a fuel cell option)      * Data and general work update repository are located here: [GitHub - julflore000/KAUST: Work/research done for my summer at KAUST!](https://github.com/julflore000/KAUST) * Mathematical formulation of model in repository: [KAUST/greenAmmoniaFormulation.pdf at main · julflore000/KAUST · GitHub](https://github.com/julflore000/KAUST/blob/main/productionOptModel/formulation/greenAmmoniaFormulation.pdf) * Initial visualization of results from data and validation that model is operating within expectations can be found at the jupyter notebook [KAUST/modelOutputAnalysis.ipynb at main · julflore000/KAUST · GitHub](https://github.com/julflore000/KAUST/blob/main/productionOptModel/dataAnalysis/modelOutputAnalysis.ipynb) * Currently getting wind and solar data from the following resource: [JRC Photovoltaic Geographical Information System (PVGIS) - European Commission (europa.eu)](https://re.jrc.ec.europa.eu/pvg_tools/en/tools.html) * It appears that there is also data for Saudi Arabia available for wind and solar from the following atlas however I am unable to access the resource: [Renewable Energy | King Abdullah City for Atomic and Renewable Energy](https://www.energy.gov.sa/en/futureenergy/renewableenergy/pages/renew2.aspx) * First runs of geographical data included below. Past studies have found most optimistic green global LCOA ~ .4-.5$/kg ([source](https://pubs.rsc.org/en/content/articlelanding/2021/se/d1se00345c#!) see table 6). Other studies ([source](https://pubs.rsc.org/en/content/articlelanding/2020/ee/d0ee01707h)) have found LCOA around $1/kg for Saudi Arabia. Initial results with current day parameters have an output from my model ~ $1.2/kg (see image below for what the final graphics I expect to look like/breakdown in costs). * Takes ~30 minutes for full year run-want to explore running model on cluster * How hydrogen storage is operated in optimization model for a full years’ worth of wind and solar data (green line represents current hydrogen available in tanks). Can see that excess renewable generation stored during summer season and then deployed as fall and winter seasons hit due to lower renewable generation (see graph after for clear decrease in solar generation). |
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| ACTIVITIES IN PROCESS | NEXT ACTIONS | DUE DATE |
| 1. **Testing multiple electroyzer options in model (to capture the economies of scale). Right now in initial tests I used just one electroyzer with fixed constraints, however will provide a range of models to choose from** 2. **Developing GUI for non developer interaction of model (initial sketch up done however focusing on model validation first)-since the model will probably require being run on a cluster-does it make sense to develop a GUI?** | * **Review model assumptions and identify if model needs to be tweaked** * **Initiate first look at distribution and cracking side of Ammonia supply chain** |  |

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| ACTIVITIES TO BE STARTED NEXT WEEK |
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| LONG TERM PROJECTS |
| * Analyzing optimal economic analysis of green ammonia from production to end consumption * Increasing useability of model for non-developer use. |

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| ISSUES FOR IMMEDIATE ATTENTION |
| * N/A |

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| KEY TEAM INTER DEPENDENCIES |
| * N/A |