Thesis Project Portfolio

Design of a Processing Plant for the Extraction of Lithium from Geothermal Brines in the Salton Sea, California

(Technical Report)

What Role did the Young Entrepreneurs Play in the Failure of the "Young Mall" Program

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

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In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

My STS research thesis and technical report differ in their specific focus, as one focuses on the technical design in cleaner energy fields while the other addresses the social problem of unemployment through a program. However, they share a common goal in seeking to provide answers to pressing questions within the realm of large-scale technology. The technical report design is to retrofit the lithium extraction process into existing geothermal powerplants, and the STS research looks at what the problems of the young mall program were, which could help the future carrier of the project in creating a successful program.

The technical design focuses on a process that can generate clean and renewable energy while extracting and producing lithium hydroxide monohydrate. This involves retrofitting existing geothermal power plants in the Salton Sea region. Extraction of lithium is done using a novel redox intercalation process that selectively captures lithium ions over other similar charged ions found in geothermal brines. Electrolysis is employed to regenerate deintercalation material, while the crystallization unit filters and dries the final product for use as battery-grade lithium. To minimize water consumption throughout the process, a reverse osmosis unit recycles water and steam generated as byproducts. Ultimately, this project seeks to address the global lithium supply shortage projected to occur in the near future.

My STS explores factors that contributed to the failure of the young mall program in several regions in South Korea. The ethical framework of virtue ethics along with Actor Network Theory is used to find a more comprehensive reason for the demise of the program. My claim is that while previous analysis has looked at failures from the government, the participants who benefited from the program were also crucial actors in the program. Hence, these participants lacked three core virtues as entrepreneurs: independence, rationality, and pride. My paper looks at

the evidence to show how the participants struggled to keep these virtues and emphasize the importance of having these virtues.

Completing both projects concurrently has enriched my understanding of the factors involved in process engineering. Through the technical report, I have gained valuable experience in the calculations and considerations required of engineers, while the STS research has highlighted the significance of non-technical factors. This experience has inspired me to approach future projects with greater care and consideration, as I work towards becoming a meticulous and successful engineer in the real world. In summary, my work on these projects has given me a deeper understanding of the complexities involved in large-scale technology projects.