

ABSTRACT

- ❑ Hydrogen is rapidly increasing in demand
- ❑ Most research is done on methane steam reforming which is detrimental to the environment
- ❑ This project is based on "pink hydrogen"
- ❑ Hydrogen production through electrolysis, a low-carbon energy generation method, can produce hydrogen fuel via high temperature steam electrolysis (HTSE)
- ❑ Here we present plans for a 170 metric ton per day HTSE system

BACKGROUND

- ❑ Hydrogen has the potential to be zero-carbon emission energy
- ❑ Pink hydrogen is generated purely from nuclear power and can combat environmental challenges presented by methane steam reforming
- ❑ Initial research suggests that HTSE supported by solid oxide electrolyzer cells (SOEC) is the most efficient way to use this energy

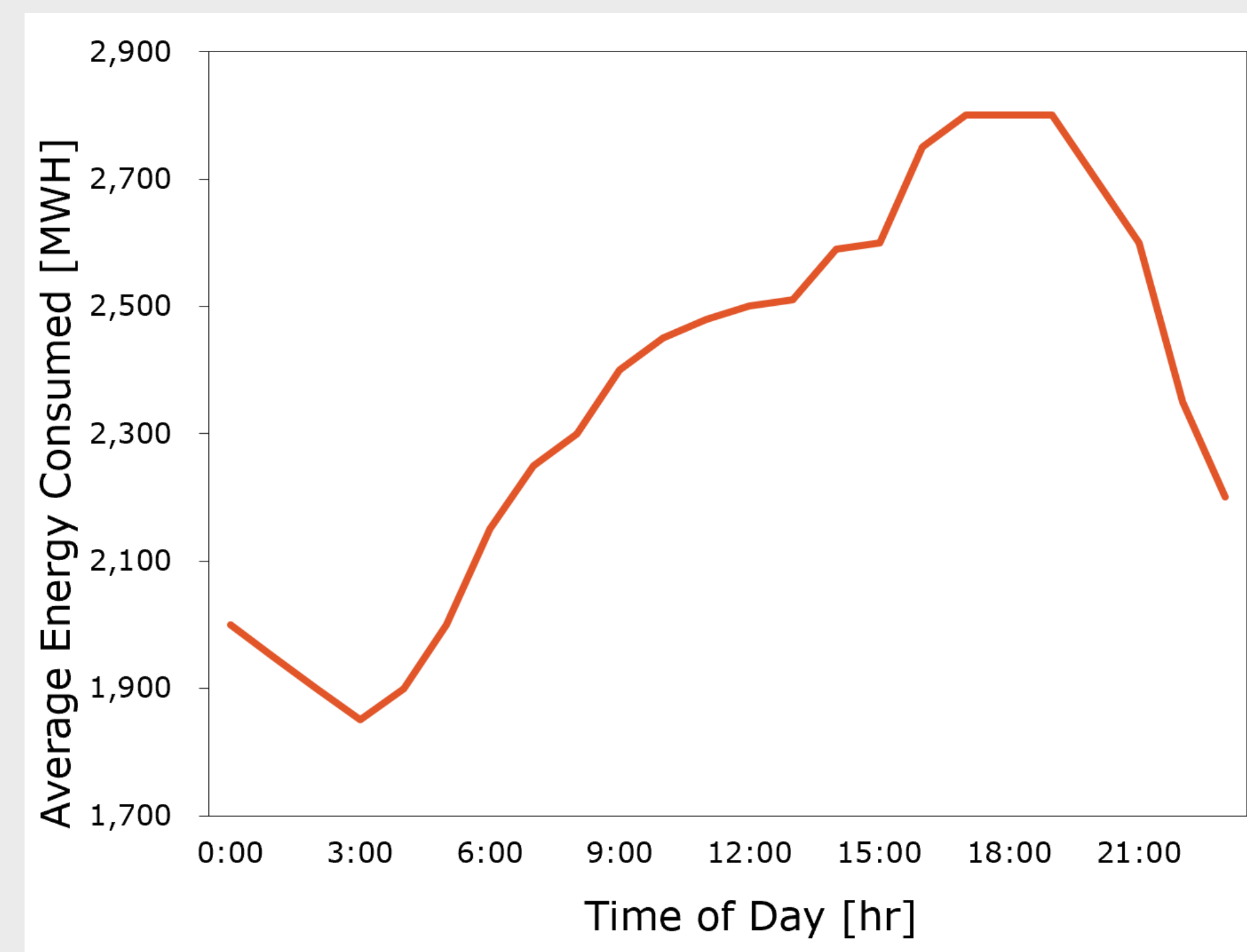
# PRODUCTION OF HYDROGEN FROM NUCLEAR ENERGY THROUGH HIGH TEMPERATURE STEAM ELECTROLYSIS

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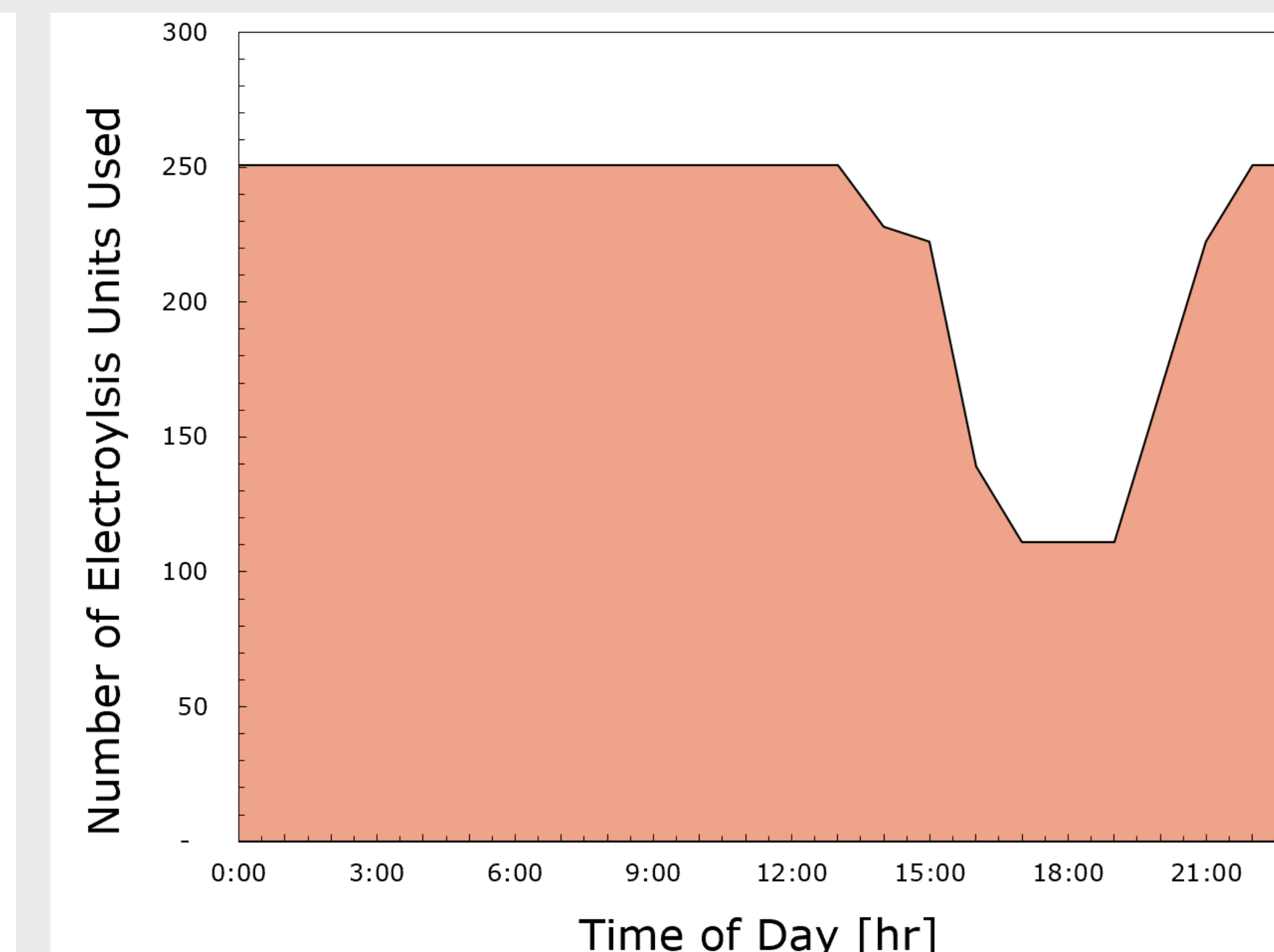


Osian, Erica. Bloom Energy. 2021.

## ENERGY CONSUMPTION PER DAY

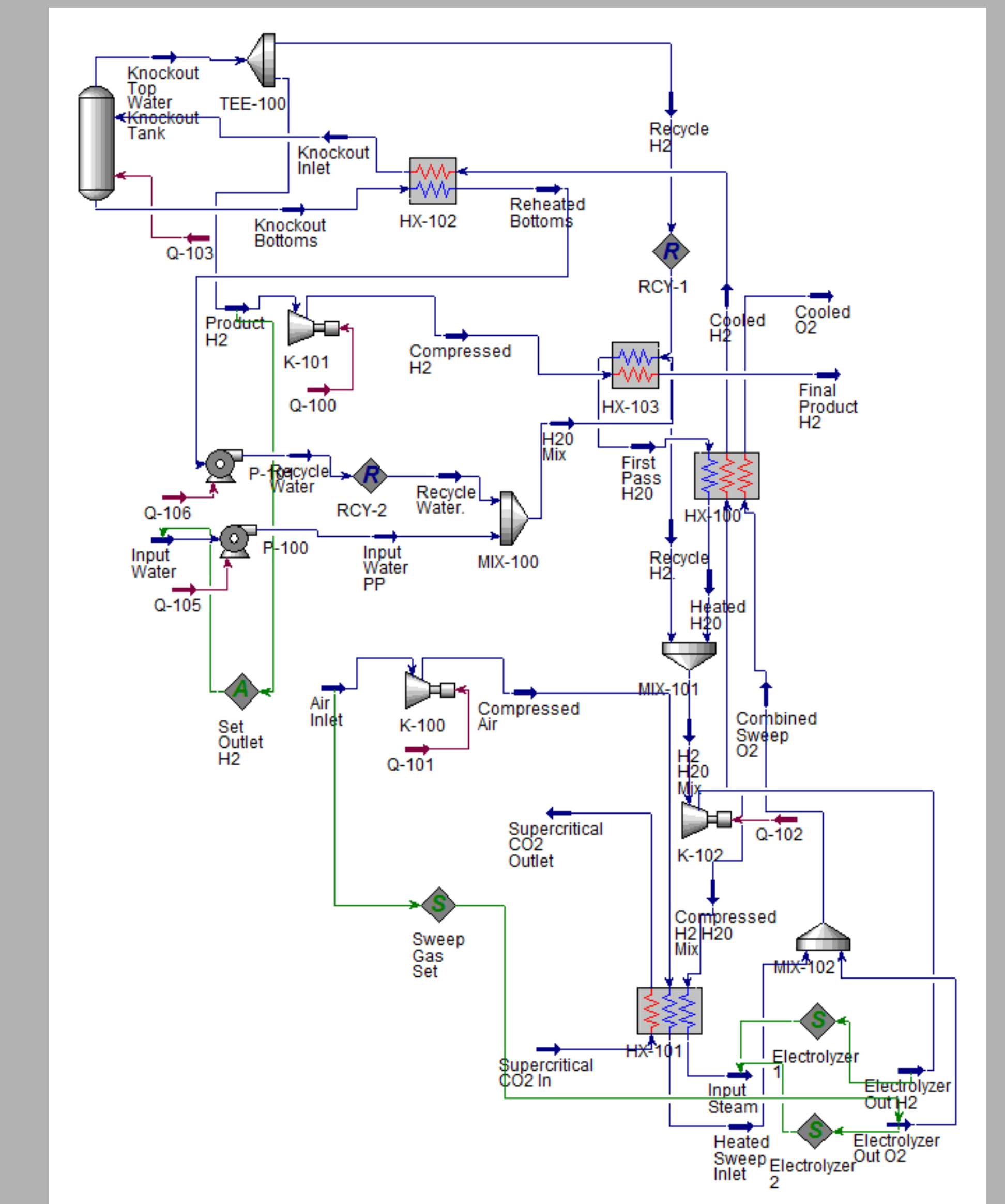


- ❑ Average energy consumption for San Diego in megawatt hours



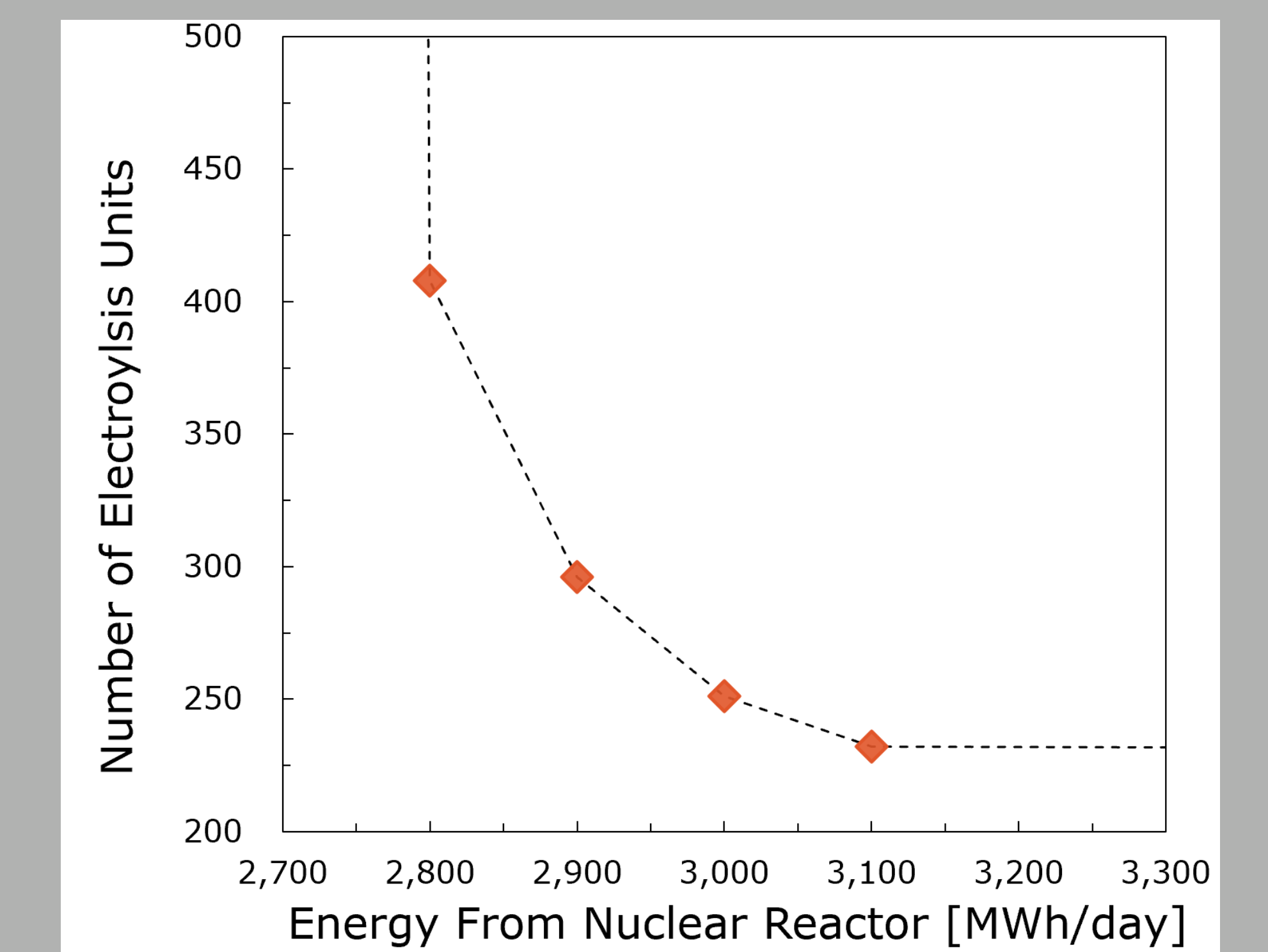
- ❑ Modular electrolysis units based on average energy consumption in San Diego

## HYSYS PROCESS DESIGN



- ❑ This model is our proposed production system of hydrogen
- ❑ Product hydrogen is at 99.9% purity

## ELECTROLYSIS UNITS



- ❑ Optimizing energy coming out of the reactor and the number of electrolysis units used

## ACKNOWLEDGEMENTS

Our team would like to thank Dr. Nick AuYeung and Dr. Natasha Mallette of Oregon State University

<p><b>GREY HYDROGEN</b> Generated through SMR* using natural gas or fossil fuels</p>	<p><b>BLUE HYDROGEN</b> Generated through SMR with carbon capture using natural gas or fossil fuels</p>	<p><b>GREEN HYDROGEN</b> Generated through electrolysis using renewable electricity</p>	<p><b>YELLOW HYDROGEN</b> Generated through electrolysis using solar power, specifically</p>	<p><b>PINK HYDROGEN</b> Generated through electrolysis using nuclear energy</p>
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Meyer, Dave. Hydrogen production: exploring the various methods and climate impact. 3Degrees

