



# **Electric Heating Solutions for SMR-Based Ammonia Plants**

# Presenter Overview

## Dave Yeardye

*Manager – Field Development and Application Engineering*

### Short Biography:

- Qualifications
  - B.Sc. Physics and Mathematics – Dalhousie University, Halifax, Nova Scotia, Canada
  - 25+ years of experience in Industrial Electric Heating, including Production, Research and Development, and Engineered Sales
- Present Job and Responsibilities
  - Manager – Field Development and Application Engineering
    - Front-end RFQ receipt and classification for Process Heating and Filtration Applications
    - Quote Preparation – Specification Review, Conceptual Design, and Cost Estimation
- Special Work Interests
  - Electrification / Decarbonization of Process Heating Applications
  - Optimization of Work Processes
  - Talent Development



# Electric Process Heaters

## Capabilities & Limitations

### Application

Circulation heaters are mainly used for liquid and gas heating in closed or open loop systems.

Widely used in heat transfer systems, regeneration, gas treatment, heat efficiency systems, steam super heating, and recirculation processes.

Typical Process fluids:

- Water heating
- Hydrocarbons liquids, heavy and light
- Hydrocarbon gases
- Acids
- Polymers
- Salts
- Air
- Inert gases
- Steam



### Basic Specifications

- Power: Up to 5 MW per bundle
- Flange Size: Up to 60"
- Voltage: Up to 690 V
  - ❖ MV up to 7200V Coming Soon
- Design pressures up to 5,000 PSI
- Process Temperatures up to 1,200°F
- Hazardous and non-hazardous areas.
- CSA / UL / ATEX / IEC Ex Approval

### Typical Installations

- Regeneration heaters
- Fuel gas heating
- Crude oil recirculation
- Steam superheating
- Coker heaters
- Burner efficiency systems
- Reboilers and Vaporizers
- Seal gas heating



# Electric Process Heaters

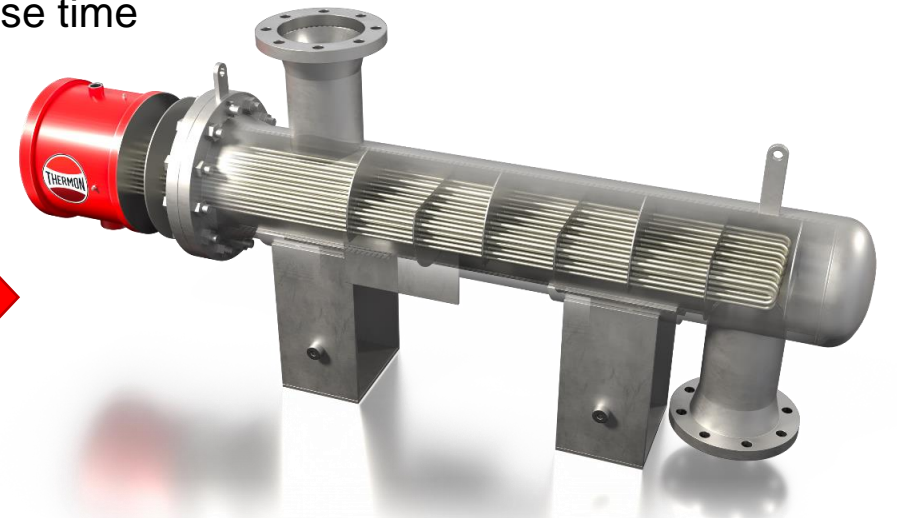
## Benefits of Electrification

### Existing Technologies:

1. Costly Maintenance
2. Limited Temperature Control (temperature swing)
3. High Heat Flux Issues
4. Fugitive Emissions
5. Can lose power over time from fouling
6. Larger footprint
7. Higher maintenance
8. Slower response time

### Direct Electric Heating:

1. Eliminates Greenhouse Gas Emissions
2. Increases Energy Efficiency
3. Reduces Operational Costs
4. Allows for precise process duty control
5. 100% of power (as heat) transferred to the process
6. More compact design
7. Lower maintenance
8. Faster response time



4.25 MMBTU/hr

x 80% efficiency

÷ 3412 BTU/hr/kW

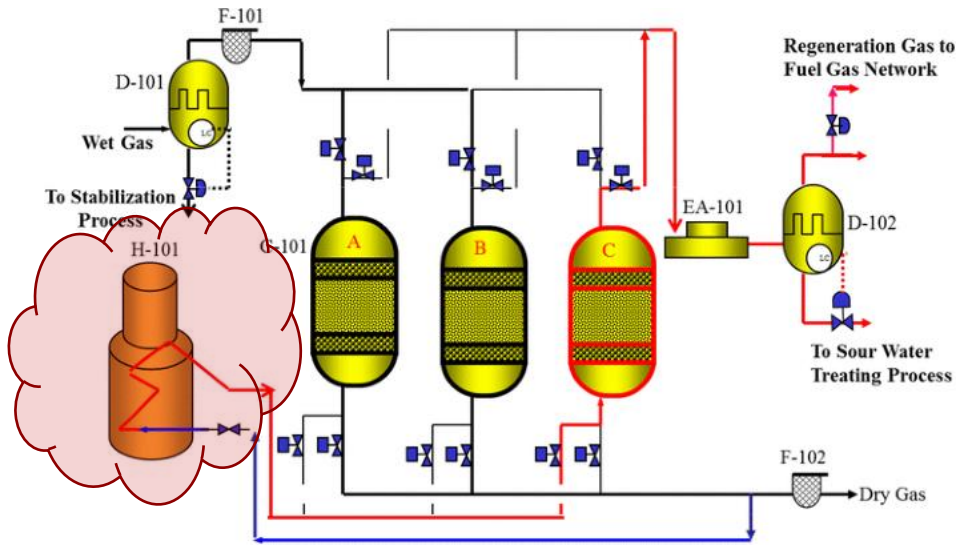
1MW (1,000kW)

# Electric Process Heaters

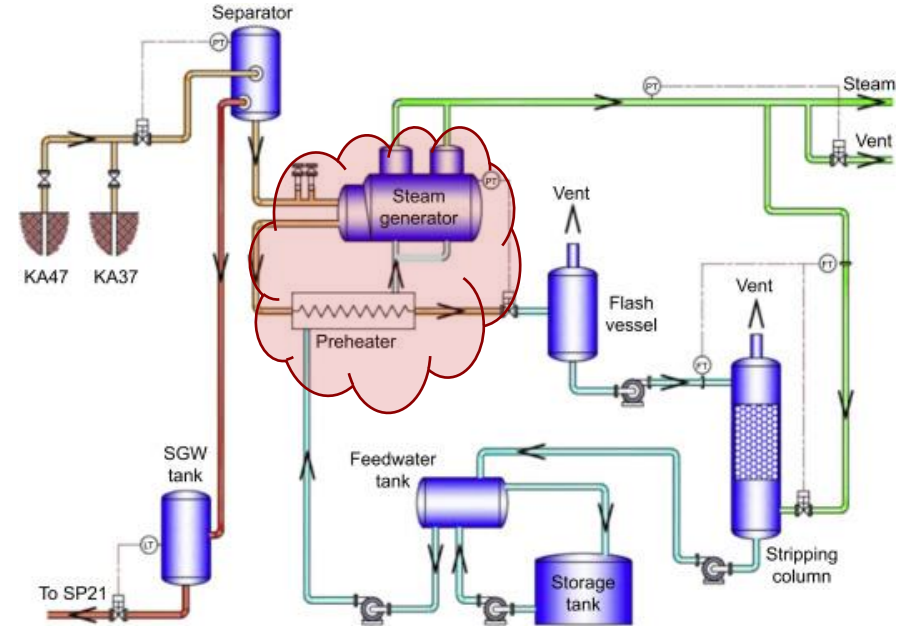
## Application Overview



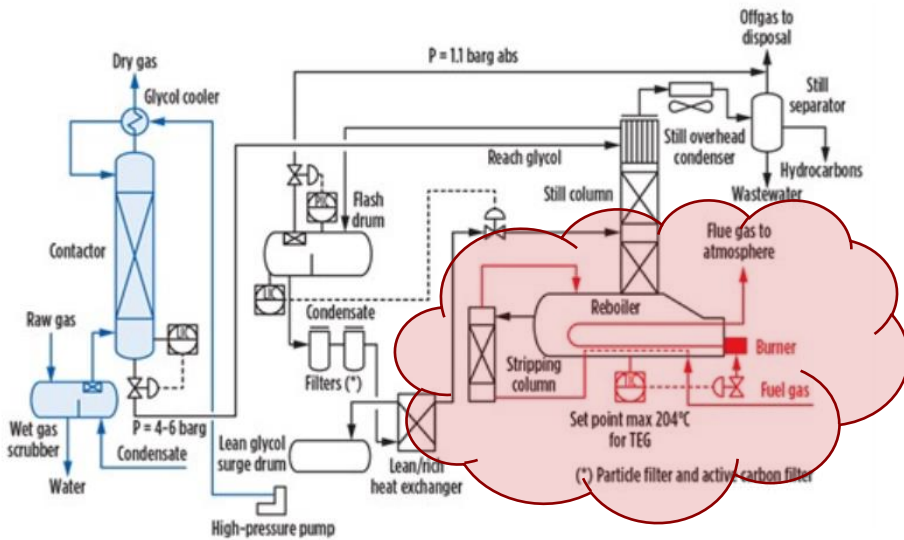
Regenerator



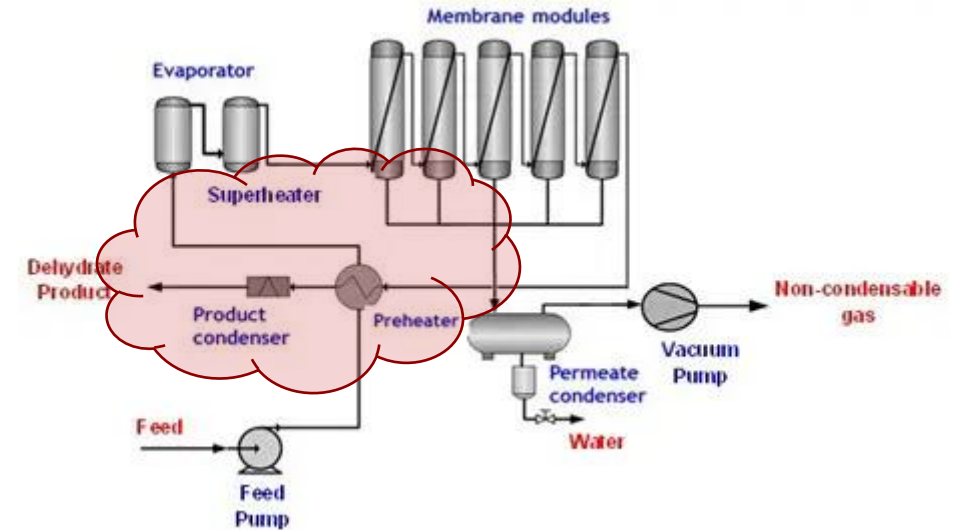
Preheaters



Reboiling

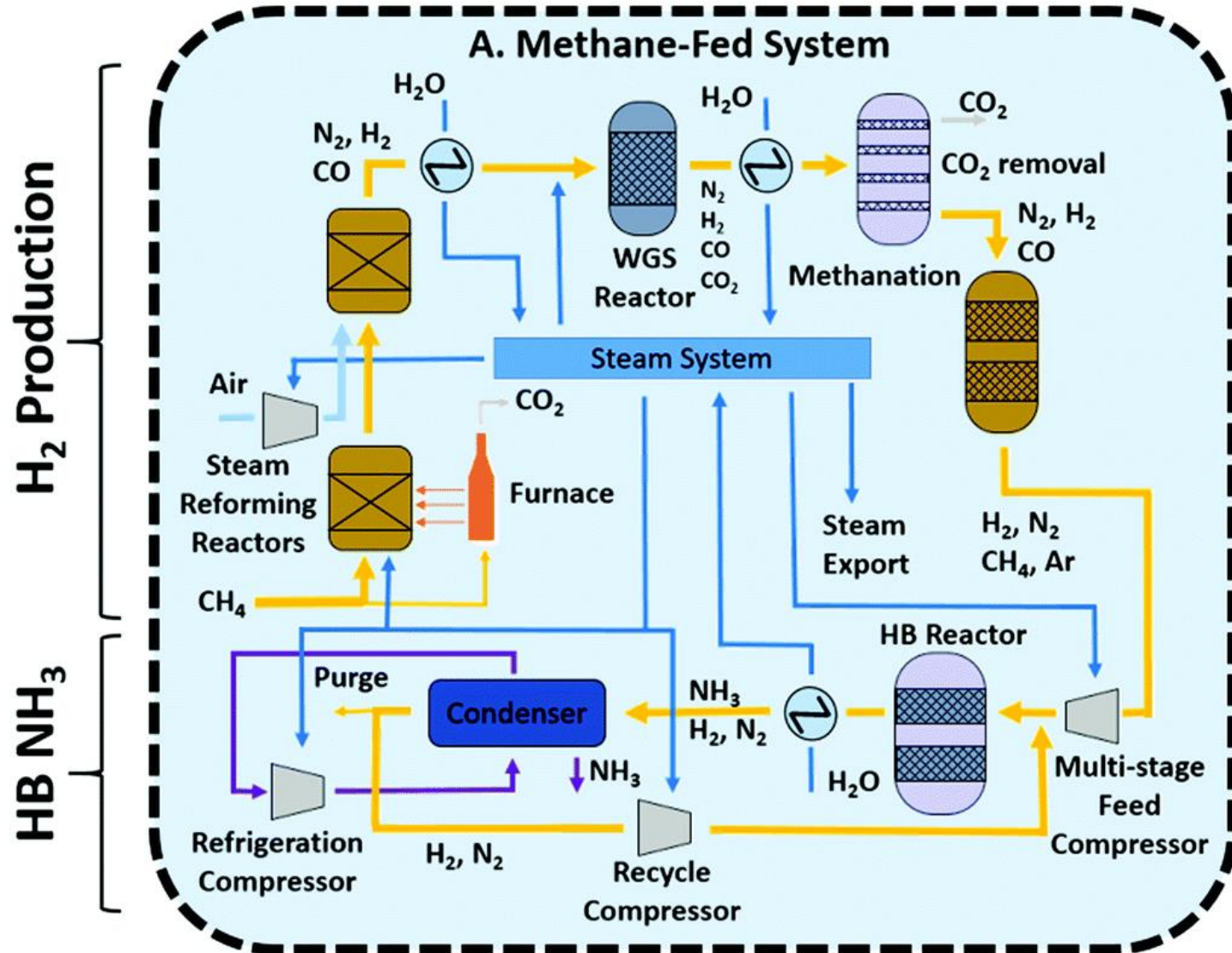


Dehydration



# Process Flow Diagram

## Steam Methane Reforming w/ Haber Bosch



Example Applications that can be Retrofitted:

- Pre-heater
- Steam Boiling & Superheating
- Heat Exchanger
- Gas Regeneration
- Separator
- NH<sub>3</sub> Storage
- Vaporizer
- DI Water Heater
- PSA Heaters
- Thermal Energy Storage using electric heaters for on-demand steam



# Case Study

## Direct Electrification

### HIGHLIGHTS

#### Project Name:

Replacement of 3 inline gas fired heaters for a Sulphur Recovery Unit (SRU)

**Client:** Refinery in Sweden

#### Description:

- Outlet temperature of 650°C
- 3 x 100kW, 400V

#### Features:

- Designed to match existing dimensions
- ATEX Ex d IIC T3 IP66
- NACE





**Thank You**