

# Direct Contact Hot Water (DCHW) for Mined Bitumen Process

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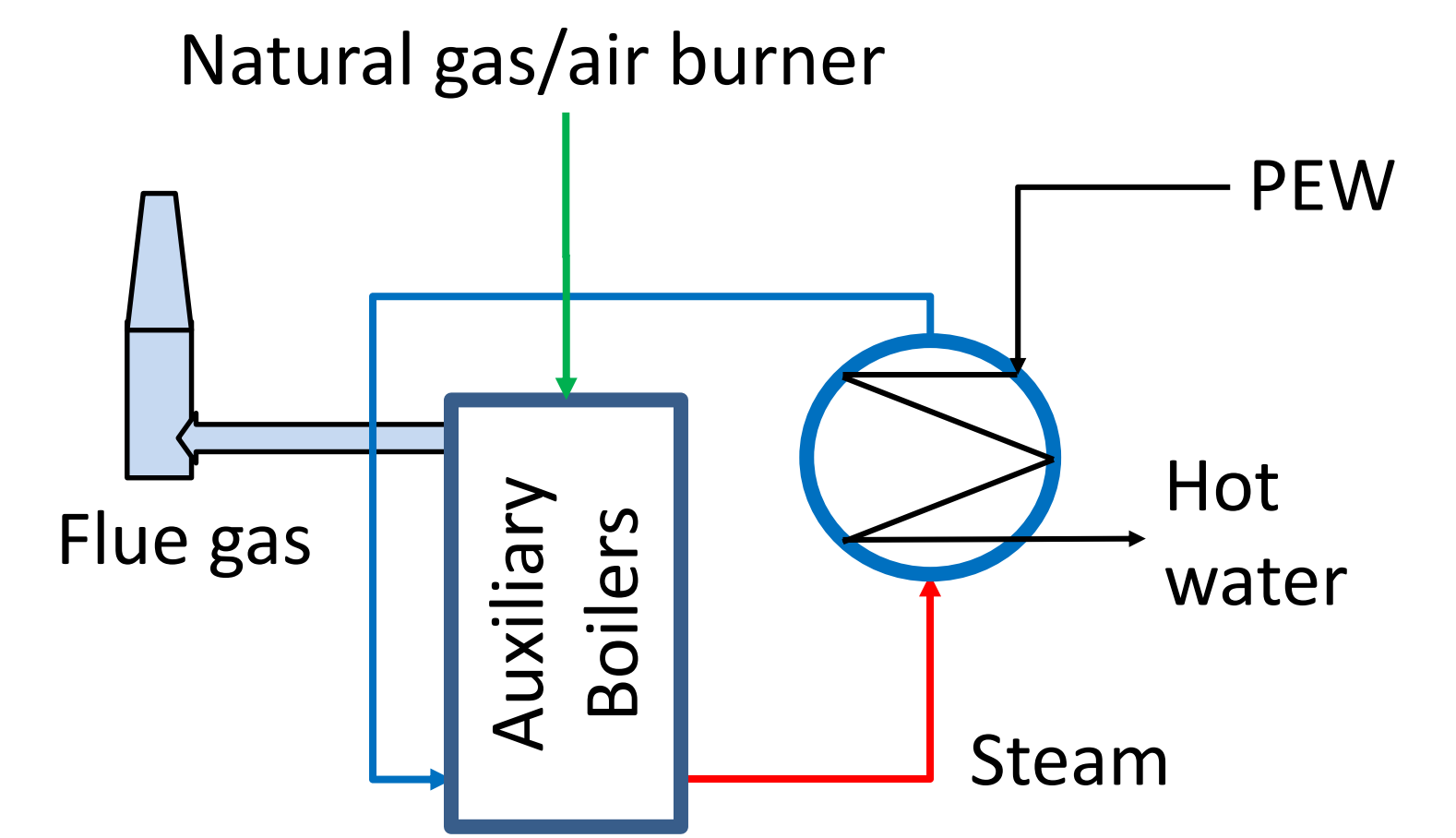
## What is DCHW

Generate hot water using PEW/MFT in direct contact fashion for mined bitumen process.

## DCHW Benefits

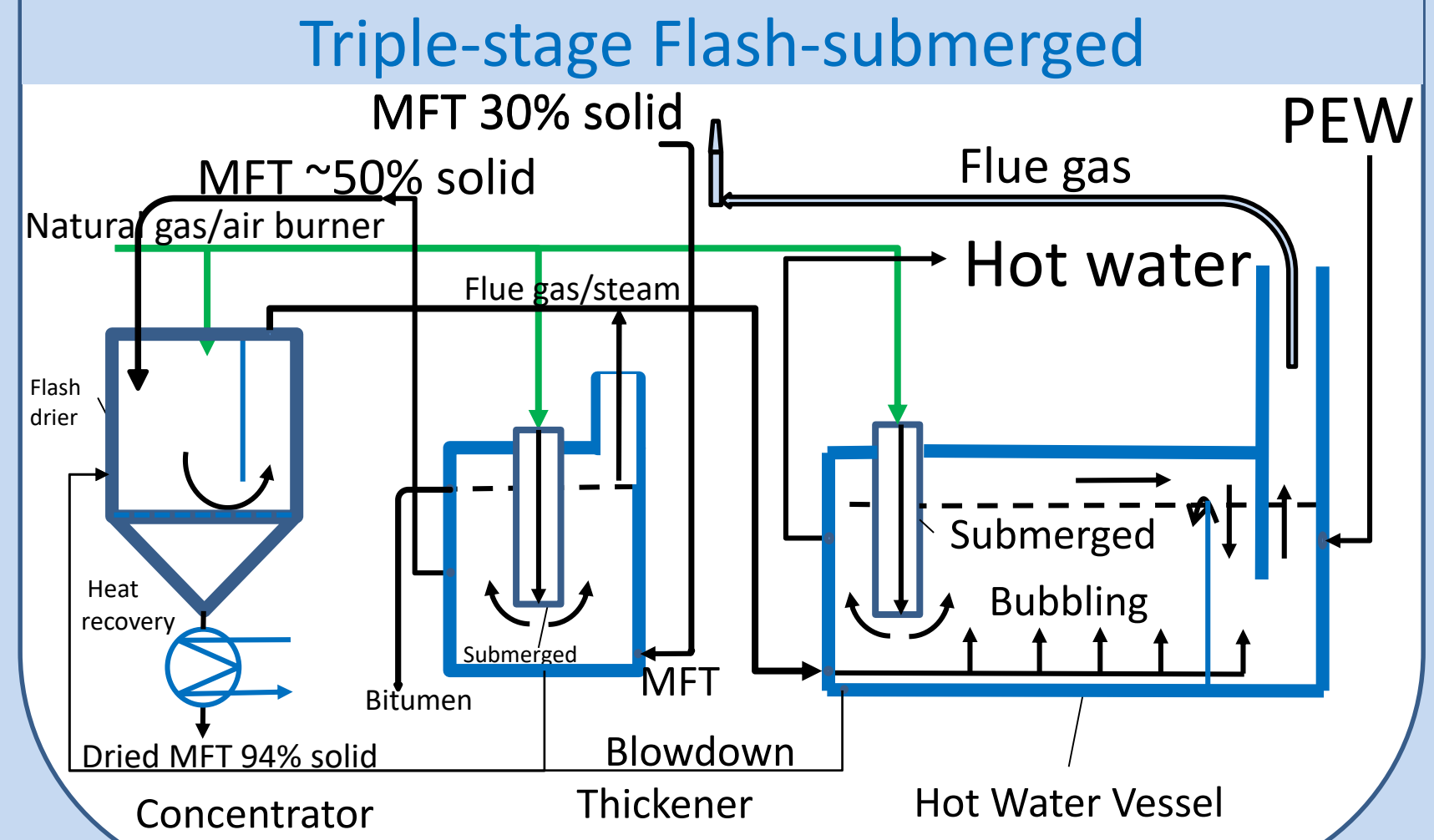
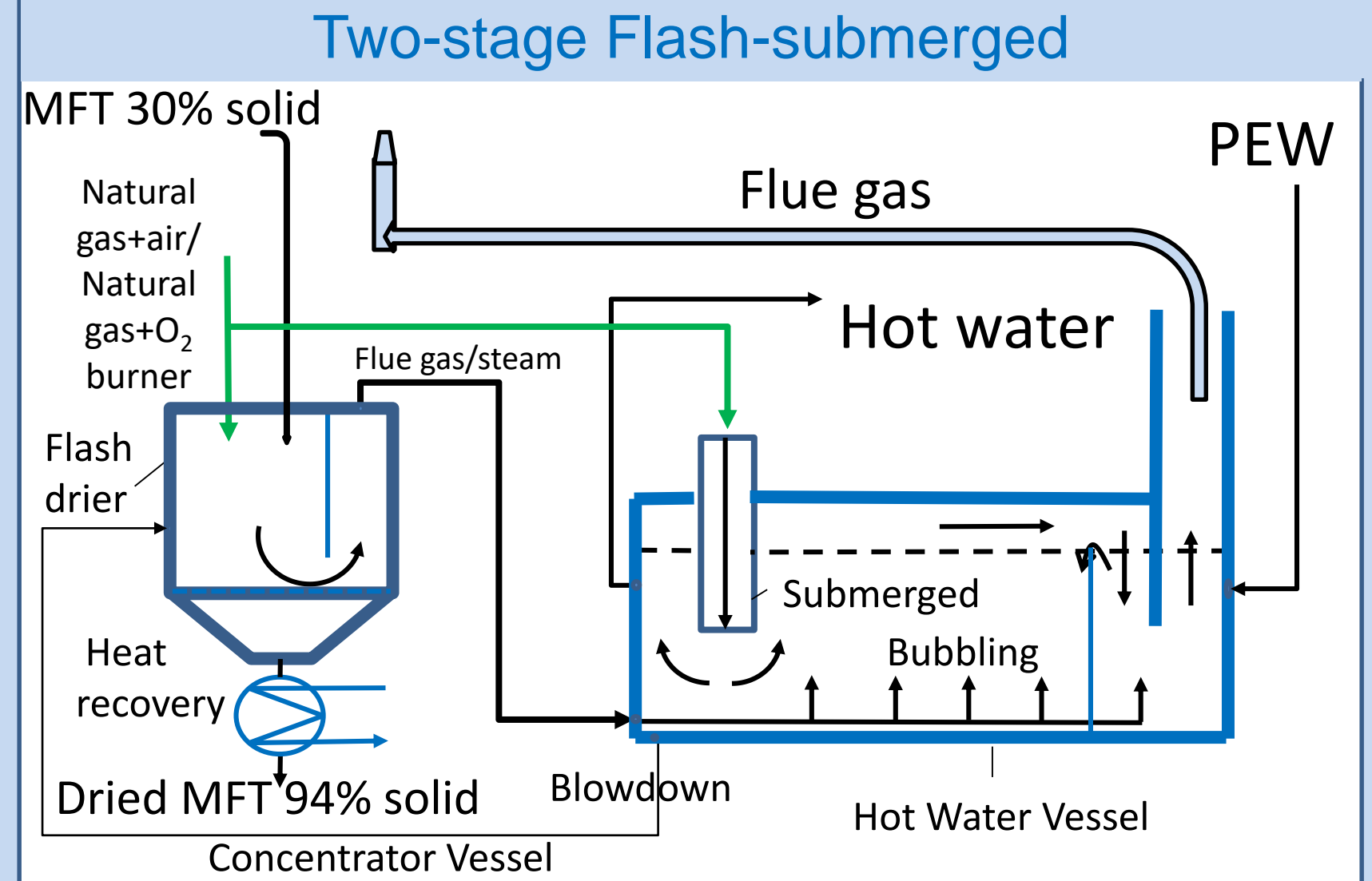
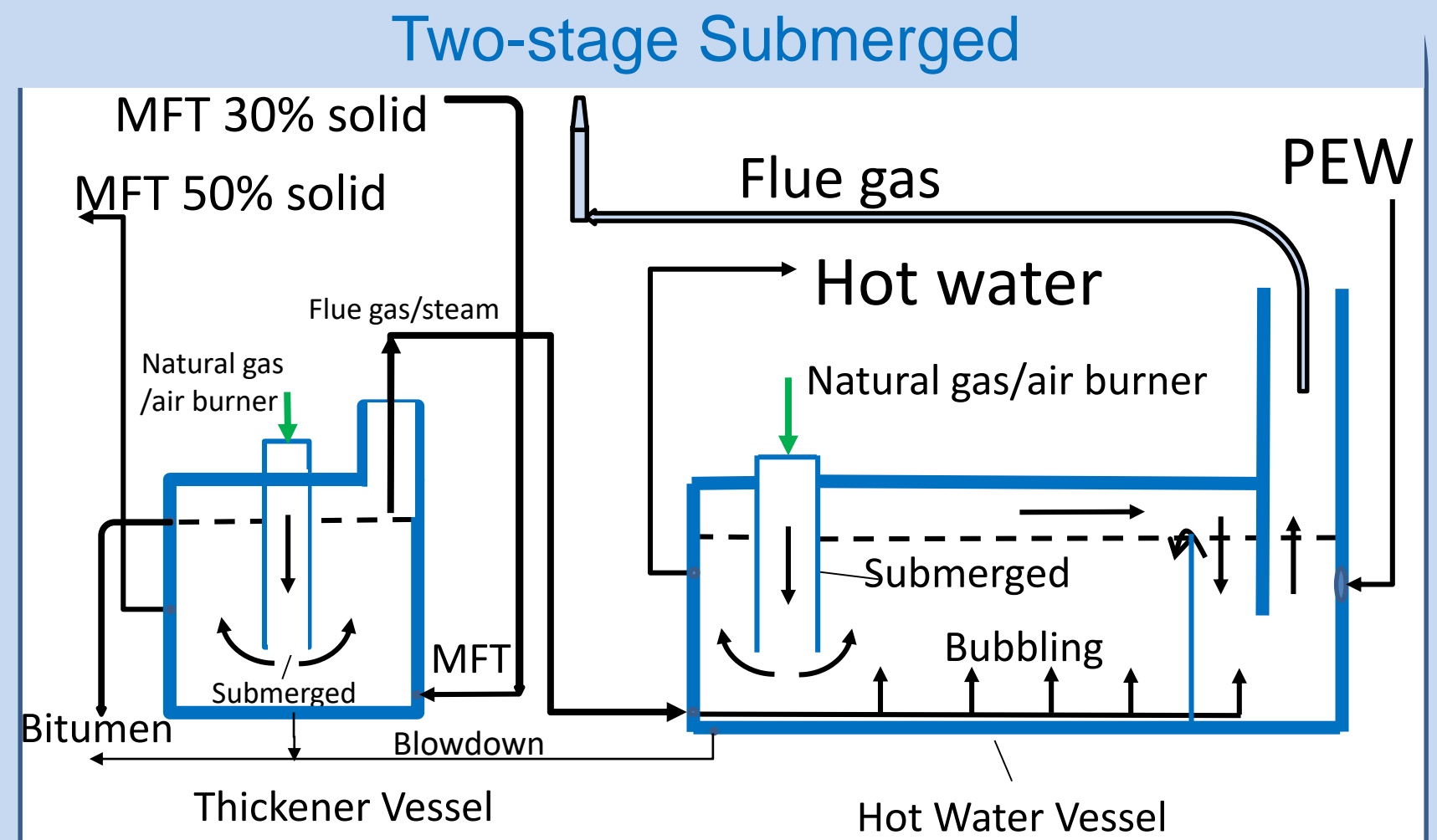
- Use process effluent water (PEW) and mature fine tailings (MFT)
- Able to use fluid fine tailings (FFT) also
- Reduce size of tailings pond
- Reduce fresh make-up water
- Reduce GHG emissions
- Increase energy efficiency
- Produce dry tailings
- Reduce numbers of auxiliary boilers
- Eliminate heat exchangers
- Improve CAPEX/OPEX

## Current Technology

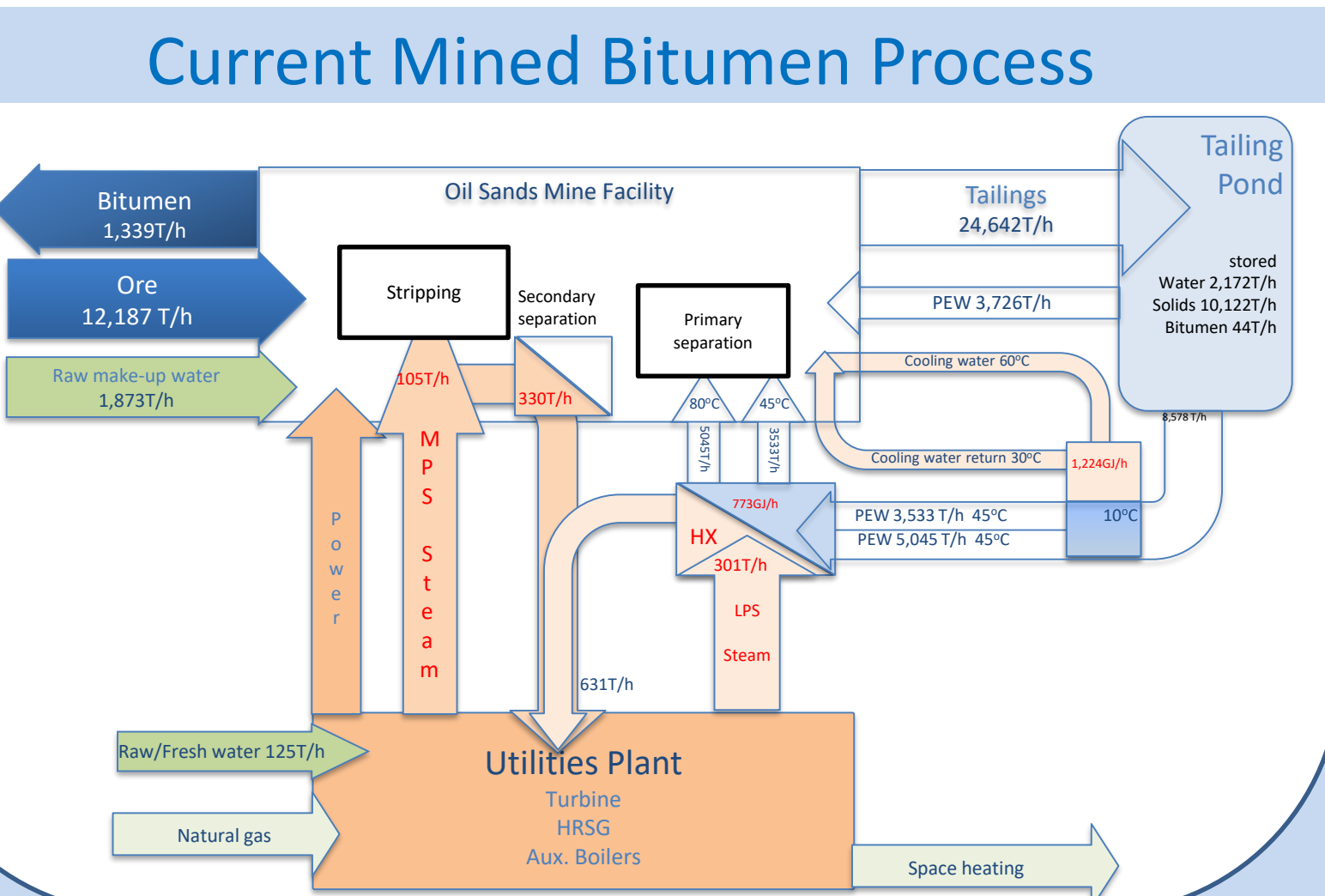
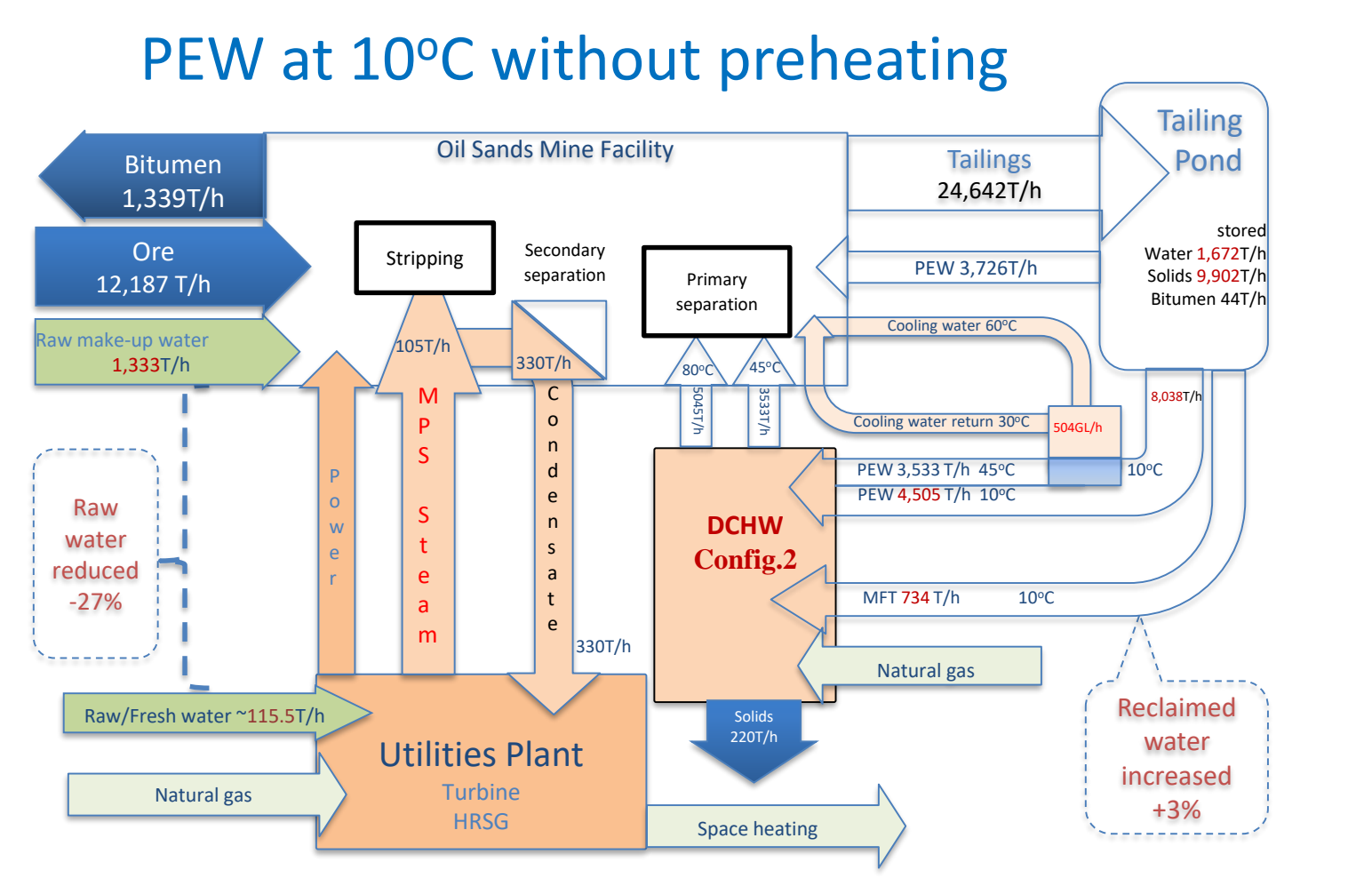
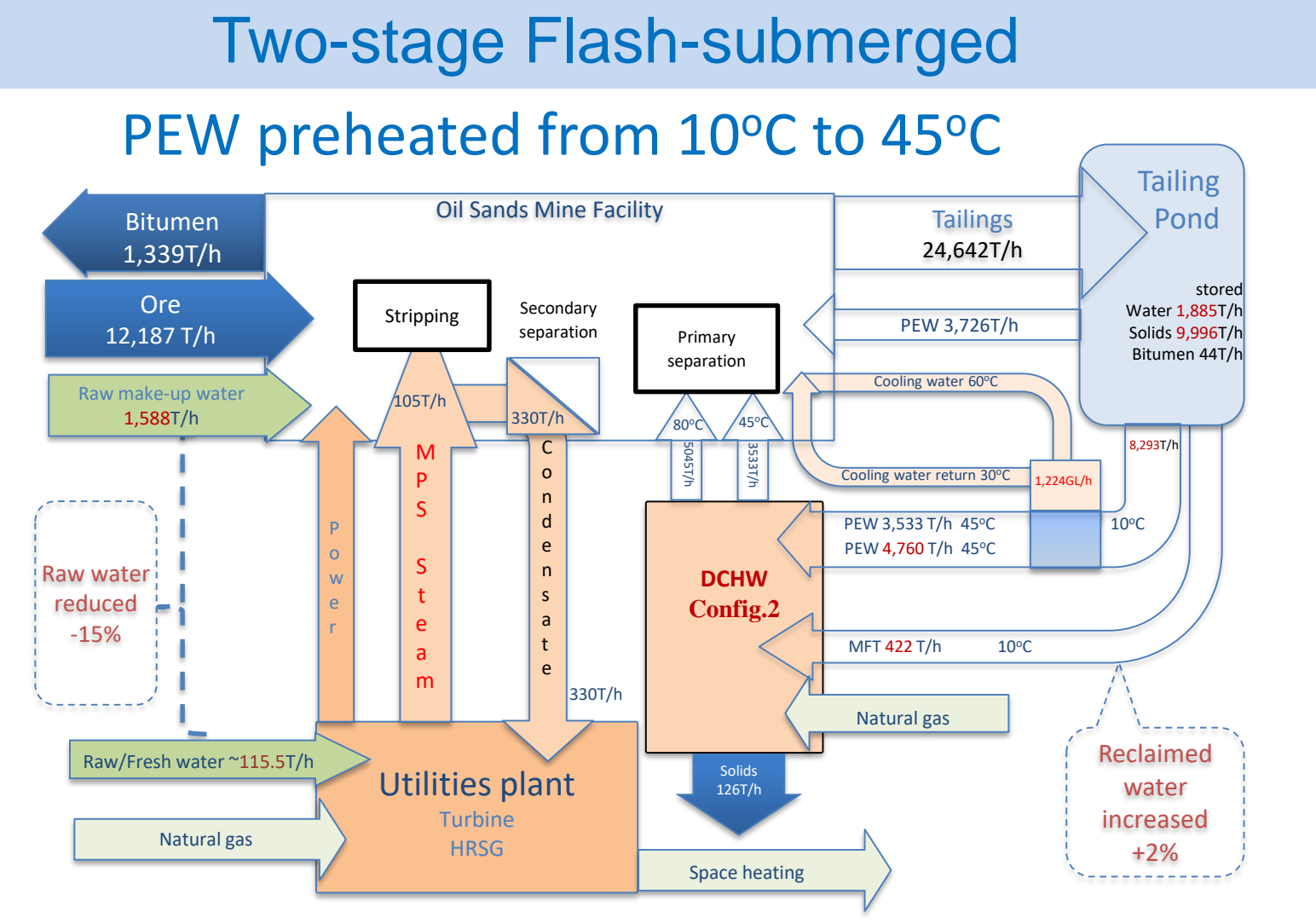


Base case: Auxiliary Boiler & Heat Exchanger

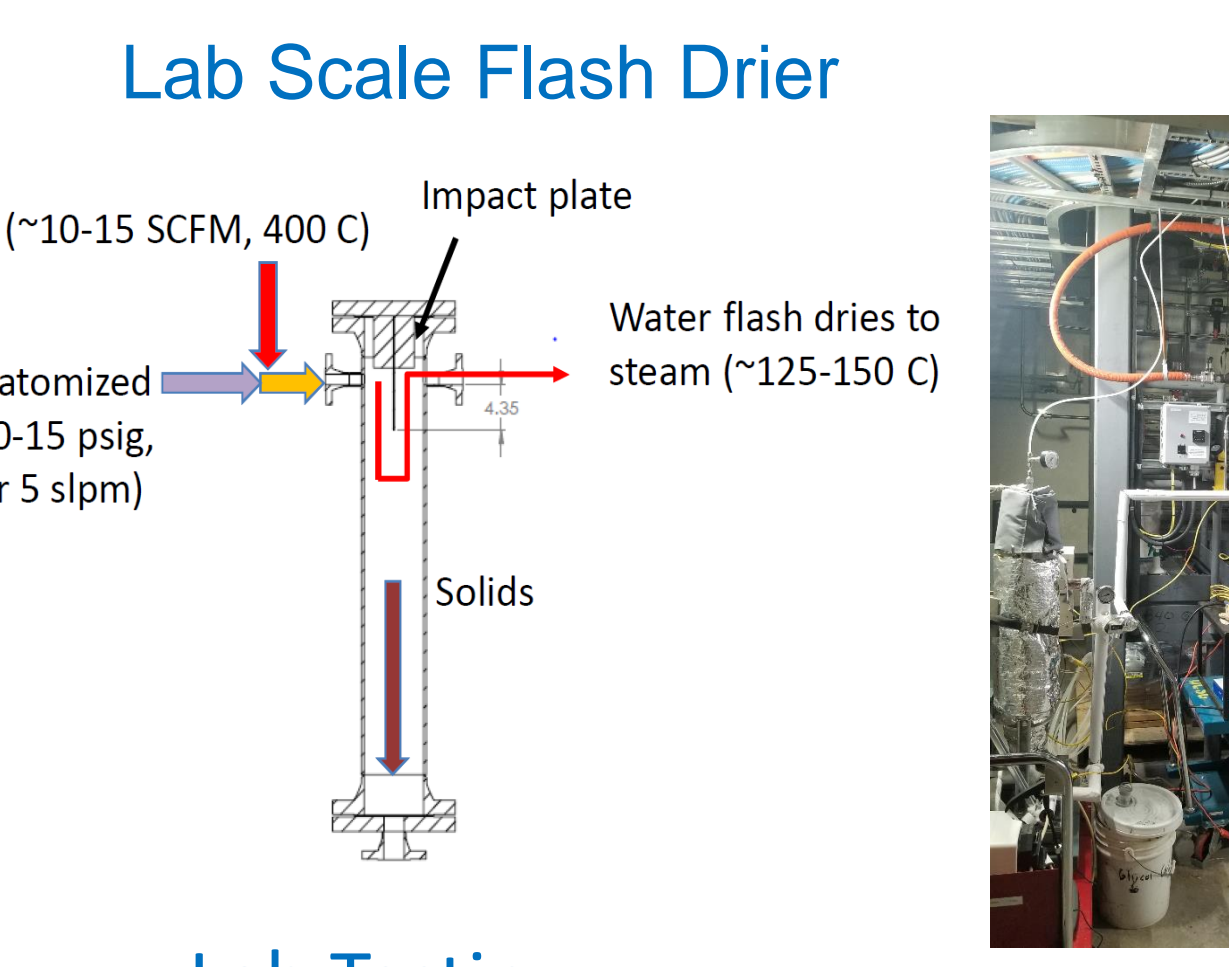
## DCHW Configurations



## DCHW Case Studies



## DCHW Lab Work



- ### Lab Testing
- Bitumen handling (suspended in the MFT)
  - Solids handling (dryness will impact options)
  - Performance and fate of materials in flash drier: Materials (water, solids and bitumen) will be consumed (combusted), evaporated, entrained, or deposited in various parts of the system.



MFT "as received" at 25% Solid: 25%, 50%, 70% Solids on impact plate

## DCHW Configuration Summary

DCHW Configuration	Dryness of MFT	Oxidizing hydrocarbon	Potential to recover bitumen	Energy efficiency (Air-firing without PEW preheating)	CO2 Reduction (Air-firing without PEW preheating)
2-stage Submerged	50%	No	Yes	89% (summer, 25°C) 87% (winter, 10°C)	-4.7% (summer, 25°C) -3.9% (winter, 10°C)
2-stage Flash-submerged	94%	Yes	No	96.2% (summer, 25°C) 94.8% (winter, 10°C)	-11.2% (summer, 25°C) -11.7% (winter, 10°C)
3-stage Flash-submerged	94%	Yes	Yes	96.4% (summer, 25°C) 94.8% (winter, 10°C)	-11.2% (summer, 25°C) -11.7% (winter, 10°C)

## Patent Pending

Canadian Patent Pending, 3,133,905,  
 "DIRECT CONTACT PROCESS AND METHOD FOR PRODUCING HOT WATER USING MATURE FINE TAILINGS (MFT) FEEDWATER"