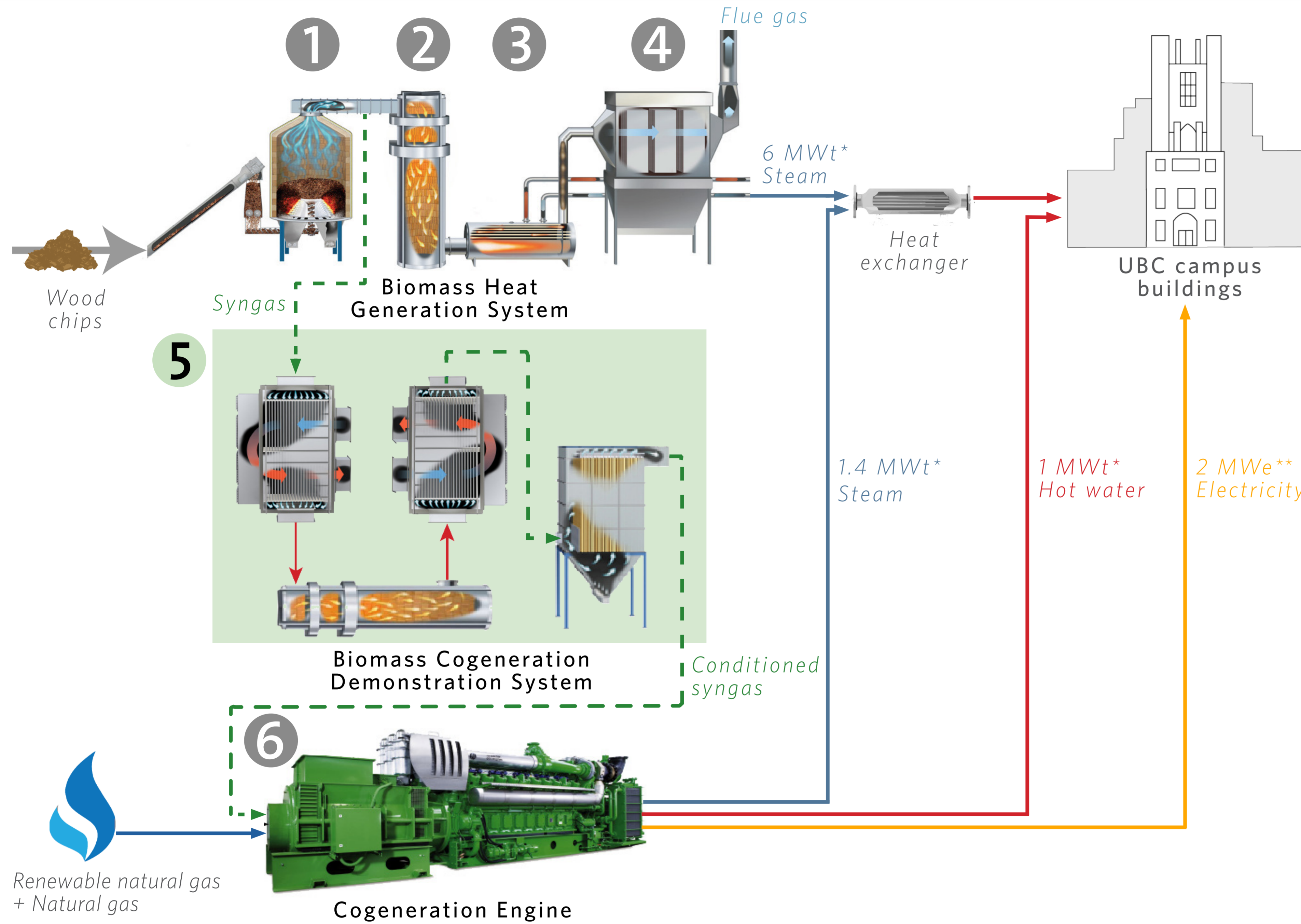




# BIOENERGY RESEARCH & DEMONSTRATION FACILITY

# ENERGY SYSTEMS



### BRDF PRODUCES...

- 25%** of total campus heating and hot water needs per year
- 100%** of campus heating and hot water needs in the summer
- 5%** of total campus electrical needs per year

### BRDF HAS ENABLED...

- 20+** research projects using the facility data and on-site lab
- 1,000** visitors through 50 to 100 tours each year

### BRDF SAVES...

**\$800K** on UBC operational costs annually (CAD)

### TECHNOLOGY DEMONSTRATION

- The biomass cogeneration system consists of fuelling the cogeneration engine with conditioned syngas in place of natural gas.
- This technology was in operation at BRDF for 450 hours before it was stopped due to an equipment failure, which was not economically feasible to repair or replace.
- Incorporating the demonstration system encouraged researchers to keep studying and improving this technology for future applications.

### RESEARCH PROJECTS

- As part of UBC's Campus as a Living Lab initiative, BRDF enables research collaborations between academics, campus staff and industry partners.
- The on-site lab within BRDF allows researchers to use the syngas and by-products from the facility for research purposes.
- BRDF has also been used as a case study to improve the sourcing and processing of wood waste and to advance bioenergy production.

## 1 GASIFIER

Converts the wood waste biomass into a clean synthesis gas (syngas).

## 2 OXIDIZER

The syngas is combusted and the resulting flue gas is directed through the boiler.

## 3 BOILER

Hot flue gas enters the boiler to produce steam for campus heat distribution.

## 4 ELECTROSTATIC PRECIPITATOR

Filters the particulate matter from the flue gas, which is then released into the atmosphere.

## 5 SYNGAS CONDITIONING

In the demonstration system, syngas was conditioned and filtered from impurities to fuel the cogeneration engine.

## 6 COGENERATION ENGINE

The internal combustion engine uses renewable natural gas and natural gas to generate electricity and heat.

Systems diagrams courtesy of Nexterra Systems Corp. \*MWt: megawatt thermal \*\*MWe: megawatt electrical