Brewing... With a Twist!

RenewaBrew

"Simply the Best"

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Brewing with Geothermal Energy

Indirect:

1. General building electrical needs
2. Mechanizing brewing process
3. Production of aluminum containers from Icelandic producers

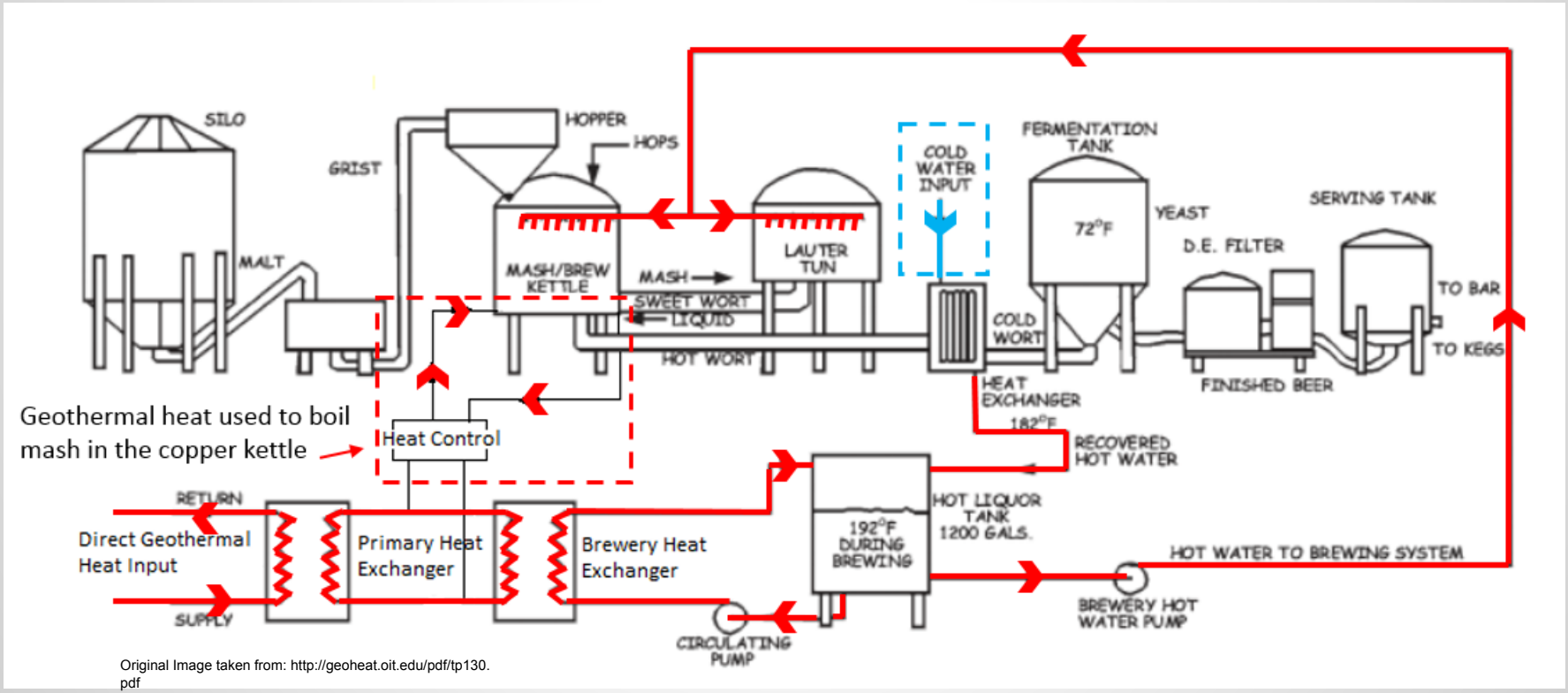
Direct:

1. Any heating that is involved in the brewing process
2. Heating the buildings
3. Keeping parking lots free of ice

Miscellaneous:

1. Use of biofuels for truck delivery fleet

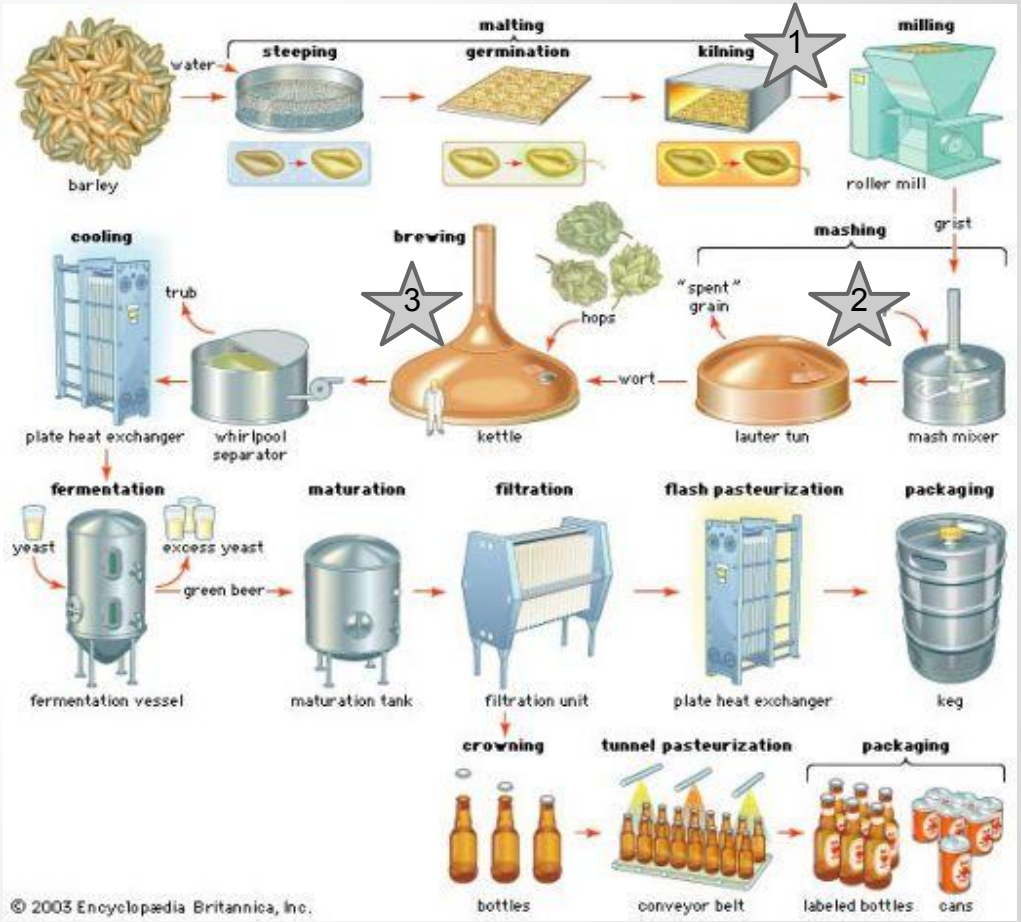
Brewing Process



Original Image taken from: http://geoheat.oit.edu/pdf/tp130.pdf

Overview of Brewing Process Alterations

1. Kilning
2. Mashing
3. Preparation for and addition of hops



Advantages

1. Only beer made using direct geothermal heating in the world*
2. 100% Green Product
    a. All energy used is renewable
        i. direct geothermal heating
        ii. renewable electricity
    b. Certify through third party e.g. *Green Seal*
    c. Wider consumer range
3. Reduced energy costs
    a. Direct geothermal heating
4. If you own the land, you own geothermal rights (in Iceland)

*Determined from the limited time given for internet research.

Disadvantages to using geothermal

1. Higher capital costs
    a. Geothermal heat pump
2. Higher maintenance costs
    a. Geothermal maintenance
3. Possible unforeseen costs regarding Green certification
4. Geothermal gases released into atmosphere

Location of Business

1. Geographic:
    a. Brewing requires 3-7 barrels of water in each barrel of beer produced
    b. Abundance of clean water in Iceland
2. Economic:
    a. Low corporate tax rate (20%)
    b. 9/10 top beer consuming countries (average 101.66 L/person) of the world have free trade agreement with Iceland
3. Political:
    a. Icelandic land use rights
        i. Owning land → Own geothermal reservoirs underneath it
    b. Permit process in USA could take 2 years
        i. Less wait time for permit in Iceland → earlier entry to market

Costs

To keep costs low, we plan on:

1. Keeping a small operation (~5,000 BBL / year, or 20 BBL / day)
2. Using cheap Icelandic renewable electricity to power the plant
3. Using aluminum produced locally in Iceland.

Direct Geothermal Energy Use

Per batch of 20 BBL (barrels):

122 kW Kilning

56 kW Mashing

+ 56 kW Preparation and addition of hops

234 kW / 0.63 (Capacity Factor) = **372 kW** (17 kW/BBL)*

We need a geothermal pump that can harness 372 kW at a time, which is easily doable in Iceland.

*This is about .50 kWh per 12 oz beer. If direct geothermal brewing took over just 1% of US Market, 333 MWh of electricity would be saved per year in the US alone.

Start Up Costs

Property (5,000 sq. ft. in location with access to water supply and geothermal energy): $1M

Geothermal Pump: $850 / kW * 372 kW = $316k
Water Pump & Filter: $4k
Aluminum Canning Machine: $30k
Truck (for shipping): $100k

Projected Total: $1.45M

Loan: $1.5M 5% 20 years
Monthly Payoffs: $10k ($120k / year)

After 12.5 years, investor will break even on investment, and will continue to make $120k for the next 7.5 years.

Annual Costs

Annual Loan Payment: $120k

Geothermal Pump: (includes Operation & Maintenance): $83.1 / kWyear * 372 kW = **31k**

Electricity:

Electrical:	~12.5 kWh / BBL	* 5000 BBL	=	75k kWh
Chiller:	~5 Wh / BBL	* 5000 BBL	=	25 kWh
Space Heating:	~38 kWh / BBL	* 5000 BBL	=	+190k kWh
			Total:	265k kWh *$0.09/kWh = **$24k**

Ingredients:

Water (3.0-7.0 BBL per BBL of beer sold)			Included in property cost	$0
Barley:	45-60 # / BBL	$6.00 / 48#	$6.00 / BBL	$30k
Hops:	0.5-0.8 # / BBL	$8.00 / #	$5.00 / BBL	$25k
Yeast:	1 gal / BBL	$10.00 / gal	$10.00 / BBL	$50k
Aluminum:	10.5# / BBL	$0.80 / #	$8.40 / BBL	+$42k
				Total: **$147k**

Shipping: (assuming we are within 25 from distributer) $1.00/BBL **$5k**

Total: $327k

Costs if we only used electricity...

20 barrels produced per day...

122 kW Kilning (24 hours)	2928 kWh
56 kW Mashing (1.5 hours)	84 kWh
56 kW Preparation/addition of hops (1.5 hours)	+ 84 kWh
	3096 kWh = **774 MWh per year** (5 days per week, 50 weeks per year)

774 MWh / year * $0.09 / kWh = **$69,660** per year

In conclusion…

Geothermal	Electricity
$316k to startup	$0 to startup
$31k per year	~$70k per year

After 8 years, geothermal will be cheaper.

Financial Statement

Revenue:

Beer sold wholesale in cans to distributer: $180 / BBL * 5,000 BBL / year = **$900k**

Costs: **$327k**

Profit: $900k - $327k = $573k

Taxes: $573k * 20% (Corporate Tax Rate in Iceland) = $114.6k

After Tax Income: $458,400

split 6 ways = $76,400 per person per year (around 9.11M ISK)

once we fire Yeshar…$91,680 per person each year.

Funding

1. Iceland

Vifilfell

   a. Reduce pollution and waste
   b. Promote increased recycling
   c. Increase the proportion of renewable energy in operation.

2. Europe

Heineken

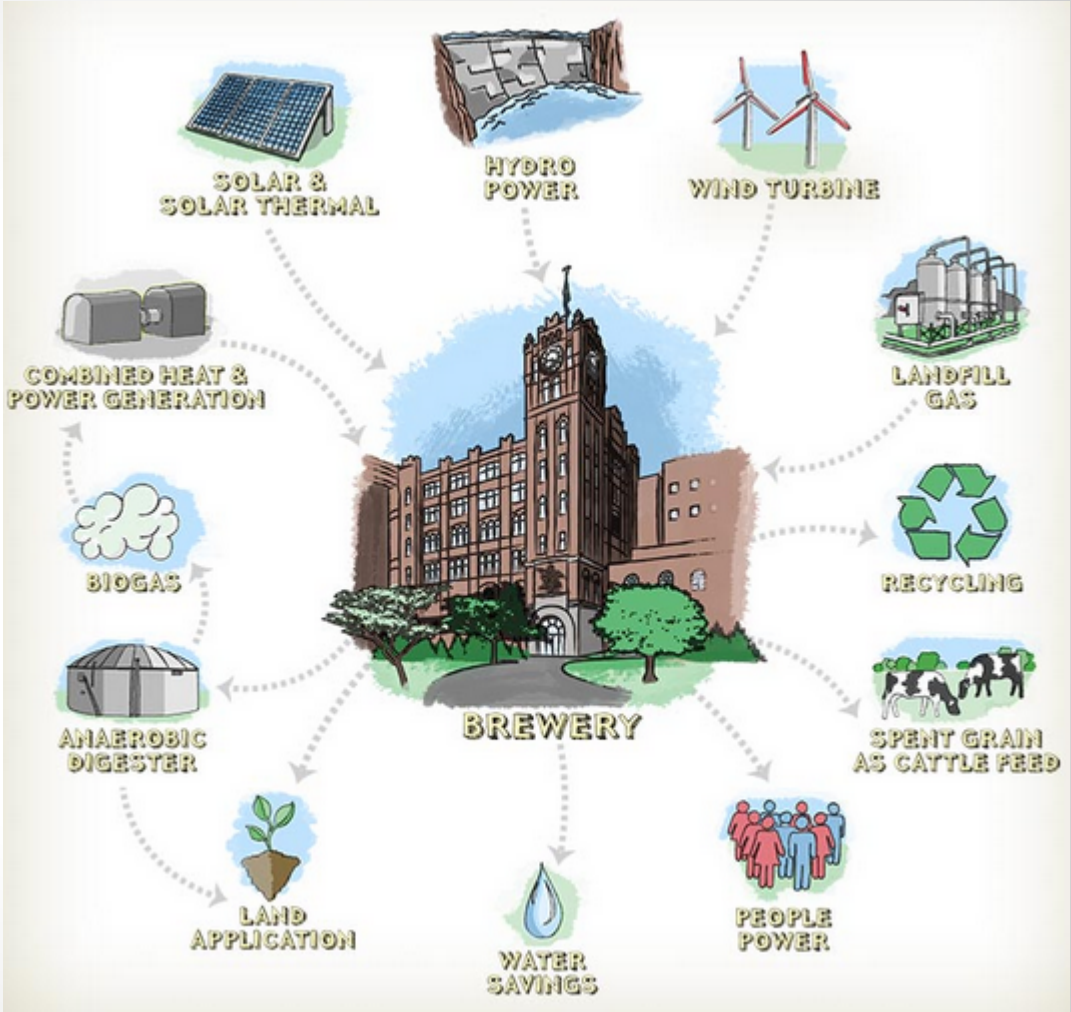
   a. 1.1 billion euro invested in renewable energy a year
   b. “The Heineken company … aims to explore the use of renewable energy such as biogas, biomass, solar energy and wind energy.”

Continued...

3. USA

   Anheuser - Busch (47.6%)

   a. “At Anheuser-Busch, we are committed to brewing the highest quality beers, improving our environmental performance, and making a positive impact on our communities.”



Customers

1. People in Iceland:
   a. Environmentally conscious
   b. Appreciate quality beer
2. Rise in quality of life recently makes this a good emerging market
3. We will focus on this sector (allows us to stay small)

The End