Project Introduction

Firewood™

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1 Abstract

The aim of this document is to provide the reader with a rough overview of the business plan of Firewood™, alongside all technical and financial decisions that were made to maximise the business' chances of succeeding. The document aims to outline the current state of the target market and establish a USP for our product lineup whilst flaunting complex mathematics in hopes of persuading the reader into believing in our non-existent competence in the field.

2 Our Purpose

We at Firewood™ would really like you to think that our business is not just about grabbing cash from our customers, but rather that there is an overarching ideology and mission behind our existence. Our business aims to deliver high quality incendiary equipment that is, in its entirety, manufactured from wood. This not only helps save the planet by reducing the amount of plastic waste, but also opens up the floodgates to artistic expression by permitting a wide range of sculpted styles for our products. What we sell are not merely lighters; they are artistic planet saviours.

3 The Market

3.1 Customer Traits

It is reasonable to assume that, due to the inherent nature of the products offered by Firewood™, its customers must exhibit one common trait, namely **the need for a mobile, localised source of heat energy**. This definition, despite not being necessarily flawed, ignores a very important parameter of the energy source — the (average) thermal power output. There is, after all, a vast difference between a cigarette lighter, and an acetylene torch.

3.2 Power Calculations

To narrow down our customer base, let's run some primitive calculations to determine the power range we're striving to operate within. Consider a typical lighter from a competing company, *BIC*. Said lighter is equipped with $4.5g$ of butane fuel. This amount of butane allows the device to maintain a (more or less) constant power output throughout the duration of $30min$. Upon combustion, one mole of the butane fuel releases a fixed amount of energy into the environment. This energy is defined by the *enthalpy of combustion* ...

$$\Delta H_{c(mol)} = -2.88 \cdot 10^3 \; kJ \cdot mol^{-1}$$

Thus, the device is capable of outputting an average amount of thermal power equal to ...

$$\begin{aligned} M &= 58.124 \; g \cdot mol^{-1} \\ n &= \frac{4.5 \; g}{58.124 \; g \cdot mol^{-1}} \\ &= 7.74 \cdot 10^{-2} \; mol \\ \Delta H_c &= \Delta H_{c(mol)} \cdot n \\ &= -2.23 \cdot 10^2 \; kJ \\ \bar{P} = \frac{E}{t} &= \frac{2.23 \cdot 10^2 \; kJ \cdot 10^3}{30min \cdot 60s} \\ &= \frac{2.23 \cdot 10^5}{1.7 \cdot 10^3} \\ &= \underline{\underline{123.8 \; W}} \end{aligned}$$

3.2.1 Continuous Form

Assuming that the fuel consuption is not constant, the formulæ for the instantaneous and average power outputs shall be expressed in a continuous form:

$$P(t) = \frac{dE}{dt}$$

$$\bar{P} = \frac{1}{T} \cdot \int_0^T P(t) \, dt$$