

Sustainable Guitar Project

Daniel McGinn

Note: This Presentation has been modified from its original version to
only contain contributions by Daniel McGinn

Needs & Design

Typical Guitar LCA
Customer Interview

Guitar Prototype

Prototype Iterations
Demo

Environmental Analysis

SOLIDWORKS Sustainability
LCI with NREL Data
System Map

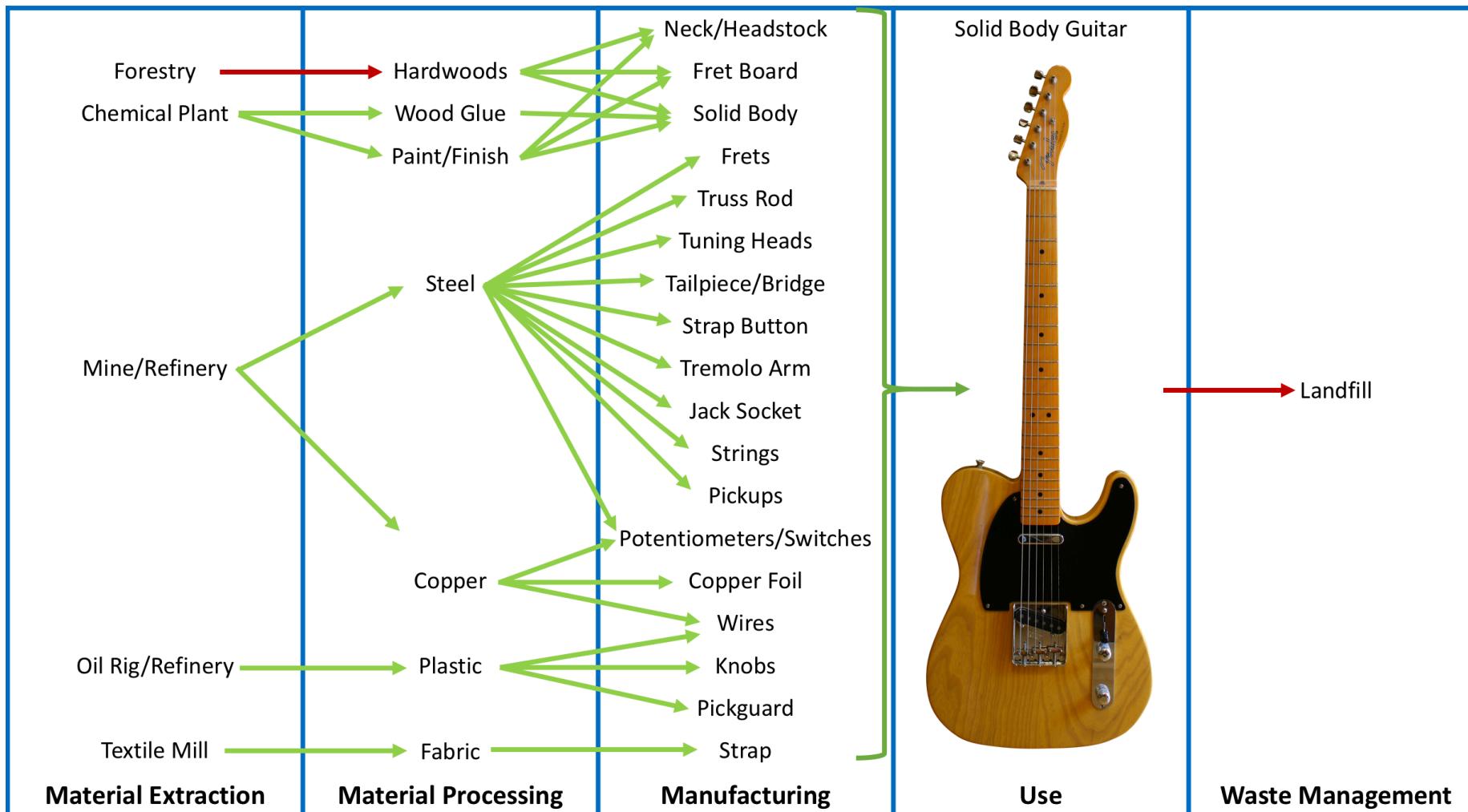
Economic Analysis

Business Model Canvas

Social Analysis

Social Cost of Carbon

Incumbent Tech: Life Cycle Diagram



Consumer Interviews Regarding Existing Tech

Skilled Players	Manufacturers	Beginner/Potential Players
<ul style="list-style-type: none">• Tonality, playability, and build quality are most important• Generally don't consider sustainability• Less inclined to sacrifice these for sustainability• Open to used parts and guitars• Tend to stock up on guitars/parts instead of selling them	<ul style="list-style-type: none">• Rare wood use is most detrimental to environment• For electric, whole new materials (i.e. plastics, metals) for the body/neck• Electronic components and hardware, including pickups, can end up in landfills• Evidence shows that people are willing to buy/pay more for sustainable products	<ul style="list-style-type: none">• Not likely to shell out money for a first guitar• More curious about/willing to consider sustainable products• Values from skilled players less important• More willing to sacrifice tonality and playability

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Cutting the Body



Pink Foam Prototype



Final Prototype

Guitar Demo

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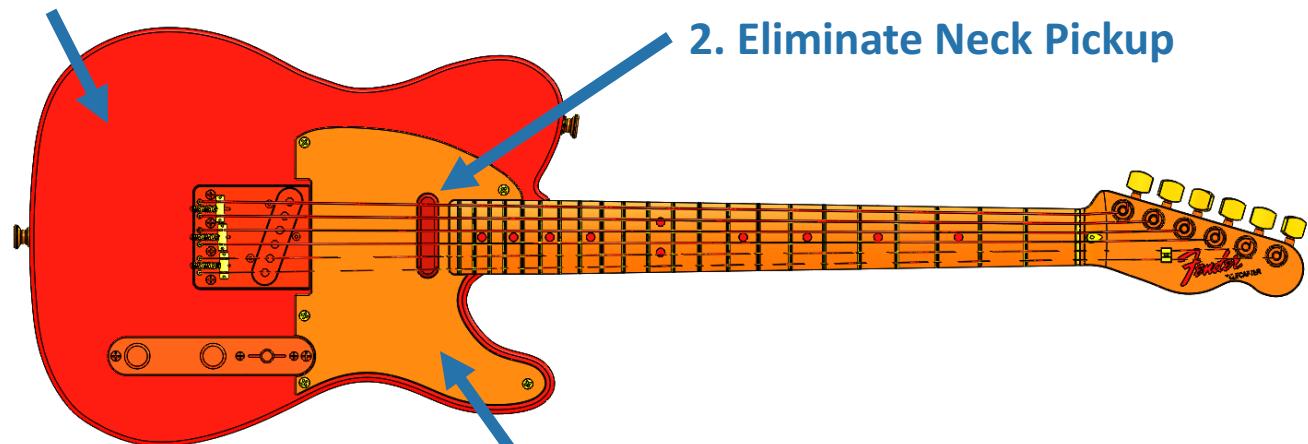
Social Analysis

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SOLIDWORKS Sustainability



1. Substitute Reclaimed Wood for the Body

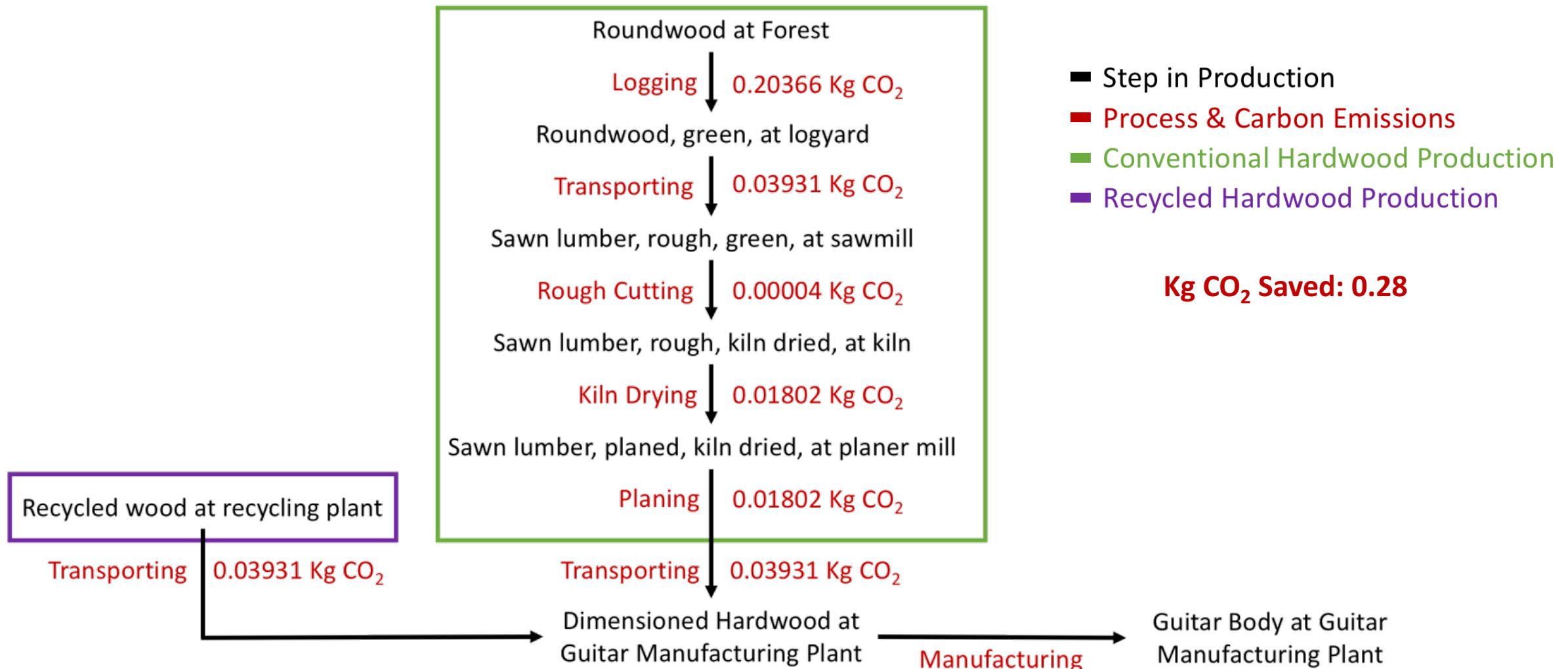


2. Eliminate Neck Pickup

3. Eliminate Scratch Plate

Part	Quantity	Sustainability-carbon
1 TELECASTER BODY	1	0.69
2 TELECASTER NECK PICKUP	1	0.43
TELECASTER BRIDGE	1	0.32
TELECASTER ELECT PLATE	1	0.26
TELECASTER NECK PLATE	1	0.21
TELECASTER NECK	1	0.14
TELECASTER SCRATCH PLATE	1	0.11
TELECASTER TUNERS	6	0.10
TELECASTER STRAP BUTTON	2	0.03
TELECASTER FRET 7	1	0.02
TELECASTER FRET 8	1	0.02
TELECASTER FRET 9	1	0.02
TELECASTER INPUT JACK	1	0.02
TELECASTER PEGS	6	0.02
TELECASTER BRIDGE STRING	3	0.01
TELECASTER NUT	1	0.01
TELECASTER PLUG	1	0.01
TELECASTER FERRULE	6	0.00
TELECASTER FRET 10	1	0.00

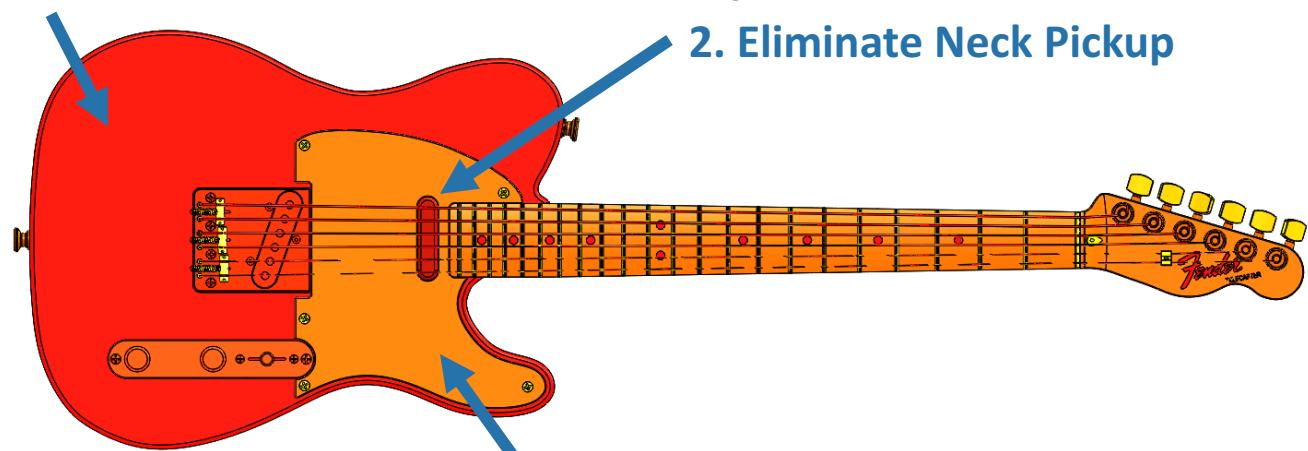
Wood Production System Map (NREL Data)



SOLIDWORKS Sustainability



1. Substitute Reclaimed Wood for the Body



2. Eliminate Neck Pickup

3. Eliminate Scratch Plate

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TELECASTER NUT	1	0.01
TELECASTER PLUG	1	0.01
TELECASTER FERRULE	6	0.00
TELECASTER FRET 10	1	0.00

0.69 kg CO₂

Quantity Sustainability-carbon

0.69

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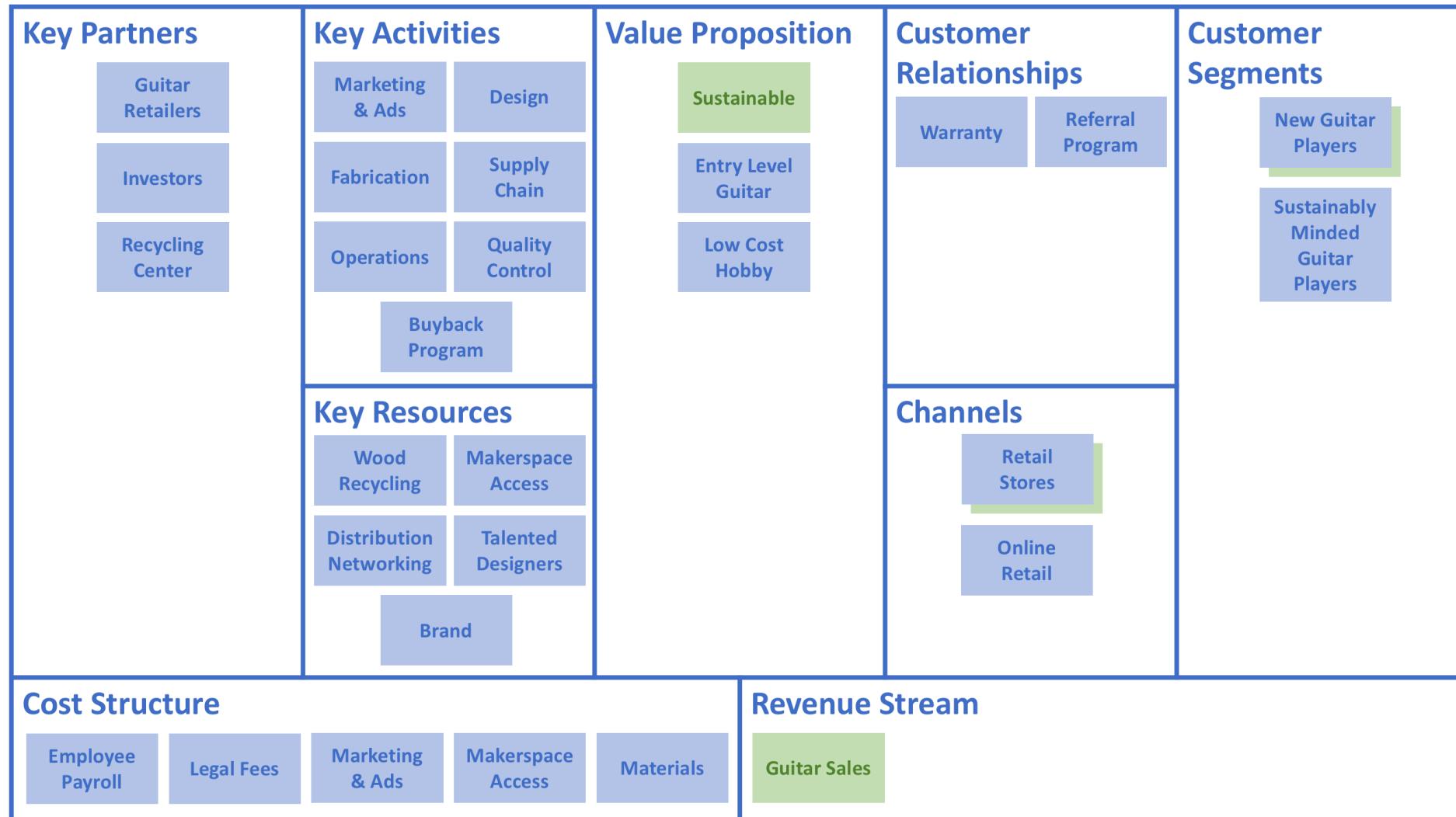
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Business Model Canvas

Social Analysis

Social Cost of Carbon

Business Model Canvas



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ATAR Model
Competition

Social Analysis

Social Cost of Carbon

Social Cost of Carbon

	Calculated Value	Lower Bound	Upper Bound
kg CO2 Saved Per Guitar	0.82	0.738	0.902
kg CO2 (body)	0.28	0.252	0.308
kg CO2 (neck pickup)	0.43	0.387	0.473
kg CO2 (scratch plate)	0.11	0.099	0.121
Guitars Sold	5000	4500	5500
Total Kg CO2 Saved	4100	3321	4961

- The amount of carbon saved equates to around 4100 kg
- This is the equivalent of one car off the road
- While this is discouraging, we discovered that this metric doesn't fully encapsulate the goal of our product
- The deforestation savings and the dialogue our product will open are more important

Thank You