THE NORTH FACE

NAMED FOR THE COLDEST, MOST UNFORGIVING SIDE OF A MOUNTAIN

PRODUCT RECOMMENDATIONS

WOMEN'S CRESCENT FULL-ZIP FLEECE JACKET
NEVER STOP EXPLORING MEANS AN UNWAVERING COMMITMENT TO PUSHING THE LIMITS OF INNOVATION AND DESIGN.

- Systems Map
- Design Brief
- Life Cycle Assessment
- Top Design Ideas
- Decision Matrix and Top Designs

WOMEN'S CRESCENT FULL-ZIP FLEECE JACKET

- Size: medium
- Color: blackberry wine heather
- Fit: relaxed fit

Product Functions:
- Protect core body temperature
- Retain Body Heat

thenorthface.com
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**Product Layers Breakout**

**End of Life Connections**

**Raw Materials**  
- Design  
- Price Point  
- Use/System  
- Body  
- Comfort Zone

**Supply**  
- Product Functions: Protect Core Body Temperature, Retain Body Heat

**Retail**  
- Visual Merchandising/Pricing

**End of Life**  
- Recycle  
- Landfill  
- Material Repurpose  
- Overstock  
- Product Layers

**Use**  
- Food  
- Wear  
- Adventure  
- Washing  
- Storage

**Use/System**  
- Product Functions: Protect Core Body Temperature, Retain Body Heat

**User**  
- Comfort Zone: Reflected Body Heat, Cold  
- Cold  
- Cold  
- Cold  
- Cold  
- Moisture  
- Heat  
- Heat

**Manufacturing**  
- Packaging

**Transportation**  
- Price Point  
- Packaging

**Retail**  
- Overstock  
- Visual Merchandising/Pricing

**Overstock**

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SCOPE // Design → Supply → Retail → Use → End-of-life

FUNCTIONAL OBJECTIVE // One year of service: The fabric is synthetic and with proper care it would be functional for 10 years. As a result, the functional unit will be 1 year of service for the 10 year estimated life of the garment.

SUSTAINABILITY OBJECTIVES FOR PRODUCT //
1. Reduce total lifetime Use Phase CO2 emissions by 90% (measured by CO2 eq. kg / functional unit)
2. Extend product life by 5 years through end of life strategies to reduce product impact
3. Extend product material life through recycling programs with goal to reclaim 100% of fabricated polyester

BUSINESS OBJECTIVES //
4. Maintain price point -/- 5% of current fleece market as stated by client
5. Maintain user experience — to ensure brand integrity and quality for customer

Summary Notes
For this brief, strategies for gaining significant improvements in reducing environmental impacts were explored. The LCA analysis showed that the garment cleaning during the use phase represents the majority of the garment’s total life impact. Strategies to reduce energy use as a result of owning the jacket will be explored to minimize impact.

Product Life Cycle Phases

PRODUCT BRIEF

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RECOMMENDATIONS //
Based on research, The North Face almost meets the Basic level for Cradle to Cradle certification. With proper documentation, TNF could achieve Basic or Bronze certification with initiatives in the Material Reutilization category.

1. Ensure a Material Reutilization Score ≥ 35 — for Basic MR level
2. Increase Material Reutilization Score to ≥ 50 — for Bronze MR level

(Material Reutilization Score is calculated by the following equation:
( % recycled or rapidly renewable + (% recyclable or compostable x 2) ) / 3

Lowest achievement level represents product’s overall mark.

CRADLE TO CRADLE CERTIFIED™ PRODUCT STANDARD

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>BASIC</th>
<th>BRONZE</th>
<th>SILVER</th>
<th>GOLD</th>
<th>PLATINUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Reutilization</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Renewable Energy</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Water Stewardship</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Social Fairness</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

Program entry at BASIC LEVEL

Lowest achievement level represents product’s overall mark.

<table>
<thead>
<tr>
<th>CLEANING</th>
<th>IMPROVED ECological IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>2 wash, 2 dry per month</td>
</tr>
<tr>
<td></td>
<td>1 wash, no dry per season</td>
</tr>
<tr>
<td>TRACI mPts / functional unit</td>
<td>0.1</td>
</tr>
<tr>
<td>CO2 Impact</td>
<td>2.1</td>
</tr>
</tbody>
</table>

The LCA analysis showed that the garment cleaning during the use phase represents the majority of the garment’s total life impact. Strategies to reduce energy use as a result of owning the jacket will be explored to minimize impact.
#1 Textured Polyester Fabric
Biomimetic design focused on the wing surface of the Morpho butterfly which sheds water and dirt via hydrophobic microstructures.

#2 Dryer Hooks
Add loops or hooks to the garment that would make line drying easier and encourage no drying.

#3 Antibacterial
Minimize energy impacts further by using a material that requires less washing. SeaCell® fabric has odor-reducing and antibacterial properties because it contains zinc oxide. This helps to reduce the need for washing.

#4 Recycled Polyester
Using recycled PET for polyester fabric removes energy used during material extraction.

#5 Online Repair Locator
Leverage collaboration with partners, such as the Outbound Collective (www.theoutbound.com), by adding a “FIND A REPAIR PARTNER NEAR YOU” service to help extend the product’s useful life. The added service could be available through the websites and TNF mobile app.

#6 LCA Information on Tag
Provide Life Cycle Assessment results on the tag with more information available on The North Face website. A reference concept would be presented based on the average user behavior. Different washing scenarios would demonstrate how proper care is better for the jacket and the biosphere.
OVERVIEW

TOTAL IMPACT BY SCENARIO

TOTAL CO2 IMPACT BY SCENARIO

USE PHASE CO2 IMPACT BY SCENARIO

TOTAL IMPACT BY TOP 10 COMPONENTS

TOTAL CO2 IMPACT BY TOP 10 COMPONENTS

COMPONENTS

METRICS & IMPROVEMENTS

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RESULTS

ASSESSMENT

LIFE CYCLE

TRACI mPts / functional unit

CO2 eq. kg/func. unit

Original #1 #2 #3 #4 #5 #6

Original #1 #2 #3 #4 #5 #6

Original #1 #2 #3 #4 #5 #6

Original #1 #2 #3 #4 #5 #6

Original #1 #2 #3 #4 #5 #6

Dryer Electricity (120V, US)
Main Shell Polyester
Zipper Metal (Steel 18/8)
Water, completely softened
Polyester Fabric
Polyester Thread

Total Impact

0.1

Improved ecological impact ➤

CO2 Impact

2.1

Improved ecological impact ➤

Use Phase CO2

1.3

Improved ecological impact ➤

Original Textured Fabric Dryer Hooks Antimicrobial Recycled Poly Online Repair LCA Tag

5.2 x 10^2 5.5 x 10^4 6.2 x 10^2 0.1 8.2 x 10^2 0.1

+57% +55% +50% +7% +33% -0.095%

5.5 x 10^4 9.8 x 10^1 1.1 2 1.4 2

+53% +48% +5% +33% 0%

6.2 x 10^2 1.3 6.34 x 10^2 1.3 8.46 x 10^3 1.3

+93% +90% +96% 0% +33% 0%

6.34 x 10^2 1.3 6.34 x 10^2 1.3 8.46 x 10^3 1.3

+93% +90% +96% 0% +33% 0%

9.4 x 10^1 9.8 x 10^1 1.1 2 1.4 2

+53% +48% +5% +33% 0%

8.46 x 10^3 8.46 x 10^3 8.46 x 10^3 8.46 x 10^3 8.46 x 10^3 8.46 x 10^3

+93% +90% +96% 0% +33% 0%

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Reduce CO2 Impact during Use Phase
THE PROCESS FOR DECIDING ON THE TOP DESIGNS

Each design objective is assigned a weight in the decision matrix which indicates the importance of the objective with which a winning design must align. Next, each scenario is graded with a value from one to five (one indicates that it does not achieve the objective, five indicates that the scenario achieves the objective almost perfectly). The assigned weights strengthen the importance of the top goals by multiplying their value. These were modified from the original design brief to reinforce the importance of reducing CO2 impact during the use phase while maintaining price point and experience.

### DECISION MATRIX

<table>
<thead>
<tr>
<th>Objective</th>
<th>Weight</th>
<th>#1 Textured Fabric</th>
<th>#2 Dryer Hooks</th>
<th>#3 Antibacterial</th>
<th>#4 Recycled Poly</th>
<th>#5 Online Repair</th>
<th>#6 LCA Tag</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce CO2 by 90% (Use Phase emission Impact)</td>
<td>x 5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>71</td>
</tr>
<tr>
<td>Extend Life by 5 years (Through end of life strategies)</td>
<td>x 2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>76</td>
</tr>
<tr>
<td>Reclaim 100% of Fabric (Extends material use life)</td>
<td>x 2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>56</td>
</tr>
<tr>
<td>Maintain Price Point (+/- 5% of current price point)</td>
<td>x 5</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>58</td>
</tr>
<tr>
<td>Maintain Experience (Garment provides similar feel/use)</td>
<td>x 4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>66</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>71</strong></td>
<td><strong>76</strong></td>
<td><strong>56</strong></td>
<td><strong>58</strong></td>
<td><strong>66</strong></td>
<td><strong>60</strong></td>
<td></td>
</tr>
</tbody>
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USER BEHAVIOR RESULTS:
- 2 wash per month
- No drying

Hang on clothesline using simple loop knot

Polyester fabric loops are sewn into interior collar fabric

The straps lay flat under garment when in use.

#2 DRYER HOOKS
Eliminate Need for Dryer Use

FIRST PLACE
**TOP DESIGN PICKS**

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**SECOND PLACE**

**#1 TEXTURED POLYESTER FABRIC**
Wing surface sheds water and dirt via hydrophobic microstructure

- Polyester Fiber with micro-ridges
- Using nature's design for polyester fiber
- Woven Fabric

- The micro-relief raised ridges of each wing scale do not provide enough surface area for dirt particles or water to adhere to.

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**THIRD PLACE**

**#5 ONLINE REPAIR LOCATOR**
Use geo-locating technology to encourage repair of garment to extend the life of product

- Certified Repair Facilities Mapped Nearby
- Repair Extends Product Life

- Mapping can be integrated through The North Face mobile app

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**EPIDERMAL SCALES**
Micro-relief raised ridges
Each ridge = 1,000-1,500 nm wide

- The micro-relief raised ridges of each wing scale do not provide enough surface area for dirt particles or water to adhere to.
THANK YOU FOR THE OPPORTUNITY!

PRESENTED BY
MARK & MEGAN