

Design for Lifetime and Sharing



Example 1

by Craig Johnson, Nadine Kuemmel, Kate Mohn, Shari Welsh (2013)

Comments:

Brainstorm List: Good number of ideas—beating the minimum is always good. Not all the ideas really turned the product into a service (like the online sales or custom-order bags or silkworms), but you had enough ideas that it didn't matter. And great level of detail on the ideas that required a little more subtlety to get. You had a bunch of very creative & clever ideas. Good listing of the customer value that each idea adds.

Less Material Recommendation: You listed the 8 ideas with extremely detailed descriptions, clearly showed which were lightweighting and which were Product Service Systems, showed the % mass reductions/lifetime increases, and clearly listed the customer value for all the service-systems. It would've been more readable if the value to the customer for PSS ideas were clearly called out—it got buried in the description paragraphs—but it was there.

Your winning idea was clear & you did a good job of describing the business value to the company. From the LCA perspective it would've been nice to mention that these gear sheds would only be at existing park gift shops etc., because if you're building new buildings the impacts will probably vastly outweigh the savings from products (and you'd have to count them in the LCA to be fair). I bet your winning idea would actually reduce impacts per use much more than 22% on average, because I bet you'd actually get a ton more usage per product than having them sit in people's closets most of the year. (I know you assumed a high usage for your baseline, though, which is fine.)

Great presentation overall--great sketches for everything (above & beyond the call of duty), very clear LCAs, and the little circles for mass

reduction/lifetime extension and overall impact improvement were a nice dashboard idea. Although they were inconsistent—it'd make more sense if the impact reduction were always the blue circle, while the mass reduction/lifetime extension/anything else were the white circle. Also, typo: "wouldl". But it looks really good overall.

*Please note that the Brainstorm List has been included both Lightweighting and Design for Lifetime and Sharing



Design for Lifetime and Sharing: Example 1

by Craig Johnson, Nadine Kuemmel, Kate Mohn, Shari Welsh (2013)

Brainstorming List // Service

IDEA

1. Rent your gear arrangement; incorporate sleeping sheet into the design of the bag; sheet gets rewashed by company each time before renting it out again
2. Ride sharing to camping
3. Time-share / Co-op system for sleeping bags and pads. You own rights to a certain set of equipment and a certain number of uses. Equipment is stored at local retailers or central location.
4. Partner with outdoor retailers to run skills classes on camping, hiking, etc... (don't get rained out, don't get blisters, dressing properly, what gear to bring). Then, rent the equipment at a discount to people who take the class. People become comfortable / familiar with CD gear and in turn rent, or buy it. Also teaches people how to use and care for their equipment to give it longer life
5. Rent gear at campsites
6. Arrange service agreement where gear is issued on command for a yearly fee; could be good deal for frequent users instead of renting for each camping trip (Netflix model instead of Blockbuster)
7. Guide services provide the sleeping bags and lease them to participants - maybe your guide can be part of the warmth
8. Rent bags to Scout Troops
9. Partner with outdoor retailers so that they do repairs to the bag or pad. The customer doesn't have to send the bag/pad back and wait so long for their repaired bag/pad to get back to them
10. Provide Cascade Designs sponsored cabins and/or campsites
11. Cascade Designs to develop light-weight weather proof yurts to provide most of the heat and comfort of camping instead of focusing only on sleeping bags
12. Work with Park Services to develop solar heated cabins or huts so that people can have sleeping bags that don't need such a high temperature rating
13. No retail sales--direct shipping to customer only; shops don't stock inventory
14. Provide washing/cleaning service - local outdoor retailer can provide this drop-off service
15. Custom-made sleeping bag
16. Change the entire model from buying sleeping bags based on warmth ratios to renting based on the activity you will need it for (not everyone needs a waterproof bag; different weights needed for hiking-in vs. car camping)
17. Cooperate with other companies to fill the gaps in their trucks with the easy to store fabric from the sleeping bag and mattress
18. Repair service provided at campsite
19. Sell products at campsites
20. Create an outside store (the tents and gear would be presented outside; just a storage space would be necessary for equipment - sort of a camping version of IKEA's store layout)
21. Bag woven by silkworms
22. Provide interior lining for bag
23. Create website with detailed care instructions
24. Screenprint detailed care instructions info on the product
25. Create take-back/recycling services

VALUE ADD

1. frees user from having to maintain and store equipment when not in use
2. reduced gas costs for users
3. frees user from having to maintain and store equipment when not in use
4. provides useful information to user, user gets to use quality gear at a discounted price
5. frees user from having to maintain and store equipment or pack it
6. frees user from having to maintain and storing equipment
7. frees user from having to maintain and store equipment; also, cuddling,,,
8. frees user from maintaining and storing equipment
9. More convenient, Less down-time for product
10. More convenient delivery of warmth and comfort in camping, Convenience for users.
11. More convenient delivery of warmth and comfort in camping
12. Reduction in necessary gear; more convenient delivery of warmth and comfort in camping
13. Savings passed along to consumer
14. Convenience
15. providing a custom-made sleeping bag that fits the customer exactly
16. More customized bags, better user experience
17. Fuel savings passed along to consumer
18. Company has your back if something goes wrong
19. Convenience
20. Storage savings passed on to customer
21. Novelty and natural process production
22. Reduces consumer hassle of having to clean product)
23. Helps consumer extend life of product
24. Helps consumer extend life of product
25. Consumer feels good about not having to landfill product and Cascade Designs can reuse some material





Winning Idea // PRODUCT-SERVICE-SYSTEM

The Gear Shed

A Co-op/Time-Share System:

Problem //

For many entry level outdoor users, equipment can be an expensive purchase. This equipment may often sit unused for months before seeing action. Along with this lack of use, improper storage and care can shorten a products use even further over time. Another issue, owning the right equipment for the right situation, can also be a burden if that particular equipment is only needed once or twice a year.

Solution //

"The Gear Shed"

a Co-op/Time-Share system for sleeping bags and pads (and other Cascade Design products)

Members own access to a certain set of equipment (provided by Cascade Designs) and a certain number of uses. Equipment is stored at local retailers or a central location for access before the trip.

Consumer Value //

The Gear Shed solution frees users from having to maintain and store equipment when not in use. When equipment is stored and maintained properly it adds to its longevity.



Business Value //

The Gear Shed system gives unexperienced, outdoor enthusiasts a way to get to know and become comfortable with camping and other outdoor activities – leading to an increased potential-customer market. It also provides an opportunity to increase profits by charging by the use vs a one-time purchase of the product. Another business bonus is a connection to the consumer that didn't exist before – new users can get comfortable with Cascade Design gear, making it more likely to be their gear of choice when it comes time to purchase.

Summary //

The "Gear Shed" Co-op/Time-Share system allows Cascade Designs to extend the usage of their products' life (by ~25%). By charging by use vs. a one-time product purchase, Cascade Designs has the opportunity to see an increase in profits. This model is also less impactful, environmentally, than our baseline, changing the impact from **3.7 mPts func/unit** to **2.9 mPts func/unit**. This new model will also generate a better connection between the user and the company. It will increase customer familiarity with the products and produce an added opportunity for the company to collect feedback to direct toward future product development.

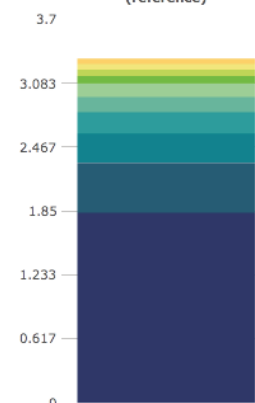
overall extended life of product

25%

overall improvement

22%

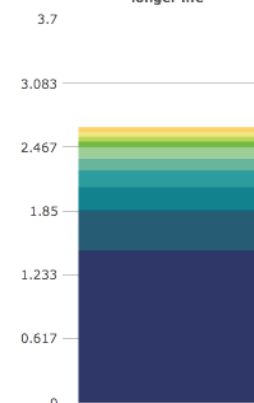
Therm-a-Rest Bag / Pad / Small Bag / Lg Bag Baseline (reference)



Total = 3.7mPts/func unit

Input	mPts/func unit
Van, <3.5t	1.84
Nylon 6	0.484
Polyester fabric	0.281
Polyester fabric	0.206
Truck, 20-28t	0.146
Polyester fabric	0.133
Polyester fabric	0.0700
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Nylon 6	0.0524

Thermarest--Adjusted functional unit for 25% longer life



Total = 2.9mPts/func unit

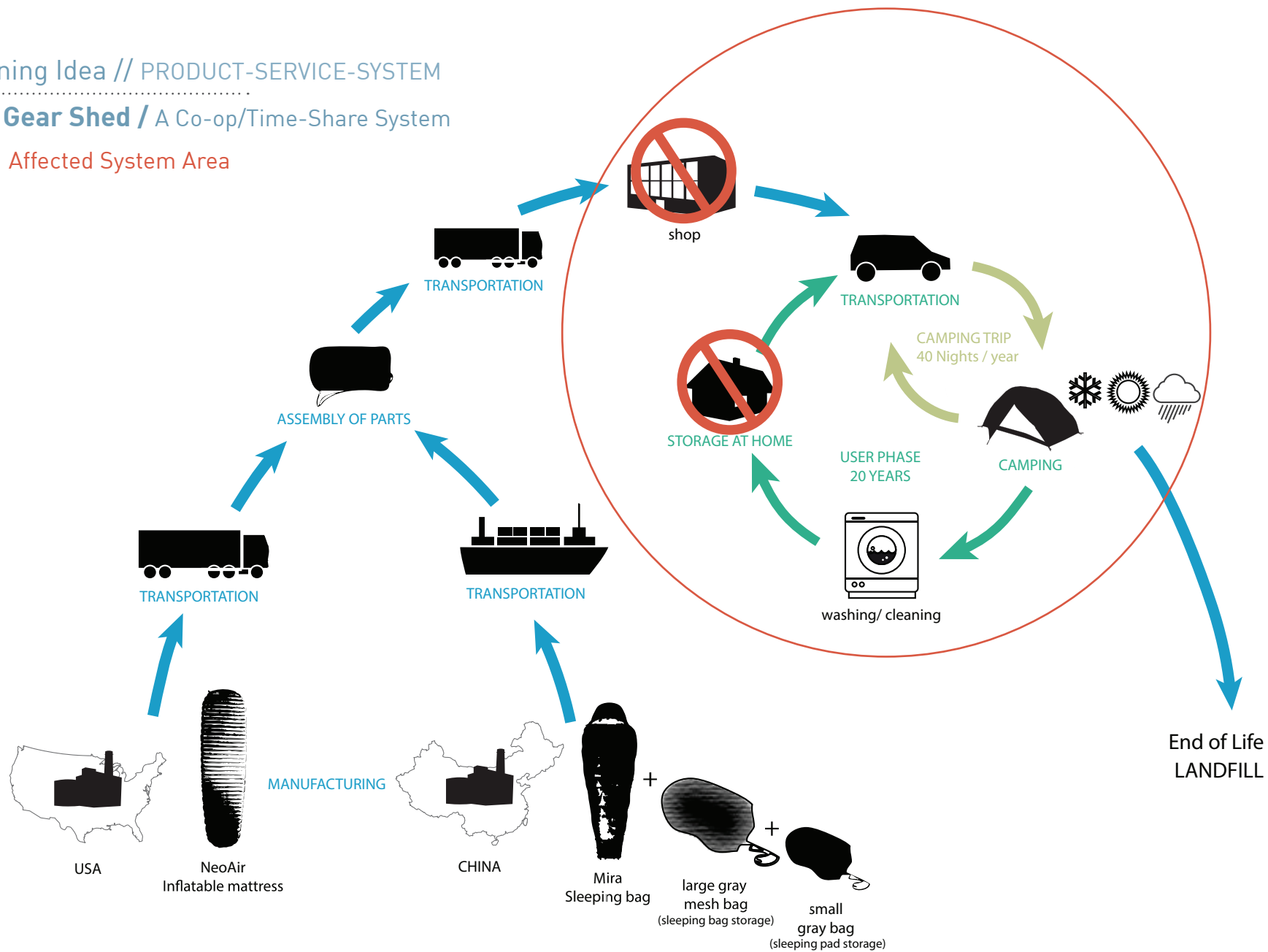
Input	mPts/func unit
Van, <3.5t	1.47
Nylon 6	0.387
Polyester fabric	0.225
Polyester fabric	0.165
Truck, 20-28t	0.117
Polyester fabric	0.107
Polyester fabric	0.0560
Polyester fabric	0.0494
Polyethylene terephthalate, granulate, amorphous, PET	0.0435
Nylon 6	0.0419



Winning Idea // PRODUCT-SERVICE-SYSTEM

The Gear Shed / A Co-op/Time-Share System

○ Affected System Area

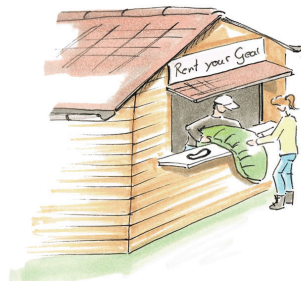




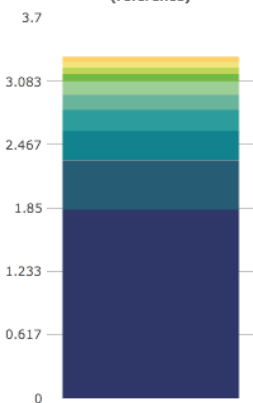
Top Idea // PRODUCT-SERVICE-SYSTEM

1. The Gear Shed

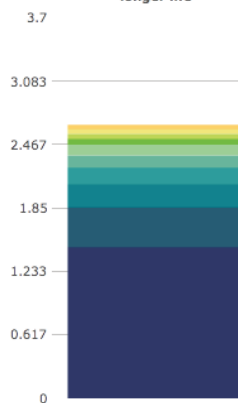
A Co-op/Time-Share System:



Therm-a-Rest Bag / Pad / Small Bag / Lg Bag Baseline (reference)



Thermarest--Adjusted functional unit for 25% longer life



The "Gear Shed" Co-op/Time-Share system allows Cascade

Designs to extend the usage of their products' life (by ~25%). By charging by use vs. a one-time product purchase, Cascade Designs has the opportunity to see an increase in profits. This model is also less impactful, environmentally, than our baseline, changing the impact from **3.7 mPts func/unit to 2.9 mPts func/unit**. This new model will also generate a better connection between the user and the company. It will increase customer familiarity with the products and produce an added opportunity for the company to collect feedback to direct toward future product development.

Total = 3.7mPts/func unit

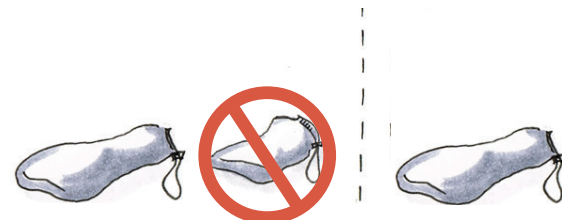
Input	mPts/func unit	Input	mPts/func unit
Van, <3.5t	1.84	Van, <3.5t	1.47
Nylon 6	0.484	Nylon 6	0.387
Polyester fabric	0.281	Polyester fabric	0.225
Polyester fabric	0.206	Polyester fabric	0.165
Truck, 20-28t	0.146	Truck, 20-28t	0.117
Polyester fabric	0.133	Polyester fabric	0.107
Polyester fabric	0.0700	Polyester fabric	0.0560
Polyester fabric	0.0618	Polyester fabric	0.0494
Polyethylene terephthalate, granulate, amorphous, PET	0.0544	Polyethylene terephthalate, granulate, amorphous, PET	0.0435
Nylon 6	0.0524	Nylon 6	0.0419

overall improvement
22%

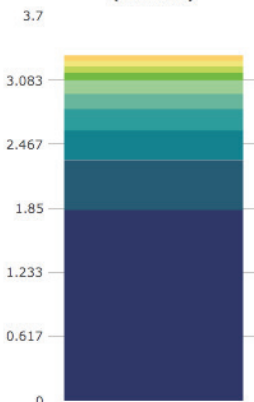
extended product life
25%

Top Idea // MATERIAL REDUCTION

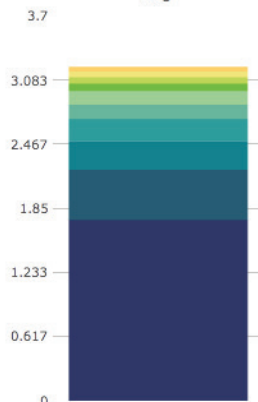
2. Eliminate Bag (for NeoAir Sleeping Pad)



Therm-a-Rest Bag / Pad / Small Bag / Lg Bag Baseline (reference)



Therm-a-Rest Bag--Eliminate small sleeping pad bag



Total = 3.7mPts/func unit

Input	mPts/func unit
Van, <3.5t	1.84
Nylon 6	0.484
Polyester fabric	0.281
Polyester fabric	0.206
Truck, 20-28t	0.146
Polyester fabric	0.133
Polyester fabric	0.0700
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Nylon 6	0.0524

Total = 3.5mPts/func unit

Input	mPts/func unit
Van, <3.5t	1.74
Nylon 6	0.484
Polyester fabric	0.281
Polyester fabric	0.206
Truck, 20-28t	0.139
Polyester fabric	0.133
Polyester fabric	0.0700
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Zinc, primary	0.0450

While this material reduction is small in the percent of material it takes out of the system, the reduction is quite sizable in an already lightweighted product. The NeoAir sleeping pad, which should be stored unfolded, can be folded and rolled for trips. Instead of using a nylon bag, the sleeping pad can simply be stuffed into other gear, held by a strong spare rubber band or tied tight with a spare cord, once rolled.

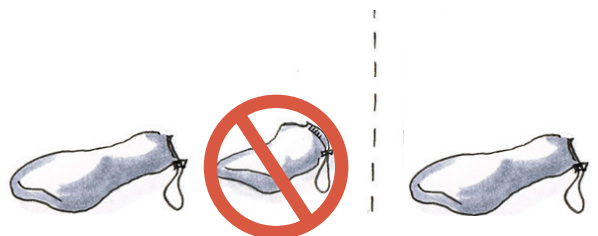
material reduction
1.6%

overall impact improvement
4.7%



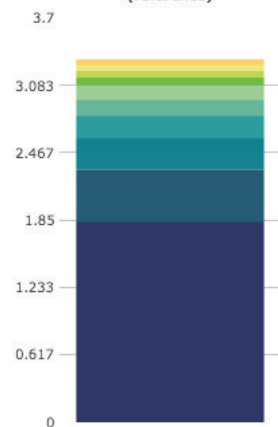
Top Ideas // MATERIAL REDUCTION

Eliminate bag for Sleeping Pad //



Therm-a-Rest Bag / Pad / Small Bag / Lg Bag Baseline (reference)

Therm-a-Rest Bag-- Eliminate small sleeping pad bag



Total = 3.7mPts/func unit

Input	mPts/func unit
Van, <3.5t	1.84
Nylon 6	0.484
Polyester fabric	0.281
Polyester fabric	0.206
Truck, 20-28t	0.146
Polyester fabric	0.133
Polyester fabric	0.0700
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Nylon 6	0.0524

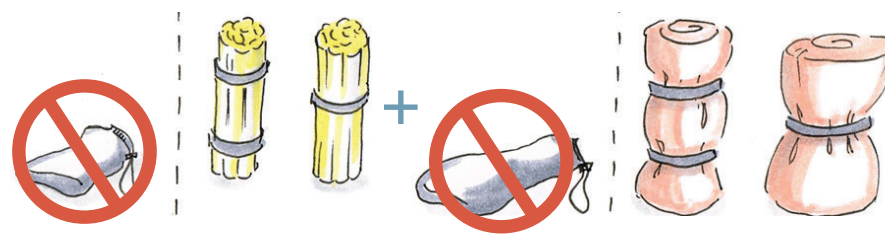
Input	mPts/func unit
Van, <3.5t	1.74
Nylon 6	0.484
Polyester fabric	0.281
Polyester fabric	0.206
Truck, 20-28t	0.139
Polyester fabric	0.133
Polyester fabric	0.0700
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Zinc, primary	0.0450

While this material reduction is small in the percent of material it takes out of the system, the reduction is quite sizable in an already lightweighted product. The NeoAir sleeping pad, which should be stored unfolded, can be folded and rolled for trips. Instead of using a nylon bag, the sleeping pad can simply be stuffed into other gear, held by a strong spare rubber band or tied tight with a spare cord, once rolled.

total material reduction
1.6%

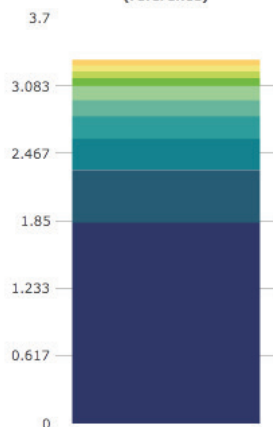
overall impact improvement
4.7%

Eliminate bag from Sleeping Bag and Pad //



Therm-a-Rest Bag / Pad / Small Bag / Lg Bag Baseline (reference)

Copy of Therm-a-Rest-- Skinny Sleeping Bag Straps



Total = 3.7mPts/func unit

Input	mPts/func unit
Van, <3.5t	1.84
Nylon 6	0.484
Polyester fabric	0.281
Polyester fabric	0.206
Truck, 20-28t	0.146
Polyester fabric	0.133
Polyester fabric	0.0700
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Nylon 6	0.0524

Input	mPts/func unit
Van, <3.5t	1.70
Nylon 6	0.484
Polyester fabric	0.281
Polyester fabric	0.206
Truck, 20-28t	0.136
Polyester fabric	0.133
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Zinc, primary	0.0450
Polyester fabric	0.0343

Reduction of both the NeoAir sleeping pad bag and the Mira sleeping bag storage bag, yielded an 8.7% improvement (or reduction in impact). Straps were added to the LCA and the impact to material reduction is less than we'd hoped. Still, 8.7% is a good reduction in an already lightweighted product. The trade-off is less protection for the down sleeping bag which could lower lifetime use.

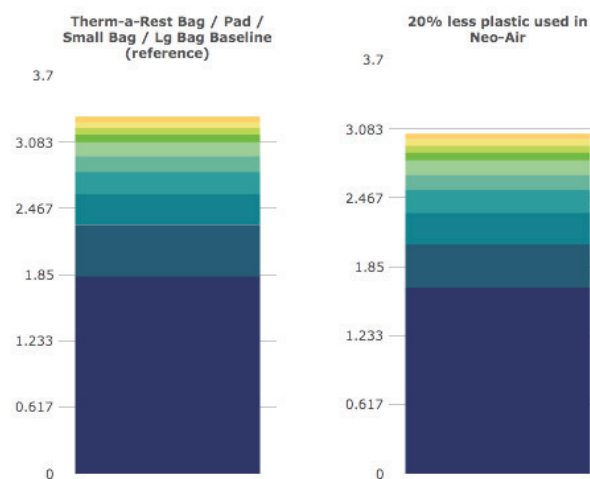
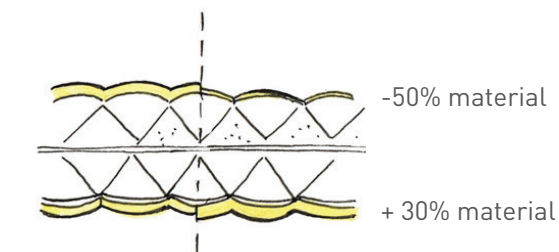
total material reduction
4.9%

overall impact improvement
8.7%



Top Ideas // MATERIAL REDUCTION

Material changes to NeoAir Sleeping Pad //



Total = 3.7mPts/func unit

Input	mPts/func unit
Van, <3.5t	1.84
Nylon 6	0.484
Polyester fabric	0.281
Polyester fabric	0.206
Truck, 20-28t	0.146
Polyester fabric	0.133
Polyester fabric	0.0700
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Nylon 6	0.0524

Total = 3.4mPts/func unit

Input	mPts/func unit
Van, <3.5t	1.67
Nylon 6	0.387
Polyester fabric	0.281
Polyester fabric	0.206
Polyester fabric	0.133
Truck, 20-28t	0.133
Polyester fabric	0.0700
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Nylon 6	0.0524

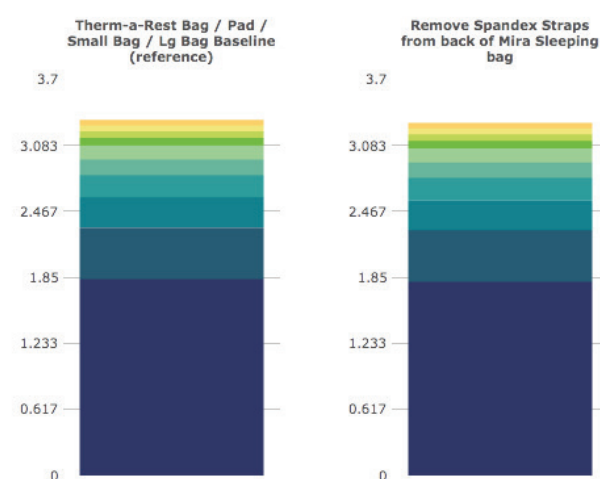
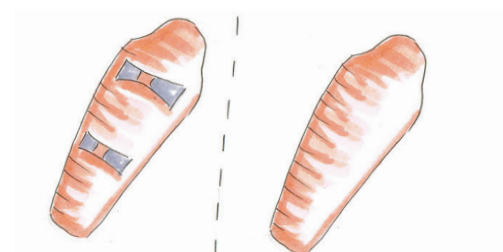
The NeoAir sleeping pad receives a majority of its wear from contact with the ground. We propose reducing the material on the upper surface that comes into contact with the sleeping bag and moving 30% of the material to the bottom for added protection. This 50% reduction in the surface should also benefit the life of the product through an added 30% durability on the bottom, which is in contact with the ground or tent floor.

total material reduction 2.9%

overall impact improvement

7.8%

Eliminate spandex strap //



Total = 3.7mPts/func unit

Input	mPts/func unit
Van, <3.5t	1.84
Nylon 6	0.484
Polyester fabric	0.281
Polyester fabric	0.206
Truck, 20-28t	0.146
Polyester fabric	0.133
Polyester fabric	0.0700
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Nylon 6	0.0524

Total = 3.6mPts/func unit

Input	mPts/func unit
Van, <3.5t	1.81
Nylon 6	0.484
Polyester fabric	0.281
Polyester fabric	0.206
Truck, 20-28t	0.144
Polyester fabric	0.133
Polyester fabric	0.0700
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Nylon 6	0.0524

After reviewing use of the Mira down sleeping bag, it was decided that most mummy bag designs are meant to fit fairly close to the users body. With this restriction, many users interviewed said they prefer to be able to flex their legs up with the bag. The spandex straps that attach to the sleeping pad would inhibit this movement. A reduction of these parts/ materials were calculated and resulted in a 1.7% improvement, along with a lighter product.

total material reduction 2.2%

overall impact improvement

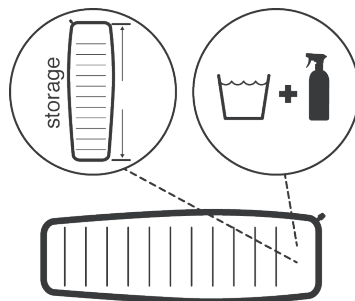
1.7%



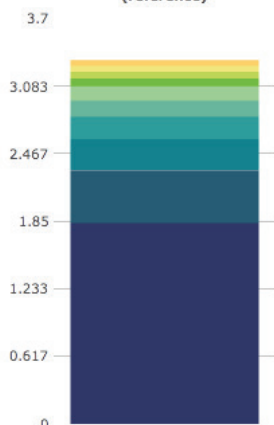
Top Ideas // PRODUCT-SERVICE-SYSTEM

Detailed Care Instructions //

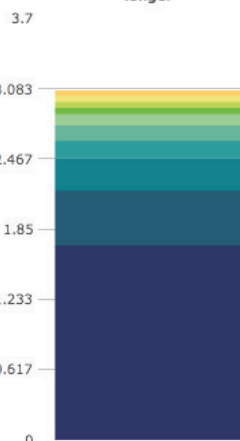
STORAGE //
CARE //
WASHING //
USE //



Therm-a-Rest Bag / Pad / Small Bag / Lg Bag Baseline (reference)



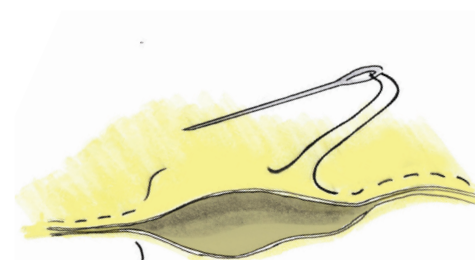
Sleeping bag lasts 25% longer



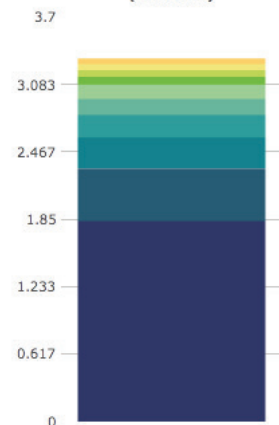
By screen-printing detailed care instructions onto the sleeping bag, we assumed an increase in useful life of the sleeping bag (but not the pad) by 25%. By giving the consumer easy access to care instructions and educating them on proper bag maintenance, they will have direct control over increasing the life of their investment. The result was a 9.2% improvement.

overall impact improvement
9.2%

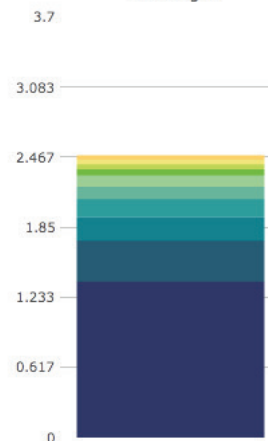
Repair service //



Therm-a-Rest Bag / Pad / Small Bag / Lg Bag Baseline (reference)



Sleeping pad and bag last 25% longer



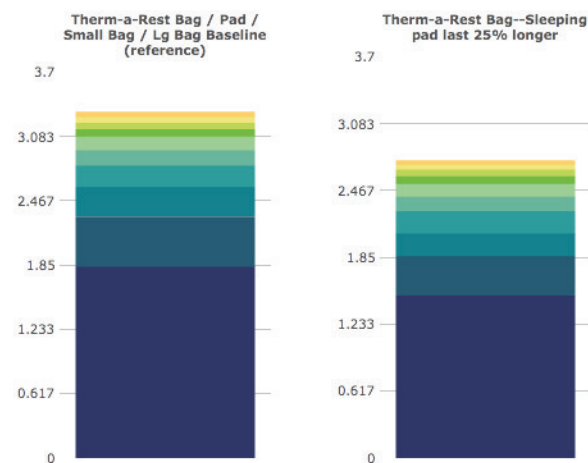
By partnering with outdoor retailers, users would be able to bring their bag or pad to a local shop for repair, rather than having to ship it back to Cascade Designs. This would decrease the amount of time that the product is unavailable for use, decrease the shipping (or travel) distance for repair and could also be a profitable model for Cascade Designs. We assumed this service would increase the life of both the sleeping pad and sleeping bag by 25%.

overall impact improvement
25%



Top Ideas // PRODUCT-SERVICE-SYSTEM

Outdoor Skills Course //



Total = 3.7mPts/func unit

Input	mPts/func unit
Van, <3.5t	1.84
Nylon 6	0.484
Polyester fabric	0.281
Polyester fabric	0.206
Truck, 20-28t	0.146
Polyester fabric	0.133
Polyester fabric	0.0700
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Nylon 6	0.0524

Total = 3.1mPts/func unit

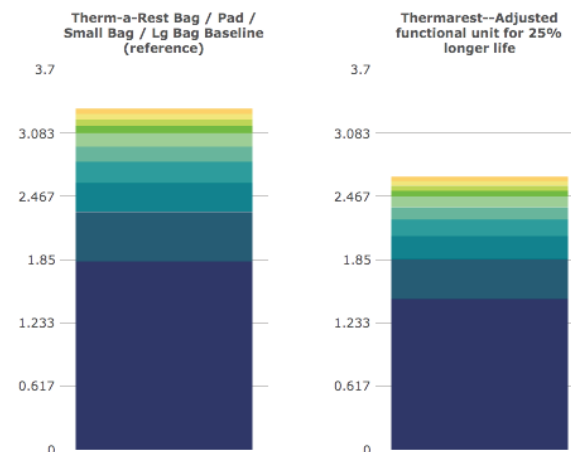
Input	mPts/func unit
Van, <3.5t	1.50
Nylon 6	0.363
Polyester fabric	0.211
Polyester fabric	0.206
Truck, 20-28t	0.133
Polyester fabric	0.120
Polyester fabric	0.0700
Polyester fabric	0.0618
Zinc, primary	0.0450
Polyethylene terephthalate, granulate, amorphous, PET	0.0408

overall impact improvement

16%

Cascade Designs would partner with organizations to teach entry level Outdoor Skill Courses—this useful series of courses would help adventurers to deal with topics such as: staying dry, treating injuries, and planning meals, in addition, the company can also teach classes on the proper use and care of the Mira & NeoAir products. We assumed a 25% longer lifespan for the sleeping pad, since this item is often punctured due to misuse.

The Gear Shed: Co-op/Time-Share //



Total = 3.7mPts/func unit

Input	mPts/func unit
Van, <3.5t	1.84
Nylon 6	0.484
Polyester fabric	0.281
Polyester fabric	0.206
Truck, 20-28t	0.146
Polyester fabric	0.133
Polyester fabric	0.0700
Polyester fabric	0.0618
Polyethylene terephthalate, granulate, amorphous, PET	0.0544
Nylon 6	0.0524

Total = 2.9mPts/func unit

Input	mPts/func unit
Van, <3.5t	1.47
Nylon 6	0.387
Polyester fabric	0.225
Polyester fabric	0.165
Truck, 20-28t	0.117
Polyester fabric	0.107
Polyester fabric	0.0560
Polyester fabric	0.0494
Polyethylene terephthalate, granulate, amorphous, PET	0.0435
Nylon 6	0.0419

The "GearShed" Co-op/Time-Share system allows Cascade Designs to extend the usage of their products' life (by ~25%). By charging by use vs. a one-time product purchase, Cascade Designs has the opportunity to see an increase in profits. This model is also less impactful, environmentally, than our baseline, changing the impact from **3.7 mPts func/unit** to **2.9 mPts func/unit**. This new model will also generate a better connection between the user and the company. It will increase customer familiarity with the products and produce an added opportunity for the company to collect feedback to direct toward future product development.

overall improvement
22%

extended product life
25%