

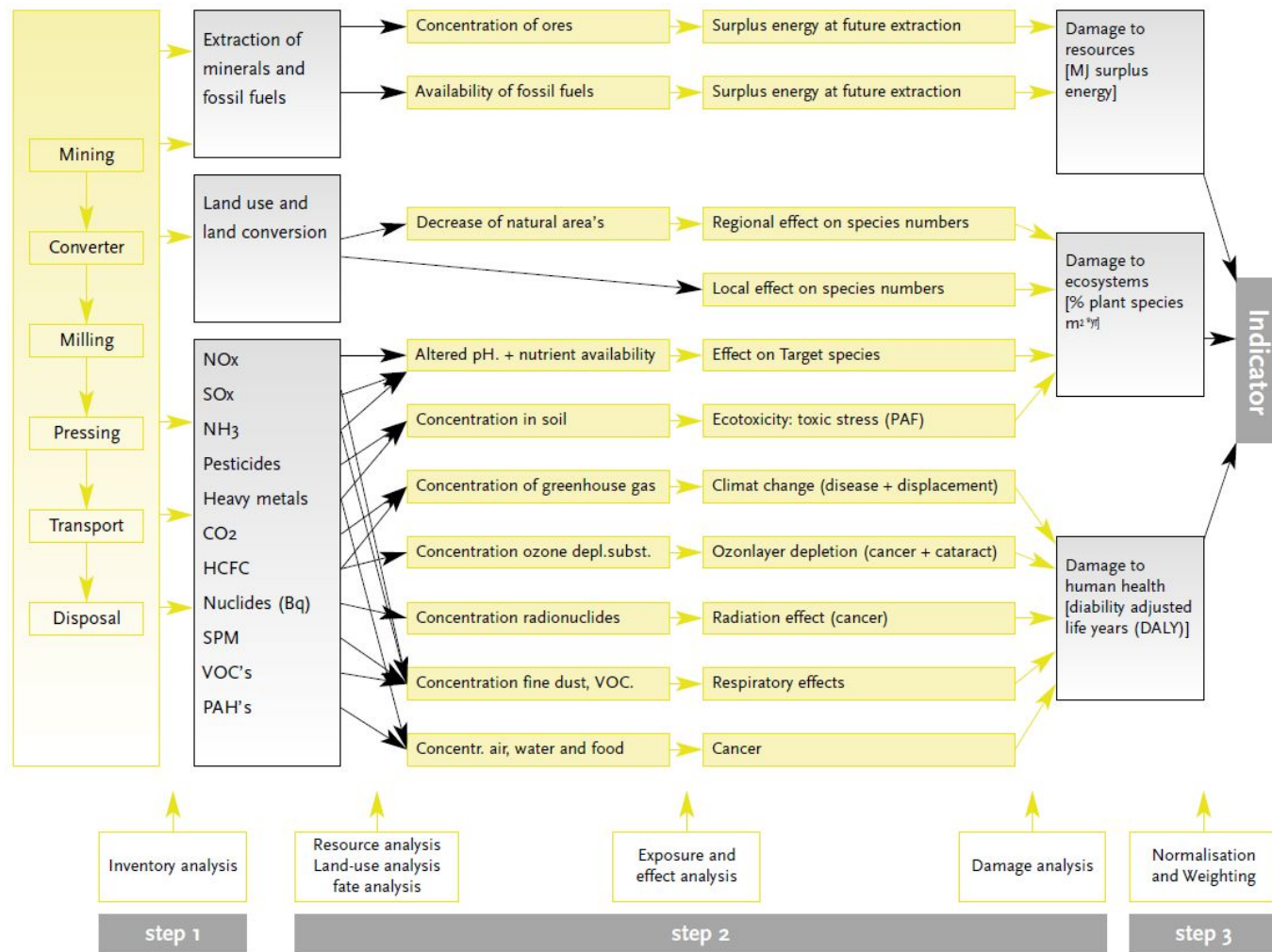


Session 6 - Product Design Sustainability | Service Design

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Vice Dean of Entrepreneurship & Innovation

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Paper or Plastic?

(EcoIndicator Analysis)

	Paper	Plastic	Driving to/from Store
Quantity	1 bag	1 bag	16 km
Material	Kraft paper	HDPE	
Mass	64 g	7 g	
Production	96 mPt/kg	330 mPt/kg	
Recycling	-1.2 mPt/kg	-240 mPt/kg	
Disposal	4.3 mPt/kg	3.9 mPt/kg	
Use			29 mPt/km
Total @ Landfill (mPt/kg)	100.3 mPt/kg	336 mPt/kg	
Total (mPt)	6.4 mPt	2.4 mPt	464 mPt

Personal Environmental Footprint of U.S. Professional

Automobile driving (~25%, 500 pt)

Air travel (~25%, 500 pt)

Home energy (~25%, 500 pt)

Food, products, and services consumed (~25%, 500 pt)



1 round trip PHL – SFO - PHL ~



250,000 Styrofoam Coffee Cups (per passenger!)

Water Consumption



California bans bars and restaurants from serving water except upon request....

“...uh, ok, I’ll just have orange juice please.”



Embodied water in orange juice ~ 575 liters per liter.



Environmental & Social Responsibility › The Footprint Chronicles › Our Business and Climate Change

Supply Chain: The Footprint Chronicles®

20 years of organic cotton
Corporate Responsibility
Fair Trade Certified™
What is a living wage vs. a minimum wage?
Traceable Down Insulation
Our Business and Climate Change
A Shell Game in the Dark
Merino Wool Sourcing

More in Environmental & Social Responsibility

The Activist Company
Environmental Impact
Supply Chain: The Footprint Chronicles®



Requirements for Effective Differentiation through Sustainability



1. Consumer willingness to pay.



3. Barriers to imitation.



2. Credible information.

Reference:

Forest Reinhardt, "Environmental Product Differentiation,"
California Management Review, Vol. 40, No. 4, Summer 1998.

Meaningfully Sustainable Products

- Metrics that align with values and objectives
(e.g., greenhouse gas emissions, water use, landfill volume, species degradation OR multi-attribute metrics like *EcoIndicator*).
- Focus on the high-impact elements of the system (based on sound science and engineering).
- Use for competitive advantage when:
 1. Customers care.
 2. You can provide credible information and transparency.
 3. Rivals can not easily replicate approach.





























Thoreau's *Walden* Cabin



OPIM 651 (now OIDD 614) – Fall 2004



The best financed start-up in history?

BenVen Mission Statement

BenVen is a for-profit social venture with the objective of reducing the rate of extraction and combustion of fossil fuels.

BenVen's first product allows automobile operators to remediate the environmental impact of driving.

In the next 42 days, we will:

- launch our first product,
- achieve positive cash flow,
- acquire >1000 users/customers of our product,
- create an enterprise of substantial financial value,
- and learn a great deal about problem solving, design, and system improvement.

Assumptions, Constraints, and Focus for Next 42 Days

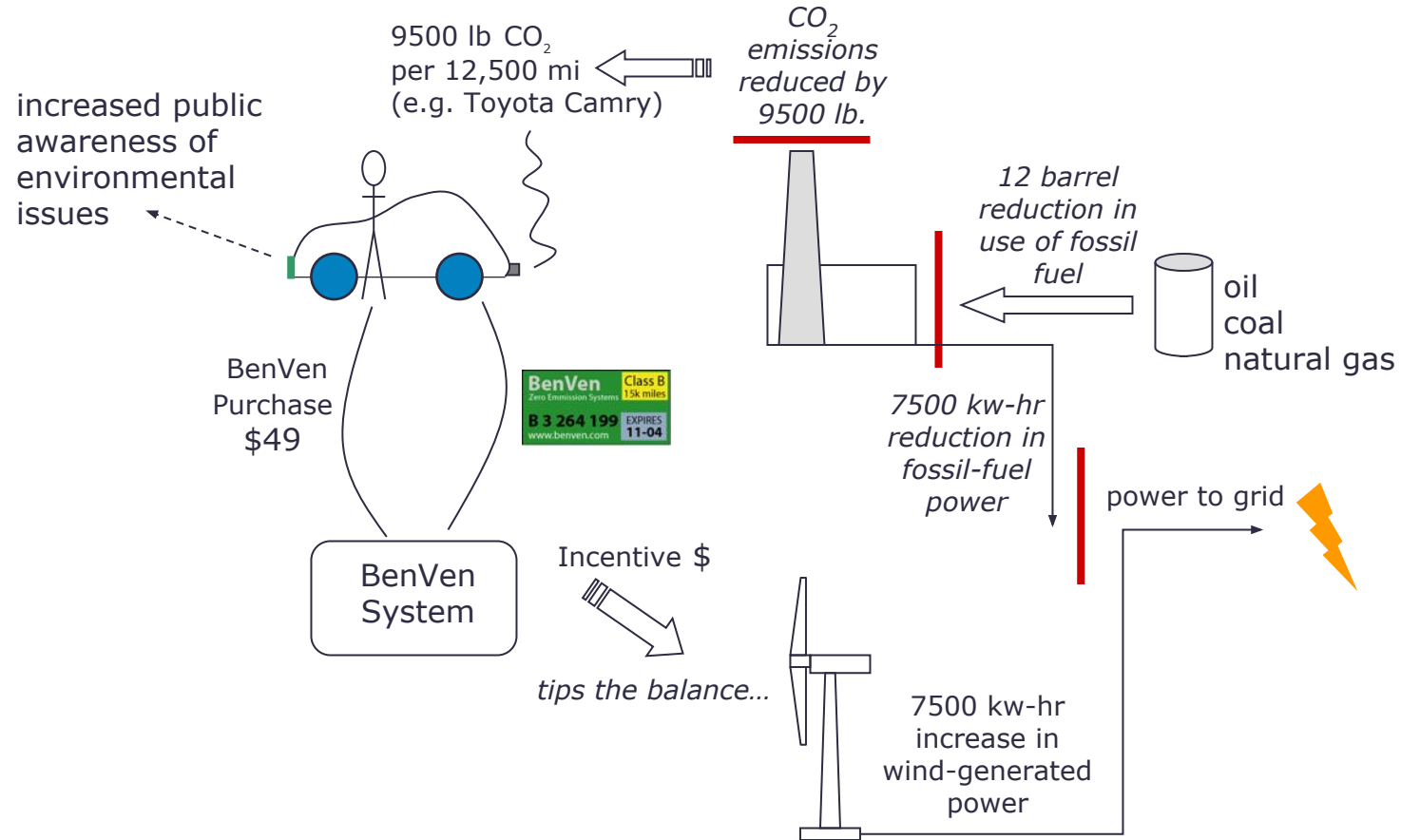
- Product will be focused on offsets for Automobiles/Driving.
- Initial channel will be direct to consumer under our own brand.
- Initial market will be US, with global expansion to follow.
- The company has \$4700 in cash in its checking account.

Hypothesized Benefit Proposition to Consumer

- Public display of environmentalism.
- Zero environmental consequences of driving.
- Altruism.
- Evangelism of environmentally conscious behavior.



Original Concept



Most Products Are Hybrids of *Tangible Goods* and *Services*



Pure Services



Tangible Goods



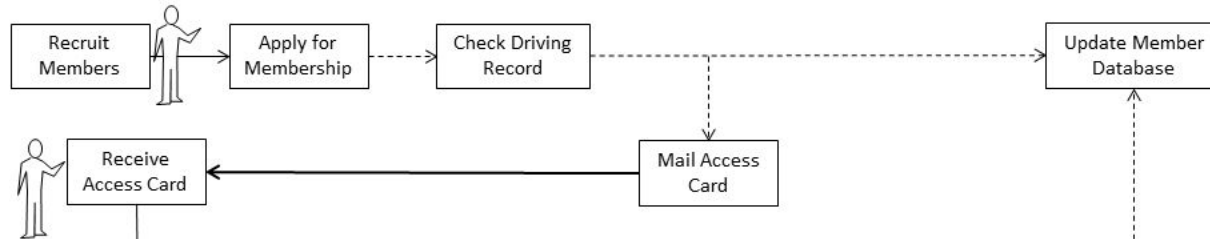
Predominantly service products often differ from tangible goods in these ways:

- High degree of customer involvement in production/delivery/use.
- Prominent time dimension (order time, processing time, duration).
- Requirement for close matching of capacity and demand.
- Modular architecture usually in the form of a process, with process steps.
- Repeated purchase and use cycles by customers.
- At least some customization or adaptation to the needs of individuals.

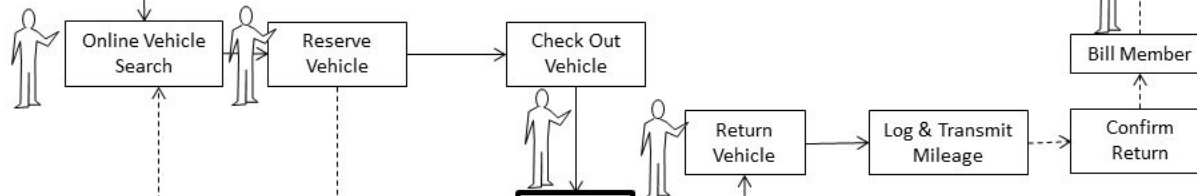


Service Designs Typically Represented by Service Flow Diagram

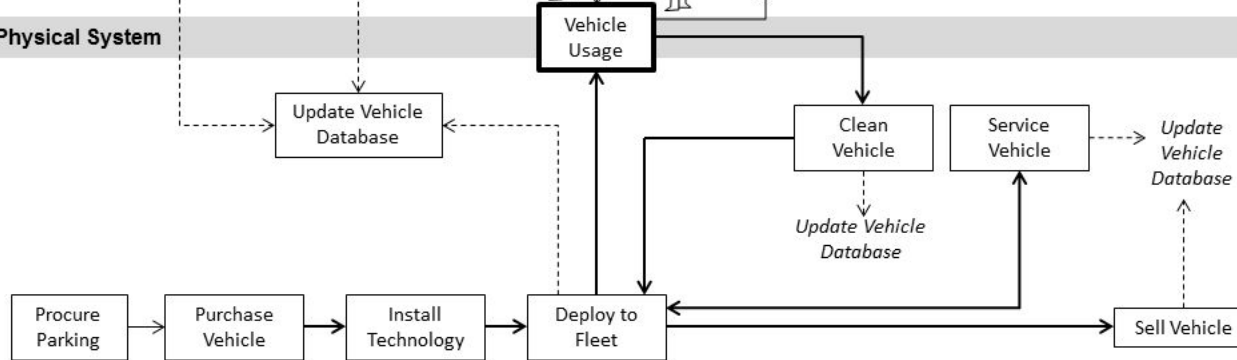
Customer Acquisition and Relationship Management



Transaction



Physical System



Design and Services

- Design of the *service itself*
(usually a *bundle of features* plus a *service flow diagram*).
- Design *approach* to the *non-product* aspects of business.
 - Naming
 - Branding and identity
 - Information
- Design of *ancillary physical goods*.

enviraplanet	arborbarter
enviraworld	arborexchange
driveclean	arborsafe
driveraircare	balanceearth
noc02	cleanspring
c02begone	cleanswap
kleenkar	clearcycle
noco2gas	climatecheck
nomoregreenhousegas	climateco
envirasave	climateswap
atmos-fair	cycleclean
fairaircare	earthswap
driverduty	ecobarter
saviorair	ecoreduce
stopco2gas	ecorenew
stopgreenhouse	ecorenu
betterclimate	elmbarter
idealclimate	elmclean
co2care	elmclear
stopairpollution	elmswap
carefourair	elmtrade
aircareauto	equiswap
cleanaircar	globeelm
autoaircare	globeswap
healthyauto	maplechange
globalairaware	maplecool
envirasky	natureswap
nomorecarbon	oakbarter
atmosfresh	renucycle
saveyourair	seabarber
atmoscare	seacarbon
atmos-care	seaglobe
stopthesmog	sequoiaclear
stopgreenhousegas	sequoiaexchange
fightco2gas	sequoiaglobal
driverdioxide	sequoiaglobe
stopdriversmog	sequoiaswap
responsibledriver	springbarter
fairairdriver	springcycle
enviradrive	springexchange
killsmog	swapcarbon
cleanwindpower	swapclean
driverairpower	swapearth
smogforwind	swapgreen
smog4wind	swapspring
windcars	terrable
	tradeearth

buyyourright
buyairpower
coolroads
floatflow
reversethedamage
honorourair
breatheblue
dagwa
cleanzoom
driveoutpollution
offsetit
pollutionoffsets
stopthewarning
pollutionono
drivefortheplanet
greenzoom
cleanthebreed
drivedownthelane
zoomtotime
zoomandsave
zoomdifferent
driveswith
drivewithoutguilt
drivingfordifferent
naturedrive
envirozoom
driveclean
movinblue
noguilt driving
nonpollute
travelclean
zoomswap
honorair
freshswap
coolthedriver
coolroads
imforair
empowereddrivers
driveupairquality
coolairdriver
driversforearth
feelbettercars
feelbetterdriver
feelgooddriver
emissionenemy
airambassador
drivingdifferent

atmosave
naturetect
carbonstop
carbonsave
ozonesave
envroset
envrosity
envrocar
envrotag
climasave
naturetag
climapass
envropass
carbocar
moveo2
moveotwo
o2saver
o2imtag
o2imcar
atrefresh
climapro
co2act
o2saver
o2stop
stolpute
naturpass
climapass
o2saver
co2stop
climabooast
atmotag
atmobooast
atmotector
planettag
cloudpass
ozonetag
co2tag
co2tag
nceoo
atmoflow
attno
lowmit
antimit
airfixer
airotect
tagamo

antigreenhousegas
automundus
aviagreen
aviaverde
biggreenfunmachine
buenair
carbegreen
carmundus
carverde
ceroimpresion
ceromarque
charmair
cleanaircar
cochelimpio
cocheverde
driveverde
earthmiles
emissionsgreen
enviagreen
evergreenmiles
florflower
friopower
friendair
freecarbon
greenmundo
harmnoone
ibegreen
leangreencar
livinglapuravida
MELuvus
moreflower
morepure
muchcleanercar
muchcleanercars
nomessair
nomoreemissions
nomoregreenhouse
onecleanworld
puracar
puracoche
purauto
smilegreen
stopgreenhouse
stopgreenhousegas
verdair
verdemundo
equiclear

guiltfreedriving
co2bgone
co2begone
co2guiltfree
consciencefree
co2vanishing
vanishingco2
warmingconscience
windgas
fossilwind
windjuice
gasreduce
gasreduction
co2less
lessco2
drivingwind
gastankowind
mechanical
drivingwindenergy
windflurry
windtunnelenergy
drivingwindenergy
drivingwindanc
gastankowind
endofthewindtunnel
windtag
tagwind
windburnenergy
windvoltage
cleanvoltage
currentcarbon
carboncurrent
airflairenergy
carbonspring
carbonflair
lightroadenergy
maxutility
utilizenergy
currentco2
co2currency
utilityflair
flairutility
windco2
co2formeandyou
windreduce
windcurrency
fewtility


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 carbonlessmiles
 carbonlesswheels
 earthsponsor
 Ecomaze
 ecospire
 emissionfreesponsor
 emissionguardian
 emissionlesscar
 environcar
 freepollution
 Greenatmosphere
 Greenexplorer
 greenecar
 greenkeeper
 greenprint
 Greenmaze
 greenmilesponsor
 Greenshrub
 greensponsor
 guiltfreecar
 pollutionfilter
 pollutionfreewheels
 pollutionguardian
 pollutionrepair
 Spareearth
 symbiosiscircle
 Clavileño Power
 Ventri Clean
 Rocinante Power
 Ventri Quest
 carboncurrency
 carboncurrent
 carboncurrents
 verdetodo
 wellearth
 weluvu
 savethair
 envirowins

Guilt Free Carbon
 Guilt Free Smog
 Guilt Free Guzzling
 Guilt Free Power
 Guilt Free Polluters
 Guilt Free Emissions
 Carbon Catch
 Carbon Cutters
 Carbon Cancel
 Counter-Carbon
 Emissions Swap
 Emissions Filter
 Emissions Offset
 Emissions Catch
 Emissions Cutters
 Emissions Canceling
 Counter-Emissions
 Smog Swap
 Smog Filter
 Smog Offset
 Smog Catch
 Smog Cutters
 Smog Canceling
 Counter-Smog
 Clear Sky Power
 Blue Sky Power
 Clear Sky Ventures
 Blue Earth Ventures
 Blue Air Coverage
 Blue Sky Coverage
 Clear Sky Coverage
 Renu Power
 Trees On Wheels
 Nu O Zone
 Smog Exchange
 Smog Transfer
 Emissions Transfer
 Kyotocar
 Kyotomobile
 Kyoto Transfer
 Kyotocarbon
 Kyoto Coverage
 Rocinante Air
 Rocinante Quest
 Clavieño Quest
 Quixote Ventures
 Quixote

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gatonese
ecofume
verdanesse
autobreathe
greenbreathe
envirobreathe
fume-negator
carbo-negator
gato-negator
eco-negator
energy-gator
antithefume
energefume
gasnegator
anti-fume
energivisor
petronizer
petronize
petroffset
petro-eraser
petro-negate
petro-negator
petro-reverser
neutralize
petro-track
petro-pero
plane-tag
terra-pure
car-REC
auto-rec
carbo-sterilizer
petro-sterilizer
ozone-sterilizer
energy-trade
fuel-sterilizer
phospho-rizer
steri-pure
gas-eze
green-REC
REC-trader
Verde-swap
Arborswap
tago2
taotwo

~500 names
1/6 of total for team

Ecospire 2005



UT 002319 **class C**
member since 2004




ecospire.com
Ecospire

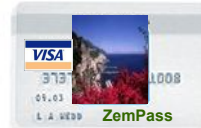
Your purchase of an Ecospire certificate eliminates the environmental impact of your driving.

Your membership in Ecospire allows you to join forces with thousands of others to improve the environment.

ZemPass 2005



UT 002319 **class C**
member since 2004




zempass.com
ZemPass

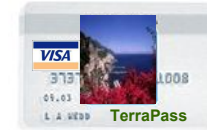
Your purchase of ZemPass eliminates the environmental impact of your driving.

Your membership in the ZemPass network allows you to join forces with thousands of others to improve the environment.

TerraPass 2005



UT 002319 **class C**
member since 2004



terrapass.com
TerraPass

Your purchase of a TerraPass eliminates the environmental impact of your driving.

Your membership in the TerraPass network allows you to join forces with thousands of others to improve the environment.

enter rank 1-3 >

enter rank 1-3 >

enter rank 1-3 >

A-1



A-2



A-3



A-4



A-5



A-6





C-1



terrapass

C-2



terrapass

C-3



terrapass

C-4



C-5

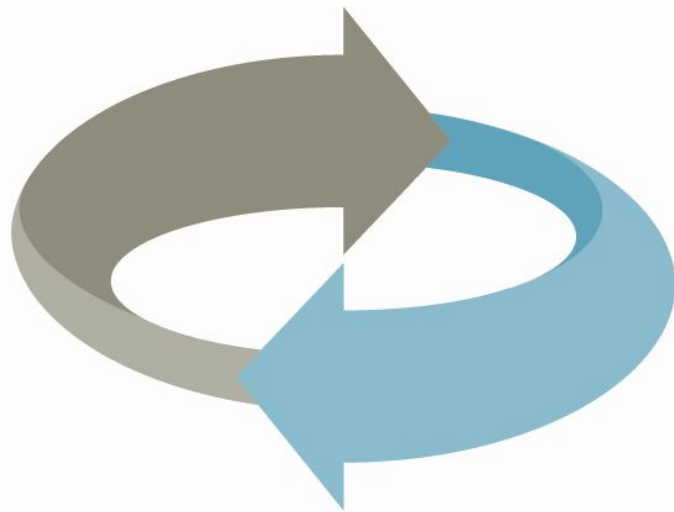


terrapass

C-6

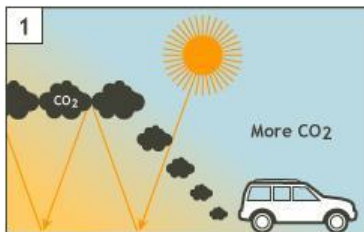
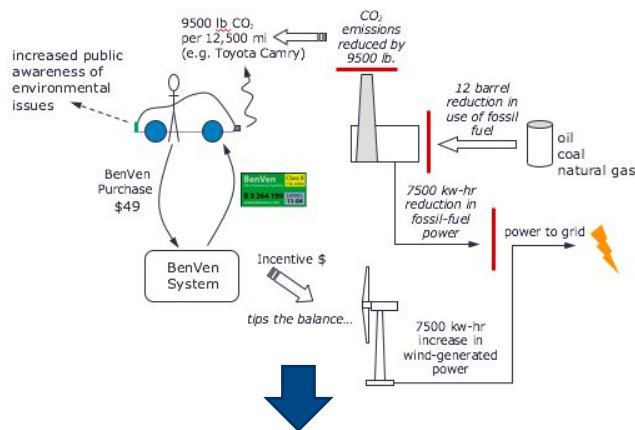


terrapass



terra pass

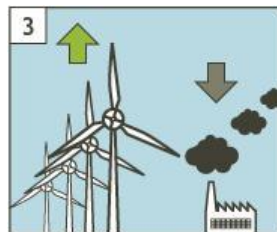
Information Design



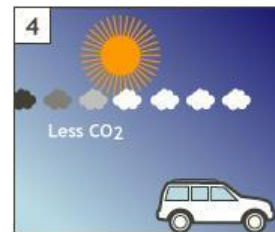
Your car emits 10,000 lbs (three times its weight!) in carbon dioxide each year.



You enroll in TerraPass.



TerraPass members finance projects that reduce industrial CO2 emissions.



Your TerraPass purchase is certified to eliminate the equivalent of your car's CO2 pollution, helping to preserve the environment for future generations.

Design of Ancillary Tangible Goods





START

? ping just one question

Beyond software, in which industries will open source thrive?

Craig Newmark

Founder Groupm

We're going to see the open source philosophy become integral to the news industry. In the future, everyone will be able to act as researchers and writers. Their work will complement existing newsrooms. Tools are already being built to help us all figure out what the big stories are and to point to the best sources for those stories.

Bob Young

Cofounder, Red Hat; CEO, Lulu.com

Whether it's the fashion industry or retail, any business can benefit from open source principles. Lulu is a marketplace where people can publish and sell print-on-demand books and music. We provide tools that let content creators collaborate on the development and design of their products. The content creators have control over the technology as well as their content.

Steven Weber

Author, *The Success of Open Source*

It's only a matter of time until someone releases a therapeutic molecule under an open source license. That could change the ecology of innovation in the pharmaceutical sector. Of course, the puzzle is finding ways for these companies to create advantages in the value chain. Lawyers provide a great example. Legal code is available for free for anyone to use. But lawyers are very good at working the rest of the value chain and doing things that are hard to replicate.



EMISSIONS

SUV Redemption Sticker

How gas-guzzlers can support renewable energy

In Washington, DC, eco-vandals smear SUV door handles with dog crap. In Santa Cruz, California, protestors tag more than 60 gas-guzzlers with anti-oil graffiti. In Los Angeles, a Caltech grad student is sentenced to eight years in prison for trashing more than 120 SUVs around the city. It's almost enough to make you feel bad for SUV drivers. After all, some of them are green, too – just not as hardcore about it.

Now they have TerraPass, a clever eco-capitalism experiment. Launched by a group of Wharton Business School classmates, the startup sells a decal that drivers can slap on their windshields. The sticker price – \$79.95 for SUVs, less for greener cars – gets invested in renewable energy projects and credits. The credits are traded through local brokers on the new Chicago Climate Exchange.

TerraPass lets consumers participate in an emissions trading system the US established in 1990. (Give credit to economist Ronald Coase, who won a Nobel Prize for the idea in 1991.) Under the system, industrial operations that spew less than their share of emissions can sell a credit to companies that fail to keep gunk out of the air. In effect, the dirtier factories can pay greener operations to do the work of cutting emissions. The approach has taken off worldwide, spawning a billion-dollar market.

And it's not just for big-time polluters. Today, farmers cash in on credits by collecting and processing cow dung, which produces globe-cooking methane. Land-

owners earn credits by installing wind farms on their blustery fields, which top off the power grid with carbon-free electricity.

But until now, the Chicago Climate Exchange was off-limits to all but registered traders, and the transaction cost of buying credits piecemeal from small outfits was too high. TerraPass aggregates the money plunked down by guilty – ahem, environ-

mentally concerned – SUV

drivers, allowing them to participate in the market.

Burning a gallon of gasoline produces about 20 pounds of CO₂. So the average SUV – which travels 12,000 miles a year – pumps out about 20,000 pounds of greenhouse gases annually. On today's market, TerraPass can scrub that pollution from

the environment for less than 80 bucks. Only a few months old, with a staff just out of grad school and a membership of fewer than 1,000, TerraPass is no match for the world's half a billion cars – the second-biggest source of greenhouse gases. But Ned Ford, a member of the Sierra Club's Global Warming and Energy Committee, believes TerraPass could change the way people think about energy and the environment. "Politicians and business leaders have been telling us for the last 20 years that there's this huge painful cost associated with reducing carbon," he says.

"If you think about your own personal impact on CO₂, and you find out you can offset it for a reasonable amount of money, it makes you think differently about the problem. TerraPass is mind opening," he says, "and that's pretty cool." – Douglas McGray



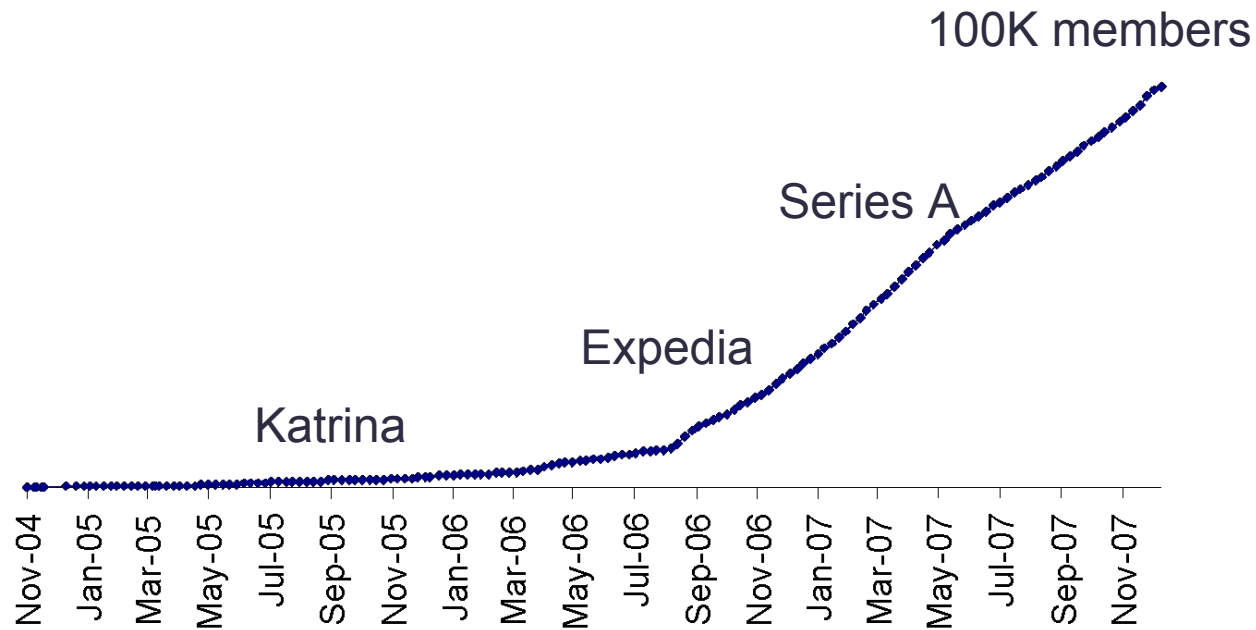
Katrina 1545z 2005 August 28th

Category 5 175 mph winds




visit www.tornadochaser.net

TerraPass Memberships Sold



Products for road, flight, home, and wedding.

 **Over 420 million pounds of greenhouse gas emissions reduced!**  **Your cart**

Welcome Road Flight Home Wedding Gifts About Projects Blog Shop




Your car puts several tons of CO₂ in the air every year.
Your New Year's resolution: balance it out.

With TerraPass, you can balance it out.
Undoing your contribution to global warming is easier than you think.
TerraPass is simple, affordable, and verified. Be part of the solution.

Calculate your car's emissions: [Go](#)


Our other products:
[TerraPass for flight](#)
[TerraPass for home](#)
[TerraPass for dorm](#)



Calculate the carbon cost of going
back to school






[Learn More](#)



 **Expedia.com**

Balance your flying
when you book a ticket.
TerraPass partners with Expedia

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As seen in:      TIME FORTUNE

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Carbon Footprint Calculator

Tell us about your car or truck:
 Select a year...

Sign up for weekly climate news and conservation tips:
 Your email address



TerraPass, Bloomsberry & Co and Whole Foods Markets present Climate Change Chocolate

Chocolate bars. They're supposed to taste good, but can they also *be* good? We think so!

Our Climate Change Chocolate bar is meant to educate while tasting great. It comes in a wrapper with 15 tips for lightening your environmental impact. These helpful hints teach you how to save energy by making small changes to your daily habits. And of course, thanks to Bloomsberry & Co., you can be sure the finest chocolate is attached to these green lifestyle lessons.



You've offset a day.
[Now offset a year](#)
 Learn more about
[TerraPass](#)

Climate Change Chocolate comes with a verified TerraPass offset of 133 pounds of carbon dioxide reductions, the average American's daily carbon impact. We hope this small offset will be the first taste of a lower-carbon lifestyle for Whole Foods shoppers who decide to take responsibility for their climate change impact.

In addition, the carbon emissions associated with the production and distribution of the chocolate bar has been balanced out.

Whole Foods Market

Whole Foods sells a variety of cause-related chocolates that raise awareness and funds for protecting the rainforest. Now, Climate Change Chocolate has joined the mix, offering a fun and delicious way to educate consumers on ways to reduce energy consumption.

Whole Foods is an environmental leader among American retailers. The company has reduced its carbon footprint through efficiency and alternative fuel programs, and purchased enough renewable energy credits from wind farms to offset 100 percent of the electricity used in all of its stores, facilities, bake houses, distribution centers, regional offices and national headquarters in the United States and Canada. This October, The EPA named Whole Foods the Green Power Partner of the Year for the second year running. For more




How big is the market?

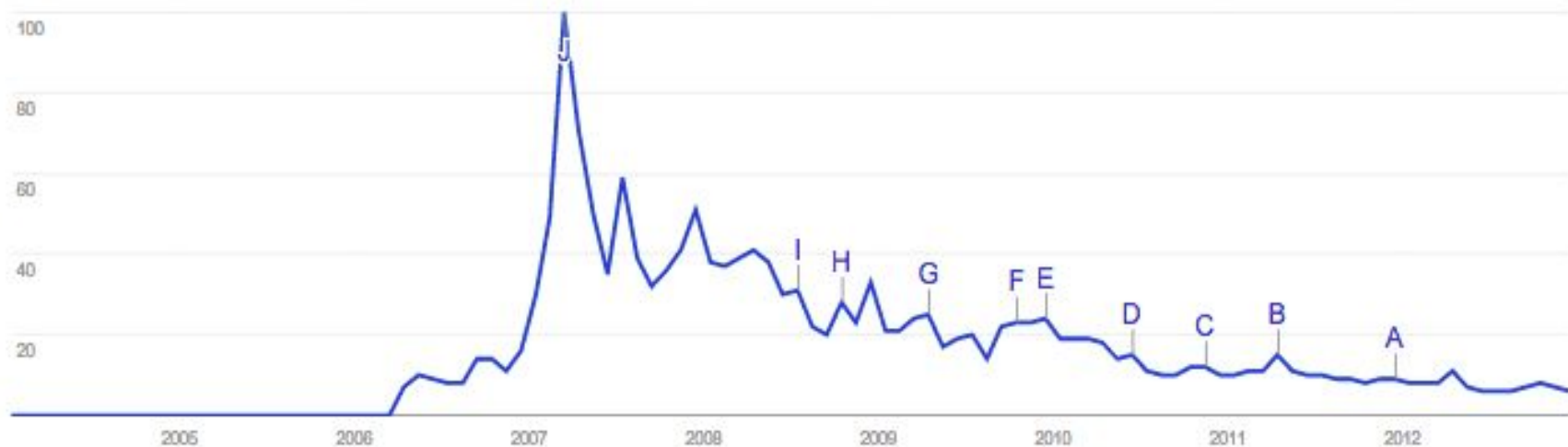
(Sometimes “scratching your own itch” will not result in a mass-market product.)

Web Search Interest: **carbon offsets**. Worldwide, 2004 - present. 

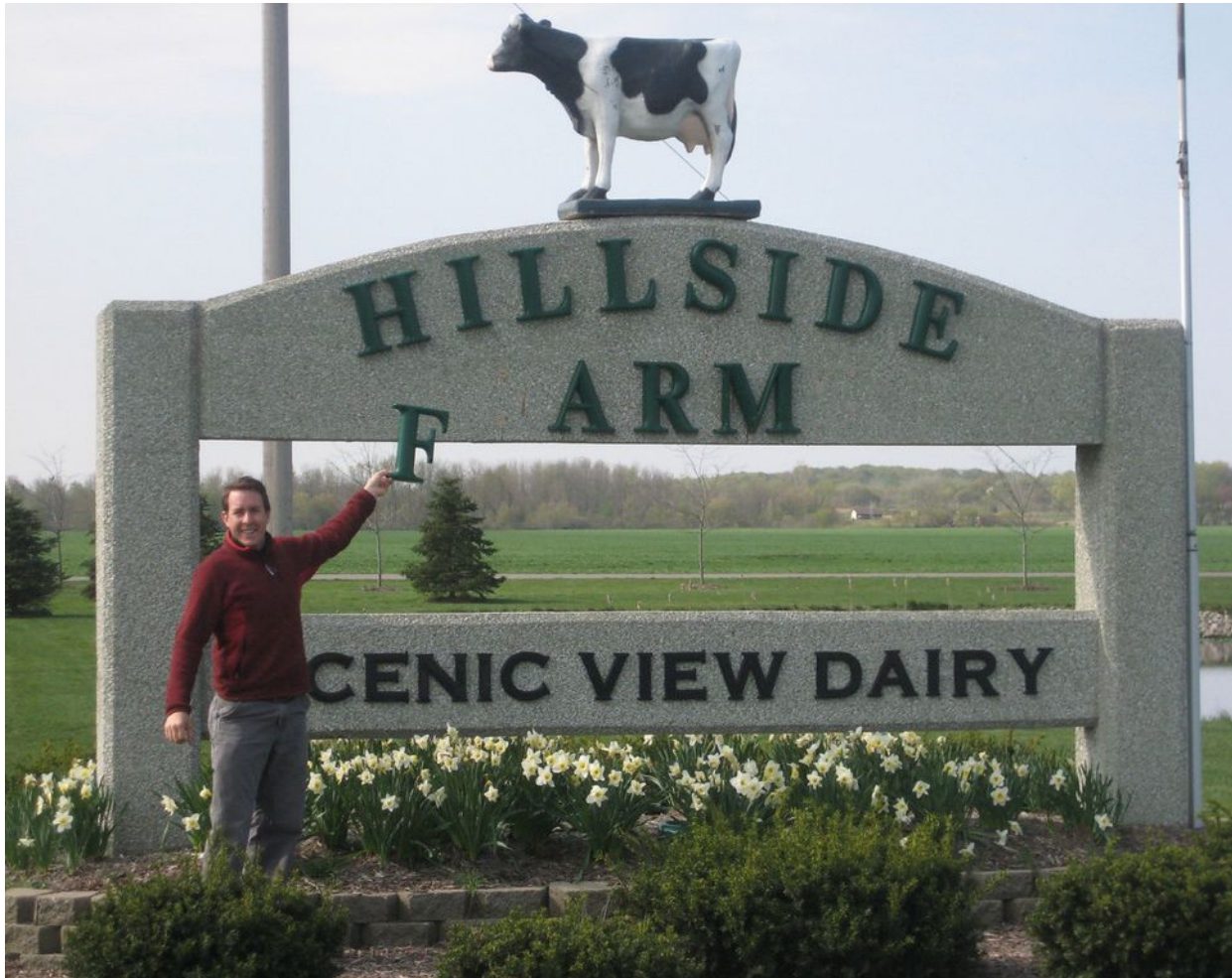
Interest over time

The number 100 represents the peak search volume

☒ News headlines ☐ Forecast 



Where is the value created?





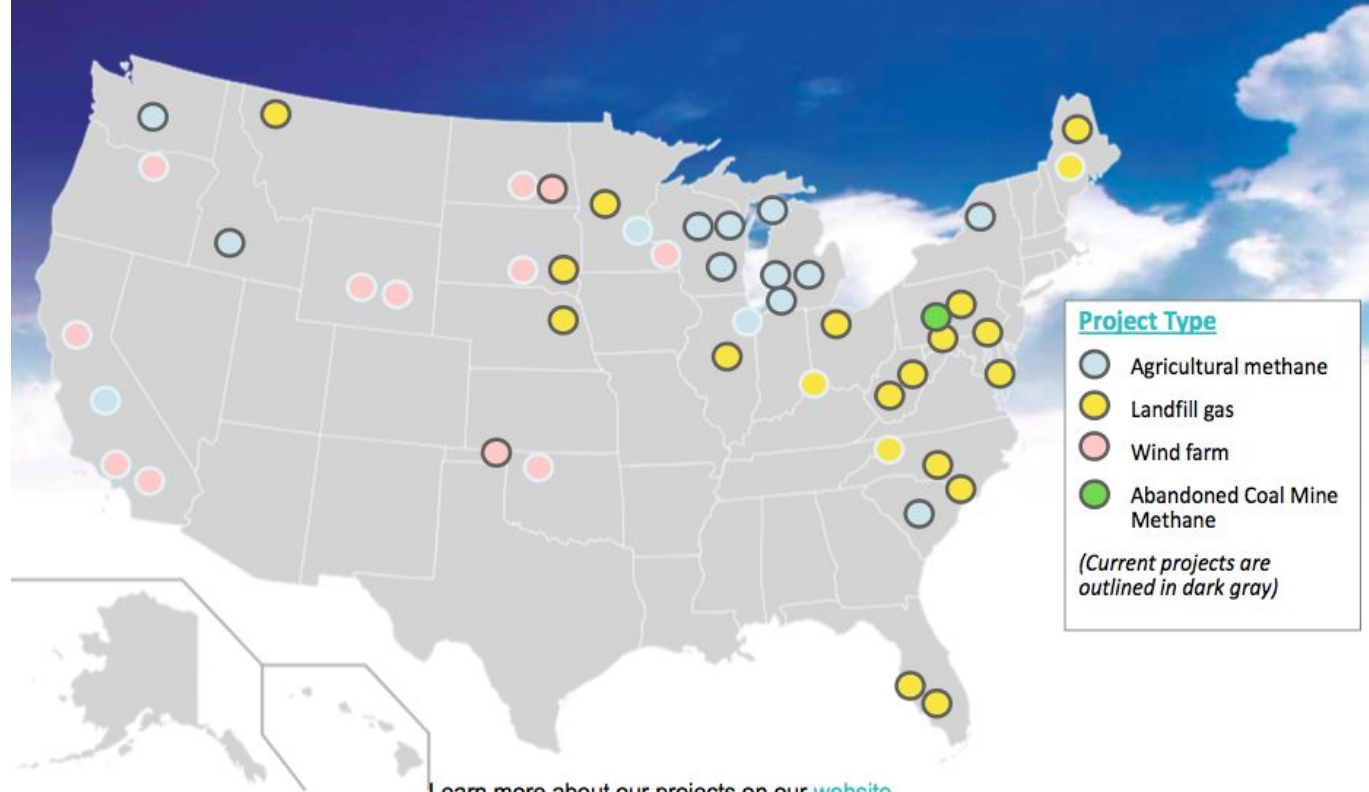
Certified



CorporationTM

TerraPass in Action

We are fighting climate change by destroying greenhouse gases and putting clean energy on the grid. Our projects are made possible by your offset purchases.



Learn more about our projects on our [website](#).

The Difference You've Made

In the past seven years, our projects have destroyed Greenhouse Gases equal to over **4,400,000,000** pounds of CO₂.

That's the equivalent of:



440,000 cars off the road for a year.



57,000,000 tree seedlings grown for 10 years.



5,500,000 laptops turned off for a year.

Note: All TerraPass retail offset sales and retirements are independently reviewed by a leading U.S. accounting firm. See the TerraPass website for more details.

Industry Leadership: Offset Origination

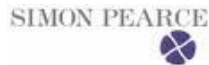
- Managed a portfolio of over 5.5 million mT of CO₂e reductions from a portfolio of 24 dairy and landfill projects.
- Managed more carbon projects on the Climate Action Reserve than any other originator.
- Active participant in design of regulation and offset protocols for the Western Climate Initiative and California's AB32.
- *Best Carbon Originator 2010* as voted by readers of *Environmental Finance* and *Carbon Finance* magazines.
- *Best of Green 2010* – Treehugger.com
- *Climate Action Champion 2010* – The Climate Action Reserve's most prestigious award



Sample of Terrapass Partners



MEMBERSHIP
rewards®



Just Energy Acquires Terrapass in 2014



Your State: **Pennsylvania**



FOR NEW SERVICE, CALL:

1-877-921-8956

FOR YOUR HOME

FOR YOUR BUSINESS

LEARNING CENTER

MY ACCOUNT

Just Energy Unlimited Supply Plan

Truly unlimited electricity and natural gas supply – no matter if you go over your typical energy use, you'll still pay the same flat price every month. [Learn More](#)

✓ Complete consistency ✓ No hidden fees

Starting at **\$109**/mo

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TAKE ACTION!



CARBON OFFSETS
\$5.95 per 1,000 lbs

• Carbon Offset

Help reduce greenhouse gases! One-time or monthly subscription available.

[Purchase](#)



RENEWABLE ENERGY CREDITS
\$5 per 1,000 kWh

• RECs

Support clean energy. One-time or monthly subscription available.

[Purchase](#)



BEF WATER RESTORATION CERTIFICATES*
\$2.00 per 1,000 gal

• BEF WRCs®

Help restore our freshwater ecosystems.

[Purchase](#)



ORIGINS

Management Buy-Out of Terrapass
Origination Business

About

WHAT WE DO

LEADERSHIP

ORIGINS

RESPONSIBILITY

Origin Climate is the continuation of TerraPass Inc, a pioneer in the origination and sale of carbon offsets to consumers and businesses.

The Origin Climate name was adopted in May 2014 when TerraPass completed the sale of its retail carbon offset business to Just Energy Group, Inc. Just Energy now markets carbon offsets under the TerraPass brand, and the long-time management team of TerraPass now leads Origin Climate.

Energy Management

Get a handle on your energy expenses with simple yet powerful online tools.

[START FOR FREE !\[\]\(faf942dc3e59ce8eb64b4ac481eca7e0_img.jpg\)](#)

Energy costs are maddeningly complex.

Worse, your utility layers on a of day, day of week, and sea: is next to impossible.

Adam Stein WG05 & Tom Arnold WG05