

Sustainability and Eni Puzzle Land through Life Cycle Analysis

Hello, or 여보세요

Welcome to a new beginning.

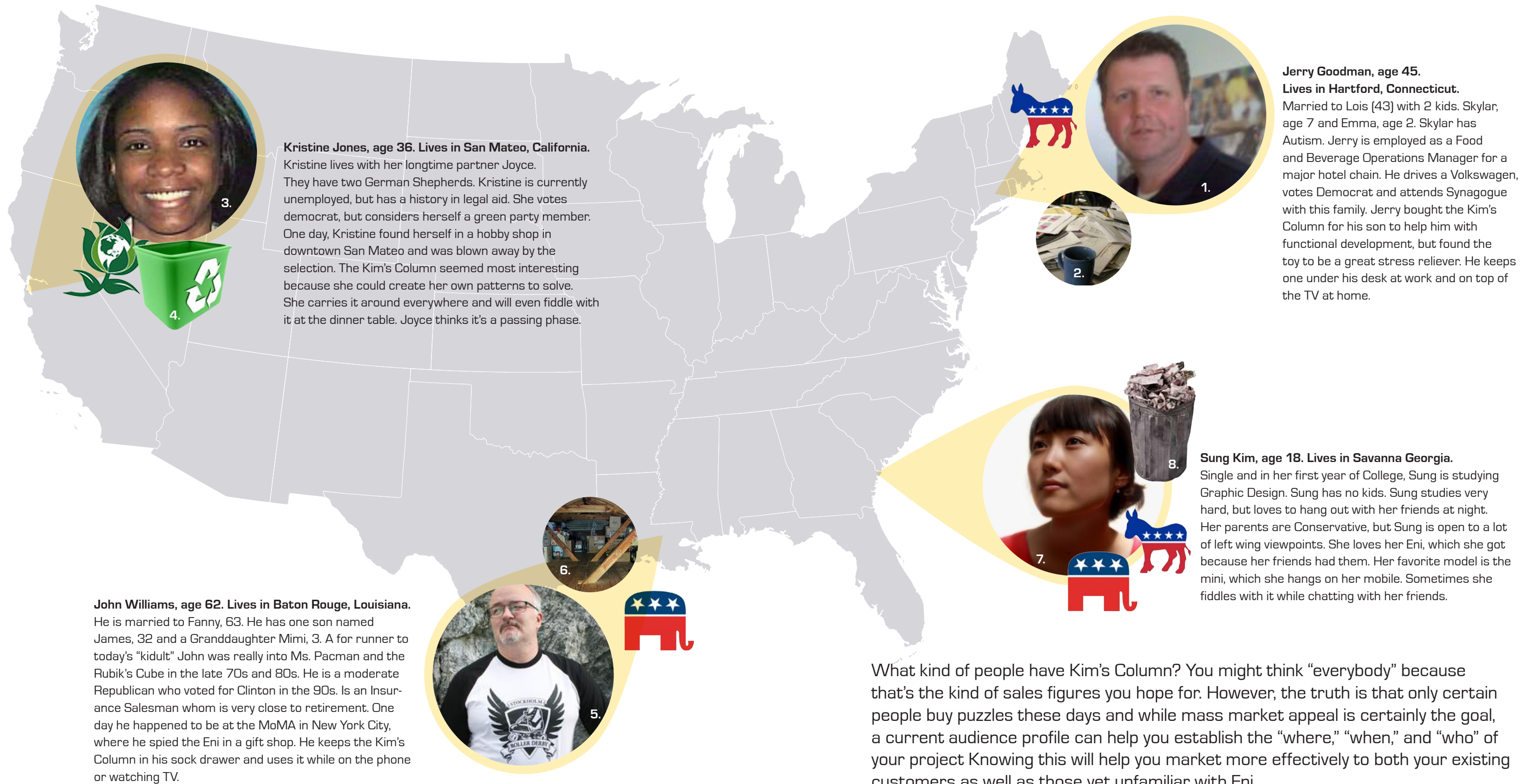
Most of you have already met me. I'm Noble Cumming and Tom is one of my best friends. You could say that Tom and I are all about new beginnings, as we met on September 12th, 2001. The two of us were just beginning our Junior year at Pratt Institute. I was beginning a new life in New York City and Tom was beginning a rough patch having lost his livelihood only a day before.

What has really governed both our lives since then, is the need to change. We both realize that things just can't continue going the way they have in the past. We cannot expect life to continue the way it did when we were growing up, nor can we expect our jobs or businesses to function the same as they did in the past.

As you listen and later review this presentation, please keep in mind that this is not about saving polar bears, or getting your product in Whole Foods. It is about being the change that is coming to the business landscape.

Eni Puzzle Land, beginning to change.

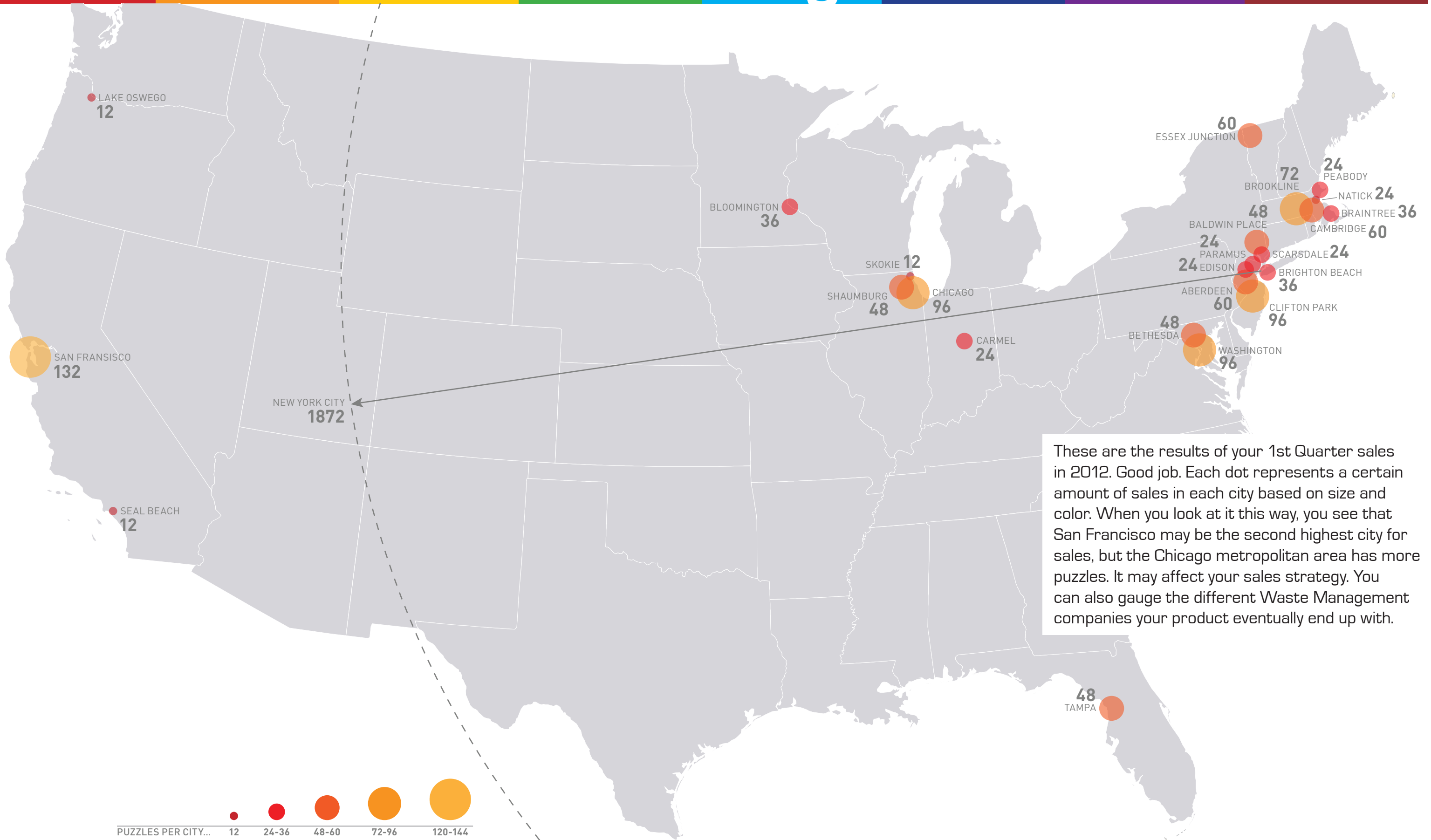
Who Buys Kim's Column?



What kind of people have Kim's Column? You might think "everybody" because that's the kind of sales figures you hope for. However, the truth is that only certain people buy puzzles these days and while mass market appeal is certainly the goal, a current audience profile can help you establish the "where," "when," and "who" of your project. Knowing this will help you market more effectively to both your existing customers as well as those yet unfamiliar with Eni.

So, what does this map tell us? 1st, young women and middle aged men are buying. 2nd, these people tend to be well educated and progressive in lifestyle. They also tend to live in places with a high level of affluence.

Where are Puzzles Going?



PUZZLES PER CITY... 12 24-36 48-60 72-96 120-144

What are Your True Markets?

Store Clerks

These people depend on the success of Kim's Column almost as much as Eni employees do. One puzzle sale equals half an hour of living wage pay per person.



9.

Kim's Column Audience

All are usually educated or from educated backgrounds. Economically well off. Eni Puzzle Land sells exclusively to this set in Museum Stores and Hobby Shops.



10.



11.

Eni American Employees

This is where Tom and EunYoung come in, running Eni in their home office. From here they ship Kim's Column all over the US and World.



12.

Waste Managers

All things come to an end and so does the life of the Eni Puzzle. It goes out in the trash and gets picked up early in the morning. It's then trucked to a landfill where workers tend to the piles of waste and eventually cover them.



13.

FedEx Workers

The web of employees at FedEx headquarters in Memphis, Tennessee is vast. With pilots and truck drivers, operators and sorters all working together, they bring the toys to their destinations.



14.

Intercontinental Shippers

The finished product gets loaded onto ships bound for the US. Shipping to the States will take provisions and logistical support including GPS and weather forecasting. Upon arrival at the port, they will be brought to Queens, NY and kept in a warehouse with a few employees.

Saudi Oil Workers

Saudi Arabia is the primary source of South Korea's petrol needs. The average oil field worker is well compensated for working with toxic chemicals in 100°+ weather.



15.

Chinese Factory Workers

Your ABS dyes are probably from China. Made with some chemicals and mined metals, there may be lead in them. This is hard to tell as the dyes are passed through distributors. They may work in poor conditions, but have money to get by and eat three meals per day.



16.

Korean Refinery Workers

The various petrochemicals that make up ABS need to be refined before processing can occur. Once finished, the chemicals are mixed to create ABS resin.



17.

Korean Factory Workers

Workers make about 40K US\$ per year. The conditions of the factory are excellent, with masks, Tyvec suits and filtered air for those handling the ABS as they are molded. Workers all drive to work. There is a well-maintained cafeteria at the factory.



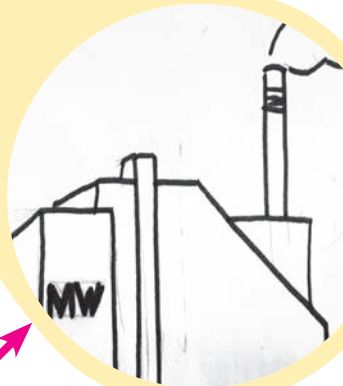
18.

When you think of the market for Kim's Column, the previous slide usually comes to mind. However, the puzzle actually has about 10 markets, each with their own economy. This is important because each step in the journey of Kim's Column effects the price and availability of the puzzle. In some cases, it may even effect whether you are allowed to sell the puzzle.

The Life Cycle of Kim's Column

8. Incineration or Land Filling

Essentially, this is where items are either burned to a crisp or entombed in the earth. Materials are lost to industry. However, both serve as energy sources. Kim's Column currently has no options for this scenario except reuse.



START
HERE

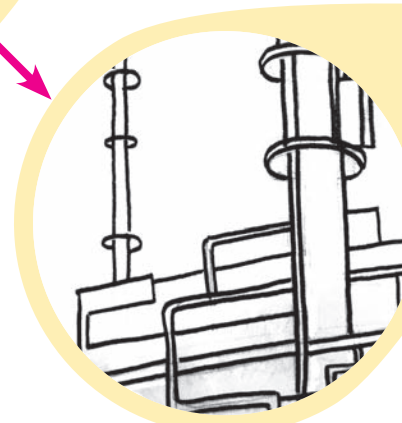
1. Raw Material Extraction

Mines and fisheries, forests and wells. The stuff we make our products from is getting harder to find. So, we often have to resort to more aggressive techniques to get that stuff. In the case of Kim's Column, this would be oil.



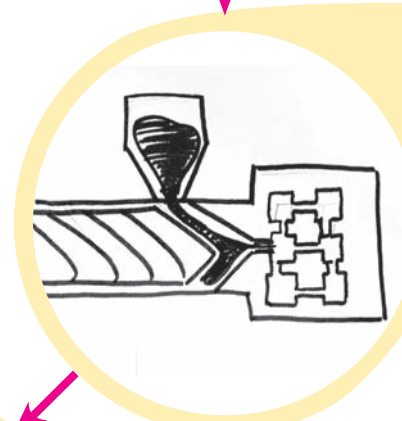
2. Material Processing

Another term for this is refinement. Mined minerals need to be purified from ore and wood needs to be pulped before it can become paper. For the production of plastic, this occurs both in refinement and polymerization.



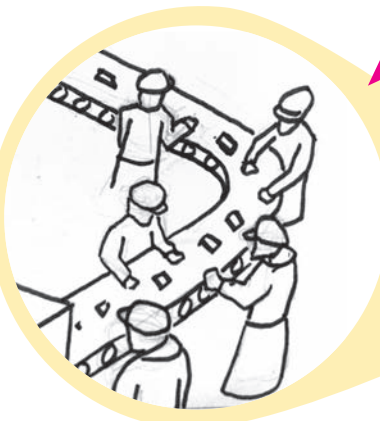
3. Component Manufacturing

This is where all the parts of "the product" are made. Copper is spun into wire and pulp is pressed into paper. Nickel is made in screws, etc. Once at the Eni factory, this is achieved through injection molding.



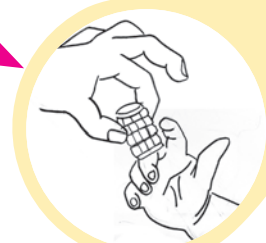
4. Assembly & Packaging

Labor is the key ingredient. Whether labor by human, machine or animal, the pieces of the puzzle are put together and the product is ready for the world. It needs to be made pretty and kept safe, so packaging is put around it. Hand labor is used to put Kim's Column together and package it.



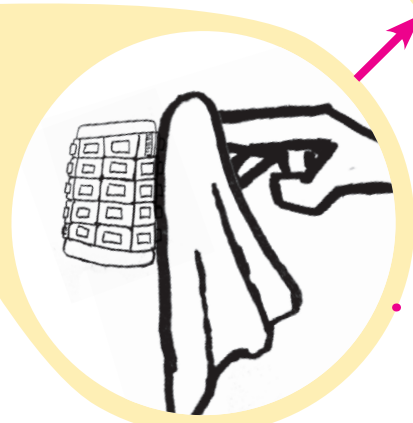
8a. Product Reuse

Can the product be refurbished or handed down to a younger generation? Reused Products can be inserted back into the Life Cycle at the Distribution and Purchase phase. Currently, the durability of Kim's Column makes it perfect for handing down to the next generation.



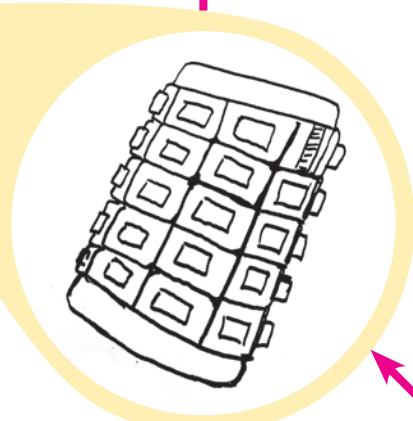
7. Maintenance & Upgrading

Through the life of the item, it will need to be cleaned, dusted, oiled or have updates installed. Many of these costs are externalized, in some cases, used as revenue streams. However, Kim's Column only requires a damp cloth and a little patience!



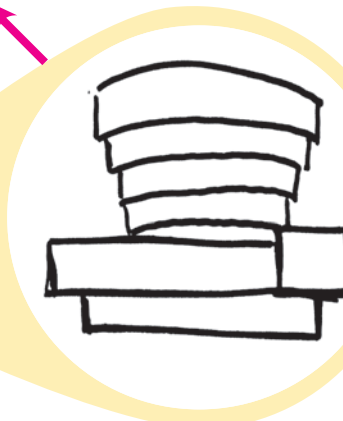
6. Installation & Use

Some items require a myriad of techniques, tools and materials to get them ready for use. In use, some products require input sources which the manufacturer can't provide. All you require is that the user have the ability to challenge themselves.



5. Distribution & Purchase

This means shipping to the people in charge of selling the product. Purchase is the act of acquiring stewardship of the product. You have done a marvelous job at keeping these avenues to museums and hobby stores.



In biology, the life cycle of an animal determines developmental stages like larval, mating and eventually death. A product life cycle has many stages too, but it is about determining the "what's?" as well as the when's?" of a product. This is important because every input can have its own story and sets of inputs. This, in turn, puts us closer to knowing the whole story of Kim's Column and eventually learning how to control it.

Life Cycle Analysis

In today's complex society, our ability to control, let alone trace the means by which things are created is limited. If we are ever going to create a more sustainable future (let alone a well designed one) we need to have a great understanding of our manufacturing processes and our supply chains. But doing this is practically an exercise in Forensics.

Life Cycle Analysis (LCA) is the means of having Forensic analysis done on your product and regaining the ability to control your supply chains. What does it mean to your business? It means the chance to change raw materials on a dime, or defend your product's virtue in court (even increase your product's virtue at your own discretion).

In essence, an LCA is about control of your product. Controlling your product means controlling your business in a way you couldn't attempt before.

A new beginning.

The LCA Scope

If Life Cycle Analysis is the means of having Forensic analysis done on your product, then the scope marks the boundaries of your crime scene.

In the scope of Kim's Column, we have included the production and shipment of the puzzle itself, including material and energy sources. Modes of transportation and the most likely end of life scenarios are also counted along with fuel needs.

The LCA Scope does not include the building of the machines used to make the toys since the factory makes multiple items. It also doesn't include packaging since the toy is often distributed and sold without primary packaging.

Functional Unit for Our Analysis

The Ecological Impact of Kim's Column will be measured in units of 20 tile moves.

Why 20? Because that is the about the average amount of moves it takes to align a tile group to a particular design.

The moves occur unrelated to time as different people complete puzzles at different speeds with different challenges. While this fundamentally doesn't change the actual function, it changes the perspective. For instance, the blind user will not relate the pieces through colors the way a person with excellent sight would. They, in fact, use the braille on the pieces to judge their moves. They are feeling the numbers rather than seeing the colors.

Because Kim's Column functions so differently per user (and has no algorithm for solving, like a rubik's cube) a functional unit based on wear, rather than time is the best choice.

The Impact of Kim's Column

With the advent of LCA data tools like Sustainable Minds, Manufacturers can finally get numbers by which to gauge their efforts. To the right is a chart detailing the overall Ecological Impact (measured in millipoints) and the Carbon Dioxide impact (measured in square kilograms per foot) of each component of Kim's Column during the manufacturing, use and end of life phases. It also covers the assembled product through these phases and transportation.

On the Sustainable Minds website, each measurement is further refined to reflect various toxins and processes specific to each material.

No lie, these numbers are hard to interpret. So, to help out, we have reinterpreted them on the next page...

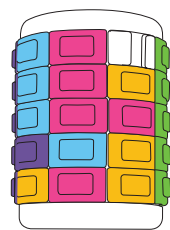
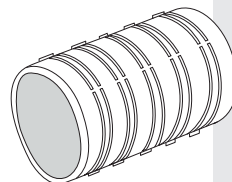
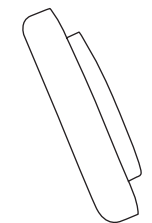
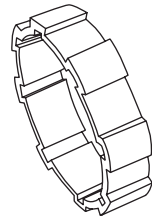
PART	WEIGHT	MANUFACTURING	USE	END OF LIFE (GREATEST IMPACT)	TRANSPORTATION	OVERALL IMPACT
TILE (ABS)	.64g (EACH) 24.96g (TOTAL)	0.267 mPts		6.73 mPts	1.46 × 10 ⁻⁴ mPts 0.000146	6.99 mPts 6.997146
CO ² IMPACTS		.122 eq. kg/fu		.00217 eq. kg/fu	1.21 × 10 ⁻⁴ eq. kg/fu 0.000121	0.12 eq. kg/fu 0.124291
GEAR (ABS)	5g (EACH) 25g (TOTAL)	.268 mPts		6.74 mPts	1.46 × 10 ⁻⁴ mPts 0.000146	7.01 mPts 7.008146
CO ² IMPACTS		.122 eq. kg/fu		.00218 eq. kg/fu	1.21 × 10 ⁻⁴ eq. kg/fu 0.000121	0.12 eq. kg/fu 0.124301
END CAP (ABS)	10g (EACH) 20g (TOTAL)	.214 mPts		5.40 mPts	9.66 × 10 ⁻⁵ mPts 0.0000966	5.61 mPts 5.6140966
CO ² IMPACTS		.0974 eq. kg/fu		.00174 eq. kg/fu	1.17 × 10 ⁻⁴ eq. kg/fu 0.000117	0.1 eq. kg/fu 0.099257
CYLINDER (ABS)	17.5g (ONE PER TOY)	.187 mPts		4.72 mPts	1.02 × 10 ⁻⁴ mPts 0.000102	4.91 mPts 4.907102
CO ² IMPACTS		.0852 eq. kg/fu		.00152 eq. kg/fu	8.46 × 10 ⁻⁵ eq. kg/fu 0.0000846	0.09 eq. kg/fu 0.0868046
COMPLETE TOY (ABS)	87.46g	.936 mPts	.0152 mPts	23.6 mPts	1.93 mPts	26.48 mPts 26.4812
CO ² IMPACTS		.426 eq. kg/fu	.00137 eq. kg/fu	0.01 eq. kg/fu 0.00762	1.23 eq. kg/fu	1.67 eq. kg/fu 1.66499

A Second Look at the Numbers

Once again, it is up to us to take the numbers and transform them into something a little more understandable.

Looking at each specific part of the puzzle and what its impact is in each phase, you can see how the end of life phase has the greatest eco-impact and how the transportation phase has the greatest carbon impact.

Funny coincidence that the bottom of the graphic shows us the “low hanging fruit.”



Recommendations

With your End-of-Life Phase being the largest impact category, it quickly becomes evident that dealing with it will have the greatest influence on your product's ecological footprint.

Finding the best way to “rescue” the product from land-filling or incineration is key to any sustainable strategy. But, since your product's material is both singular and difficult to recycle by municipal means, product reclamation is our recommendation.

With a profitable system for reclamation in place, you will immediately see the other steps in your life cycle change, beginning with resources extraction. Less and less will you need to track and pay for ABS resin as its price fluctuates. That also means less transportation and less injection molding, as some pieces can simply be reused rather than recycled.

This also keeps the door open for future developments. For instance, a change in plastics to resin from recycled milk bottle lids, will not disrupt this system. As long as you have control of your material stock, you can decide what you want to do with it.

Controlling your product means controlling your business and enabling you to keep ahead of your competitors. It's a new beginning.

To Wrap it up...

The honest truth is that Kim's Column is a wonderful puzzle and an engaging toy.

You have created an approachable product and given it to the world as a way for children to develop, adults to play and those with disabilities to gain a stronger foothold in life. Therefore, by its very nature, Kim's Column is intended for those who want something better.

Don't settle on your first creation to do it alone. The era of unilateral change is past and the era of small multiples is here. By moving forward bit by bit, you are promoting a better future for your company and your fans. You are also driving the innovation that will define you as leaders in a multibillion dollar gaming industry, rather than just another puzzle, lost in the crowd.

Thank you for your time.

Photo and Source Credits

Page 2: Photo Credits

- ¹ <http://www.facebook.com/people/Joe-Dnistrian/1081510899>
- ² http://s3.amazonaws.com/readers/2010/03/07/doctorbobsdesk_1.jpg
- ³ http://a.abcnews.go.com/images/US/ht_stacey_english_phoenix_coldon_jef_120109_wblog.jpg
- ⁴ <http://cdn.thetechjournal.com/wp-content/uploads/recyclebin.jpg>
- ⁵ http://shop.rollerderby.se/shop/thumbnails/shop/23508/art8/h9484/9669484-origpic-912772.jpg_0_5.81162_100_62.1242_235_219_75.jpg
- ⁶ <http://0.tqn.com/d/garages/1/0/0/2/-/-/attic-A.jpg>
- ⁷ <http://www.web.uvic.ca/~ksingbei/exercises/ex13/img/korean-girl-face-500x329.jpg>
- ⁸ <http://lifewithoutbaby.files.wordpress.com/2011/01/trash.jpg>

Page 4: Photo Credits

- ⁹ <http://www.citypass.com/new-york/moma>
- ¹⁰ <http://www.ronmertens.com/nz/>
- ¹¹ <http://successfulsoftware.net/tag/home-office/>
- ¹² <http://www.albanyny.gov/Government/Departments/GeneralServices/TrashRecycling/TrashCollection.aspx>
- ¹³ <http://www.wtop.com/?nid=&sid=1839586>
- ¹⁴ <http://worldmaritimeneeds.com/archives/43773>
- ¹⁵ http://articles.businessinsider.com/2012-03-28/markets/31248250_1_spare-production-capacity-oil-prices-supply-shock
- ¹⁶ <http://drpinna.com/economic-rip-tide-chapter-two-2-4113>
- ¹⁷ <http://www.arabianbusiness.com/qatar-external-debt-rise-90bn-by-end-of-2010-365157.html>
- ¹⁸ <http://dalje.com/en-world/n-korea-expels-souths-workers-from-factory-zone/135206>

Source Credits

All life cycle analysis statistics are from a Life Cycle Analysis performed by myself using the Sustainable Minds web-based platform: <http://www.sustainableminds.com/>
Any references to South Korea's source of crude oil are based on research and may not be up to date.
Any references based on South Korea's use of Nuclear power are based on research and may not be up to date.
All statistical sales data provided by Tom Sebazco, Chief Marketing Officer of Eni Puzzle Land America
All assumptions about audience and markets are based on research and the opinions of Eni Puzzle Land. No serious investigation or market research on the subject has been made.