

Only So Big



Negawatt Media

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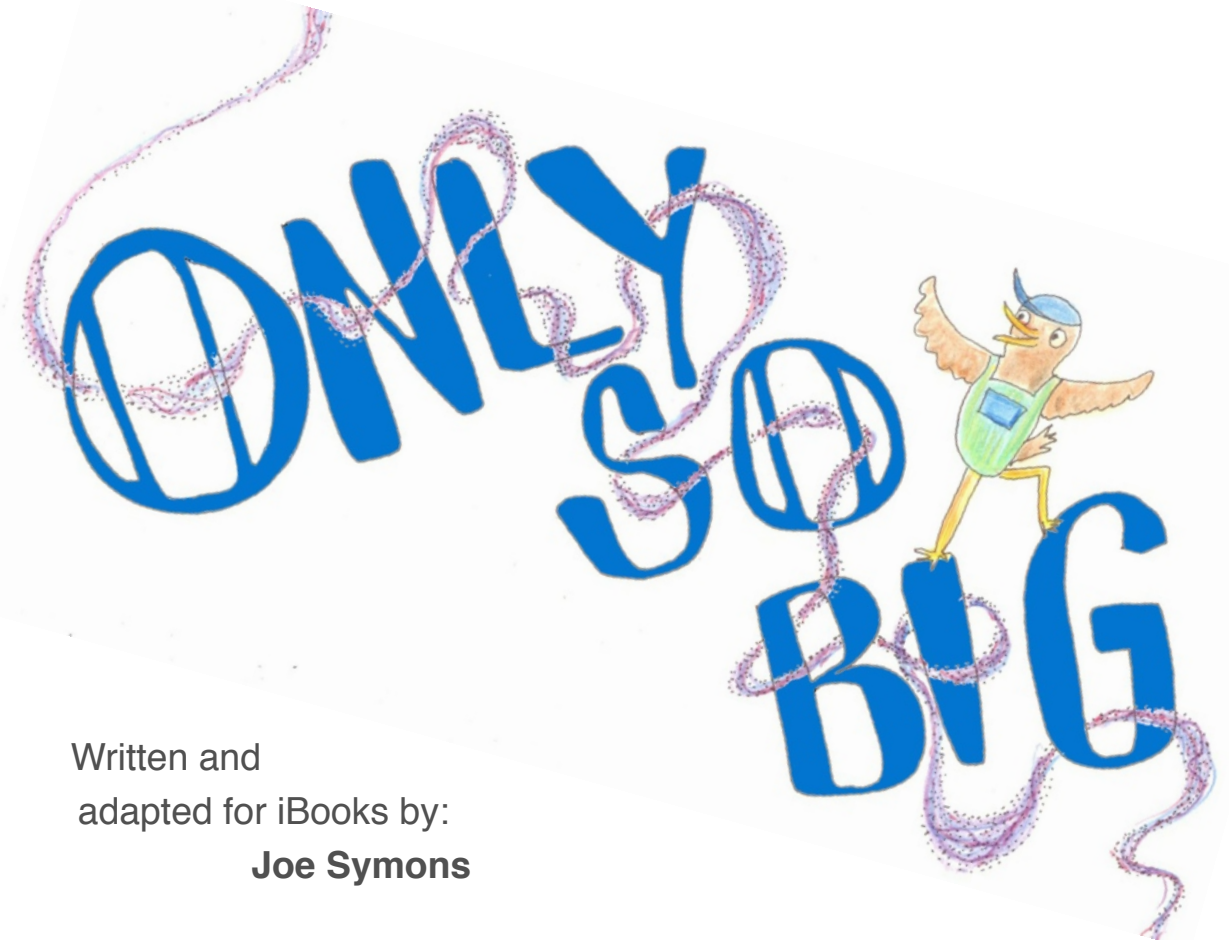
This book is dedicated to:
everyone who is under 50 years old in 2012,
and everyone 50 and older who will offer their time
money, energy and wisdom to help
those under 50 maintain a viable
global habitat

Published by
Negawatt Media
a division of Centripetus Corporation
3222 Point Lawrence Road
Olga, WA 98279

negawattmedia.com

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Notes on the PDF Version

Only So Big was designed around many interactive features available only for the Apple iPad. For this pdf version, where possible, the iPad-only interactive graphics have been replaced with identical content.

Not all graphic images are interactive. Some are simply colorful drawings.

Click on a graphic image. Most will open a separate pdf file showing the images that would be available if you were using an iPad. If clicking does not open a page, no equivalent graphic is available.

When a pdf file does open, note that most of them represent multiple pages. *Be sure and scroll* to see all the information!

The iPad version has review questions at the end of most chapters. These are deleted in the pdf version.

You can get the iPad version via the Store on the iPad app iBooks; using your iPad, tap the image shown here. The book is free.

For the best reading experience, view this **Only So Big** pdf file with a pdf viewer (e.g., Adobe reader, or Preview) rather than within a browser window. That is, fully download the file (that is, save the file) on to your device before reading it.



CHAPTER 1

A Funny Morning



Mornings in Bauville, like so many towns across the land, find its good citizens up and moving. Neighbors turn on lights, make breakfast, take showers.

Air conditioners start, computers and tv's come to life, workers open stores. Factories restart after being silent and still.

And like everywhere else, Bauville citizens own, use, and appreciate **Zervs**. Most have a basic group of Zervs, while others have Zervs for special tasks. Even the poorest residents of Bauville have a few Zervs.

Zervs come in all sizes, they do all kinds of work, and they all eat just one food

(**Zervberries**). Some eat much more than others. Zervs can eat all the time if they need to. If they don't need to work, they don't eat.

But, in order to work, a Zerv must have Zervberries!

Zervs heat water, cook food, wash clothes, make light, wash the dishes, run telephones, TV's, computers, clocks, alarm systems, blenders, furnaces, freezers, flashlights. Baby Zervs eat just a few Zervberries—most eat them all the time, keeping the

portable phone charged, the HDTV ready for instant on, the internet modem running 24/7, the clock accurate. Mama Zervs chill food, wash clothes, run the furnace fan. Papa Zervs heat water for showers, dry clothes, bake potatoes.

Interactive 1.1 Zervs Around the House



Touch a Zerv!

The Zervberries come in fast moving streams from the **Zervberry Factory**. Whenever a

Listen! 1.1 Zervberry Cries

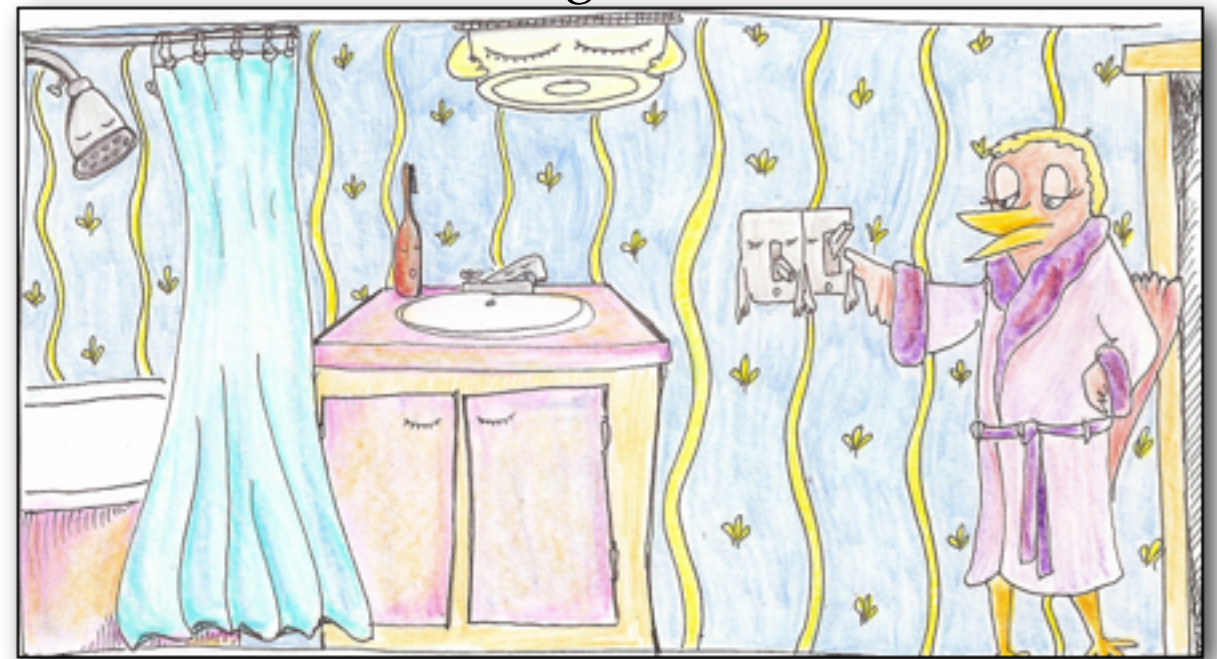


Zerv works, it eats, so it calls out with its unique Cry for Zervberries. The Zervberry Food

Factory hears the call and sends just the right amount of Berries to keep the Zerv working. All the Zervs in every house in Bauville call the Zervberry Factory whenever they need Berries. You might think with all those Berry requests coming all the time that it would be Really Noisy at the Berry Factory! Actually, the Zervberry Call can't be heard by the good people of Bauville—it is a tiny high pitched Zerv Squeak, too quiet for the citizens of Bauville to hear. Should Zervs need to work when there is no food, they don't die—they just go to sleep. They can sleep for a long

long time, until the Berry Factory sends Berries.

The **Jennerik** Family lives on Peaceful Lane in Bauville: Mother Linda, Dad Ralph, Big Brother Bobby, and Little Sister Samantha. One morning, Linda, who always gets up first, discovered that every Zerv in their home was hibernating.



The light Zervs were asleep. The alarm clock Zervs were asleep. The furnace Zervs were asleep. The house was really quiet. The stove

didn't work, the garage door wouldn't open, the refrigerator was getting warm.

Sometimes just a part of a Zerv would fail. At first, Linda thought that the part of the Zerv that makes light had failed. (She flipped the bathroom wall switch on and off a few times, but that didn't help.) She tried the Zerv that operates the bathroom fan, and when that didn't work, she knew that all the Zervs were out of Berries.

"This is really inconvenient!" she said to herself. She could not make coffee. She could not make her usual hot breakfast. She did not want to take a shower in cold water. She couldn't even tell what time it was.

There was a knock on the door. Linda, feeling even more frustrated because she was still in her robe, saw that it was Cog, the elderly next

door neighbor. "What's up?" she said opening the door.



“Nothing in my house is working!” Cog said.
“How about here?”

“No, all the Zervs are asleep here too. I’ll send Bobby over to the Zervberry Factory to find out what is going on.” Cog shuffled back home. Bobby, yawning but dressed and ready for breakfast, came in to the kitchen.

“Bobby, the Zervs are all asleep. Can you ride your bike over to the Zervberry Factory and find out what happened?”

“Sure Mom. I’ll go over right now.

CHAPTER 2

What Went Wrong



The overhead garage door wouldn't budge. Bobby wrestled his bike through the side door and took off for the Zervberry Factory. After parking his bike, Bobby went into the main office and asked if someone could tell him why there were no Zervberries. The manager said "A **steam turbine** cracked trying to keep up with the demand for Zervberries. We're waiting for the replacement to arrive. Meanwhile, would you like a tour of the Factory? I would be happy to show you what we do here and explain why we can't make Zervberries." Bobby said "Sure."

"Let me introduce myself. My name is Steve. I'm the Manager. "

"My name is Bobby. I live about a mile away in Bauville."



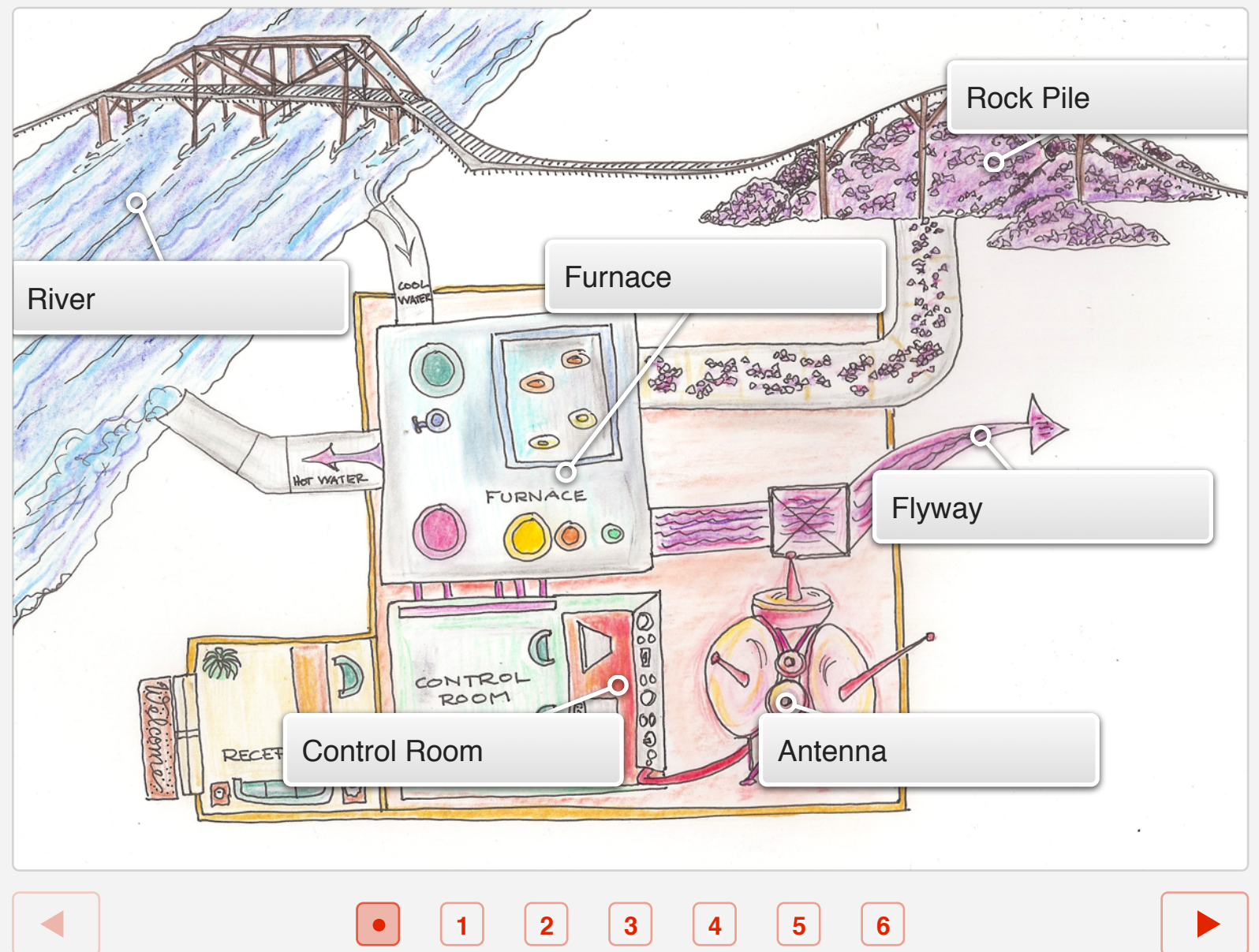
"Well, Bobby, let's get started. You'll need to wear this visitor's hard hat." Steve handed Bobby a bright yellow hard hat and put a white one on his own head.

"I am guessing you don't know where the raw ingredients for Zervberries come from, or do you?" Steve asked.

“No, actually, I don’t know anything about Zervberries. Usually the Zervs just get whatever Berries they want so they can do all the things we want them to do. I don’t really think about it. I guess my parents pay the Zervberry bill every month. Otherwise, I don’t know anything about what you do here.”

Steve pointed to a huge pile of **purple rocks**. “Over here is one of the main ingredients we use to make Zervberries. These rocks come from the mountains several hundred miles away. They come by train. We grind up these rocks and put them in the Furnace,

Interactive 2.1 Zervberry Factory Tour

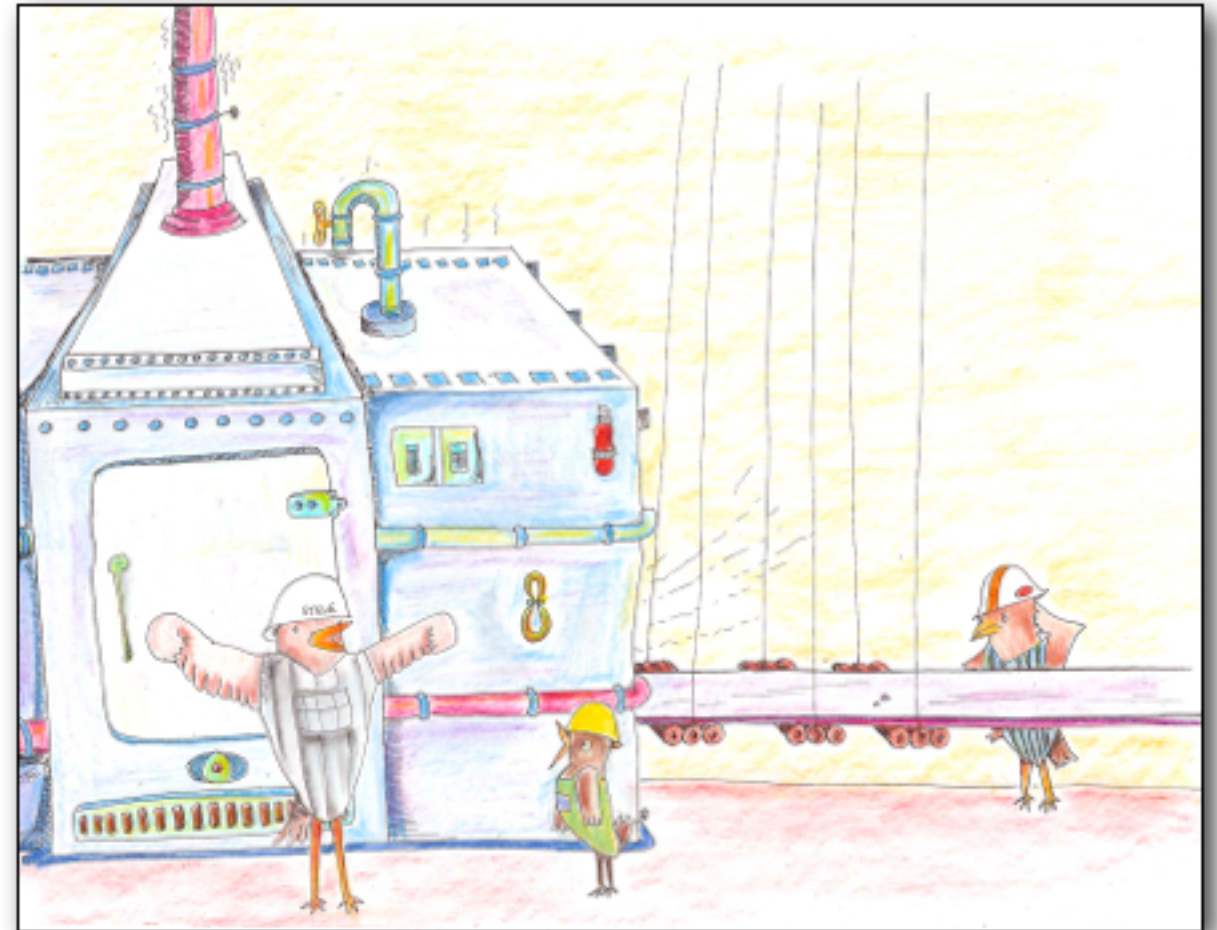


which makes Zervberries. If we didn’t have these rocks, we couldn’t make the Berries. We also need **water**, lots of water, so that’s why

the Factory is next to the river. Some of the water is used to mix with the rocks to make Zervberries, and some of the water is used to cool the Furnace, because it gets really hot. We have to have a hot oven, but we also need to cool the outside of the oven so the factory won't catch on fire."

"Every day we get a whole trainload of purple rocks, and every day we put all of those rocks in the Furnace to make Zervberries.

Our furnace is big, but it is only So Big." Steve held out his hands as if he were describing the size of a large fish he might have caught. "We can't make the Berry Furnace any bigger, at least not very quickly."



Bobby looked at the Berry Furnace. It was huge. He thought it could make tons and tons of Zervberries. "Gosh, Steve, it seems to me that this factory would be able to make a humongous amount of Berries. I don't understand why all our Zervs were hibernating today."

“Sometimes your Zervs are forced into hibernation because the **flyway** that sends the Berries to your house is broken. We have to send trucks out to fix the flyway so the Berries can fly on their path to your home. As you know, flyways don’t break very often, and they are fairly easy to fix. Today we have a much bigger problem.”

“What is that?” Bobby inquired.

“Today,” said Steve, “we can’t make all the Berries that everyone wants. I don’t know what happened. Maybe because so many people have moved into Bauville. Maybe because there was a sale on new Zerv High

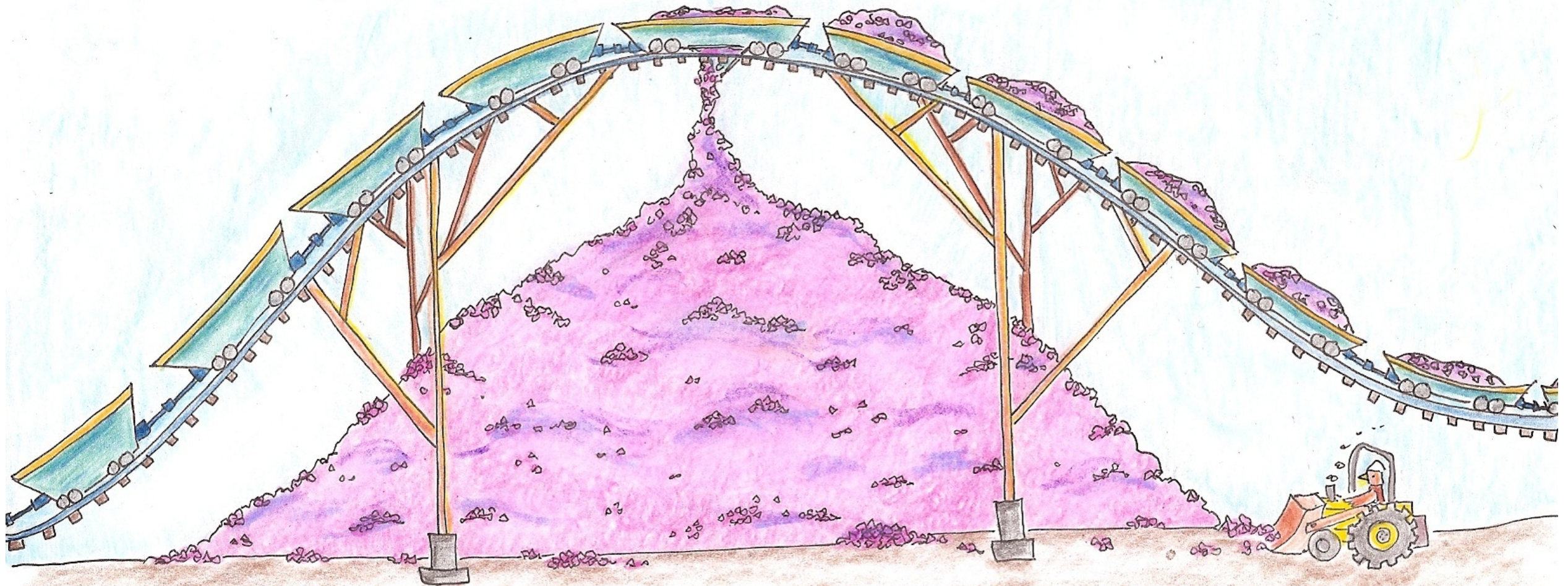


Definition Theater Size Viewscreens at the Want-mart, and lots of people went out to get them. It was really hot yesterday, and maybe the good citizens of Bauville turned up their Zerv Air Conditioners to make their homes cooler. It could both of those things, and more. What we know is that so many more Berries were being sent to all the homes yesterday afternoon that the Factory was working over its limit, and this morning,

when people got up and turned all their
Zervs on, it broke down.”

CHAPTER 3

Interesting and Complicated

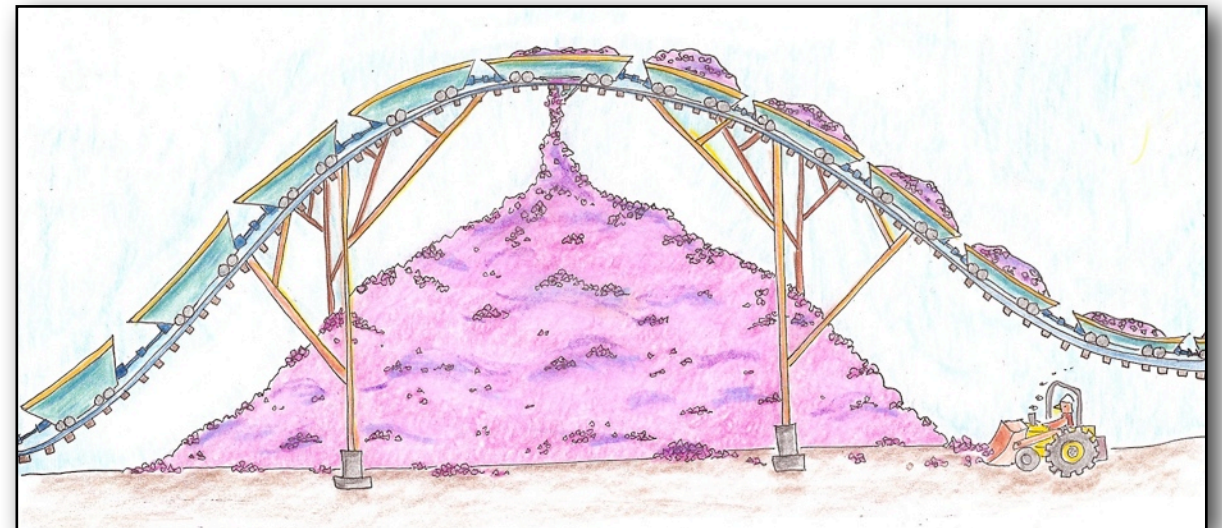


“Gosh. What will you do now?” Bobby wondered. He was thinking that he couldn’t play games on his Zerv computer.

“First, we have to fix the Furnace so we can make Berries. Then we have to tell everyone that they can’t ask for all the Berries they want for the Zervs all at the same time. We may have to build another Factory to make more Berries. Or we have to ask everyone to use some Zervs in the middle of the night when the Factory isn’t working very hard instead of in the middle of the day when everyone is awake and has become used to getting all the Berries they want whenever they want them.

“The problem with building another Factory is that it will take years and millions of dollars to get the Factory working. And it means that we will need to build another railroad track because the purple rocks we

already use for the Factory we already have take up the whole train track each day. We also have to build another train—each Purple Rock Train has one hundred cars which are



filled and emptied each day! And then we have to get the people who live near the mountain where the purple rocks come from to let us take Even More purple rocks from the mountain they call their backyard. Many people there don’t want us to take any purple rocks even now.

And there's another problem with the Factory that we already have. The Furnace mixes those crushed purple rocks and water to make the Berries, but it also makes something else that no one knows what to do with. We call it **Ceeotu**. We don't need it or want it, so we throw it out the window. The wind takes it away. Ceeotu is so tiny you can't see it, and it doesn't smell. For a long time no one worried about it—since we couldn't see or smell it, it didn't seem to bother anyone. Now we realize that it didn't just somehow disappear, but it went “somewhere”. Because we couldn't see it, we didn't realize it was piling up, and, you know, Bobby, that the Earth is Big”—Steve stretched out his hands again like he was describing a really Big Fish—”but it is only So Big, and that Ceeotu we were throwing out is now clogging the sky!



Can you believe it? It was hard for me to believe at first. I mean, look at the sky! Does it seem clogged? But then, you can't see this Ceeotu, and now we know that a clogged sky means we have to do something different. We can't just keep throwing this stuff out the window.

“Some people say they don't care about the clogged sky. These people take as many Zervberries as they want, whenever they want it, and when their Zervs don't work all the time, they get very unhappy. Other

people want to use less Zervberries so there will be less sky clogging and less of the purple rock mountain that has to be loaded on to the train every day.”

“Wow, Steve, I didn’t know any of this. What should I tell my mom and dad?”

“Well, Bobby, first I’d let them know that we are fixing the Berry Factory as quickly as we can. Then I’d tell them that they should get to know their Zervs better. There are Baby Zervs that don’t eat many Berries. There are Mama Zervs that eat a mom size diet, and there are Papa Zervs that eat a lot of Berries. The first thing to do is for you and

your family to talk about the different size Zervs that you have and see if there is a way to get the hungrier Papa Zervs to eat only at night.

Gallery 3.1 Zerv Choices Grow Through the Generations



In Grampa’s day there were not many Zervs



• • •



“You see, there are a number of problems with the way we created the whole Zerv system that no one really thought about. One problem is that Zervs eat whenever they are working, no matter how many Berries the Factory can make.

And there are so many more Zervs doing all kinds of useful things! There are way more people! Each family has way more Zervs than when I was a kid like you. So if you have

many more people and each one of them has many more Zervs and each of the Zervs eats more Berries, it all adds up quickly to a Lot of Berries. And when the Zervs eat whenever they want, rather than having some kind of agreement that some get to eat sooner and others get to eat later, then the Berry Factory has to be able to make a whole lot of Berries during part of the day—sometimes more than it can handle—and yet at other times, like two o'clock in the morning, the Factory produces almost no Berries because most of the Zervs are hibernating then.

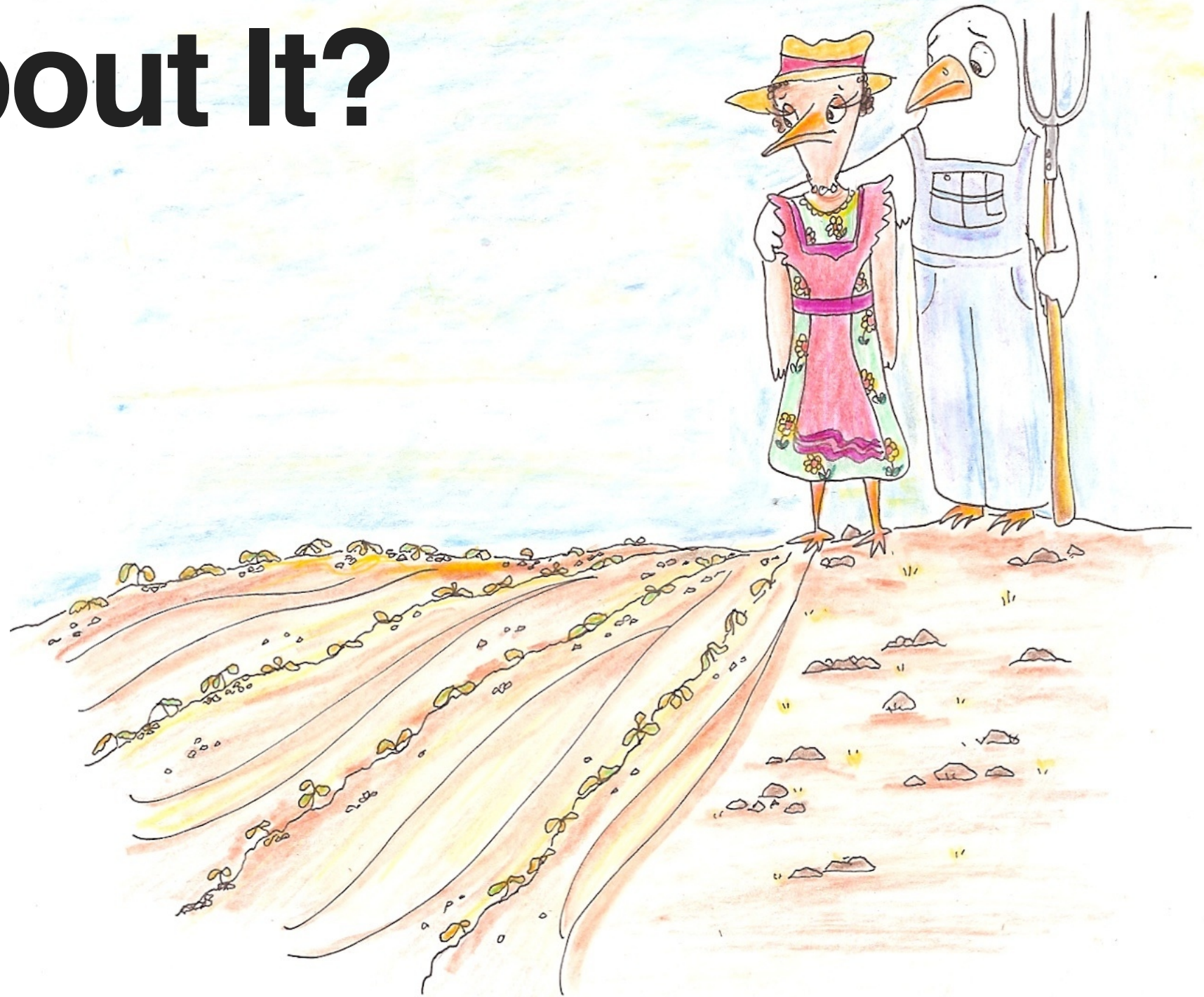
“And, unlike regular food, Zerv Berries are very special. They must be eaten within a few seconds of when they are made, or the Berry evaporates! Also, they all have to be made exactly the same or the Zervs will get sick. If the Zerv Berries aren't perfect, the Zervs can't eat them, and if they can't eat, they won't work! As you can see, it takes a very special

factory to make millions of perfect Zerv Berries.”

“Wow. This is really interesting, and it is really complicated! I don't think I can take in much more right now,” said Bobby. “I'll tell my mom and dad all about what you said. Thanks so much for the tour of the Berry Factory!”

CHAPTER 4

Why Should We Have to Think About It?



Bobby rode back home. He was hungry and his head was full of questions. At home, he told his mom and dad what he learned about Zervs from Steve. While they were



talking, Berries began to arrive again; the Zervs woke up and started doing their chores. The Zerv Refrigerator began to hum. The Zerv lights in the kitchen went on. The whole family let out a small cheer! Hooray!

“We can get back to normal now” said Ralph.

“No, wait, no we can’t!” said Linda. “If we keep doing what we’ve been doing, and

everyone else does what they’ve been doing, this is going to happen again, maybe even later today or tomorrow! We have to talk about the eating habits of our Zervs! Not only do those Berries cost money, but there is only So Much!” and she held out her hands like she was describing a big fish.

“Wait!”, said Samantha, who was always quick to ask questions. “Why do we have to figure out what each Zerv eats? Why can’t we just have the Zervs tell us what they eat?”

Interactive 4.1 Find the Zerv Label

Click on an image to see a label



Tap to Enlarge

“Actually, they DO tell us what they eat. Each one of them has a label somewhere which says how many Berries they eat. But what we

don't know is WHEN they eat," said Bobby, not wanting his younger sister to take the floor.

"Well, no one has the time to go around and read all the labels. We know when some Zervs eat. We tell them what we want, like when we flip on the lights, or make toast or turn on the dryer. But some Zervs eat when they choose to, like the hot water Zerv, or the refrigerator Zerv.

"What we Don't Know is how many Berries that they are all eating here at any one time. Who wants to figure that out? And then, we don't know what all the other Zervs in all the homes and shops and factories in Bauville all want to eat, and whether the Berry Factory can supply all that food whenever the Zervs say they're hungry and have to eat Right Now," said Linda.

"This seems way too complicated and way way too much bother," said Ralph. "Look,



we've never had to think about this before. Why should we have to think about it now? The whole Berry Factory System—that's not our job. We pay for the Berries our Zervs eat.

It's up to the Factory to make sure there's plenty of Berries ready whenever we, or anyone, needs it. I don't have time to mess with this, and I have no interest either. I pay the Berry bill. That's all I can do and that's got to be enough."

"Well, that's the way it **used to be**," said Linda. "But things are changing. Remember when the kids were young? They didn't have to have special car seats. Today kids have special seats so they are safe if there is a crash. Remember when we were kids? We didn't have smoke detectors. Now we do and I'm glad that everyone has to have one. I wouldn't want Samantha going over to Annie's house for a sleepover if I knew Annie's parents had no smoke detectors.

"Did you know that the rocks for the Berry Factory come from the mountains that are right next to the Great Buffalo National Park?

If we have to have another Berry Factory, we are going to have to have more rocks to make the Berries, and it will mean that the National Park may have to close. I think we should try to prevent that. And, like the Berry Factory manager said, there will be more waste clogging the sky, which means the food that



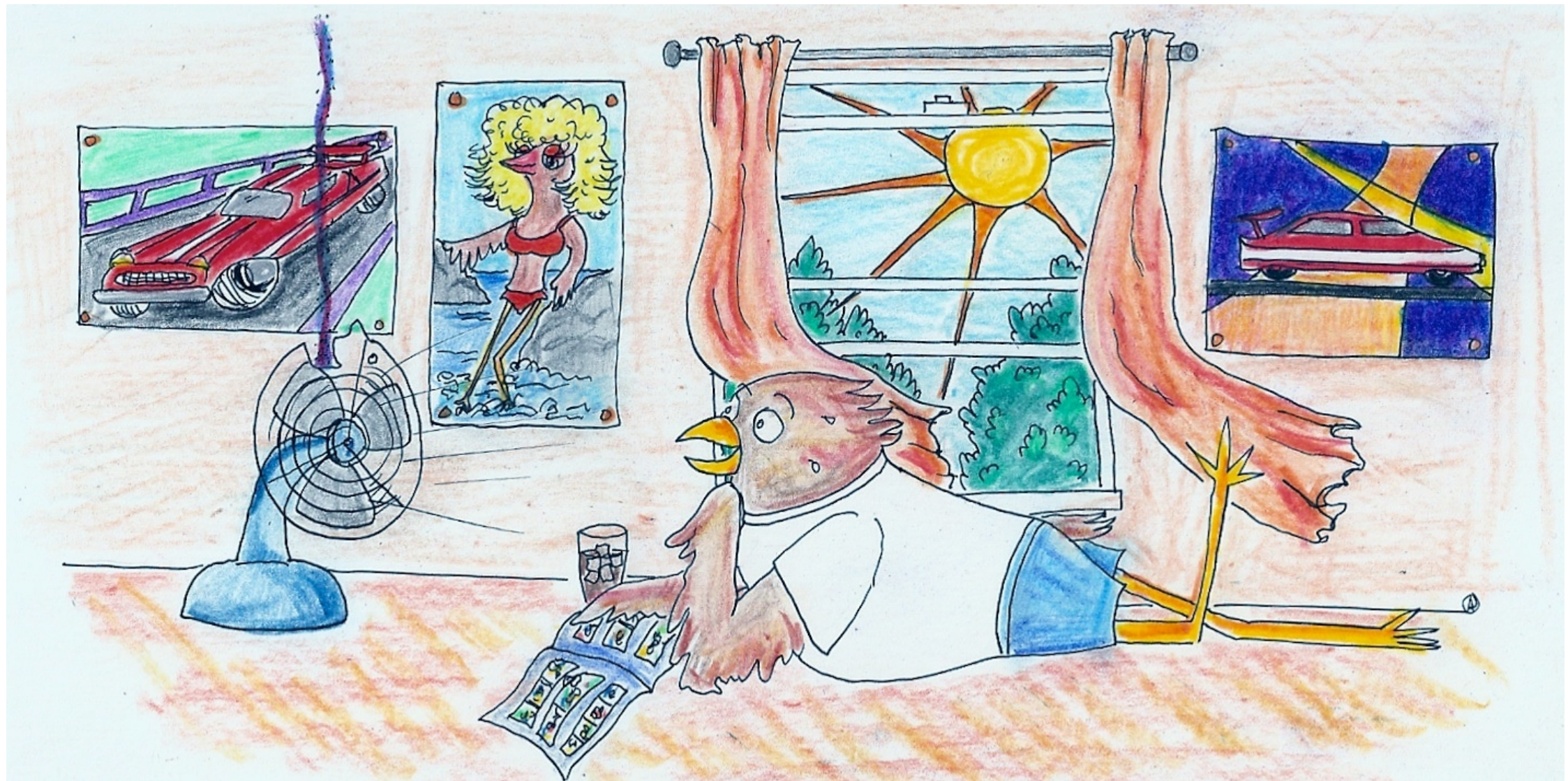
Aunt Millie and Uncle Bobbie grow on their farm may not grow because the more the sky is clogged the less rain there is. Last year was their worst year ever.

“Guys, it’s time to put the day on the map,” Ralph said. “We’ve already had a major disruption. The Berries are back on line. I’ve got to get to work. You kids have got to get to school. Linda has to help at the hospital.”

“Ok Dad,” Bobby said. “But maybe we can think about this and talk tonight.”

CHAPTER 5

Everyone Learned Something That Day



At dinnertime, Samantha spoke first. “Hey everyone, I’ve been thinking about the Zerv Berry problem. It seems that the Berry Factory works hard during the day and is pretty slow at night.

Couldn’t we have some of the Zervs do their work at night? Like what about washing clothes?”

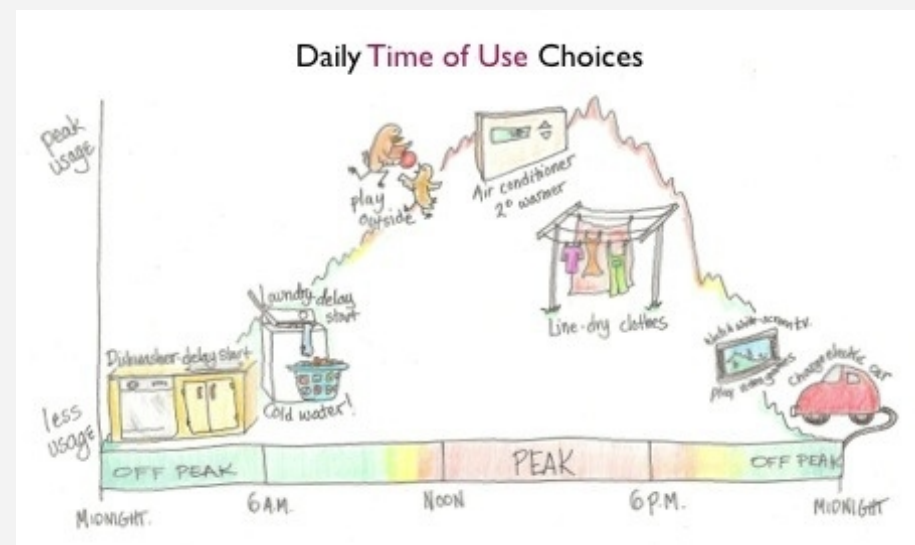
“Great idea, Samantha,” Linda said. “I’ve been thinking about this too. I wish there were a way we could know when the Berry Factory is getting close to maxxing out. I know we couldn’t turn off some Zervs, but we could choose to not do other things until later.”

“Well, everyone, I heard something at work,” Ralph said. “My boss told us that the company is going to save money if we shift from making certain things during the day

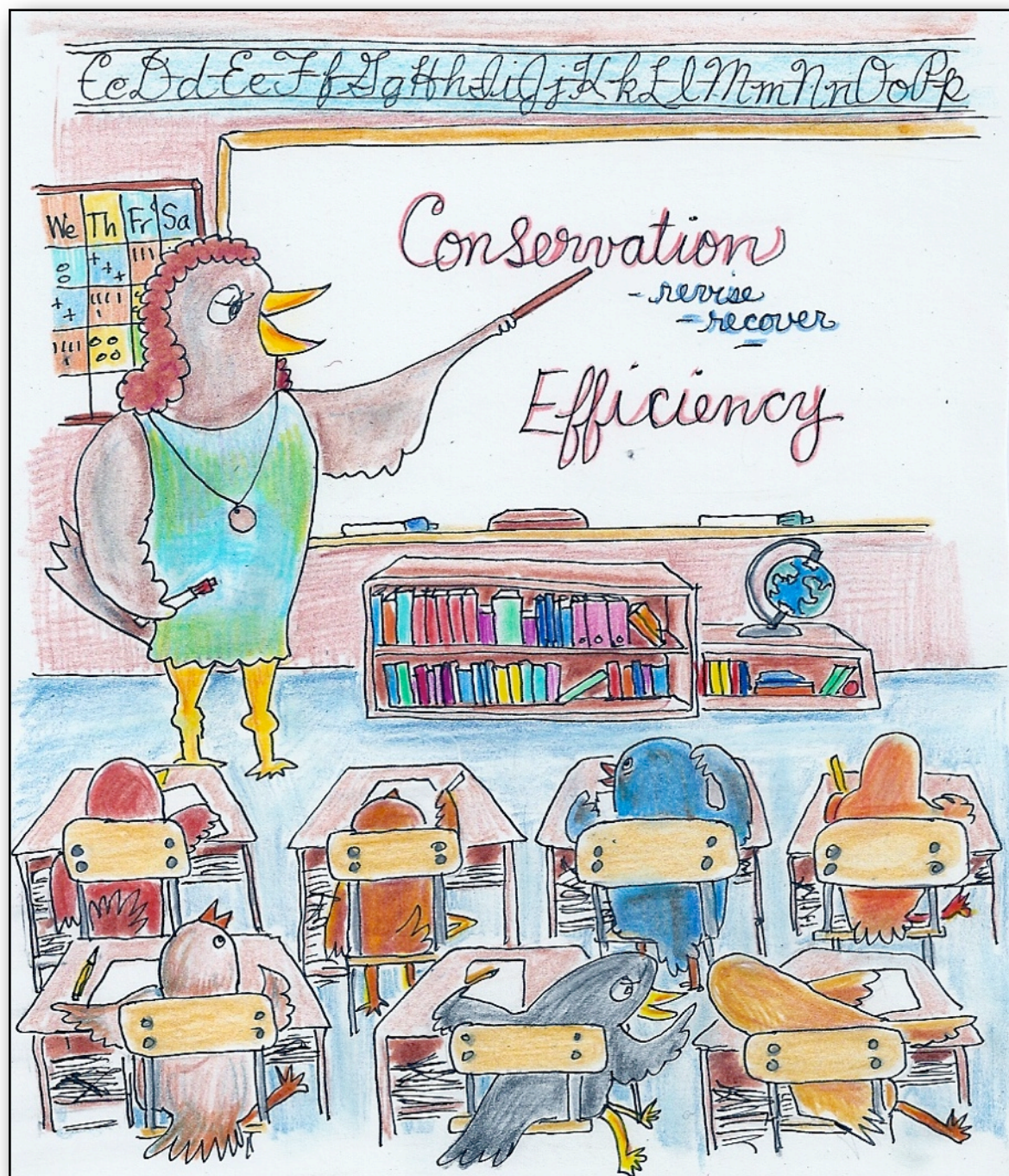
when the Berry Factory is close to producing its maximum amount of Berries—he called it the “**peak**”. If we delay producing some things, we won’t need Zervberries right then, and the Berry Factory will give us a big discount. We can produce those things in the evening, and save money. The Berry Factory will tell us when it

wants us to turn off some of our Zervs. My boss said that we would be buying Berries during the **off-peak period**. I guess he means when the Berry Factory isn’t working so hard.”

Interactive 5.1 Peak vs Off-Peak



Tap to enlarge



“Well, maybe we could get the same discount here at the house,” Linda said. “What if everyone in our neighborhood were buying

Berries during the off peak period. We’d be saving as much as your whole company! We might be able to save enough so we can help the kids go to college.”

Bobby piped in. “Because the Berries all stopped in Bauville today, my science teacher decided to teach us about **conservation**—using less Berries—and **efficiency**—getting the Zervs to eat less Berries while doing the same work. She said that the price of Berries will be different at different times of the day. She said that the old system, where everyone pays the same cost for Berries no matter what time of day it is or no matter how stressed the Berry Factory is, won’t work any more. She said that a new system, where the Berry Prices changes during the day, is better for everyone. It’s simple: when the Berry Factory is working really hard, the Berry Price will be higher. When the Factory is not working hard, like at midnight, Berries will cost less.”

“But how are we going to know what the cost



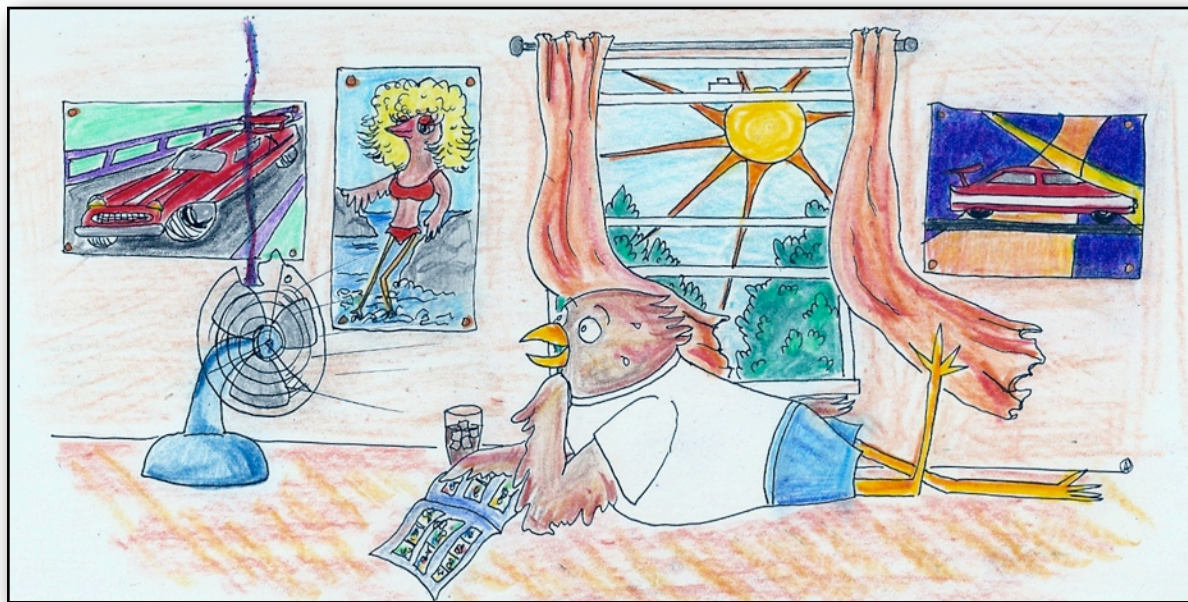
of Berries is?”, asked Samantha.

Bobby continued, “She told us that soon everyone will have a **Berry Price Meter** that tells us what the Berry price is every minute. The Berry Factory will send out the price like a text message on your cell phone. She thought most people would put the Price

Meter on the refrigerator door where everyone can see it, because almost everyone in every house likes to be in the kitchen. The Price Meter will also say what the Berry price will be at night, and on weekends, so we can decide whether we really need to have the Zervs work for us right then, or whether we can have the work done when the Berries are less expensive. She said that there will be two periods during the day: an expensive time and an inexpensive time. She called the expensive time the “peak” period, which might be between 1 in the afternoon and 6 o’clock at night, and the inexpensive time she called “off-peak” that would be any other time of day or night.”

“I don’t get it,” said Ralph. “Why is the expensive time in the afternoon?”

“I bet I know!”, said Samantha. “It’s because everyone is working really hard then!”



“Yes,” said Bobby, “and also because that’s when it is the hottest part of the day, and all the Zerv Air Conditioners are working really hard, and because they are Papa Zervs, they eat lots of Berries.”

“Gee,” said Ralph, “when I was a kid we didn’t have Zerv Air Conditioners. We only had fans.”

“Well,” said Linda, “I sure like the Zerv Air Conditioners. They make the house way more comfortable than just a fan.”

“Yes, that’s true,” said Ralph. “But it looks like we need to pay more attention to what we ask the Zervs to do, and when we ask them to do it, if we don’t want our Berry Bill to go through the roof.”

“And,” said Linda, “we don’t want the sky to be clogged. Today at the Hospital I heard that the **weather** patterns are changing—it is getting hotter and there is less rain.”

“But if it gets hotter,” said Samantha, “it means our PapaZerv Air Conditioners will have to eat more Berries, and it will cost more!”

“Yes,” said Linda, “and since everyone in Bauville will want their PapaZerv Air

Conditioners to work harder, the Berry Factory might break down again, and then no one will be cool.”

“I don’t want the sky to keep getting clogged,” said Samantha. “Our teacher said that even if we stopped throwing all the Ceeotu out the window today, it will take a thousand years to get the sky and the weather back to normal.”

“What can we do now to do our part?” said Ralph.

CHAPTER 6

We're All In This Together





“Well, there is!” said Bobby. “I heard that the old fashioned Zerv lights eat five times as many Berries to make the same amount of light as the new Zerv

lights.”

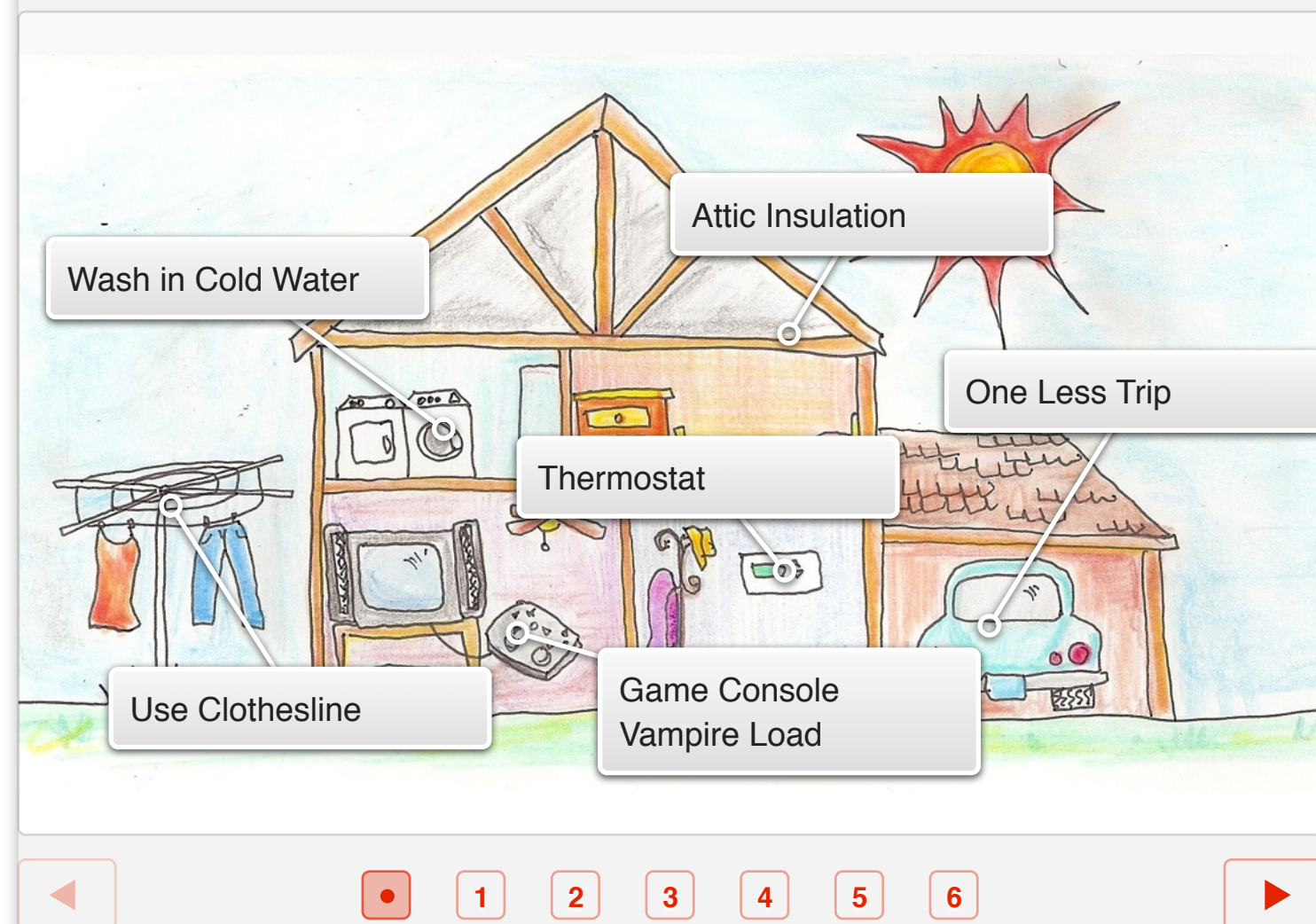
“That must be ‘efficiency’”, said Samantha, “just like what your teacher was saying.”

“Right. So we could make sure that we get rid of the old Zerv lights and put in new Zerv lights. It will make our Berry Bill go down!” said Ralph, who liked the idea of spending less money on the Berry Bill.

“My teacher told us that new MamaZerv Refrigerators are like the new Zerv light bulbs—they eat way fewer berries to keep our food just as cool,” said Bobby.

“Maybe we don’t have to have the PapaZerv Air Conditioner work as hard. Maybe we

Interactive 6.1 What the Jennerik Family does to reduce their Zervberry Use



could all be just a little warmer inside on hot days,” said Linda.

“My teacher said that if everyone in Bauville did these kinds of things we wouldn’t have to build another Berry Factory,” said Bobby.

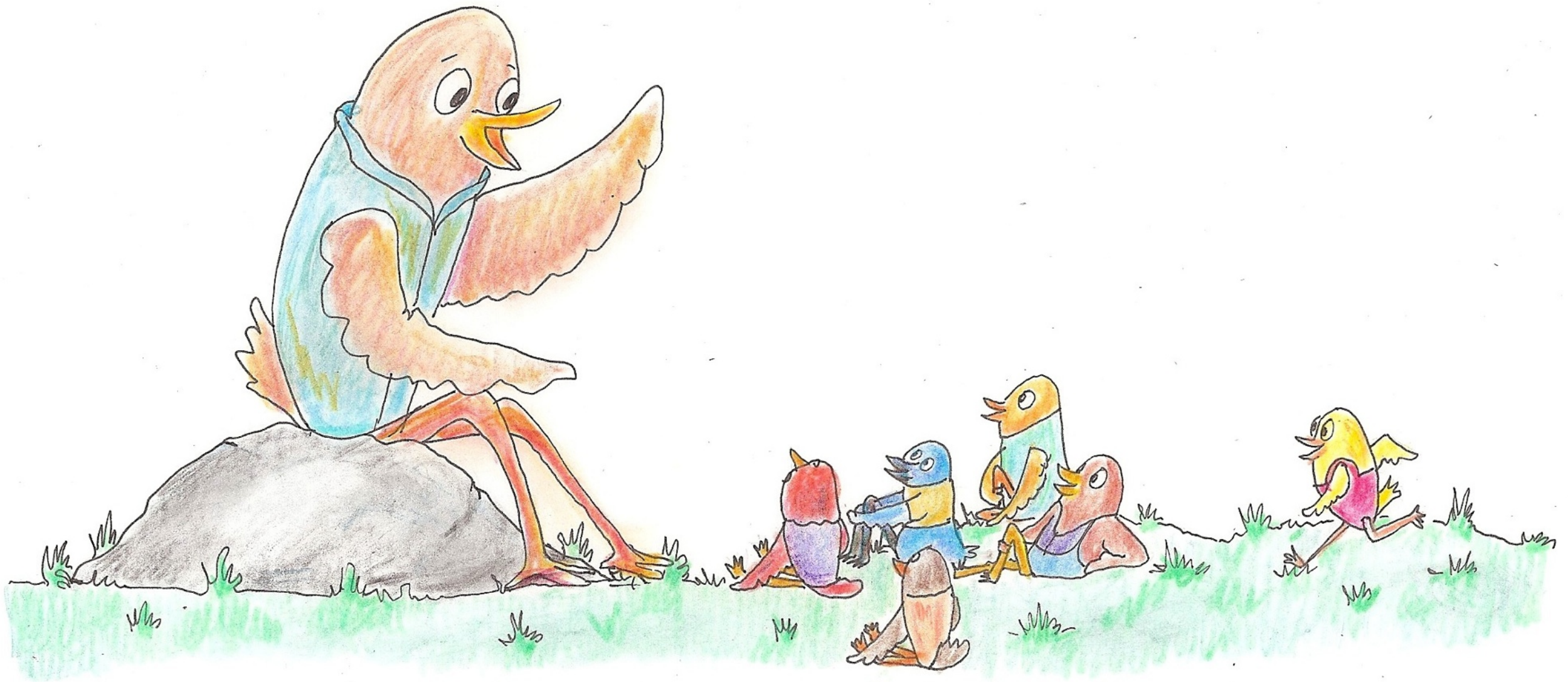
“Wow!” said Ralph. “That would save a lot of money and save the sky too!”

“I like to think that we’re all in this together” said Linda. “Everyone in Bauville uses Berries. Each of us thinks there are plenty of Berries, but only the Berry Factory knows how much it all adds up to. I didn’t know we were wasting Berries, and I’ll bet Cog and all my other neighbors didn’t know that either, and I’ll bet most of us didn’t know about how the Ceeotu clogs the sky. We used to think that there was plenty of everything for everyone, but since there are so many more people and so many more Zervs, it looks like



it adds up really much faster than anyone thought! The Earth is only so big!” She stretched out her arms to show the size of a Really Big Fish.

For Parents and Teachers



Only So Big explains one challenge of transitioning from fossil-fuel generated (“dark spark”) electricity to renewable, (“clean spark”) electricity: the challenge of demand. It is the *demand* for electricity that drives the supply of electricity. Because electricity is invisible, the story created Zervberries, which are *electrons* (electricity) *made visible*. The intention is for readers to thus *imagine* electricity (Zervberries) flowing into their homes and into each electricity consuming device (Zervs). The story broadly describes some of the environmental issues that are associated with the existing, Version 1, electrical system, which involves centrally distributed, one-way power flows from supply to customer. The story’s fulcrum is in Chapter 4 (page 21) where Linda, in response to her husband’s statement that all he has time to do is pay the bill (i.e., he, like

everyone else, is too busy to want to know more about electricity), says that’s the way it “*used to be*”, signaling the need for a change.

The Jennerik family discusses the kinds of changes that America is just coming to understand: peak v. off-peak power rates, the climate change challenge of producing electricity with fossil fuels, the role of conservation and efficiency in transitioning from the old (the way it *used to be*) system to the new, more aware, more participatory, more informed two-way information and power flow Version 2 system.

There are many more people and each of us is using way more power per person than our parents or grandparents did; the old system is no longer viable. Changes do not have to be either framed, or experienced, as “sacrifices”; they are really adjustments to

reality. The intention of **Only So Big** is to start the conversation.

An example is air conditioning. Until about 1970, few in America had access to air conditioning. That is, since the dawn of history, from the ancient Chinese civilizations to the Greeks and the birth of America and well past the Civil War, WWI and WWII, no where in the world was there any air conditioning. Shakespeare, the founding fathers, Michelangelo, Lao Tzu, Bach, you name it (even the Beatles): there was no air conditioning. Point: air conditioning is not required for human survival or creativity. Yet the invention of this one device has transformed the electrical landscape, principally because it is both extremely desirable and very energy intensive.

The conversation implied here is to discuss the challenge of keeping everyone cool. As summer temperatures climb, we may soon find ourselves making a personal / collective choice. Either we are all *slightly warmer* (where we all choose to raise our individual air conditioning temperatures a couple of degrees) or we are all **hot** (because we chose not to and the system tanked, plunging everyone into a blackout).

In the *used to be* world, we wouldn't have this conversation. We would expect nameless *others* to just make sure we had all the power we wanted whenever we wanted it.

We are no longer in that world. We've reached what Malcolm Gladwell calls the tipping point. We alone create the habitat we and our descendants will inherit. It's time to create new talk and real walk.

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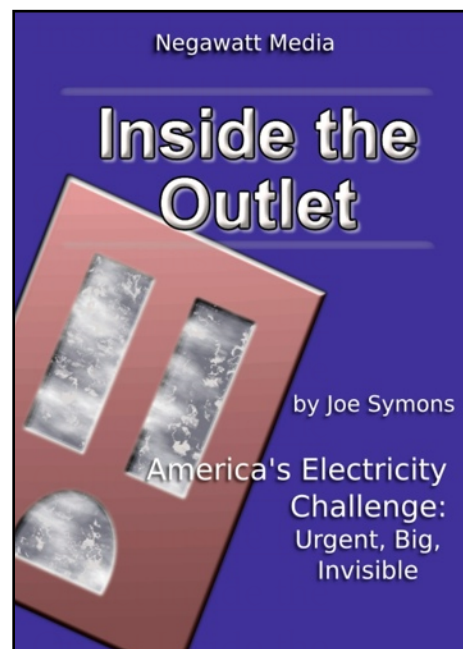


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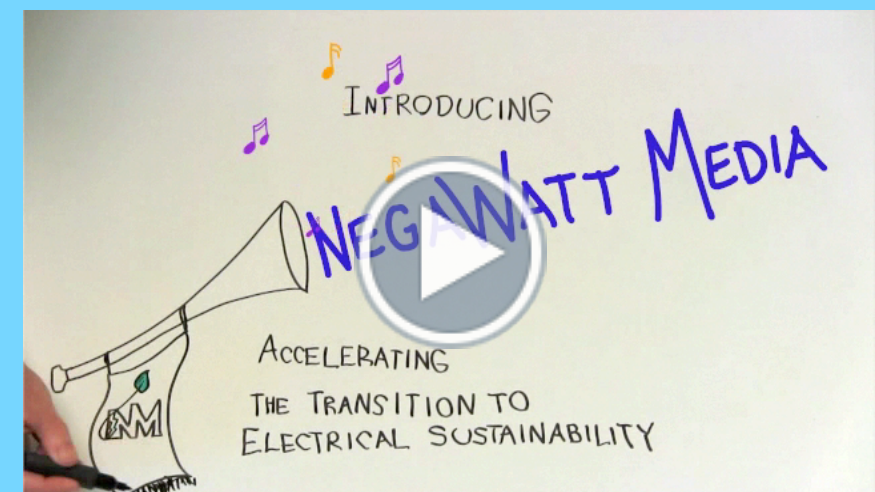
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Berry Price Meter

The Berry Price Meter represents a technology that is moving toward national implementation as the smart grid becomes operational. The Price Meter will show a household what the cost of power is as it changes throughout the day, what the remaining capacity of the system is (i.e., how close the system is to a blackout), what each power consuming device in the household is using at that moment and what it costs to operate. The Berry Price Meter in Bauville becomes the Home Area Network monitoring station in every home in America, revealing fundamental information about the otherwise-invisible energy flows, costs and impacts in the home.

Related Glossary Terms

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Ceeotu

Ceeotu is a Bauville-inspired phonetic spelling of CO2, or Carbon Dioxide, the principal greenhouse gas, created when fossil fuels are burned.

Related Glossary Terms

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Chapter 3 - Interesting and Complicated

Conservation

Conservation is a term meaning to reduce the consumption of Zervberries (or kilowatthours) by choosing actions that reduce or eliminate waste. Lowering a thermostat temperature setting (in winter) for certain hours of the day or night, or turning off lights in an unoccupied room are examples of conservation. Other more structural actions can be taken, such as increasing the insulation in attics and walls, or replacing single pane windows with double or triple pane window units. These actions reduce the heat loss that is otherwise occurring. Lost heat is waste, costing money, making systems (like a furnace) work harder and longer, producing more carbon dioxide.

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Efficiency

Efficiency describes the degree to which a device uses Zervberries (or in the real world, kilowatthours) to achieve its goals. The higher the efficiency, the lower the waste. For example, an incandescent light bulb turns 90% of the Zervberries it eats into heat, and less than 10% into light. The heat is waste, since people buy light bulbs to see by, not to heat their homes. An LED lightbulb turns well over 70% of the Zervberries it eats into light; it is 6 to 10 times as efficient as an incandescent bulb. Efficiency is often an attribute of an appliance, such as a clothes washer. Energy Star appliances earn that rating because they are significantly more energy efficient than appliances that do not have that rating.

Related Glossary Terms

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Chapter 5 - Everyone Learned Something That Day
Chapter 6 - We're All In This Together

Flyway

In Bauville, power (Zervberries) is delivered by “air” to homes and businesses. The intention of this technique is to make Zervberries visible, which is to say, to help visualize the flow of electrons, which today are carried in wires. However, seeing wires does not communicate the flow of electrons within those wires, just like seeing a water pipe does not tell the viewer whether there is any water in the pipe, nor whether it is flowing normally or not.

Related Glossary Terms

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Chapter 2 - What Went Wrong

Jennerik

The name Jennerik was created to reflect the term “generic”, meaning average, ordinary, standard, typical. The Jennerik family is intended to represent the average household in America in terms of its knowledge of electricity and its access and use of typical household electrical devices. The Jenneriks undergo an educational transformation regarding their understanding, and then use, of electricity that represents the transformation of knowledge and behavior/use change that Americans are facing in order to transition to a sustainable habitat.

Related Glossary Terms

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Chapter 1 - A Funny Morning

Off-peak period

This is the time of the day (or night) when there is substantial excess capacity in the power system. It is the opposite of the “peak” period. Because the cost to make power is much higher during the peak period, utilities are moving toward “time of use” rates which means that power used during peak periods costs more than power used during “off peak” periods.

Related Glossary Terms

Peak, Zervberry Factory

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Peak

The daily profile of electricity (or Zervberry) consumption could be described as looking like the profile of the sun’s path across the sky. In the wee hours of the early morning the power consumed is almost zero, and as the sun comes up, so does the power consumption. When the sun is high overhead, the power consumption is close to the maximum (usually peaking in late afternoon, which isn’t quite what the sun does), and then as the late evening comes on the power consumed goes down to almost zero. Utilities that make power have to have power plants that can make enough power to meet all the needs at the peak period of the day. If they can’t make as much power as everyone in Bauville (or America) wants, the system crashes and there is a blackout.

Related Glossary Terms

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Find Term

Purple rocks

Purple rocks represent coal. America has abundant supplies of easily accessible coal, which means that the cost of extracting coal is low, making the use of coal as a fuel more economical than using other fuels. Coal is really old, or stored, sunlight, which millions of years ago made trees which over time were converted to coal.

Related Glossary Terms

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Chapter 2 - What Went Wrong

Steam turbine

Most electricity in America (90%) is made by boiling water in order to make steam. Steam is then used to turn a turbine which is connected to an electrical generator. The technology for making electricity has not advanced much over the past 100 years. Two Thirds (2/3) of the heat from fossil-fuel generated steam (i.e., coal and natural gas generated steam) is wasted in the process of making steam to make electricity. It just goes up the stack.

Related Glossary Terms

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Chapter 2 - What Went Wrong

Water

Everyone knows what water is. What many people may not know is how much water is a component of electricity. Water is used for two purposes: 1) as the fundamental ingredient in steam, and 2) to cool the systems used to make electricity. Cooling water is needed in huge quantities. As the planet heats from Global Climate Change, the amount of water available to power plants often declines due to drought. Without adequate cooling water, power plants cannot make as much, or in some cases any, power.

Related Glossary Terms

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Chapter 2 - What Went Wrong

Weather

As the planet heats up due to Global Climate Change, or GCC, (which is occurring as humans burn fossil fuels), the weather changes. Generally, GCC triggers more extreme weather events (stronger storms, more droughts, floods, tornadoes, blizzards) which cause more damage to homes, businesses, crops and livestock.

Related Glossary Terms

Ceeotu

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Chapter 5 - Everyone Learned Something That Day

Zervberries

Zervberries are Zerv food. In the real world, Zervberries represent electrons that flow through electrical devices. Zervberries were created to *visualize* electrons, which are *invisible* and therefore unknown and unconsidered as a resource worthy of stewardship. Zerv’s “eat” Zervberries just like a toaster consumes flowing electrons, transferring the electron flow into heat which when directed carefully makes toast just the way you like it.

Related Glossary Terms

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Chapter 1 - A Funny Morning

Zervberry Factory

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Chapter 1 - A Funny Morning

Zervs

A Zerv is an electrical device that provides a service (a toaster Zerv makes toast; a cordless phone Zerv allows freedom of movement while using the telephone network—which itself is another Zerv). The term Zerv was created to mimic the idea of a servant, or Zervant. Most electrical devices provide Zervices that make life safer (a smoke detector), easier (a stove), faster (access to information from a computer, broadband Zervice, and router).

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Chapter 1 - A Funny Morning