

# THE RECYCLER

Newsletter of Recycle Rutherford, Murfreesboro, Tenn.

Summer 2022

## Wagener Looks at Needed Changes in Solid Waste

The new solid waste director in Rutherford County, **Bishop Wagener**, **shared his assessments of what is needed at Recycle Rutherford's annual meeting on May 2.**

Wagener told the Facebook Live audience, "I have looked at each operation we were doing, and I want to improve everything." He is especially determined to modify operations at the recycling centers, previously called convenience centers. "They are just not what I want them to be. You have citizens walking across traffic to get to bins, walking on catwalks, and trying to reach doors that are quite high," says the director who joined the county in November 2021.

"Most people have a lot of cardboard to recycle. When they have to climb up carrying that cardboard, the lines build up," says Wagener. To help remedy that, he has installed a cardboard compacter at the Haley Road facility. "Not only does this save people from climbing steps, but it cuts the number of loads to be hauled significantly. We've gone from two hauls a day at times to every eight days, saving resources and hauling costs."

Wagener says that he would like for Haley Road "to be a show place. Most of the people who use the facility are avid recyclers," and he would like to make it as user friendly and efficient as possible. Eventually, he would like also to have an area or facility to bring children and other groups for education and awareness programs.

A "rabid recycler" himself, Wagener says that "right now we're recycling about 85 percent of the plastic" people bring. He attributes that to having a "full-time person sort the plastic and keep the area clean." He would like to have equipment to bale the plastic because it would increase the revenue

and reduce the hauls.

"I had a picture of what I thought a convenience center should be. I still have it." He remembers using the Almadale center when he was growing up. "I had to take the family trash on Saturdays. I would try to have everything ready, but I sometimes got turned away" because bins would be full.

"The centers should be service oriented and helpful and that is my goal. But turning the ship is more challenging than I thought it would be. Loads are contaminated by people putting the wrong things in—plastic bags are the most common contaminant. Citizens bring many things that cannot be taken—building materials, TVs, paints, etc. The attendants who turn them away are doing the right thing, but it's hard. Some are traumatized by the reactions they get. Our population has grown exponentially, but the convenience centers haven't changed.

"Am I providing the best services for our citizens? The answer is 'NO!' I identify this as an area that I must address. Generally, sites must be bigger; we need ramps rather than steps." He is happy to say that two centers are to be revamped and one is to move. It is the beginning of overall improvement."

Wagener says that some of the nationwide shortages are affecting construction and changes we need to make.

"I am encouraged by the opportunities we have in our county. Some companies that have developed technology to handle waste already have markets set up; jobs and help come from such endeavors. I want to see curbside recycling companies flourish. With our population, we have a pretty big stake in the market. Opportunities for growth are enticing."

Wagener states that much is changing in the way the county will deal with solid waste. "Rutherford County has had free disposal for

*(continued on page 4)*

## What Happens to EV Batteries?

“With the encouraging move toward more electric vehicles (EVs) comes the question of dealing with large complex batteries, the key component of an electric vehicle.

**Both lead-acid and lithium-ion batteries used in electric vehicles are recyclable, though not 100% recyclable.** The process of extracting the materials is still being refined and improved. Currently, of the two types, more lead-acid batteries are recycled. There are federal mandates about the recycling of lead-acid batteries, and about 99% of the lead from them ends up recycled. However, these are used more as occasional supplements than main power sources in EVs, so electric cars don't use them very often.

**Lithium-ion batteries are the main kind of battery used in EVs.** Their recycling process is still not perfect, as most large recycling facilities can recover the precious metals in the batteries but often don't have ways to repurpose other spare materials

There are also issues with smaller, less sophisticated recycling facilities accepting batteries but processing them incorrectly. This can lead to harmful chemical exposure and even fire or explosions.

Some manufacturers repurpose batteries too spent to recharge for a car for storage of power or other in-house uses. Electric car batteries are still not fully recyclable, but with the right management and further innovation, progress toward this goal will continue.

**An article published by *Scientific American* in February 2022 offers news of an encouraging breakthrough.** Even as efforts to develop ways to fully recycle lithium-ion batteries ramped up, there was concern that such batteries wouldn't be as effective as new. But this article, written by Jordan Wilkerson, **cites new research showing that recycled lithium-ion batteries can perform better than new ones.**

The new research describes what experts describe as “a more elegant recycling method that refurbishes the cathode—the carefully crafted crystal that is the lithium-ion battery's most expensive component and key to supplying the proper voltage.” Researchers found that using the new cathode-recycling technique resulted in batteries that performed just as well as those with a cathode made from scratch. **“In fact, batteries with the recycled cathode both last longer and charge faster.”**

This approach and “successful demonstration are ‘very unique and very impressive,’ says Kang Xu, an electrochemist at the U.S. Army Research Laboratory, who was not involved in the study.” The co-author of the study, Yan Wang, is a

materials science professor at Worcester Polytechnic Institute, who started researching battery recycling 11 years ago. He recalls that people joked that there weren't enough such batteries to recycle. “That joke is not aging well.

**The Department of Energy estimates the battery market may grow ten-fold over the next decade.**” Getting the valuable components in lithium-ion batteries back into the supply chain is critical, says Dave Howell of the DOE, which funded the new research as part of its massive effort to encourage innovations in battery recycling.

When a lithium-ion battery is providing power, a cluster of “ions moves from one crystalline ‘cage’ (the anode) to another (the cathode).” Recycling methods previously involved dismantling and shredding the whole battery, then melting or dissolving in acid. Chemical elements or simple compounds were salvaged from the resulting black mass and put through the same manufacturing process as newly mined elements to make cathodes.

Wang and colleagues use a similar process, but instead of breaking the battery down to chemical elements, **their technique keeps some of the old cathode's crucial composition intact.** **They have developed a process that results in an effectively refreshed cathode,** one that retains the precise mix of minerals that determine the batteries voltage. That value was lost when the battery was simply melted down.

When the researchers compared the recycled cathode powder with cathode powder commercially made from newly mined minerals, they found that the recycled powder is more porous, which allowed room for a slight swelling and kept the crystal from cracking as easily, a major cause of battery degradation over time. More pores also provide more surface area, where the chemical reactions that charge the battery happen, thus allowing for faster charging.

These findings demonstrate that cathodes made from recycling batteries are “as good as—or even better than—the commercial material we've been importing,” says Linda Gaines, a transportation analyst at Argonne National Laboratory and chief scientist at ReCell Center.” (Gaines was not involved in the study.)

Most of the imports come from China, world leader in battery recycling. This innovative approach developed by Wang's team cuts down significantly on transportation costs and offers a path for more sustainability through domestic recycling.

The complete article can be found at <https://www.scientificamerican.com/article/recycled-lithium-ion-batteries-can-perform-better-than-new-ones/>

## What Should We Do with Lithium-Ion Batteries?

The article on page 2 focuses on lithium-ion (Li-ion) batteries used in electric vehicles, but smaller versions of these batteries are used in many products such as electronics, toys, wireless headphones, handheld power tools, small and large appliances, and electrical energy storage systems. The Environmental Protection Agency (EPA) warns that if not properly managed at the end of their useful life, they can cause harm to human health or the environment.

Li-ion batteries are in demand because of the high “energy density” of this battery chemistry, meaning the amount of energy that a system stores in an amount of space. Lithium batteries can be smaller and lighter than other batteries while holding the same amount of energy. It’s easy to see why this battery has become essential for smaller portable and cordless products.

Li-ion batteries are made of materials such as cobalt, graphite, and lithium which are considered critical minerals. When these batteries are disposed of in the trash, we lose these critical resources outright. Additionally, if the battery or electronic device that contains the battery becomes damaged or crushed in transport or from processing and sorting equipment, it creates a fire hazard. It is important that Li-ion batteries be recycled at certified battery electronics recyclers that accept batteries rather than being discarded in the trash or put in general recycling bins.

There are **two types of lithium batteries** that U.S. consumers use and need to manage:

### Single-use, non-rechargeable batteries

- Made with lithium metal and are commonly used in products such as cameras, watches, remote controls, handheld games and smoke detectors.
- These batteries may be difficult to distinguish from common alkaline battery sizes, but can also have specialized shapes (e.g., button cells or coin batteries) for specific equipment, such as some types of cameras: look for the word “lithium” on the battery to help identify them.

### Re-chargeable polymer cells (Li-ion, Li-ion cells).

- Commonly found in cellphones, power tools, digital cameras, laptops, children’s toys, e-cigarettes, small and large appliances, tablets and e-readers.
- Some Li-ion batteries can be removed easily from the products they power, others cannot.

**Send or take electronic devices containing Li-ion batteries** to certified electronics recyclers, participating retailers, and recyclers in electronics takeback services or contact your local solid waste or household hazardous waste collection program for more options.

**If you can easily separate the Li-ion battery from the product** (example: power tools), find a recycling location nearby to properly dispose of Li-ion batteries. Send or take individual batteries to specialized battery recyclers or retailers that are participating in takeback services or contact your local solid waste or household hazardous waste program for more options.

**To find locations for battery recycling, go to Earth911.com. Click on “Where to Recycle”; choose Lithium-Ion Batteries** (or any other material) and **enter your zip code**. Among the listings are businesses, such as Batteries Plus, Home Depot, Lowe’s, Staples, and Best Buy.

**Handling precautions:** Place each battery or device containing a battery in a separate plastic bag. Place non-conductive tape (e.g., electrical tape) over the battery’s terminals. If the Li-ion battery becomes damaged, contact the battery or device manufacturer for specific handling information. Even used batteries can have enough energy to injure or start fires. Not all batteries are removable or serviceable by the user. Heed battery and product markings regarding safety and use.

The EPA recommends that consumers contact the manufacturer or automobile dealer regarding larger or vehicle Li-ion batteries.

## Recycle Rutherford Membership Form

I enclose my annual dues to support Recycle Rutherford and receive the newsletter.

\$25.00 supporter                       \$15.00 student                       \$100.00 patron

I am contributing \$\_\_\_\_\_ in addition to dues.

I prefer the newsletter to be emailed and am providing my email address.

### PLEASE PRINT:

name \_\_\_\_\_ amount enclosed \_\_\_\_\_-

address \_\_\_\_\_

city, state, zip \_\_\_\_\_

telephone: day \_\_\_\_\_; evening \_\_\_\_\_

email \_\_\_\_\_; volunteer interest \_\_\_\_\_

**Please make check payable and mail to Recycle Rutherford, P.O. Box 1804, Murfreesboro, TN 37133-1804**

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### Wagener Looks at Needed Changes

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30 years. That is ending. The subsidy will go away. We will pay for hauling and disposal. We need to reduce what we have to deal with. This is a very real way people can control the taxes they have to pay.”

He urges all residents to take measures in addition to improving their recycling to reduce the amount of waste they generate. **He suggests home composting, selective purchasing, creative reuse and repurposing.** “If you start doing some of these things, you will see a benefit, and it becomes a challenge that not only benefits you but greatly benefits society. I think that Tennesseans and Rutherford Countians will respond better to their neighbors than to the government.”

### Dates to Remember

#### MoreTreesBoro Fall Meetings

The new organization formed to save and increase trees in our community has announced the following schedule for meetings this fall:

Sundays: September 11; October 16, November 13, December 11

12:30 – 1:30 p.m., The Pavilion at Oaklands  
Molly Taylor-Poleskey, 615-397-0616

#### Fall Meeting—Recycle Rutherford:

Monday, October 24, 7:00 p.m.

Program TBA

Go to [www.recyclerutherford.org](http://www.recyclerutherford.org) for information

#### Household Hazardous Waste Collection:

Saturday, November TBA, 8:00 a.m. – 12 noon  
4765 Florence Road, Murfreesboro

### 2022-23 Officers and Board

*Recycle Rutherford holds elections each April at the annual meeting; in general, officers and part of the board are elected in even years for two-year terms, and approximately half the board is elected in uneven years, providing for staggered terms.*

*The officers are listed below with the board members, who are elected each April and serve staggered terms. The date indicates when the term of each ends. The board meets monthly on first Mondays at 6:15 p.m. at First Presbyterian Church, 210 N. Spring Street.*

Rachel Cornett, president  
Bonnie Black, vice president  
Suma Clark, secretary  
Rick Racker, treasurer  
Glenn Himebaugh, past president

#### Board Members:

Linda Hardyman, 2023  
Diane Parker 2023  
Beth Spivey, 2023

**Reminder: To renew your membership, please see the form on page 3. Dues are only \$25 per year. We don't want to lose you!**

**For more information, go to [www.recyclerutherford.org](http://www.recyclerutherford.org)**

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