ONE BIN FOR ALL

RECYCLING REIMAGINED IN HOUSTON

Our City

Houston + Innovative Spirit

Houston is a city that dreams big. Sending men to the moon, engineering medical breakthroughs and leading the world in energy technology, Houston has proven it is a city of innovation. In this spirit, leveraging Houston's legacy of exploration, the City of Houston has tackled the challenge of changing the way the world thinks about residential waste and recycling, with the goal of maximizing the amount of waste kept out of landfills and recycled into new products.

One Bin For All (One Bin) is the next evolution of recycling. Using technology, the program would allow Houston residents to place all trash, recyclables and compostables in one bin, providing for a much higher rate of resource recovery.

The One Bin review is ongoing and will not be complete this year. This report chronicles efforts to date, gives an update on the current status of the program and provides a blueprint for other cities who want to pursue a similar program.

Background: Houston's Recycling History

In 2008, the New York Times and Waste News reported a recycling rate for Houston of 2.6 percent. Residents demanded more recycling options and political lines formed over how to respond. As part of her campaign for mayor in 2009, Annise Parker promised to expand curbside recycling to every single family residence served by the City. Six years later, in early 2015, Mayor Parker achieved the goal of curbside recycling for every resident.

With curbside recycling, Houston's diversion rate has improved, but it remains low. In 2014, the City was sending more than 80 percent of its residential waste (including yard and tree waste) to a landfill, with a 19 percent recycling rate. Numerous other cities have had difficulty improving their recycling rates using traditional curbside recycling, with a national recycling rate of just 34 percent. Obviously, there is a need for a better way for Houston and other cities to increase diversion and resource recovery. By using technology to sort and process waste, allowing for the disposal of all residential waste—both organic and recyclable—in one bin, diversion rates can increase significantly and commercially manufactured goods can be created.

Bloomberg Philanthropies Mayors Challenge

Mayor Parker envisioned Houston serving as the national model for how to improve residential waste diversion rates through better systems, processes and technology. Senior staff worked with the Clinton Climate Initiative (CCI) and the C40 Cities Climate Leadership Group (C40) to study the economic and environmental benefits and challenges of implementing new technologies when compared to full expansion of conventional single stream recycling. The current state of Houston recycling, the possibility of expanding single-stream recycling and the possibility of a One Bin approach were evaluated based on both conservative and optimistic financial and operational scenarios.

The conclusions detailed in a September 2012 report served as the basis for Houston's One Bin for All application to Bloomberg Philanthropies Mayors Challenge. The Mayors Challenge is an ideas competitions that encourages cities to generate innovative ideas that solve major challenges and improve city life and that have the potential to spread to other cities. Houston's project was also the number one favorite among fans of the competition. .

One Bin would employ game-changing technology to allow for the disposal of all residential waste—both organic and recyclable—in one bin. A diversion rate of up to 75 percent within two years was anticipated.

Houston's submission was identified as one of twenty out of 305 submissions invited to further refine the proposal and resubmit in January 2013.

In March 2013, Houston was selected as one of five winners of Bloomberg Philanthropies Mayors Challenge. The award came with one million dollars to support the project, as well as $50k in-kind support for being the fan favorite.

The One Bin Approach

Blueprint: The One Bin Approach

The One Bin project focuses on one important goal: making Houston more sustainable. The key to the success of the project is the ability to utilize innovative waste-sorting technology and processes that currently exist along with new technology to convert conventional recyclables and non-traditional recyclables into valuable feedstock for industry. A supplementary goal of not increasing greenhouse gas emissions complimented this approach.

Houston's research and due diligence regarding technology, operations and financing has been extensive. The following is a blueprint for a city beginning work exploring the One Bin concept for their city.

The Research

To ensure that One Bin could be a good fit for Houston, the City performed extensive research including site visits both domestic and international, literature reviews, assessment of information and data, as well as numerous meetings and discussions with other cities, trade groups, experts, non-profits, environmental groups and companies.

The City, CCI/C40 and ARUP, the world's largest engineering firm and waste expert, applied for and obtained an additional grant from the Urban Sustainability Directors Network (USDN) to develop an environmental assessment tool that could be used to evaluate current municipal waste systems. The tool, available to any city, serves as a supplementary guide to maximizing landfill diversion and assessing what technologies could be right for a city.

To understand Houston's waste stream, which had not been analyzed for more than ten years, the City conducted a waste characterization study. The data from the study was important for potential contractors/companies to create a realistic proposal. It is important for any city embarking on this process to invest in a current waste characterization study, to clearly understand the composition of the municipal solid waste and help identify what the waste resources available are in any forthcoming contract.

The Technology

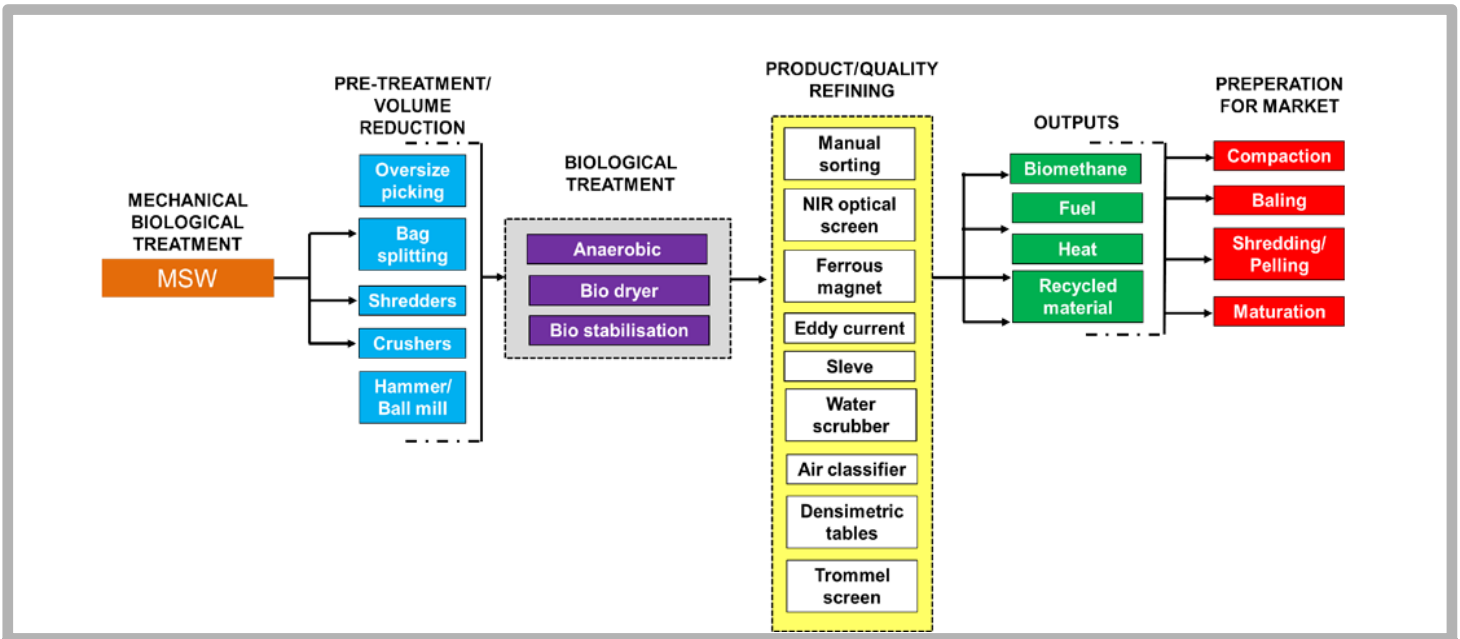
The City used the ARUP tool and the CCI/C40 report to understand what types of technology could deliver a one bin concept. Mechanical biological treatment with advanced resource recovery (MBTARR) was identified as a potential system that could be used to achieve a high diversion rate using a one bin process. This system includes numerous waste treatment technologies: density separation, optical character recognition, dimensional separation, advanced shredders, trommels, eddy currents, screening for 2" minus materials, metal recovery, anaerobic digestion, composting and others. These technologies can convert materials that historically could not be recovered for recycling by current Materials Recovery Facilities (MRFs) into acceptable feedstock for the remanufacture of useable products. Examples of these types of products are food waste stained papers remade into FDA approved napkins, paper towels and toilet tissue.

This approach is preferable because the system recycles many materials that would normally be landfilled. That means fewer greenhouse gas emissions will enter Houston's airshed and revenue from the sales of products is greater due to the increased volume available for reclamation.

These technologies, albeit on a smaller scale than Houston, are being used in other cities in processes that are similar to the one bin concept. The teams that bid on Houston's Request for Proposals (RFP) identified and proposed programs that could scale the technology to process the waste from a city the size of Houston, which generates 435,000 tons of waste annually.

Anaerobic digestion, a critical component of the project, is used to convert food waste into compressed natural gas (CNG). The converted food waste can be used to create transportation fuels for a more energy efficient fleet of waste hauling vehicles in the future. The digested solids and nutrients left over from this process can further be composted and eventually utilized as fertilizer. Because a significant amount of Houston's waste stream is food waste the use of anaerobic digestion is one of the main reasons for the increase in diversion rate.

The following graphic depicts a generic MBTARR System and components.



Generic MBTARR (Mechanical Biological Treatment and Advanced Resource Recovery)

Economic Considerations

The proposed project will provide more than 500 jobs and a multi-million dollar capital investment to Houston through the construction of the waste processing and paper manufacturing complex, with ongoing and operational benefits estimated to be in excess of one billion dollars over the life of the contract. This concept differs from other proposals and other facilities as it is not solely dependent upon the commodities market.

The contractual arrangement being finalized is based on a long-term, 25 year contractual relationship. The contract is complex and is designed to minimize any risk to the City over the life of the contract.

The contract also provides cost neutrality for the City, which was one of the main goals of the RFP, for 25 years at a rate that is equal to our current landfilling contract and is escalated only by Consumer Price Index (CPI) calculation. There are revenue sharing opportunities from any new customers that are brought in by the contractor and/or the City, as well as the sale of carbon credits that will result from the reduction in CO2 emissions.

Cities considering technologies such as these should have a detailed understanding of their cost basis before engaging in the procurement process. For most cities the cost elements (both hard and soft costs) are in the form of disbursements to vendors, allocated direct service provision costs and contract administrative costs.

The major areas to fully analyze are tipping fees paid to a landfill owner, state levied landfill fees and transportation costs (fuel, insurance, salaries, maintenance and operation of vehicles, transfer fees and indirect costs). Estimates are also required for cost reductions associated with increased efficiencies, reduction of capital costs (carts), reduced fuel, reduced operation and maintenance costs as a result of route reductions, reduced administrative costs as a result of the number of contracts to administer, and the implication of revenue sharing. A clear understanding of the current status of all existing related waste/recycling contracts is also necessary, including an understanding of escalation terms and the implications of the conventional commodities market. It is advisable to contract for an external financial analyst to test the assumptions and results derived by internal city professional financial personnel and to review potential bidders financial terms.

This data will allow cities to have a clear understanding of the cost of municipal solid waste services versus the price of a ton of waste being processed.

The Procurement Process

On June 13, 2013, Houston issued a Request for Qualifications (RFQ) to gauge market interest. The RFQ was prepared utilizing the goals and objectives listed below. Only those proposals that specified a plan for financing, building and operating a One Bin facility were to be evaluated. Goals and objectives included:

- Transform the concept of “municipal solid waste” into “resource recovery,” eliminating *all* distinctions between “trash” and “recycling” within the first year following acceptance of equipment and facility.

- Provide the City with access to a substantial increase (17% to 55%) in the volume of valuable resources for recovery within the first year following acceptance of equipment and facility. Provide the highest

guaranteed diversion rate for City residential municipal solid waste (R-MSW) materials, 75% or better within “Year 2” and after.

- Allow all residents to put all of their discarded materials into one bin (excluding heavy trash, e-waste and hazardous household waste).
- Decrease the volume of waste sent to landfills by recovering more materials.
- Allow technology and new process systems to sort household materials more effectively than current systems.
- Reduce greenhouse gas emissions (GHG) from a 2010 baseline of 30,955 MTCO2E, by diverting organic material from landfills, converting the organic material into feedstocks, thereby improving air quality.
- Reduce City MSW costs through reduced charges and revenue sharing.
- Increase the net jobs that result from managing R-MSW as compared to the current method of primarily transferring and disposing of R-MSW in landfills.
- Secure through a Service Agreement, a developer(s) with key team members that include design, equipment, finance, construction firms and a commitment to meet the City’s MWBE subcontracting goals for execution of a contract and long-term operation of the Center.
- Explore the use of publicly available tax incentives to create a feasible transaction.
- Encourage collaboration, creativity and innovation between the selected Respondents and City staff and other stakeholders.

Goals were also included for ongoing recycling education, a recycling educational center and environmental impacts on neighborhoods.

The City was also clear that there would be no incineration of waste considered. Other cities may choose to consider the potential economic benefits against the direct and indirect costs of waste to energy. The City would also hold no equity position in the entity during the term of the service contract.

An Evaluation Committee composed of seven voting members from senior level personnel, one support person and two ex-officio advisors was formed to evaluate the eleven proposals submitted in response to the RFQ.

On April 11, 2014, six of the eleven firms that had responded to the RFQ were prequalified to participate in a Request for Proposals (RFP). Five of the six firms submitted proposals aiming to meet the City’s specified criteria and goals of cost neutrality, guaranteed diversion rates, site location and acceptable environmental technologies.

The responses to the RFP were reviewed internally by the Evaluation Committee. The stringent evaluation process identified two finalists capable of managing the multi-million dollar construction project, as well as meeting the many goals set out by the City.

The City also created an Advisory Committee, another important step to provide stakeholder input to the project. The two short listed proposals were reviewed by the City's external Advisory Committee, comprised of local experts in air quality, health impacts, finance, law, recycling, sustainability, neighborhood and community organizing and innovation.

Stakeholder Engagement and Legislative Outreach

In addition to creating an Advisory Committee, another key step in developing any project is community engagement. In addition to the City's outreach, outside agencies were hired to help increase public awareness of the project. A One Bin for All website was also created to provide accurate facts and information about the project. The City has worked diligently to dispel myths about the project. City elected officials have been briefed on One Bin facts, progress and other considerations.

Lessons Learned

There have been many lessons learned during Houston's journey to this stage of the One Bin for All project. The lessons learned below briefly chronicle Houston's path and a more detailed explanation of each will be provided upon request.

Leadership

- Ensure there is consensus among the City leadership team regarding the goals of the project.

- Hire a qualified project manager, and create a city team of advisors to help guide the project. The team should be appointed by the mayor and be committed and supportive of the project moving forward.

Research/Data

- Conduct extensive interviews/meetings with business community leaders to ensure understanding of the project and process.

- Conduct group and stakeholder tours of similar plants in other cities.

- Ensure risks are adequately communicated and managed.

Process

- Once a vendor is chosen, work closely with the team to ensure constant progress. Changing scopes of work can occur through the negotiation process, which can improve the project financially and socially, but understand this will add to the complexity and length of the process. This type of communication and changes should not be discouraged, but understanding of the implications is essential.

- Create reasonable expectations and timelines. New projects, particularly ones that are groundbreaking, take longer to implement in city government. Understand that changing a core service (such as garbage and recycling services) takes time and constant communication.

- Work closely and collaboratively with procurement staff and include them on the city team. Ensure procurement leadership are supportive of this new concept and the project and will work with the team on advancing the goals of the project.

Communication/Stakeholder input

- Upfront and constant communication with stakeholders is needed to dispel myths which if left unaddressed, create significant loss of project time and energy.

- Stakeholder communications can be adversely affected by the lack of a common lexicon between waste experts and the public, which will result in confusion and a loss of time.

Contract Status

Contract negotiations are ongoing. Discussions, while still in progress, have thus far yielded a viable proposal that is entirely privately financed with the contractor recouping expenses from the sale of feedstock, recyclables and commercially manufactured goods. The City would be required to provide residential waste for the facility and enjoy the savings resulting from lower fuel costs and a smaller collection fleet. To protect the City's interests, the proposed contract requires a funded liquidated damages account, which would be used to restore City solid waste operations to preexisting levels in the event of default.

The technology for a one bin approach is available and has proven effective in smaller applications. Most proposed contract terms, at this point in the negotiations, appear favorable to the City's requirement of cost neutrality. The City is, however, conducting additional due diligence and financial review of the proposed project structure, risk management issues and financial terms.

Final Observation

The One Bin project is a testament to Houston's innovative visionary spirit. It is the next evolution of recycling, allowing Houston residents to place all trash, recyclables and compostables in one bin, using technology to provide for a much higher rate of resource recovery. By using a combination of existing waste sorting and processing technology in a new way, One Bin for All can help Houston lead the nation to a greener future.

For more information, please visit
Houstontx.gov/onebinforall.