



PUTTING PLASTIC TO WORK FOR TEXAS

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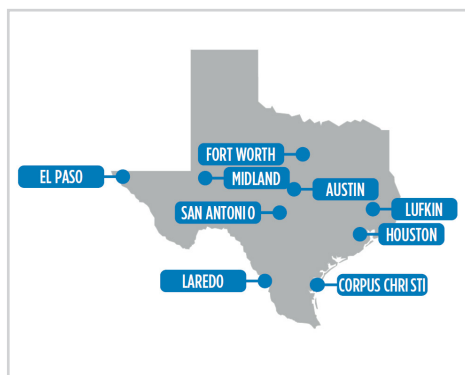
Appendix: Economic Model, Assumptions, and Detailed Financial Analysis

Plastic production, processing, and recycling contribute to the state economy and plastic material provides value to consumers. However, plastic material is ubiquitous in roadside and waterway litter, which can clog stormwater systems, devalue private property and public space, and damage agricultural products (ex. cotton, livestock). To address this issue, a proposed public policy approach has been developed to increase the recovery and diversion of these plastics in Texas. “Putting Plastic to Work for Texas” would place an initial 1¢ collection at the point of sale for non-alcoholic PET beverage bottles, plastic bags, and plastic film. The 1¢ per item collection would be limited to non-alcoholic PET beverage bottles and plastic bags/film used to carry or transport purchased items. Consumers could then redeem the various plastic types and receive a per pound rebate for recovered plastic material, which would initially be 25¢ per pound. After accounting for program administration and handling costs, remaining revenue from the 1¢ per item collection could provide sustained funding for litter prevention education and law enforcement of litter violations as well as funding for natural disaster community resiliency, recovery, planning, and preparedness. A Consortium comprised of representatives across the system, system stakeholders, and other designees would be responsible for providing ongoing program management to entities across the system, which would include assessing potential needs to adjust the per item collection amount.

To evaluate key issues associated with the “Putting Plastic to Work for Texas” initiative, Texans For Clean Water retained Burns & McDonnell review the economic implications to the state by increasing plastic recovery through proposed policy. This review provides perspective on the following:

- Overview of Statewide Projects to Assess Plastics Management and Litter in Texas
- Description of the Proposed “Putting Plastic to Work for Texas” Program
- What Plastic Materials Would Be Included in the Program?
- How Much Plastic is Generated and Recycled Annually in Texas?
- Potential Economic Impacts of the Proposed Policy
- End Markets and Material Demand
- Potential Program Benefits and Challenges

Multiple initiatives by state agencies and non-profit organizations have evaluated the impacts of plastics and litter in Texas. A summary of these initiatives follows:



Study on the Economic Impacts of Recycling (SEIR)

This 2017 study completed by the Texas Commission on Environmental Quality (TCEQ) documented the quantities of municipal solid waste recycled and landfilled in Texas.¹ For plastics, the study concluded that 108,000 tons of plastic (including 47,000 tons of PET) were recycled in 2015. However, approximately 331,000 tons of PET and 1,101,000 tons of plastic bags and film wrap were landfilled. Based on this data, approximately 12.4 percent of PET was recycled in Texas in 2015.

The Cost of Litter & Illegal Dumping in Texas: A Case Study of Nine Cities Across the State

A 2016 study completed by Texans For Clean Water documented that nine cities in Texas (which represent 25 percent of the state's population), spend more than \$50 million annually on prevention, education, abatement, and enforcement of litter and illegal dumping violations.



Texas Litter Survey

In 2013, the Texas Department of Transportation (TxDOT) completed a statewide study to document litter on TxDOT maintained roads. This study concluded that there were more than 435 million littered items on TxDOT's roadway system, including approximately 13 million plastic film packaging items and 17 million plastic water bottles.

TxDOT and Keep Texas Beautiful's (KTB) Anti-Litter Efforts

With its 387 affiliates across Texas, KTB offers statewide litter prevention, waste reduction, and beautification programs. KTB's 2016 Statewide Return on Investment Study showed that services provided by KTB and its affiliates result in an annual value of more than \$20 million. This is in addition to the approximately \$47 million incurred annually by TxDOT for litter clean-up.



Adopt a Beach Program

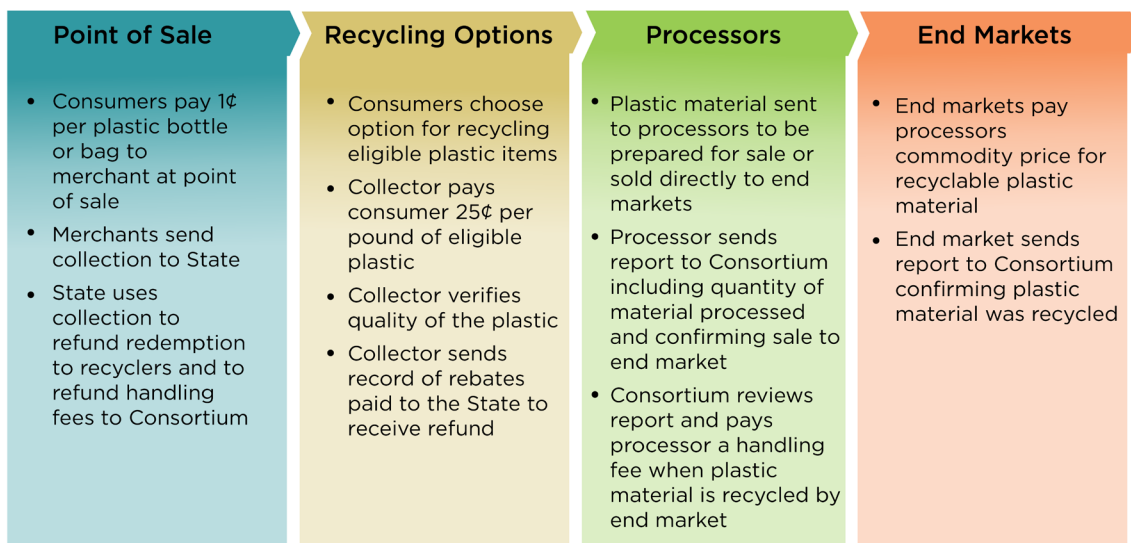
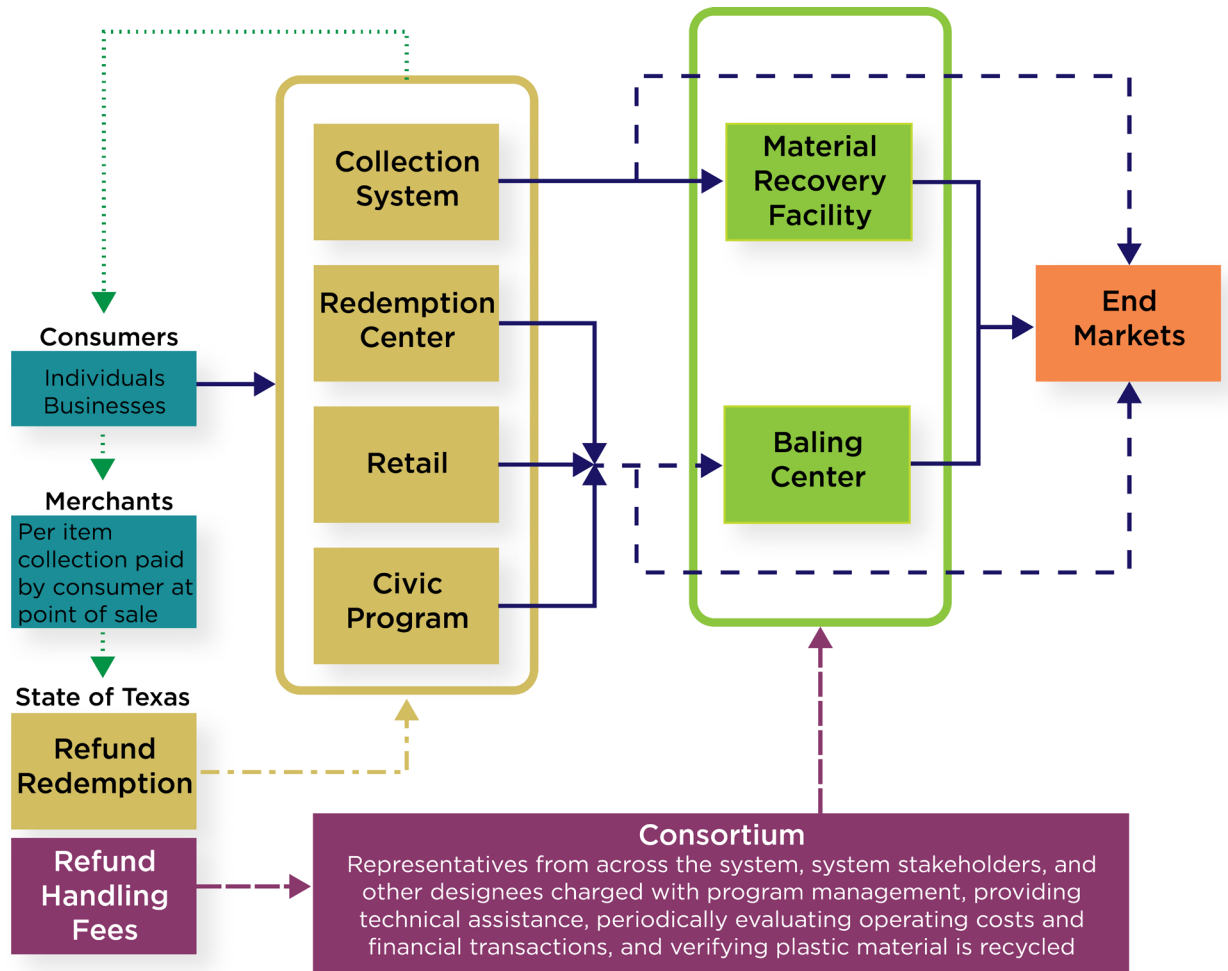
Since the General Land Office's Adopt a Beach Program began in 1986, more than 517,000 volunteers have removed more than 9,500 tons of trash from Texas beaches. The 2016 data showed that more than 5,600 people collected close to 265,000 items, and various plastics accounted for 44 percent of the items.

1. Study on the Economic Impacts of Recycling (July 2017). Prepared by Burns & McDonnell for TCEQ. <https://www.tceq.texas.gov/p2/recycle/study-on-the-economic-impacts-of-recycling>.

Figure 3-1 describes how plastic material, including plastic polyethylene terephthalate (PET) beverage bottles, bags, and film, would flow from consumers through end markets under the proposed program. Section 4.0 describes the materials that would be included in the program. Descriptions of each step are described after Figure 3-1.



FIGURE 3-1: PLASTIC RECYCLING PROGRAM FLOWCHART



LEGEND



3.1 Point of Sale - Consumers, Merchants, and State of Texas

When the program commences, consumers would pay 1¢ for each eligible plastic bottle and bag at the point of sale. The per item collection would be limited to non-alcoholic PET beverage bottles and plastic bags/film used to carry or transport purchased items. While the per item collection would not apply to the plastic packaging in which a product is contained (e.g., bread enclosed in a plastic bag), these materials are eligible for redemption funds. Section 4.0 describes the types of plastics that would be subject to the per item collection and would be eligible for redemption funds. Merchants would include the per item collection with the applicable sales tax, which would be paid to the State Comptroller through the existing sales tax collection system. The State of Texas would be responsible for overall program administration.

3.2 Recycling Options

Consumers will have a variety of options for recycling plastics. Consumers would be able to have their materials collected as a part of a recycling collection program or take their materials to redemption centers, retailers, or civic programs, as described below.

Collection System

Consumers who have an existing recycling program, either a private hauler or a municipal collection system, could continue to recycle their plastics as they do currently. A collection system could provide this service through a curbside recycling program or by providing designated drop-off centers for collecting eligible plastic material. Recycling drop-off facilities could bale the material and send it directly to end markets, which would mean the drop-off facility would receive the rebate, handling fee, and revenue from sale of the material (based on the price paid by the end market to the drop-off facility). Consumers who choose to recycle plastic items through their current collection system would not receive the per pound rebate. Instead, the collection system entity, (e.g. a municipality), could negotiate with its material recovery facility to determine how the rebate received by the material recovery facility would be shared with the collection system. The collection system could use its share of the rebate to support its operations and public education and outreach efforts.

Redemption Center

A redemption center could be operated by a private business or other non-profit organization. The redemption center would accept eligible plastic material and pay the rebate value to consumers. A redemption center could be located within another business or at a stand-alone location. The redemption center would keep a record of rebates paid to consumers and the amount of plastic collected, which it would submit to the State Comptroller to receive a refund for the rebate. In addition to the rebate, to compensate for operational costs redemption centers would receive a per pound handling fee for PET bottles and plastic bags and film if sold directly to end markets. Handling fees could also vary by geographic location and population density (rural or urban designation). The basis for handling fees is described on the next page. Redemption centers could also send material to baling centers, which would sell to end markets and receive a per pound handling fee. The handling fee

Defining Consumers

Participation in program would be open to consumers who generate municipal solid waste, including individuals and certain businesses and commercial entities. Examples of businesses and commercial entities that would be included are offices, restaurants, schools, and retailers. Each of these entities would be able to participate by collecting post-consumer PET bottles, plastic bags, and plastic film to receive a rebate. Businesses that generate or receive large quantities of source-separated PET and plastic film would be excluded from the program.² Industrial or manufacturing entities would not be included in the program since plastic material generated by these sources is generally already handled by existing material management systems.



2. A furniture center is an example of a generator of a large amount of source-separated plastic film that would be excluded. Pieces of furniture or mattresses are often wrapped within a plastic cover for transportation. There are already end markets available to manage this source of clean and dry plastic. While source-separated plastic film generated by furniture centers would not be included, the individual who receives the plastic film at home could choose to redeem the material.

would be distributed only to the entity providing the material directly to end markets. The handling fee is intended to compensate the entity for the additional effort needed to process the plastic bottles, bags, and film. The redemption centers and processors could separately negotiate to share the handling fee amongst themselves.

Variation by Rural and Urban Designation: The Consortium, further described in Section 3.5, would have the ability to set per pound handling fees initially and to adjust handling fees as the program matures and markets fluctuate. Because of varying distances to end markets, transportation costs, and volume of recyclable materials generated, handling costs for redemption centers in rural areas are likely to be higher than for those in urban areas. Therefore, handling fees redemption centers receive would be based on population and geographic location.

For modeling purposes in the initial evaluation, Burns & McDonnell utilized U.S. Census Bureau definitions and data for rural and urban areas. Rural areas were defined as those with a population of less than 2,500 people, and urban areas were defined as those with 2,500 people or more.³ Additional analysis would be needed to determine the actual criteria used to determine rural and urban areas for program purposes.

Handling Fee Basis

Handling fees would be implemented to provide a “market floor,” or baseline value for the program commodities handled by the redemption center. This is intended to provide an incentive for accepting materials and processing them for end markets. Handling fees may vary by rural or urban status and by material type.

Variation by Material Type: There is also potential for the need for handling fees to be varied by material type. In the economic model, Burns & McDonnell based handling fees for PET bottles on recent data received from the Container Recycling Institute (CRI). Program data from ten states with redemption programs indicates handling fees ranging from zero to 4¢ per container for plastic bottles. Based on this data, Burns & McDonnell assumed a per container handling fee for PET bottles of 3¢ for rural areas and 2¢ for urban areas. Based on these per container assumptions and the material weight assumptions utilized in the model (refer to Section 5.0), the model utilized PET handling fees of \$0.90 per pound for rural areas and \$0.60 per pound for urban areas. Data was unavailable for handling costs for plastic film. Therefore, the same per pound handling fees were applied to PET bottles and plastic film for modeling purposes. Further analysis would need to be conducted to determine appropriate handling fees for each material and the Consortium would have the ability to adjust handling fees as needed.

Retail Stores

Retail stores may institute programs to collect eligible plastics as a service to customers. For example, grocery and big box stores often provide collection containers near entrances. If a retailer decides to participate as a redemption center, it would maintain a list of the rebates paid to consumers, which it would submit to the State to receive reimbursement for the applicable rebates. Retailers would send material either to baling centers or directly to end markets to receive handling fee and material sales revenue. Retailer could also choose to partner with a civic program or other non-profit as a collection point for material consumers choose to donate for the rebate to be collected by organizing entity.



3. The US Census Bureau categorizes areas (census tracts or blocks) based on population density. An area with more than 2,500 people is classified as “urban,” while all remaining areas are considered “rural.” Based on this methodology, Texas population distribution is currently 15.3 percent rural and 84.7 percent urban. The Consortium would have authority to set criteria for determining geographical areas considered urban or rural, designating which areas are urban or rural, and periodically reviewing criteria and designations based on conditions and available data. For example, the criteria for defining a rural area could be expanded to include higher population communities and/or areas located further from metropolitan areas.



Civic Program

Consumers may choose to recycle eligible plastics by recycling them through collection facilities at local schools, churches, or other civic groups, if available. The civic programs could take the recycled items to redemption centers to collect the rebate. Civic programs would also have the option to provide a rebate to the consumers or to apply the rebates to support their community programs.

3.3 Processors

After eligible plastics are collected, they would be sent to end markets or to processors that would prepare the material for sale to end markets. The processor would be a material recovery facility (MRF) or a baling center.

- **MRF:** A specialized processing facility that receives, sorts, and prepares recyclable materials for sale to end markets.
- **Baling Center:** A facility that compresses and binds loose material together into bales (i.e., blocks) that can be transported to end markets.

The type of processor would depend on the degree to which the plastic material is sorted. Material collected through a single-stream collection system would require sorting that a MRF provides. Plastic material collected by redemption centers, retailers, or civic programs is often already source-separated. In some cases, high quality plastic material that is already sorted may be sold directly to end markets.

Can Texas MRFs Process PET Beverage Bottles and Plastic Bags and Film?

Burns & McDonnell interviewed multiple MRFs in Texas to better understand their processing capabilities and challenges. Since MRFs already focus on recovering PET beverage



bottles, they already have extensive experience recovering this material. Many Texas MRFs use optical sorters to recover PET bottles. Several MRFs reported that their systems have excess capacity to process additional PET, but there would be quantity and logistics limitations to the capabilities of existing equipment.

On the other hand, the recovery of plastic bags and film at MRFs is significantly more challenging. While some MRFs are recovering plastic bags and film, others are not. The reported reasons for not recovering plastic bags and film are limited end markets, relatively high processing costs, quality of materials, and operational impacts on processing equipment. For MRFs that recover plastic bags and film, they utilize manual collection, sometimes assisted by vacuum units that suck the material after staff pick it. Based on information from two Texas MRFs that collect plastic bags and film, it was estimated that they are able to currently recover a minimum of 10 percent and up to 50 percent of quantities received. To recover greater quantities of plastic bags and film, MRFs would need to either add staff or install additional equipment, such as optical sorters. The optical-sorting technology for recovering plastic bags is still evolving, and capital costs for optical sorters can range from \$700,000 to \$2,000,000. One MRF equipment vendor estimated that a large MRF would need approximately 80 people to sort plastic bags and film based on an assumption that five percent of the incoming material would be these types of plastics (for a MRF that presently have about 30 staff per shift). Due to the operational challenges and capital cost of optical sorters, MRFs do not represent the preferred method for recovering plastic bags and film.

Processors would be eligible to receive a per pound handling fee from the Consortium (as described in Section 3.5) for eligible recycled plastics along with revenue for material sold. The processor would submit a report to the Consortium to document the quantity and type of plastic recycled and provide confirmation of sale to an end market user. The Consortium would review the processor's documentation and end market reports to validate the plastic material is recycled and provide the handling fee due to the processor. The handling fee is intended to incentivize current and future processing infrastructure (i.e., redemption centers, retail programs, baling centers, MRFs, etc.) to accept additional plastic material and to cover a portion of the associated operating costs.

3.4 End Markets

End markets would purchase recycled plastic from MRFs and baling centers for use in their operations to manufacture new products. End markets would pay MRFs and baling centers based on the commodity market price for plastic bottles and plastic film. Refer to Section 7.0, End Markets and Material Demand, for further details on manufacturing efforts in Texas.

3.5 Consortium

The Consortium would be responsible for providing ongoing program management to entities across the system. It would be responsible for evaluating the plastic recycling program's performance and the per item collection amount, per pound rebate, and per pound handling amount in relation to current market prices for plastic material, and assistance for redemption centers (technical assistance, operational needs, and program outreach and communications). Based on the Consortium's evaluation, the Consortium may periodically adjust the financial transactions to optimize functionality and stability of the recycling program. The Consortium would be comprised of representatives across the system, system stakeholders, and other designees to be determined. Examples of the other activities supported by the Consortium would include:

- Providing initial working capital for payments of rebates and handling fees
- Providing assistance to redemption centers (technical assistance, operational needs, and program outreach)
- Determining what is acceptable plastic material and plastic items subject to the collection and eligible for the handling fee
- Certifying participating end markets and that plastic material is recycled
- Managing working capital and reserve funds and handling fee payments
- Coordinating public education and outreach to support program operation
- Providing grants or loans to increase diversity of use for recycled material and marketing assistance for end use products
- Consistent reporting schedule summarizing key program information (e.g., annual report the communicates quantities of plastic material recycled, collection rate, participation data, and any proposed adjustments to the program)

What is Recycling?

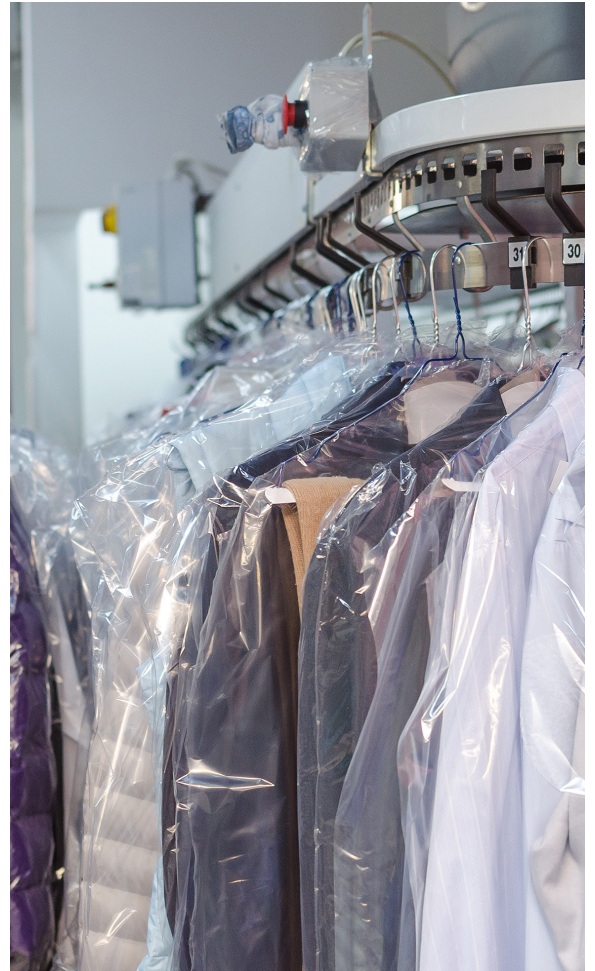
In order to be eligible for rebates, material would need to meet the State of Texas definition of recycling. Recycling is defined in the Texas Health and Safety Code Section 361.421(8) as "process by which materials that have served their intended use or are scrapped, discarded, used, surplus, or obsolete are collected, separated, or processed and returned to use in the form of raw materials in the production of new products."

State Program Administration and Use of Program Revenue

The State of Texas would be responsible for overall administration of the program. Consumers would initially pay 1¢ per eligible plastic bottle and bag to merchants at the point of sale. Merchants would send the amount collected via the existing State Comptroller revenue system. The intent would be to use the established financial transaction system to transfer collected funds so as to not require the creation of a new separate system. The State would use a portion of the revenue to reimburse the recycling collectors for rebates paid to consumers and to reimburse the Consortium for handling fees paid to processors. The State would not have any interaction with processors or end markets. Instead, the Consortium would have the authority to certify end markets and review documentation from end markets to verify recycling of the plastic material. Once the Consortium verifies the plastic material has been recycled, it would pay the applicable handling fee to processors and submit the amount paid to the State for reimbursement.

A portion of the revenue would also be allocated to the Consortium to provide initial working capital to new redemption centers. The initial working capital would enable the redemption center to open and immediately begin paying the per pound rebate for eligible plastic material to consumers.

Revenue remaining after the State has paid out reimbursements, administrative costs, and fulfilling reserve amounts, would be available for the State to allocate to other programs. It is anticipated that the State would apply this revenue to sustain activities related to community resiliency, recovery, planning, and preparedness as well as litter prevention education and law enforcement activities. These activities would be supported by providing grants to counties and municipalities to support their operation costs in their communities.



WHAT PLASTIC MATERIALS WOULD BE INCLUDED IN THE PROGRAM?

Generally, plastic PET beverage bottles and plastic bags and other film plastics would be included in qualifying materials. Table 4-1 presents material types that would qualify for the point of sale per item collection and for the per pound rebate. There would be additional film plastics that qualify for the rebate, beyond the plastic bags that qualify for the per item collection. Qualifying PET bottles would be subject to both the per item collection and eligible for the per pound rebate. Figure 4-1 presents examples of material types that will be excluded from qualifying materials.



TABLE 4-1: QUALIFYING PLASTIC MATERIALS



Eligible for Collection Per Item



Eligible for Rebate Per Pound



- PET (polyethylene terephthalate) plastic bottles used to contain water, sport drinks, or sodas

Definition: A PET container with a neck smaller than the body that contains liquids. Usually designated with a #1 recycling symbol.



Non-alcoholic Beverage Containers



- Shopping bags (retail)
- Grocery bags
- Carryout bags

Definition: A single-use plastic bag provided at point of sale that does not hold a particular shape.



Single-Use Plastic Bags



- Suit or garment bags

Definition: Single-use plastic film bags provided by merchant for cleaned garments. Sometimes provided with purchased garments.



Dry Cleaning Bags



- Plastic bags or pouches

Definition: Plastic packaging e-commerce retailer places items or to facilitate aggregation of items for delivery to the consumer.



E-Commerce Plastic



- Food packaging (e.g., bread and frozen food)
- Sealable food bags
- Produce bags
- Newspaper bags
- Case wrap (e.g., beverage cases, bathroom tissue, paper towels, and diapers)
- Air pillows

Definition: A thin flexible material of varying thicknesses which does not hold a particular shape.



Post-Consumer Plastic Film

For plastic items to be eligible for the per pound rebate, they must be:

- clean and dry;
- free of laminated materials or composites (e.g., paper laminated with plastic or padded envelopes); and
- not contain excluded items as shown in Figure 4-1.

FIGURE 4-1: EXCLUDED MATERIALS



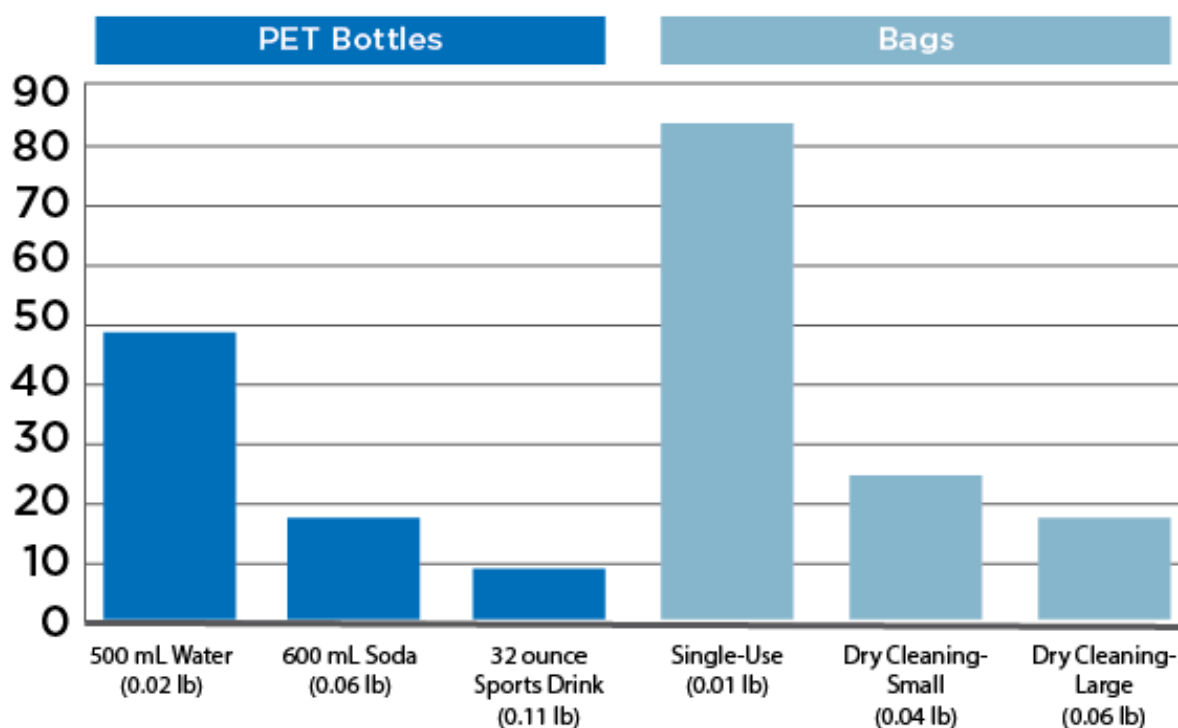
HOW MUCH PLASTIC IS GENERATED AND RECYCLED ANNUALLY IN TEXAS?

A key component for evaluating the economic impact of the proposed policy is the amount of PET bottles and plastic bags and film that are consumed and recycled in Texas annually. Statewide data was used when available, and supplemented with national data when Texas-specific data was unavailable. Data was assessed on a per-capita basis and applied to 2017 population levels to produce and compare quantity totals.

Determining a conversion rate for the number of items comprising a pound of PET bottles and a pound of plastic bags and film was key in the economic analysis of the proposed policy. The 1¢ collection is per item and the redemption and handling fees are paid on a per pound basis. Additionally, industry data is often reported in differing units, which necessitated converting data from the given unit to another (e.g., from pounds or tons to number of items).

Based on industry data and interviews, the economic analysis assumed an average of 30 PET bottles per pound⁴ and 70 plastic bags per pound⁵ of material. Actual weights of individual items vary based on material thickness and item size. Figure 5-1 compares the weights and number of items per pound.

FIGURE 5-1: NUMBER OF PLASTIC ITEMS IN A POUND



Data from this section is used in Section 6.0, which presents the economic model for a range of recycling rate scenarios possible under the proposed policy.

4. The assumption of 30 PET bottles per pound was derived from multiple data sources. The 2015 PET Resin Association (PETRA) data indicates that an average PET water bottle weighs 9.9 grams, equating to 45.8 bottles per pound. Based on information from one Texas MRF, there are approximately 35-40 PET bottles per pound. Taking into account that PET bottles other than standard 500 mL water bottles are typically heavier than the water bottles, Burns & McDonnell assumed a conservative 30 bottles per pound for modeling purposes.

5. The assumption of 70 plastic bags per pound was based on two data points. A carton of 1,000 typical “t-shirt” plastic carryout bags weighs 12 pounds, equating to 83.3 bags per pound. Based on information from one Texas MRF, there are approximately 70 plastic bags per pound. Burns & McDonnell assumed a conservative 70 bags per pound, taking into consideration information from the MRF and that a portion of plastic bags are of heavier weights and/or larger sizes (e.g. dry cleaning bags).



5.1 Consumption of Plastic Subject to Per Item Collection

The plastic materials discussed in this section include those that are purchased or used by consumers and therefore subject to the per item collection. Refer to Table 4-1 for information regarding materials subject to the collection.

PET: Based on data from Section 3.3 of the TCEQ SEIR report, Texans generated approximately 378,000 tons of PET in 2015, recycling 47,000 tons and landfilling 331,000 tons. While bottles likely comprise the majority of the types of PET disposed, only some of the waste characterization data utilized for the TCEQ SEIR distinguished between PET types.⁶ If it were assumed, based on data from the TCEQ SEIR, that 87 percent of the 378,000 tons of PET generated in Texas were from bottles, it would equate to approximately 328,860 tons of PET bottles. Utilizing the assumption of an average of 30 PET bottles per pound, this would be equivalent to approximately 19.7 billion PET bottles generated in Texas in 2017, or 719 bottles per capita. However, this reflects a single data point and Burns & McDonnell felt that additional data sources should be considered, as described in the following paragraph.

Because previous Texas waste studies did not provide a complete understanding of the PET types, Burns & McDonnell compared state-level data to multiple national PET consumption data sources. Data from the U.S. Environmental Protection Agency (EPA), CRI, and PET Resin Association (PETRA) each indicated a similar national data point for PET bottle consumption, averaging 542 bottles per capita from these three sources. To provide conservative estimates for input into the economic analysis, Burns & McDonnell utilized this assumption of 542 bottles consumed per capita, which would be equivalent to a total of approximately 15.4 billion total PET bottles consumed in Texas in 2017. However, based on TCEQ SEIR data, which would indicate a consumption rate of 719 bottles per capita, Texas could potentially produce higher per capita bottle consumption, thereby increasing per item collection revenue for the proposed program, as well as material recycled.

Plastic Bags and Film: Data from the industry journal *Waste Management* indicated that the United States consumed a total of 103.5 billion single-use plastic retail bags in 2014, or approximately 324.8 bags per capita. Applying this per capita consumption to 2017 Texas population data (approximately 28.3 million people), the State was assumed to have consumed a total of approximately 9.2 billion plastic retail bags, or 65,710 tons, in 2017.

Based on data from the Drycleaning and Laundry Institute, roughly 700 million dry cleaning bags were consumed in the United States in 2005, equating to approximately 2.4 bags consumed per capita. Some consumers likely use significantly more dry cleaning bags per year and some do not use any dry cleaning bags. Based on a 2.4 per capita consumption rate, multiplied by Texas' 2017 population, the State was assumed to have consumed a total of approximately 67.1 million dry-cleaning bags, or 479 tons of plastic film from dry cleaning bags, in 2017.

Plastic bags used in e-commerce, as defined in Table 4-1, would also be subject to the per item collection and the per pound redemption. Data regarding the consumption of e-commerce plastic bags was not available. Because a basis for estimates of e-commerce material quantities was unavailable, Burns & McDonnell did not include an assumption for consumption or recycling of these materials.

6. The TCEQ SEIR utilized data from waste characterization studies from multiple Texas cities, as detailed in Section 5 of this TCEQ report. Of the cities that provided more detailed PET data, PET bottles represented approximately 87 percent of the total PET disposed.

In summary, Burns & McDonnell assumed that an annual total of 327.2 plastic bags per capita (324.8 plastic retail and 2.4 dry cleaning bags) subject to the per item collection would be consumed. This would be equivalent to approximately 9.27 billion bags (plastic retail plus dry cleaning bags) per year consumed in Texas. This would be equivalent to approximately 66,190 total tons of film plastic, subject to the per item collection, consumed in Texas on an annual basis. The actual weight of plastic bags consumed may be higher because some plastic bags are larger or may be made out of thicker plastic film (e.g. dry cleaning bags).

5.2 Recycling of Plastics Eligible for Per Pound Redemption

The economic impacts of the proposed policy are largely dependent on the amount of material recycled through the redemption options described in Section 3.2. As described in Section 4.0, there would be additional film plastics eligible for recycling redemption that are not included in materials subject to the per item collection. Estimated recycling rates for PET and plastic bags and film are discussed below. This information was used for estimating the recycling rate scenarios presented in Section 6.0.

PET: The current PET recycling rate for Texas appears to be lower than the national average, and both the state and national averages appear to be lower than recycling rates in states with established redemption programs.

- **State of Texas:** Based on data from the 2017 TCEQ SEIR, Texas had an approximately 12.4 percent PET recycling rate in 2015.⁷
- **United States:** Data from the U.S. EPA, CRI, and PETRA show a national PET recycling rate of approximately 31 percent.
- **States with Monetary Collection and Redemption Policies:** Ten states currently implement programs for which a monetary collection is made on a per item basis at the point of sale and consumers can recycle items at redemption centers or other facilities to receive a rebate, though program structures vary. Recycling rates for program accepted materials in these states range from approximately 51 to 93 percent, with an average of about 74 percent.⁸

Plastic Bags and Film: Data for recycling rates of plastic bags and film was not available on a statewide or national basis. Based on industry interviews, a typical MRF recovers less than 10 percent of the film plastic received by the facility, and the plastic received by the facility represents only a portion of the total bags and film consumed. With this information, Burns & McDonnell assumed a current two percent recycling rate for bags and film for the economic analysis. The recycling rate for plastic bags and film would be expected to increase at a slower rate than for PET bottles, due to multiple factors including issues with ensuring material quality, less existing sorting infrastructure, and limited end markets.

Other post-consumer plastic film is not subject to the per item collection, but is eligible for the per pound rebate, as defined in Table 4-1. Based on data from Section 5 of the TCEQ SEIR report, Texans consume approximately 1.1 million tons of other post-consumer plastic film annually. While data on the detailed composition of this material was unavailable, it is assumed that substantial quantities (like trash bags and other contaminated film and bags) would continue to be landfilled. On the other hand, a significant amount of plastic bags and film could potentially be recycled.



7. Burns & McDonnell used waste characterization data from the TCEQ SEIR Study to estimate the PET recycling rate. About 47,000 tons of PET was recycled and about 331,000 tons of PET was disposed in 2015. Dividing the 47,000 tons recycled by the 378,000 tons that were generated (recycled + landfilled) yields a 12.4 percent recycling rate.

8. Recycling rate data received from CRI for ten states for recent program years (2014-2016) indicates recycling rates ranging from 51 percent (Connecticut) to 93 percent (Michigan), with an average of 74 percent.

6.0 POTENTIAL ECONOMIC IMPACTS OF THE PROPOSED POLICY

The purpose of this section is to provide an understanding of the potential economic impacts of the “Putting Plastic to Work for Texas” initiative. To complete this task, Burns & McDonnell developed an Excel-based econometric model that communicates the levels of expenses and revenue based on varied recycling rates for PET and plastic bags and film. A total of six scenarios (as described in Section 6.2) were developed. This evaluation was conducted at a planning level and should be considered a preliminary assessment. Key components to the economic model are communicated in Section 6.1.

6.1 Key Revenue and Expense Related Assumptions

The model included multiple key assumptions for program revenue and expenses.

Revenue Assumptions

Key revenue related assumptions for the econometric model focus on the quantities of materials that will be subject to the per item collection and the amount of the per item collection.

Plastic Consumption and Recycling Quantities: The amount of PET, plastic bags, and film contributing to revenue generation was based on the consumption data described in Section 5.1, which was approximately 15.4 billion non-alcoholic beverage bottles and 9.3 billion plastic bags and film items.

Per Item Collection: It was assumed that the initial per item collection would be 1¢. However, as the recycling rate increases for the program materials, there is potential for a need to gradually adjust the per item collection from 1¢ to as high as 5¢. The timing of when adjustments will need to be made will depend on the timing of when recycling rates are achieved and the potential use of reserve funds to delay the need for increases. A component of the scenarios described in Section 6.2 are potential adjustments to the per item collection rates. Actual adjustments would be made at the discretion of the Consortium based on program and market factors. The model also assumes that adjustments to the per collection basis would be in whole cents, and no fractions of a cent.

Expense Related Assumptions

The program would include the following expenses that are accounted for in the econometric model.

Recycling Rates: The assumed Status Quo recycling rates for PET and plastic bags and film were based on the analysis described in Section 5.0. For PET bottles, Burns & McDonnell assumed recycling rates that would range from 20 – 85 percent for Scenarios 1 - 6. The upper bound of this assumption was based on actual recycling rates realized by well-established, long-running recycling rebate programs in other states (refer to Section 5.2). For plastic bags and film, the assumed rates ranged from 5 – 25 percent. Burns & McDonnell was unable to identify data regarding actual program impacts on plastic bag and film recycling rates. Scenarios 1 – 6 therefore present possibilities for conservative increases in the plastic bag and film recycling rate, understanding that it would likely increase more slowly than PET recycling rates. These percentages are intended to convey robust flexibility in the system is necessary for continued positive funding. Consortium will have ability to adjust variables based on available data in order to allocate an appropriate amount in handling fees to maintain redemption centers for public convenience, provide redemption amount that is a viable incentive for consumers to return material, and ensure sustainable program funding.

Redemption Fees: Initially, consumers would receive a per pound rebate of 25¢ for recycling eligible PET bottles and plastic bags and film materials, as described in Table 4-1. As described in Scenario 2 and depicted in Table 6-1, the Consortium would have the ability to adjust redemption fees to further incentivize recycling.

Handling Fees: Plastics processors would receive a per pound handling fee for eligible materials. To incentivize processors to accept and process material, handling fees would need to be set so that they cover the full cost of processing and handling material for delivery to end markets. As further described in Section 3.2,

handling fees for rural areas would be higher than for urban areas due to the higher costs for processing and transporting material in rural areas. For initial modeling purposes, Burns and McDonnell did not differentiate handling fees for PET bottles and plastic bags and film, and held handling fees constant at \$0.90 per pound for rural areas and \$0.60 per pound for urban areas for each scenario presented in Section 6.2. The Consortium would have the ability to set different handling fees for PET bottles and plastic bags and film, as well as adjust handling fees over time.

State Administration: The State of Texas would require an annual budget for administering the program among one or more state agencies. While only intended as a placeholder, Burns & McDonnell assumed a baseline, annual budget of \$20 million. It is possible that there would be incremental increases in administrative expenses based on increased recycling rates. However, for purposes of this model, State Administration expenses were held constant for all scenarios in order to more clearly demonstrate the impacts that recycling rates, per item collections, and per pound rebates would potentially have on program economic outcomes. Burns & McDonnell did not develop an independent estimate of the annual costs for program administration.

State Working Capital and Reserve Fund: A portion of program expenditures would be in the form of contributions to a State Working Capital and Reserve Fund, which would be intended to provide additional funds for pay out of handling fees and rebates in a scenario where expenditures exceed incoming revenues from per item collections. For modeling purposes and to more clearly demonstrate the impacts of other economic inputs, as was done with State Administration, State Working Capital and Reserve Fund expenditures were held constant for each scenario presented on the previous page. An annual contribution of \$10 million was assumed; however, the Consortium would have the ability to adjust the fund contribution, and it would either increase or decrease over time.

Consortium to Make Financial Adjustments

There may be a need to make adjustments over time to key financial program metrics. As discussed in Section 3.5, the Consortium would be responsible for the per item collection amount, per pound rebate, and per pound handling amount in relation to current market prices for plastic material, and assistance for redemption centers (technical assistance, operational needs, and program outreach and communications).

6.2 Model Results

Based on the analysis and assumptions described in this report, Burns & McDonnell evaluated the potential revenues, expenditures, and resulting available program funds (net revenue) based on a series of recycling rates, from low to high for both PET bottles and plastic bags and film.

Potential Program Scenarios

The scenarios presented in this section were selected to illustrate hypothetical examples of program economics based on changes in recycling rates and program economic inputs (collection per item, redemption per pound, and handling fees per pound) that would ultimately be decided and adjusted by the Consortium. These scenarios emphasize the critical and active role that the Consortium would play throughout the life of the program.

There are any number of scenarios that could occur based on these factors. These scenarios are not a prediction of how the program would evolve over time, but rather are presented for illustrative purposes to provide a snapshot of program possibilities. Table 6-1 presents the inputs for each illustrated scenario and Table 6-2 presents the results of the economic modeling based on the inputs. An explanation of each scenario is presented below Table 6-2. The Appendix: Economic Model, Assumptions, and Detailed Financial Analysis features a more detailed version of Table 6-2.

TABLE 6-1: SCENARIO BASIS SUMMARY: RECYCLING RATES, TONS, AND PER ITEM COLLECTION

		Scenario					
	Status Quo	1	2	3	4	5	6
Recycling Rates							
Plastic Bags & Film	2%	5%	5%	15%	15%	25%	25%
PET Bottles	12.4%	20%	20%	50%	50%	85%	85%
Recycling Tons							
Plastic Bags & Film	22,017	55,042	55,042	165,125	165,125	275,208	275,208
PET Bottles	31,819	51,181	51,181	127,952	127,952	217,518	217,518
Collection Per Item							
Plastic Bags & Film	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.02
PET Bottles	\$0.01	\$0.02	\$0.02	\$0.02	\$0.04	\$0.05	\$0.05
Redemption Per Pound							
Plastic Bags & Film	\$0.25	\$0.25	\$0.50	\$0.25	\$0.25	\$0.25	\$0.25
PET Bottles	\$0.25	\$0.25	\$0.50	\$0.25	\$0.25	\$0.25	\$0.25
Handling Fee Per Pound							
Plastic Bags & Film							
Rural	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90
Urban	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60
PET Bottles							
Rural	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90
Urban	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60

TABLE 6-2: SUMMARY OF PROGRAM EXPENDITURES AND REVENUE

		Scenario					
	Status Quo	1	2	3	4	5	6
Total Revenues¹	\$246,208,036	\$399,750,505	\$399,750,505	\$399,750,505	\$706,835,443	\$860,377,912	\$953,043,479
Expenditures							
Redemption Funds ²	\$26,917,683	\$53,111,161	\$106,222,323	\$146,538,279	\$146,538,279	\$246,362,999	\$246,362,999
Handling Fees ²	\$69,544,525	\$137,217,997	\$137,217,997	\$378,596,297	\$378,596,297	\$636,503,444	\$636,503,444
State Administration	\$20,000,000	\$20,000,000	\$20,000,000	\$20,000,000	\$20,000,000	\$20,000,000	\$20,000,000
Working Capital and Reserve Fund	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000
Total Expenditures	\$126,462,208	\$220,329,158	\$273,440,320	\$555,134,576	\$555,134,576	\$912,866,443	\$912,866,443
Available Program Funds³	\$119,745,828	\$179,421,347	\$126,310,185	(\$155,384,071)	\$151,700,867	(\$52,488,531)	\$40,177,036

1. Total revenues for each scenario were based on the total number of items consumed that are subject to the per item collection (as defined in Table 4 -1) multiplied by the per item collection rate for the given scenario.
2. Redemption fund and handling fee expenditures were based on the total number of pounds of eligible material recycled (as defined in Table 4-1) multiplied by the per pound rebate and applicable per pound handling fees (rural or urban rates).
3. Available Program Funds are equal to the proposed program's net revenues (total revenues less total expenditures), and would provide funding statewide as described in Section 3.5.

Status Quo: This scenario illustrates the program economics at current recycling rates and assumes a 1¢ per item collection for both plastic bags and PET bottles. This scenario would likely occur during the first year or two of program implementation.

Scenario 1: It would be reasonable to expect recycling rates to increase slightly, but not dramatically, during the early years of the program, as illustrated in Scenario 2. This scenario assumes a 5 percent plastic bag and film recycling rate and a 20 percent PET bottle recycling rate, and assumes a 1¢ collection per plastic bag and a 2¢ collection per PET bottle.

Scenario 2: Scenario 2 is a variation of Scenario 1, again intended to illustrate possible program economics during the early years of the program. In this scenario, the redemption per pound for both plastic film and PET bottles would be increased from 25¢ per pound to 50¢ per pound. This is intended to illustrate that various economic inputs may be adjusted, as the Consortium sees fit, while the available program funds (net revenue) remains positive. An increase in redemption per pound would be intended to further incentivize increases in recycling rates.

Scenario 3: Scenario 3 illustrates a reasonable recycling rate scenario that could be expected to occur after the program is well-established and is impacting recycling behavior, with a 15 percent recycling rate for plastic film and a 50 percent recycling rate for PET bottles. However, the per-item collection (1¢ per plastic bag and 2¢ per PET bottle) is unchanged from Scenarios 1 and 2, resulting in negative available program funds. Scenario 4 describes a change made from Scenario 3 that results in positive available program funds.

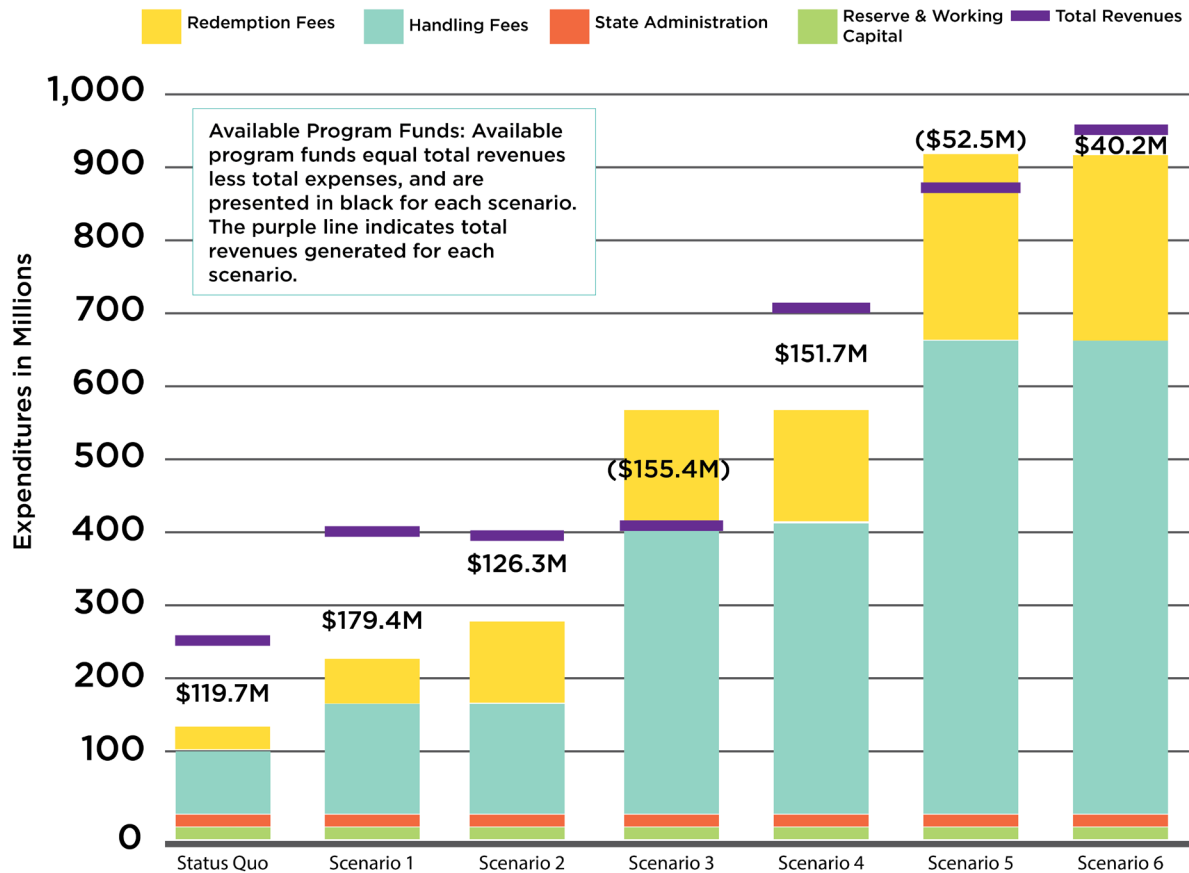
Scenario 4: Except for the per item collection for PET bottles, Scenario 4 is identical to Scenario 3. The per item collection for PET bottles increases to 4¢ per item in this scenario, resulting again in a positive available program revenue. This scenario emphasizes the role of the Consortium in adjusting various aspects of the program to guide program outcomes as the market and recycling behavior change over time. There would be over a \$300 million difference in program revenue by changing this single program input.

Scenario 5: It would be reasonable to expect that as the program matures further, recycling rates would continue to increase. Scenario 5 illustrates select possibilities if recycling rates were to reach 25 percent for plastic film and 85 percent for PET bottles. This scenario sets per item collection at 1¢ for plastic bags and 5¢ for PET bottles. The resulting available program funds would be negative.

Scenario 6: Scenario 6 illustrates that the program should not focus only on implementing changes to per item collections for PET bottles, but would need to consider plastic bag per item collections as well, particularly as recycling rates increase. By increasing the per item collection for plastic bags to 2¢ per item, and holding all else constant from Scenario 5, this scenario would realize positive available program funds.



FIGURE 6-1: PROGRAM ECONOMIC SCENARIO COMPARISONS



Recycling Rates							
Bags & Film	2%	5%	5%	15%	15%	25%	25%
PET Bottles	12.4%	20%	20%	50%	50%	85%	85%
Per Item Collection							
Bags & Film	1¢	1¢	1¢	1¢	1¢	1¢	2¢
PET Bottles	1¢	2¢	2¢	2¢	4¢	5¢	5¢
Per Pound Redemption							
Bags & Film	25¢	25¢	50¢	25¢	25¢	25¢	25¢
PET Bottles	25¢	25¢	50¢	25¢	25¢	25¢	25¢

Potential Economic Impacts

The Study on the Economic Impacts of Recycling (SEIR) estimated that more than \$3.3 billion in economic impacts and 17,037 jobs occur from the 9.2 million tons of material that was recycled in Texas in 2015.⁹ The extent to which recycling would increase in Texas resulting from the “Putting Plastic to Work for Texas” program is to be determined. Every increase of 100,000 tons of recycling generally equals \$35.9 million in economic value and 185 jobs, based on extrapolating data from the TCEQ SEIR study. If higher quantities of PET and plastic bags and film would be recycled in Texas, it could increase the economic impacts of recycling in Texas since additional efforts would occur to collect, process and transport recycled materials. As an example of increases in PET and plastic bag and film recycling could increase the economic impacts of recycling, Burns & McDonnell estimated the amount based on the medium range scenario. **For example, Scenario 3 would increase recycling by approximately 239,000 tons, meaning it could potentially provide \$85.8 million in economic value and 442 jobs to Texas.**

9. Section 8 of TCEQ SEIR details the statewide economic impacts of recycling.

7.0 END MARKETS AND MATERIAL DEMAND

A key aspect of the “Putting Plastic to Work for Texas” initiative is for the plastics to be recycled into new materials. Burns & McDonnell researched end markets for PET and plastic bags and film in Texas, providing perspectives on market pricing, as well as current and potential end markets (assuming greater quantities would be recycled).

7.1 PET

Market Pricing: End markets for PET have varied like other recycling commodities. From 2011 – 2016, the average price for PET was \$368 per ton, ranging from a high of almost \$700 per ton in 2011 to a low of \$175 per ton in 2015.

Overview of Current Texas End Markets: There are multiple plastics recyclers in Texas that have capacity to process approximately two times the amount of PET that is currently recycled in Texas. While PET has traditionally been sold to end markets outside of Texas, a new PET beverage bottle plant opened in Dallas in 2017. That plant and a Houston based plastics reclaimer both indicated to Burns & McDonnell that they would like to be able to purchase more material from Texas sources.

Perspective on Future Texas End Markets: If the State of Texas would implement the “Putting Plastic to Work for Texas” initiative, the recovery of additional, significant quantities of PET could encourage multiple end users to build new plastics manufacturing facilities in Texas.

7.2 Plastic Bags and Film

Market Pricing: Market pricing for plastic bags and film varies significantly based on type of material, grade and contamination level. The pricing for plastic film can range from \$0 – 200 per ton depending on the clearness (less coloring) and cleanliness of the film. For example, clear, source separated film would yield closer to \$200 per ton, while a combination of clear and colored film processed at a MRF may have a value closer to \$0 – 10 per ton. The value of single-use plastic bags is less than film, and the value depends on whether its collected source-separated or processed at a MRF. One MRF reported that it typically sells a combination of processed film and plastic bags for approximately \$20 per ton, while another Texas MRF has had challenges selling its baled bags and film. The proposed program would provide greater amounts of uncontaminated plastic bags and film.



Overview of Current Texas End Markets: Plastic film presently goes to a combination of end users outside of Texas and within the state. In Texas for example, a Houston based entity manages approximately 50,000 tons of film collected from retailers and other generators of film waste and is spending \$10 million on a new film processing plant, which will have capacity for another 24,000 tons per year.

Perspective on Future Texas End Markets: Additional end markets could be developed in Texas for the use of plastic bags and film, including emerging technologies for incorporating post-consumer plastic in building materials. Given the large size of the Texas construction industry, this could develop into a viable, long term market for the use of multiple plastic materials.

8.0 POTENTIAL PROGRAM BENEFITS AND CHALLENGES

The following identifies potential benefits and challenges that were identified during the course of the evaluation for the “Putting Plastic to Work for Texas” program.

8.1 Benefits

- Provides funding to overcome processing challenges for redemption centers, baling facilities, and MRFs
- Potential to create new Texas jobs from increased recycling and addition of redemption centers, and from new manufacturers locating to Texas to be near large sources of recycled plastic material
- Preserves consumer choice by allowing every consumer to make decision about which products to buy and how to recycle eligible plastic items
- The creation of a Consortium comprised of representatives across the system that would manage program operations, evaluate recovery rates, and market conditions would allow flexibility to make future adjustments and to maintain the overall viability of the program
- Plastic material types could be expanded over time to include additional problematic or commonly littered materials as determined by the Consortium
- Reduction in litter and plastic material harmful to aquatic wildlife
- Rural areas may benefit from the proportional handling fees and initial redemption center funding grants along with potential for increased recycling with associated economic development
- Provides a significant new source of funds to sustain disaster recovery, community resiliency, planning, and preparedness as well as funding of litter prevention education and enforcement activities

8.2 Challenges

- Rural areas of the state would be anticipated to have higher costs because of longer distances to transport plastic material to end markets and because rural areas would generate lower volumes of material (i.e., less revenue). To address this challenge, higher per pound redemption and handling fees were assumed for rural areas
- Reducing contamination in the recyclable material stream. For example, multi-layered (i.e., laminated) and multi-material films can be more challenging to recycle
- Retailers (brick and mortar and e-commerce) will need to update their systems to apply the 1¢ per item collection for eligible plastic items sold to individuals and businesses in Texas
- The “lightweighting” trend (i.e., reducing plastic content) would increase the number of plastic items needed to make a pound of plastic material to receive the per pound redemption, which may reduce incentive to recycle eligible plastic items.

9.0 CONCLUSION

“Putting Plastic to Work for Texas” provides an innovative approach to increase the recycling of materials that have been historically under recovered in Texas. Assuming financial adjustments to the per item collection could be made as needed by the Consortium, the program should have sufficient revenues to fund programs costs, as well as sustained funding for litter prevention education and law enforcement of litter violations as well as potential funding for natural disaster community resiliency, recovery, planning, and preparedness. This review provided an initial overview of the proposed program, and more detailed analysis is recommended to further evaluate and understand key issues, such as:

- Level of funding required by the State to operate the program
 - State Administration costs
 - State Working Capital and Reserve Fund costs
- Rural and Urban area definitions and designations
- More detailed evaluation of redemption center compensation by handling fee and material market rates
- Evaluation of scenarios given additional and/or more precise industry data regarding product per capita use

		Scenario						
	Status Quo	1	2	3	4	5	6	Notes
Recycling Rates								
Plastic Bags & Film	2%	5%	5%	15%	15%	25%	25%	1
PET Bottles	12.4%	20%	20%	50%	50%	85%	85%	1
Collection Per Item								
Plastic Bags	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.02	2
PET Bottles	\$0.01	\$0.02	\$0.02	\$0.02	\$0.04	\$0.05	\$0.05	3
Redemption Per Pound								
Plastic Bags	\$0.25	\$0.25	\$0.50	\$0.25	\$0.25	\$0.25	\$0.25	4
PET Bottles	\$0.25	\$0.25	\$0.50	\$0.25	\$0.25	\$0.25	\$0.25	
Handling Fee Per Pound								
Plastic Bags								5
Rural	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	
Urban	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	
PET Bottles								
Rural	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	\$0.90	
Urban	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	
Material Quantities								
Plastic Bags								
Number of Items	9,266,556,700	9,266,556,700	9,266,556,700	9,266,556,700	9,266,556,700	9,266,556,700	9,266,556,700	6
Tons	66,190	66,190	66,190	66,190	66,190	66,190	66,190	
Other Plastic Film								
Number of Items	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6
Tons	1,034,640	1,034,640	1,034,640	1,034,640	1,034,640	1,034,640	1,034,640	
PET Bottles								
Number of Items	15,354,246,893	15,354,246,893	15,354,246,893	15,354,246,893	15,354,246,893	15,354,246,893	15,354,246,893	6
Tons	255,904	255,904	255,904	255,904	255,904	255,904	255,904	
Recycling Quantities								
Plastic Bags								
Pounds	2,647,588	6,618,969	6,618,969	19,856,907	19,856,907	33,094,845	33,094,845	7
Tons	1,324	3,309	3,309	9,928	9,928	16,547	16,547	
Other Plastic Film								
Pounds	41,385,612	103,464,031	103,464,031	310,392,093	310,392,093	517,320,155	517,320,155	7
Tons	20,693	51,732	51,732	155,196	155,196	258,660	258,660	
PET Bottles								
Pounds	63,637,531	102,361,646	102,361,646	255,904,115	255,904,115	435,036,995	435,036,995	7
Tons	31,819	51,181	51,181	127,952	127,952	217,518	217,518	

1. Burns & McDonnell utilized current recycling rates for the Status Quo and increased rates for Scenarios 1 through 6 based on the industry research presented in Section 5.1.2.
2. Burns & McDonnell assumed that the initial per item collection would be 1¢. Burns & McDonnell manually adjusted the per item collection for Scenarios 1-6 to illustrate a range of program economic possibilities. The model assumes that adjustments to the per item collection would be in whole cents and not fractions of a cent.
3. Per item collections for plastic bags and for PET bottles could vary independently.
4. Burns & McDonnell assumed that the initial redemption levels would be 25¢ per pound for both PET and plastic bags and film. The Consortium would have the ability to independently vary redemption amounts by material type.
5. Per pound handling fees would differ for rural and urban areas for the reasons described in Section 3.2.2.1. For modeling purposes and based on industry data, handling fees were assumed to be 90¢ per pound for rural areas and 60¢ per pound for urban areas, for both PET and plastic film, as discussed in Section 3.2.2.1. Further analysis would need to be conducted to determine appropriate handling fees for each material and the Consortium would have the ability to adjust handling fees over time as needed.
6. Consumption quantities are based on the data presented in Section 5.1.1.
7. Recycling quantities are based on the recycling rates presented in Section 5.1.2 and multiplied by the material consumption quantities.

		Scenario						
	Status Quo	1	2	3	4	5	6	Notes
Revenues								
Plastic Bags	\$92,665,567	\$92,665,567	\$92,665,567	\$92,665,567	\$92,665,567	\$92,665,567	\$185,331,134	1
PET Bottles	\$153,542,469	\$307,084,938	\$307,084,938	\$307,084,938	\$614,169,876	\$767,712,345	\$767,712,345	2
Subtotal Revenues	\$246,208,036	\$399,750,505	\$399,750,505	\$399,750,505	\$706,835,443	\$860,377,912	\$953,043,479	
Expenditures								
Redemption Funds								3
Plastic Bags & Film	\$11,008,300	\$27,520,750	\$55,041,500	\$82,562,250	\$82,562,250	\$137,603,750	\$137,603,750	
PET Bottles	\$15,909,383	\$25,590,411	\$51,180,823	\$63,976,029	\$63,976,029	\$108,759,249	\$108,759,249	
Subtotal Redemption Fees	\$26,917,683	\$53,111,161	\$106,222,323	\$146,538,279	\$146,538,279	\$246,362,999	\$246,362,999	
Handling Fees								4
Plastic Bags & Film								
Rural	\$6,063,372	\$15,158,429	\$15,158,429	\$45,475,287	\$45,475,287	\$75,792,146	\$75,792,146	
Urban	\$22,377,672	\$55,944,181	\$55,944,181	\$167,832,542	\$167,832,542	\$279,720,903	\$279,720,903	
PET Bottles								
Rural	\$8,762,888	\$14,095,199	\$14,095,199	\$35,237,997	\$35,237,997	\$59,904,594	\$59,904,594	
Urban	\$32,340,593	\$52,020,188	\$52,020,188	\$130,050,471	\$130,050,471	\$221,085,801	\$221,085,801	
Subtotal Handling Fees	\$69,544,525	\$137,217,997	\$137,217,997	\$378,596,297	\$378,596,297	\$636,503,444	\$636,503,444	
Other Expenditures								
State Administration								5
Plastic Bags & Film	\$8,179,233	\$10,363,453	\$10,363,453	\$11,268,353	\$11,268,353	\$11,170,813	\$11,170,813	6
PET Bottles	\$11,820,767	\$9,636,547	\$9,636,547	\$8,731,647	\$8,731,647	\$8,829,187	\$8,829,187	6
Subtotal State Administration	\$20,000,000	\$20,000,000	\$20,000,000	\$20,000,000	\$20,000,000	\$20,000,000	\$20,000,000	
Working Capital and Reserve Fund								7
Plastic Bags & Film	\$4,089,617	\$5,181,726	\$5,181,726	\$5,634,176	\$5,634,176	\$5,585,407	\$5,585,407	8
PET Bottles	\$5,910,383	\$4,818,274	\$4,818,274	\$4,365,824	\$4,365,824	\$4,414,593	\$4,414,593	8
Subtotal Working Capital and Reserve Fund	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	
Subtotal Other Expenditures	\$30,000,000	\$30,000,000	\$30,000,000	\$30,000,000	\$30,000,000	\$30,000,000	\$30,000,000	
Revenues								
Plastic Bags	\$92,665,567	\$92,665,567	\$92,665,567	\$92,665,567	\$92,665,567	\$92,665,567	\$185,331,134	
PET Bottles	\$153,542,469	\$307,084,938	\$307,084,938	\$307,084,938	\$614,169,876	\$767,712,345	\$767,712,345	
Total Revenues	\$246,208,036	\$399,750,505	\$399,750,505	\$399,750,505	\$706,835,443	\$860,377,912	\$953,043,479	
Expenditures								
Plastic Bags & Film	\$51,718,193	\$114,168,538	\$141,689,288	\$312,772,608	\$312,772,608	\$509,873,018	\$509,873,018	
PET Bottles	\$74,744,015	\$106,160,620	\$131,751,031	\$242,361,968	\$242,361,968	\$402,993,425	\$402,993,425	
Total Expenditures	\$126,462,208	\$220,329,158	\$273,440,320	\$555,134,576	\$555,134,576	\$912,866,443	\$912,866,443	
Available Program Funds (Net Revenue)								
Plastic Bags& Film	\$40,947,374	(\$21,502,971)	(\$49,023,721)	(\$220,107,041)	(\$220,107,041)	(\$417,207,451)	(\$324,541,884)	
PET Bottles	\$78,798,454	\$200,924,318	\$175,333,907	\$64,722,970	\$371,807,908	\$364,718,920	\$364,718,920	
Total Available Program Funds	\$119,745,828	\$179,421,347	\$126,310,185	(\$155,384,071)	\$151,700,867	(\$52,488,531)	\$40,177,036	

1. Revenue generated by plastic bags was calculated by multiplying the number of bags consumed per year by the per item collection rate for each scenario. Other plastic film is not subject to the per item collection and therefore consumption of other plastic film did not impact revenues.
2. Revenue generated by PET bottles was calculated by multiplying the number of PET bottles consumed per year by the per item collection rate for each scenario.
3. Redemption funds were calculated by multiplying the number of pounds of eligible recycled material for each scenario by the per pound rebate for the material paid to consumers for each scenario. Per pound rebates would have the flexibility to differ by material type (PET bottles or plastic film).
4. Handling fee expenditures were calculated by multiplying the number of pounds of plastic bags and film recycled for each scenario by the per pound handling fee for the material type.
5. For modeling purposes, Burns & McDonnell assumed a baseline of \$20 million annually in expenditures for State Administration. It is possible that there would be incremental increases in administrative expenses based on increased recycling rates as the program matures. Adjustments would be evaluated and determined by the Consortium.
6. State administration costs were distributed proportionately for plastic bags and film and PET bottles based on recycling quantities.
7. For modeling purposes, Burns & McDonnell assumed an annual contribution of \$10 million to the working capital and reserve fund for each scenario. The Consortium would have the ability to adjust the fund contribution, and it would either increase or decrease over time.
8. Working capital and reserve fund contributions were distributed proportionately for plastic bags and film and PET bottles based on recycling quantities.