With a keen eye for opportunity and a passion for the environment you set out the conquer the bottomless pile of garbage. Starting out with your trusty truck you enter into the garbage business doing manual pickups for earning a living.

Picking up garbage and delivering it to the local landfill provides you with a steady income that you can use to save up to gradually buy-out the local landfill.

Once you have establish a good profitable business and reputation you can invest in additional trucks, upgrade existing ones, research new ways to dispose of garbage and spread your brand and the word through advertising.

You can then further establish your facility with additional recycling modules and specialize in different types of garbage.

Clean up the neighborhood through random challenges and make sure you do good on a government tender or pay the price!

**Parts of the game.**

**The problem** - Households, Commerce and manufacturing collectively creates a large amount of garbage. Households are categorized into 3 groups each creating a different quantity of garbage. Commerce creates a large amount of garbage in large amounts such as offices generates paper and restaurants organic waste. Industry generates specialized waste such as chemicals etc.

**The solution** - Garbage generated by various sources needs to be collected in order to prevent pollution. In the game there are various methods of collecting the garbage and moving it from the source location to a central site.

**The potential** - Even though garbage collecting helps getting rid of pollution at the source it only solves half of the problem, this is where recycling comes in. The missing piece of the puzzle is to research, develop and implement methods of recycling in order not only relocate garbage but turn it into products through methods such as reduce, reuse and recycle.

**Mechanics of the game.**

The problem of garbage is solved through collection and the game advance that the various "potential" options for disposing of garbage.

The generation and interaction between the problem and solution is the game mechanics.

**The problem** - Garbage is generated in the following ways.

* Random - This is for non subscriber \ contracts, it applies to residences only.
* Weekly - This applies the residences, commerce.
* Constant - This applies to industry. Industry uses large waste bins which is filled over a period of time. When the bins is full and not collected this generates a warning on the contract and could lead to a suspension and loss of contract and income.
* Bonus bags
  + Randomly spawned bags of garbage to be collected manually. (Provides an arcade feel to it).
* Residential
  + R1 – Lower income; Garbage includes a higher variety of paper, plastic, it’s not sorted.
  + R2 – Medium income; Less plastic and more organic,glass, textiles, chemicals.
  + R3 – High income; Glass, Organic, Paper, Electronic components, textiles, chemicals
* Commercial
  + C1 - Office ; Generates paper,chemicals, electronic components.
  + Retail
    - C2 - Boutique; textiles
    - Restaurant ; organic
    - General Store ;
    - C3 - Hardware Store; metal,paper,plastic,chemicals
  + C4 - Service
    - Car Service Station; chemicals
    - Hair Salon; chemicals
* Industry
  + Manufacturing
    - I1 - Car Manufacturer (metal)
    - I2 - Electronics (
  + I3 - Construction
  + I4 - Primary
    - Farming
    - Mining
    - Fishing

**Implementation**

* Spawners - Sprites are used to represent the source of the garbage. During design the sprite is placed on the relevant position. Spawners are used to categorize the source.
  + Sprites upgrade - ?
* Schedules - Schedules for daily garbage are implemented by using a function that activates a spawner when a sprite associated with the day (Which is just a text box sprite) overlaps. I.e. If the day is Tuesday and a spawner overlaps a Tuesday textbox sprites the spawner is activated.
  + Schedules can also be used for zones on which reputation can be averaged and stored
* Garbage lifetime - the garbage item has a set duration on which it is active before expiry.
  + When the garbage expires reputation is lost.
  + When garbage is picked up reputation increases.
* Type of Garbage - the spawner will determine the % breakdown of types of garbage. This is randomized on garbage creation. The types of garbage is implemented as a family variable and the % breakdown as on created function for the garbage on the active spawner.

**The solution - The collection system relies on roads or air travel no-fly zones or permits.**

* Roads - Roads are implemented through tiles which don't have collision.
  + Two way travel
    - Generally roads are bidirectional.
  + One-way
    - Non u-turn \ turn around is implemented with a blocker behind the instance of the truck which is pinned and unpinned and acts as an obstacle with pathfinding. This prevents the truck from making u-turns.
  + Road blocks
    - This is a random solid object spawned as an obstacle for trucks.
  + Potholes
    - This is a random solid object spawned as an obstacle for trucks.
  + Traffic
    - Unavoidable trucks acts as an obstacle with cost slowing down the truck.
  + Ducks
    - Unavoidable ducks acts as an obstacle with cost slowing down the truck.
* Car Mechanics \ Street Sweeper.
  + Speed.
    - To try and be realistic and act within the confines of the game speed is assumed to be around 27ms\s (100kmh). With the house tiles 3x(32x32) pixels 6-7px \ second. It would be nice to bring this within bound of realism but still keep with the game.
  + Acceleration (decrease with capacity+)
  + Deceleration (increase with capacity+)
  + Capacity
  + Engine
  + Upgrades
  + Maintenance.
    - Durability
    - Fuel
    - Battery
  + Malfunction
* Drones
  + No-fly zones
  + Permits
  + Upgrades
  + Maintenance.
  + Malfunction
* Collection Stations
  + Capacity
  + Malfunction
* Closed Loop
  + Maintenance.
  + Malfunction.

**The potential**

* Recycling Station
  + Rent.
  + Buy lot.
  + Buy existing.
* Land Acquisition
  + Buy land (new landfill)
* Research
* Recycling Station - When the game starts there is one landfill. You can hire this landfill which will generate an expense on your cash flow. As you earn money from picking up ad hoc garbage this can be saved to purchase the landfill. Ad hoc garbage collection does not provide additional income such as recycling of items such as glass etc. Thus the strategy would be to expand into more trucks or truck upgrades.
  + Illegal dumping for manual truck
    - Manual truck can dump a load with "D key" in order to have capacity for a bonus bag etc.
    - A roaming police could see the bag before you can drop the bonus bag and pickup the illegally dump garbage. This will result in a fine.
  + Renting space (in lots)
    - Space is let at a price per capacity. 100t. Etc. This is a good route if you are interested in buying the facility including the garbage which can then be recycled and sold if the landfill is upgraded.
  + Shared usage (ad hoc delivery)
    - This requires no contracts but you pay on delivery at a rate per ton.
* Land Acquisition
  + Buy Land
    - Acquire land for landfill. This is the best way to store garbage but cost the most money. There is an initial outlay but low overheads.
* Research - This enables you to find solutions to the accumulating garbage. This is a logical progression in this which starts with paper and steadily advances to be able to deal with government contracts and special assignments.
  + Car \ Street Sweeper
    - Truck mechanical upgrades such as speed doesn't require research.
    - Truck specialist such as compression or garbage related upgrades.
  + Residence
    - Pamphlets
      * This will temporary increase the amount of garbage depending on the target type. I.e. a pamphlet of organic recycling education will increase the amount of organic waste for several turns. As people fall back into regular behavior the amount normalizes.
  + Commerce
    - Legislation
      * This will permanently increase types of garbage being marketed.
  + Landfill
    - Sorting Station
      * This enables the landfill to give the breakdown of the types of garbage. The values can be used to determine the route to upgrade from here.

**Types of Garbage to collect.**

1. Non-recyclable
   1. Items that cannot be recycled due to price or size.
2. Metals
   1. Steel,Copper,Aluminum
3. Plastics
   1. Bottles, Toys
4. Rubber
   1. Tires
5. Glass
   1. Bottles,Windows
6. Chemical
   1. Paint, Detergents, Poisons, Oil, Cooking oil
7. Organic
   1. Grass,Wood,Food
8. Paper
   1. Cardboard,Paper,Boxes
9. Textiles
   1. Clothes, Wool
10. Electronics
    1. Computers, Mobile Phones

**Research**

1. Paper
   1. Paper Shopping Bags
   2. Boxes
2. Metals
   1. Collection Stations
3. Rubber
   1. Military
4. Electronics
5. Glass
6. Chemical
7. Textiles
8. Organic
   1. Vermiculture Bins
9. Plastic
   1. Plastic Garbage Bins
   2. Produce your own garbage bins.
   3. Speciality Bins

**Quests, Bonuses and random events.**

This feature is available to enhance the gameplay. This will include the following random events and encounters.

* Random bonus garbage.
* Government tender.
* Collect specific number of garbage.

**Landfilling and recycling**

* Landfill
  + Agreements
    - Stop and Drop ($rate per ton)
    - Lease (Lease landfill space fixed price but limited by capacity)
    - Purchase lot.Limited by capacity.
* Buy Land - Buying land is a way to expand your business. Once you purchase the land you can upgrade it. Each landfill can only be upgraded with a limited amount of modules. This means that you will have to move garbage between landfills to the relevant landfill where it can be processed.
  + Buy lot
  + Expand size (capacity)
  + Upgrade
    - Sorting Station - This allows you to separate garbage into the various types.
      * Type will increase and decrease independently. I.e. if you realize currently you have a lot of metal it will be good to invest in metal recycling first.
    - Recycling Modules - Modules converts raw garbage that's been sorted into raw goods. Raw goods can be sold or further developer into products.
      * Plastic Recycling Module
      * Glass Recycling Module
      * Metal Recycling Module
      * Paper Recycling Module
      * Rubber Recycling Module
      * Organic Matter Recycling Module
      * Chemical Recycling Module
      * Electronics Recycling Module
      * Textiles Recycling Module
    - Solar Panels (Reduces Expense)
    - Water Recycling (Reduce Expense)
    - Module properties
      * Power Usage
      * Water Usage
    - Processing Modules
      * This converts the raw goods into products. Products can be sold at a higher price than raw goods.
    - Selling
      * Ad hoc - This is the default where you can sell a range of goods but the number can vary, AI can buy a range of items which can vary.
      * Contract - generally contracts provide a steady income but the Gross profit is less. Failing to deliver on a contract will cancel the contract.
      * Tender - You get issued with a tender and have to fulfill the entire delivery before payment is made. Failure to make the delivery void the consignment.

**Implementation - Landfilling and recycling**

* Landfill
  + This is implemented through a sprite.
  + Landfill office?

**Reputation**

In order to advance in the game you will come to face your reputation. Reputation is used in order to tell you whether you are doing a good job or not. Each neighborhood will have it's own reputation and that is averaged to generate the overall reputation. Public opinion is also used to display reputation for the overall performance. This can be improved by public ventures.

There are 3 levels of reputation indicated by smiley faces. 30%,60%,90% . Reputation percent is measured by satisfied customers. When garbage is spawned in the neighborhood it will be available for the duration of the day. Once it is the next day the previous days garbage is destroyed.

* The next spawn of garbage will have a multiplier of 2 (the previous week's garbage).
* In order to get contracts you have to have a positive 90% + reputation.
* In order to get tenders you have to have 90% reputation.

**Upgrading** - Upgrading is not done through toolbar this is not only to bring a "old-school" feel to it but also to brings functionality to assets for immersion instead of developer an in-the-air toolbar. This is also done to support touch while maximizing real estate.

**Vehicles** - Upgrading vehicles are done by navigating to a commercial building according to the vehicles. Clicking on the business will provide a new screen where you can purchase upgrades. The truck that's in focus (That you are driving) will be upgraded.

* + Trucks - Trucks are the main source of collection. Trucks can be upgraded and will collect garbage until a point where it reach capacity. The speed of the truck will slow down when exceeding capacity.
  + Tip: There is a trade off for picking up garbage. If you pick up ad-hoc garbage you get paid on collection which means that if you get one more bag which pushes you over capacity you might drive so slow that you cannot unload in time for the next collection.
  + Street Sweeper - The sweepers are vehicles that can be purchased and upgraded to generate waste from nothing. Normally litter will not be collected due to the sheer economic feasibility. With the street sweeper you can tap into this market. The sweeper drives through the neighborhoods and slowly collects litter and when reaching capacity it can be emptied at the landfill. The re-sell value of litter is low as well as it's recycling capability. However the income is constant and it also generates positive reputation.
  + Areal vehicle - These are not limited to the roads so they can

**New trucks** can be purchased through the newspaper. Available at any café.

* + When purchasing a truck you can associated it with a zone. Each spawner is associated with a zone. When garbage is created it inherits the zone from the schedule.

**Council** - required for approval.

**Landfill** - In order to upgrade a landfill you have to own it. You could buy a piece of land for a new landfill. In order to be able build a new module you need a sorting station at the landfill. Before you can buy a module you would have to the relevant research in order to have the required module.

Commercials can be contacted to buy from you. For instance, if you have develop a product like plastic cutlery you can contract a supply to a commercial. Commercials carry significant reputation and if you do not fulfill a contract it can have a bad effect.

Tip: If you are going down the route to supply specific products to commercials you can ensure you have a steady supply of raw material such

Garbage -> Sorting Station -> Waste Plastic -> Research -> Plastic Recycling -> Plastic products -> Products with plastic components

Finances

You being the game with a single truck and can earn an income by collecting garbage while increasing your reputation.

Tip: The game is designed in such a way through one way roads, road blocks and unable to u-turn that you can

**Garbage Generation Matrix**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Garbage | Schedule | Plastic | Glass | Rubber | Organic | Paper | Chemicals | Textiles | Electronics | Metal |
| R1 | Day | 0-5 | 0-5 |  |  | 0-5 |  | 0-5 |  | 0-5 |
| R2 | Day |  |  |  |  |  |  |  |  |  |
| R3 | Day |  |  |  |  |  |  |  |  |  |
| C1 | Week |  |  |  |  |  |  |  |  |  |
| C2 | Week |  |  |  |  |  |  |  |  |  |
| C3 | Week |  |  |  |  |  |  |  |  |  |
| C4 | Week |  |  |  |  |  |  |  |  |  |
| I1 | Day |  |  |  |  |  |  |  |  |  |
| I2 | Day |  |  |  |  |  |  |  |  |  |
| I3 | Day |  |  |  |  |  |  |  |  |  |
| I4 | Day |  |  |  |  |  |  |  |  |  |

"Runner"

The current setup of the game was simulation.

If the game is based on a "runner" model then it will be more fast paced with good interaction.

This will allow better driving modes and an arcade feel.

Mechanics to add to work with this model.

I.e. the truck will drive slower with more garbage, this can be done by decreasing speed and acceleration. Could a physics object work better.

Speed indicator, this is used because you have to drive slow in order to pick the garbage. You don't have to stop dead. This is for bags. Bins you have to stop.

Road should be procedurally generated is possible in order to give a new view every time.

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Garbage King:

With a single truck you set out to change the world, one garbage back at a a time.

In the outskirts of a big city you take it upon yourself to clean up the world by using your truck to pickup garbage from the neighbourhood, town centre and helping out the occasional farmer.

Honing your skills as the fastest driver can only take you that far.

Will you take up the challenge to grow and manage your fleet, purchase and expand recycling, build a reputation in your local neighbourhood?

Use your business savvy to shape the recycling industry. Trail new technologies, discover investment opportunities and use the media to your advantage.

Do you have what it takes?

Background

The game plays out in a town on the outskirts of a big city. This allows for easier development and manage expectations to be “reasonably realistic” without what ca be done in a game. The town consists of a several **neighbourhoods,** a **town centre,** surrounding **farms** and a few small **factories**.

The object of the game

The player collects garbage, disposes of it and get reputation and income.

The cleaner the neighbourhood the healthier the town.

Income can be used to maintain and upgrade your fleet, purchase and upgrade recycling facilities, provide media coverage.

Reputation determines if customers subscribe to your service. Subscriptions enables scheduling. You can now specifics which days garbage is collect to improve efficiency and be more profitable.

can be schedule days for pickup which helps planning your trucks.

Reputation allows you to bid for contracts with local businesses.

The city puts out regular tenders that anyone can bid for. This is considered to be advanced play because there are penalties if you fail the tender. [Options]

Neighbourhoods

Depending on the map there are one of more neighbourhoods. Each neighbourhood has several families. Each family generates garbage. Garbage can be generated on a schedule or randomly.

When a family is part of a schedule you can specify the day that the garbage is left outside the house for collection. If the family is not part of a schedule the garbage is generated random.

Garbage

The unit of garbage generated is kilogram per day.

The composition of garbage is determined by the source such as family ,office, restaurant, shop, factory farm.

Each type of garbage in the composition has a volume to weight ratio.

Steel is 7:1 , paper 1:1, glass 3:1.

When the player starts out garbage is “general” and the player cannot see the composition.

With research the player can discover the composition of garbage. This is required for sorting and specialisation.

The price per kg of general garbage is low but it is available in large volume and it doesn’t require specialised equipment.

The price per kg of specific types of waste is higher but it requires capital to build the sorting stations, processing plants and trucks.

The price per kg of products such as recycled paper sales, compost, glass is the highest but requires significant capital and management.

Truck (Collection)

Collection is performed with a truck. By driving into the pickup zone the garbage is picked up. The pickup zone is a proximity close to garbage. Trucks can be specialised to pickup a single item, combo or generic.

Truck Properties

Single – Used for specific garbage due to contamination or weight.

Combo – Used for 2 types typically specific type and other or two specific types.

General – Used for any type of garbage

Acceleration – Trucks are slow to accelerate but can be upgraded. This allows the player to fine tune his strategy . For example a truck with many stops requires high acceleration to ensure it picks up the garbage in time and a truck with a single stop such as a factory or office with a lot of garbage only does a single stop and then return to dump the garbage.

Braking – Braking functions effectively at recommended speeds. If you exceed the speed given the load factor then there is a chance that your brakes may malfunction.

Speed – Speed is indicative of driving without load. There is a recommend speed factor when loaded. If you exceed the speed you risk damaging the truck or garbage have a chance to fall off the truck around corners or speed bumps. This could damage reputation of you drop garbage.

Trucks can be upgraded, require maintenance, fuel and a driver.

Upgrades:

Upgrades are done for the core attributes of the truck. This is carrying capacity (how much), driving mechanics (breaking speed,acceleration,control) and garbage specialisation.

Landfill (NPC)

The landfill is an area allocated for dumping garbage. Each town has a NPC landfill that charges a fee for disposing of garbage. The functionality is limited and the landfill can only dispose of certain types of garbage.

The landfill can strategically be used such as to do time trails where the bonus for completing the trail would exceed the cost of using the landfill.

Limits:

The landfill has it’s own processing times and may not always have capacity. The landfill has a processing kilogram per day limit.

Upgrades:

The landfill can be upgraded with additional building to recycle different types of garbage. The cost would be reduced as you would “partner” with the NPC. However the profit is also shared with the NPC. The profit pays for the land use and also covers “certification” for the property.

Landfill (Player Owned)

The player can purchase an area for a land for setting up his own landfill. The landfill needs to be certified for healthy standards and there is an occasional check that verifies the capacity. A landfill has a recommend capacity based on the size. If exceeded the traffic should be diverted to the NPC landfill. If the player exceeds the capacity and a successful dice-roll is made to inspect the landfill the player can get a penalty. This penalty needs to be paid by a certain time period. This ensures that is a good risk vs. opportunity for the player.

Traffic

The neighbourhoods, town centre, farms and factories are all connected with road.

The road all have a speed limit that is recommended. The UI features a speed limit gauge in order that the self driving player can see the speed of the road. If you exceed the speed limit there is a chance that you won’t be able to break in time and accidents will impact reputation.

Newspaper and Media

The media plays a big role in the game for influencing the town, read about city news, find good deals for upgrades, buy and sell trucks. It contains the latest research news with information about the industry and the stock market with opportunity to invests in new technology.

Upcoming challenges is also available in the paper. This provides some heads-up for the player the prepare if they want to take part in a challenge.

The newspaper also feature short bits of information about your reputation and customer sentiment.The newspaper is available from a café in town.

Challenges

Town Challenges

Have to be completed in the local town to pickup garbage, typically within a certain timeframe.

There are no financial penalties for failing a town challenge but reputation will suffer.

The challenges are available in the newspaper and can be accepted by the player.

City Challenges

The city challenges are published in the newspaper prior to their launch date in order to give the player some time to prepare. If the player accept the challenge a nominated truck will go to the city to complete the challenge. If they succeed they get rewarded financially but no reputation. If you fail the challenge you will have to pay a financial penalty, this can be done over a period of time.

The mechanics

The real world

The game has a blog where users can provide feedback about new content and challenges. This manifest in game through a newspaper.

I want to drive the truck around the city

I want to upgrade the truck but I know with the upgrade there is a trade-off such as if I upgrade their carry weight the truck will use more fuel

The town has homes, shops, offices a farm and a factory

There are other businesses picking up garbage

I want to be able to do time trails for bonuses if I get bored of the regular game

The town has roadwork, crossings, schools and a roundabout which all have obstacles

I have reputation as a company and if I deliver good service then I can charge

If I reach a certain reputation with a couple of houses I can schedule with them when they put their bins outside, otherwise it’s random.

I can provide my own bins but then I need to buy them, this means I can benefit from pre sorted gargabge which creates a revenue stream for me, as I can sell aluminium by the kg(example)

However now my generic trucks don’t work anymore because the don’t have separation for different types of garbage.

I can upgrade my trucks with compressing capabilities for single use plastics and papers

For houses with scheduled piocups I need to pickup the garbage within the timeframe otherwise my reputation does down and the houses will revert back to randomly putting their garbage outside.

I can upgrade my landfill with speciflization units such as for glas recycling or cardboard or indistrial waste.

If I load my truck over 100% load limit then garbage may fall off if I drive too fast and if someone finds this garbage within a timeframe then I get a bad reputation

At first I can’t see the makeup of garbage as I don’t know that garbage can be separated

Most people don’t sort their garbage even if you provide the correct bin so I need to deal with that at the landfill which means I need to employ people or robots.

Offices produce a lot of paper waste which is very heavy

Missing out on a contract also cause a penalty payment on top of reputation

I can go without permits but there is a chance that I get shut down if I don’t remediate the issue within a certain period of time when big brother discovers it

The newspaper is used to look for new contracts with businesses

You can also use the newspaper for acquiring new research .

With our news bins we monitor the amount of garbage you create and charge you accordingly. Each bin is weighed when lifted by a special truck and

Industrial waste requires special trucks and facilities to expose of the waste.

Bins can also be placed at industries which allow for trucks to be generic as they fit different skips containing it’s relative specialised function.

Campaigns can be run in order to reduce waste for specific weeks , if you know you don’t have enough trucks to get all garbage and don’t want to risk reputation damage you can do a media campaign which will cause a reduction in garbage but at the same you will get paid the same amount

If you spam campaigns they cost the same but their effectivity is reduced by the more frequent you use them

You can also invested in patents to reduce technology but there is a chance that they don’t work but if they do you can get a steady income from the patents

One ways, some road a one ways and other roads may get random road blocks, or old lady crossing the road or cat and fire engine. This means you garbage truck will be block, you can wait and watch your time reduce or you can try a detour, this is for occasional time trails.

Research in newspapers will allow you to discover news way to recycle certain materials such as plants absorbing metals etc.

You can also turn organic material into composts

You can turn plastics into raw plastic for selling

You can turn glas into raw product