REPORT ON:
Ecological Designs for Public Toilets

By: SALMA TIHANI
For the GottaGo! Campaign Ottawa

Table of Contents

Introduction

The importance of the toilet is undeniable. By having this simple institution , the toilet, many areas of development improve. It has positive impacts on the health of individuals, it has an impact on the decisions people make to visit a place, and it has a significant impact on the environment. The toilet is a key role player in communities all over the world and is a place of refuge for all.

As mentioned before the toilet has a key role in the depletion or sustainability of our environments. Normal toilets can be very harmful to the environment in many ways. These ways consist of excessive water consumption, chemical residues that are emitted into soils and waters and not to forget the actual waste that can be infiltrated improperly into natural water streams. It is important that the toilet plays a role in conserving and helping our environment. Many designs and technologies have been created in order to do so. In this report, you will be able to discover a couple of these innovative ecological toilet designs.

The importance of water conservation

Around the world water is a much needed and scarce resources that is being exploited and wasted daily. In total our oceans , rivers, lakes and other water reservoirs make up around 76 % of our earth's surface. This may seem like a lot, but in reality there is no resource that is so rare. Of that 76% , 97.5% of the water on earth is salt water leaving only 2.5% as fresh water . Nearly 70% of that freshwater is frozen in the ice caps of Antarctica and Greenland. Most of the remainder is present as soil moisture or lies in deep underground aquifers as groundwater and is not accessible to human use." **(globalchange.umich.edu)**. After all the calculations, in reality the water that is available for use consists of around 1%.

This beautiful natural resource is characterized highly by its limited availability , its unequal distribution and variability of uses. As mentioned before, water is very limited because only 1% is available for human uses.Both climate change and population growth are affecting the availability and demand for more water **(Wolters, 2014, p.455)**. Water is also unequally distributed making some countries lucky in their disposition because they have more access than others . For example, Canada has an abundance of rivers, lakes and accessibility to oceans , making it rich in water resources. On the other hand, other african, asian and middle eastern countries suffer from a lack of water supply, Even with the small water supply that they have, it won't always be clean and potable. Though what is very special about water is that it's uses and consumptions are very diverse. For example, it can be used for the production of a majority of other material goods, such as the clothes that protect our bodies. Water can also be used for the production of energy through hydroelectricity.

Water is a vital natural resource for plants, animals and people. For that specific reason actions need to be taken to protect this natural resource.

Recycling waste

Human waste provides great opportunities. Depending on the technology and the toilet waste can be used as as compost and can provide the opportunity for fertilizer transformation. "Human waste is a rich source of nutrients that can be processed to produce a clean fertilizer for agricultural use."(Gardner, 1997, p. 1). When using an organic fertilizer such as human waste , soils and lands are at less of a risk of depletion. Not to mention human waste is an environmentally friendly opponent to the chemical fertilizers being used now in mainstream farming. "If human wastes are made safe for use on farmland, though, their reuse can help reduce applications of chemical fertilizer." **(**Gardner, 1997, p. 2). By using human waste as a fertilizer , a self-sustaining food cycle happens. Agriculture makes food to be eaten, the food gets digested through our bodies and the waste is then used again as a fertilizer for agriculture and food production. The dry composting toilet provides a way for recycling waste in a community that needs safer and more productive agricultural practices with limited resources.

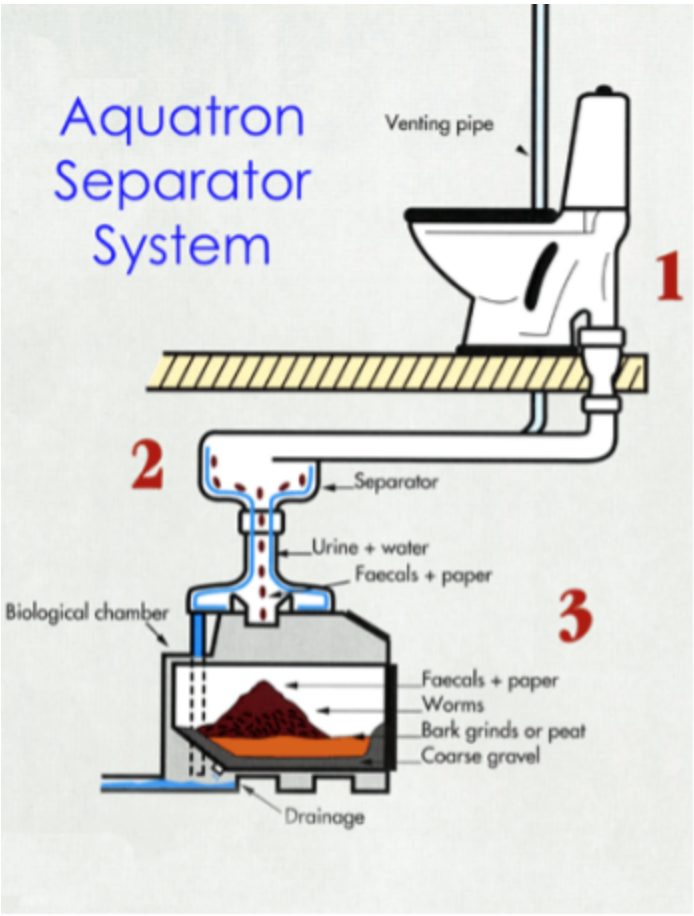
The importance of knowledge campaigns

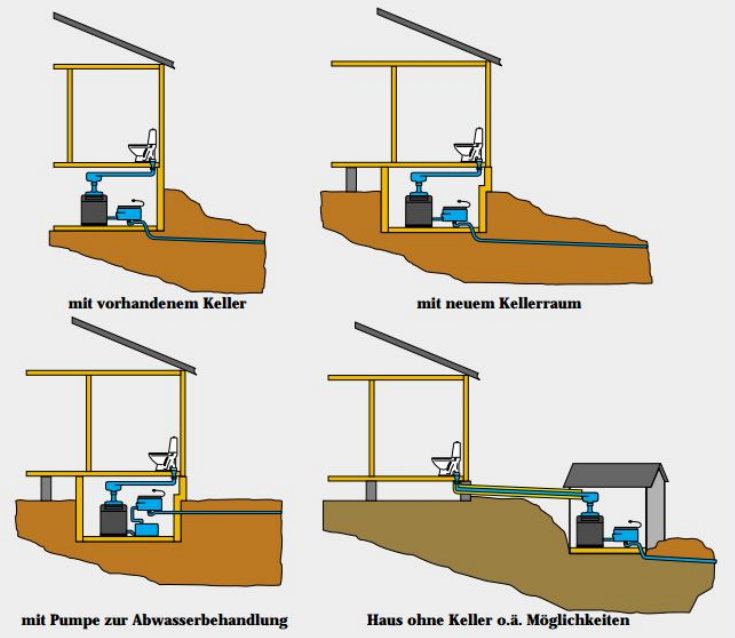
Environmental consciousness and knowledge is key for individuals in acting and behaving in a way that benefits the environment. People who consider themselves as unknowledgable will tend to consume more while people who are environmentally conscious of the impacts of overconsumption and waste of water will tend to consume less. The article**,** ***attitude-behaviour consistency in household water consumption,*** agrees in saying that consciousness of environmental issues puts in effect "pro-environmental" behaviours and decisions. Our knowledge about the environmental impacts/ issues will influence our intentions and will result to influence our actions (Wolters, 2014). In the study done by Jorgsen et al. (2014) , they found that water consumption was lower for people who reported to have a strong commitment to conserving water. Other articles explain also that " personal values consist of thought patterns that influence others' values , attitudes and actions " (Pinto et al. , 2011, p.122) **.** There is a strong correlation between water consumption and environmental consciousness. People who think in an environmentally ethical way will most positively act according to their thoughts (which also turn to values over time). " Environmentally responsible consumers are characterized by being strongly motivated by environmental issues" (Pinto et al., 2011, p. 123).

With this evidence, governments and leaders should push for environmental campaigns in order to educate and inform citizens. These campaigns will serve as a good jumping point for

actions and environmental behaviour among citizens. This will also transfer into wanting more ecological toilets and pushing communities to implement such technologies.

2. Ecological Design Proposals: Aquatron Toilet





How the technology works:

- A patented separator separates the solids (faeces and toilet paper) from the liquids (urine and rinse water) after the rinse cycle.
- The solids are composted to soil in the composting tank.
- Works in conjunction with water purifiers
- Toilet paper and faeces fall into the Composting tank.
- Every 1-2 years the composting tank to be emptied.
    - Composting worms can be added to extend the emptying intervals
- Temperatures between 12 ° C and 25 ° Celsius : Ideal for composting.
- Is well ventilated, therefore the Composting odorless and free from flies.
- If necessary, a UV unit can be installed where the urine and other toilet liquids will pass through before it is combined with the wastewater from the sink
    - This kills the bacteria

Name of Toilet	Aquatron
Company	Naturbauhof
Originating country	Sweden
Waterless?	No (But it is water saving)
Composting?	Yes
Pros	- Unlike other composting toilets , this

	one doesn't have as much odour
	- Relatively inexpensive
	- Can operate up to 20 meters from the toilet
	- Composting container is available in different sizes
	- Separates urine and feces automatically
	- A flush volume of 3 liters is enough.
	- Construction is flexible and the model can fit many different plans (see image above)
	- Is added to an already existing toilet
	  - Saves money and resources
	  - Instead of building new infrastructure , it makes an already existing toilet better and more ecological
	- Maintenance is done in long intervals

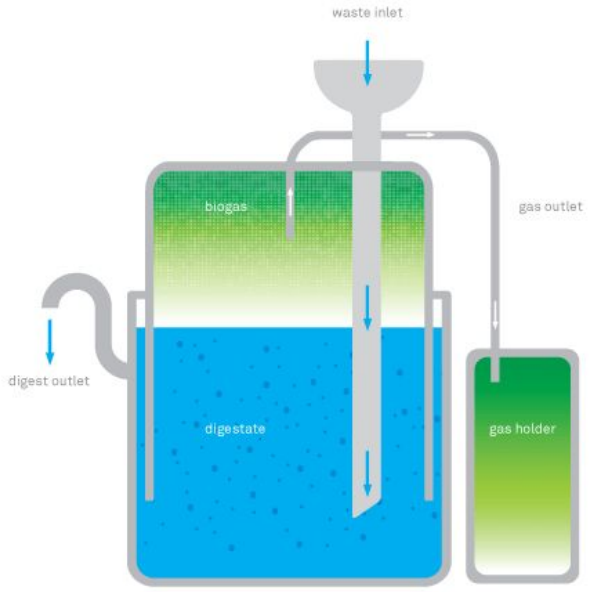
Cons	- Can take up a lot of space for one unit - Underground construction - Accessibility to empty the container can be tricky - Is added to an existing toilet - Construction of the toilet and the sinks are separate from the aquatron technology - It can stand some really cold winters
Cost	AQUATRON 90: 1.490,00 € AQUATRON 4x100: 2.950,00 € AQUATRON 4x200 : 3.520,00 €
Odour control system?	Yes (through ventilation of the tank)

Comments?

- Versatile design with many options for constructing and implementing the composting tanks and pipes
- Would be difficult to extract composting material with many toilets and many underground tanks. This can be time consuming and physically straining for workers.

For more information: http://www.naturbauhof.de/lad_komp_aqua.php

Loowatt Toilet



How the technology works:

- Toilets interior is covered by a biodegradable film
- Once stools are released, they go through a process of rolling and then drop into a cartridge
    - Periodic emptying of the cartridge is needed depending on usage
- There is also the possibility of adding a biodigester , which can extract methane gas from stools and use that gas for other things

Name of Toilet	Loowatt
Company	Loowatt
Originating country	Madagascar
Waterless?	Yes
Composting?	Yes
Pros	- Biodegradable film - Available biodigester to extract methane gas (for other uses such as

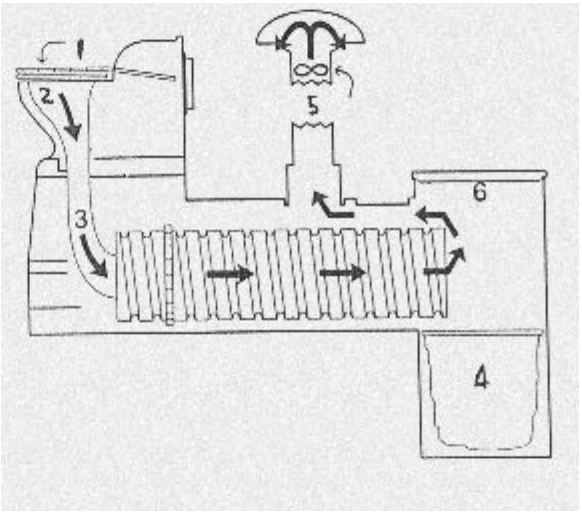
	cooking) - Company uses local materials and accessible parts - No electricity needed - Independent machine
Cons	- Solids are squeezed down (can be very messy, depending on the type of stool) - High maintenance and cleaning - Cartridge is relatively small - How to deal with liquids? - Film can be hard to install and remove - How to clean rollers and devices inside the toilet?
Cost	Not available (would have to contact company directly)
Odour control system?	Yes (the rollers create a sealant for odours to escape)

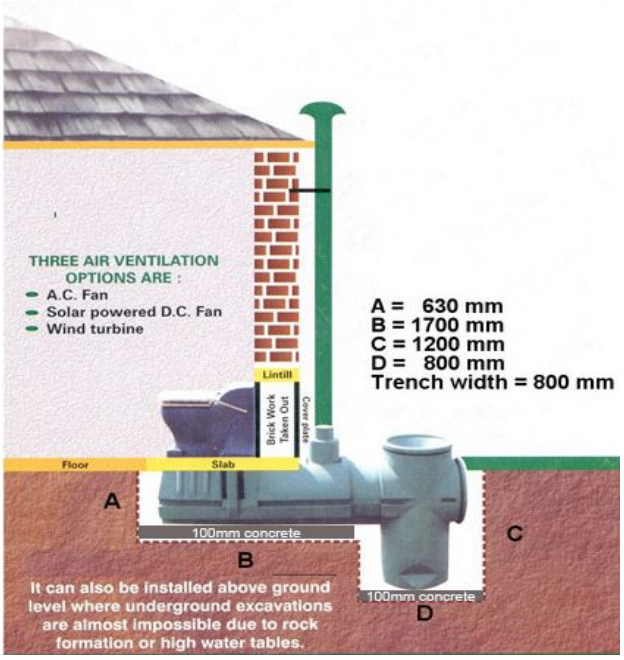
Comments?

- This toilet is ecological and also recycles waste to make something reusable (the methane gas). It does its job as a toilet an even more so.

For more information: https://loowatt.com/technology/

Intestinal Toilet





How the technology works:

"The human excrement falls down a vertical chute (2) and into one end of a specially designed helical screw conveyor (3). Every time the toilet lid (1) is lifted, a mechanism rotates the conveyor. With each rotation the human excrement slowly moves along, taking approximately twenty five days before falling into a reusable collection bag (4). It takes six months for the bag to fill with dry and odourless waste" (*Ecosan waterless toilet - product information.* Retreived from http://ecosan.co.za/product_info.html).

Name of Toilet	Intestinal Toilet
Company	Ecosan
Originating country	South Africa
Waterless?	Yes
Composting?	Yes
Pros	- Collection is done in long terms - Ventilation pipe (dehydration , evaporation and deodorizing (report)

	- Automatic but non-electric - Independent and closed (no piping needed) - Non-sticking surface for solids - Makes compost

Cons	- Screw conveyor
	  - Hard to access, fix or clean
	- Complexe installation
	  - Has to be part indoors and outdoors
	  - Deep underground
	- Can only deal smaller amounts of liquids because it is expected to evaporate
	- Toilet designed for smaller populations/groups

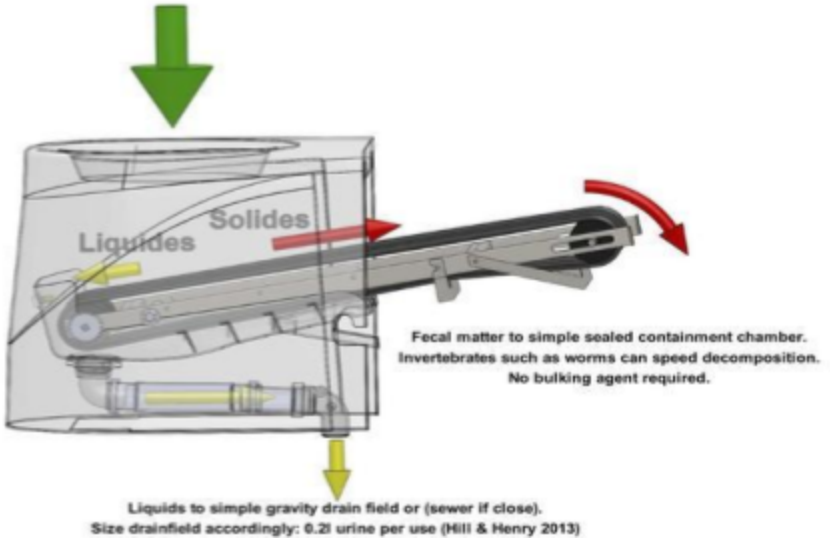
Cost	Not available
Odour control system?	Yes (through ventilation pipe)

Comments?

- Great system with many pros, but the screw conveyor would take a lot of deconstruction which can be very dangerous all simply to clean and maintain.

For more information: http://ecosan.co.za/product_info.html

Hightech Composting Toilet: Ecodomeo



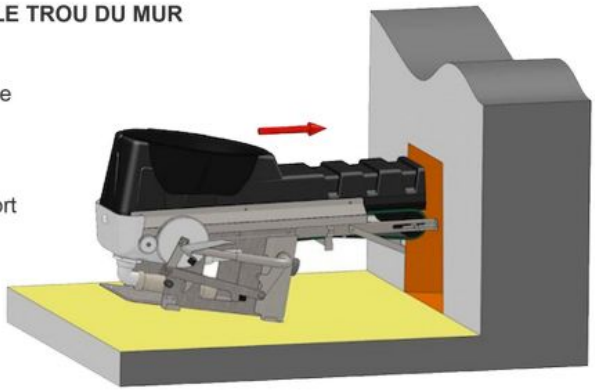
How the technology works:

- Solids are diverted to a conveyor belt , activated by a flush mechanism.
- Liquids drains down into a pipe and flows to the mainstream wastewater treatment
- Once solids are conveyed they fall into a composting bin placed outside.

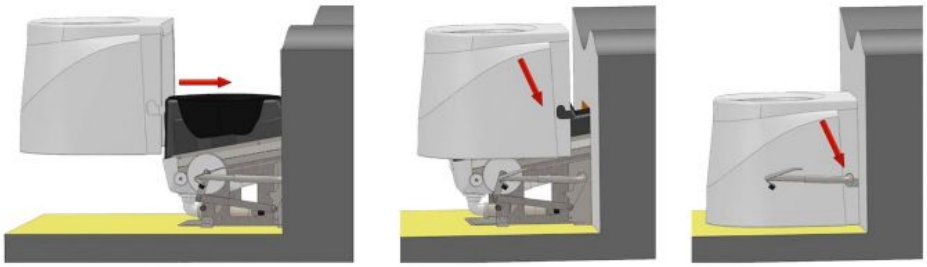
INTRODUIRE LE TAPIS DANS LE TROU DU MUR

Incliner le tapis pour le rentrer, avancer le système jusqu'a ce que le pied soit aligné avec le mur.

Puis centrer le système par rapport au trou du mur



METTRE LE SIÈGE SUR LE SYSTÈME



-

Name of Toilet	Ecodomeo
Company	Ecodomeo
Originating country	France
Waterless?	Yes
Composting?	Yes
Pros	- Accessible conveyor belt - Toilet seat is easily installed and removed - Collection is done in long terms because of the size of the composting bin - Cleanings done 1 to 2 years apart - No underground digging
Cons	- Cleaning conveyor belt (messy depending on stool type) - Liquids have to be attached to a water waste system (not completely independent - Composting bin can take up a lot of

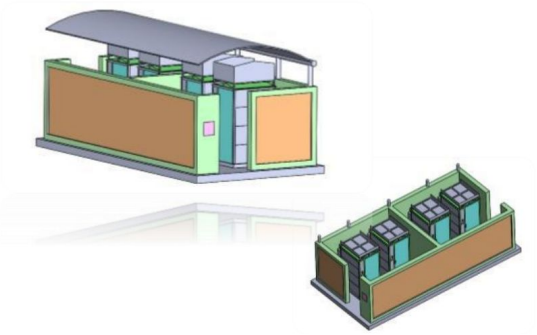
	space outside of the bathroom
Cost	ZIRCONE model (price per unit) :2499 € NÉODYME model (price per unit):2328 € NÉODYME (price per unit):2418 € Cabin with toilets:: 4000 €
Odour control system?	Yes (worms, soil and ventilation pipe)

Comments?

- This technology would be a great way to introduce ecological toilet designs to the public because of it's simplicity and similarity to the normal toilet.

For more information : http://www.ecodomeo.com/english/

Eram Delight: eToilet



Stainless Steel

Mild Steel

D-Lite

E-lite 14

How the technology works:

- Users access the toilet by inserting money
- Solids and liquids are diverted in a pipe that leads to an underground tank
- The toilet usage is monitored through wifi connections and apps

Name of Toilet	Etoilet
Company	Eram Scientific
Originating country	India
Waterless?	No

Composting?	No

Pros	- Solar powered (has a backup battery incase)
	- Provides a space for advertising and revenue (similar to bus stop shelters)
	- Controlled by wireless connections
	  - City / operators can see how long individuals spend in the bathroom
	  - Prevention of crimes
	  - Real-time updates
	- Technologically advanced
	- Comes in various materials and designs to suit needs of communities
	- Has automated cleaning mechanisms
	- Corrosion resistant
	- Quick installation time
	- Connected app for users to find nearby toilets as well as their availability

Cons	- Payed entrance - Fits warmer climates (would be difficult to use and maintain is very cold climates) - Squatting toilet
Cost	Not available (would have to contact company)
Odour control system?	No

Comments?

- Many questions of cost are asked when investing in new projects, this investion will in the long run provide the city with revenue from advertisers
- Although there is an entrance fee to use the toilets to regulate usage, we could easily remove his option and regulate entrances and exits by the push of a button
- Even though the toilet is a squatting one , which doesn't fit the sitting culture in America, maybe a sitting toilet could be a possibility or simply a chair device to let people sit.

For more information: http://www.eramscientific.com/?q=productoftheyear

Drysan Waterless Toilet

How the technology works:

- Waterless and urine diversion toilet system
- Feces travel through an elevator type mechanism and after each use the solids travel up a level
- The faeces are then deposited in a sealed bin and may then be removed from the unit when full
    - The size of the container or bag, and the toilet usage will determine the frequency of removal

Name of Toilet	Drysan waterless toilet
Company	Drysan
Originating country	South Africa
Waterless?	Yes
Composting?	No
Pros	- Can be used in various environments - Trucks and tanks are not required to empty bin - A design that is versatile and can be changed in many different ways (size of container ,etc) - Simple installation

	- No underground digging
Cons	- Odours - Diversion mechanism can be hard to clean
Cost	Not applicable (would have to contact company directly)
Odour control system?	No

Comments?

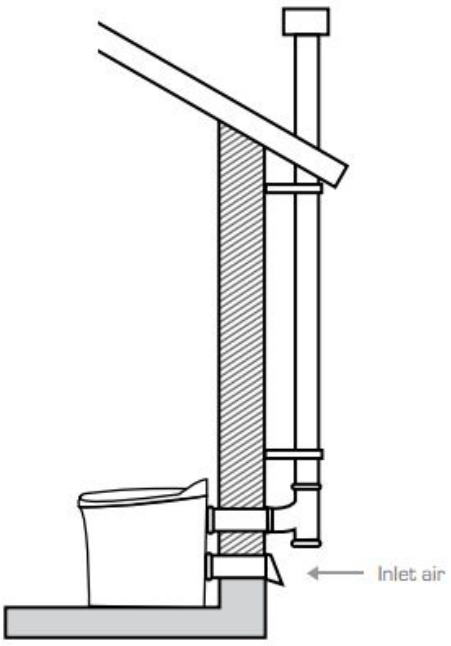
- Very informal system that can be unappealing by some users.
- The easy access to the feces bin could be an issue and there is a higher possibility for messes.

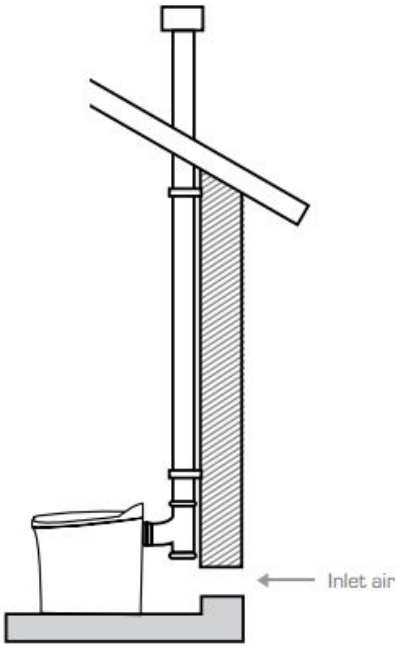
For more information: http://drysan.blogspot.ca/

Cinderella Toilet

Alternative A
This is the recommended method for installation. Inlet air flows through an external pipe connected to the rear wall of the toilet. The outlet air pipe extends through any overhanging parts of the roof, internally or externally.

Alternative B
This is an alternative configuration. Inlet air is provided from inside the room, which must have a separate air vent of at least 160 mm diameter. The outlet pipe is routed either inside the toilet or through and up an outside wall. This alternative is typically used where in lower temperature environments. Note: an extractor fan can not be used in the toilet with this alternative.





How the technology works:

- All toilet waste is incinerated at high temperatures until only an insignificant quantity of ash remains.
- The ash is stored in a small tank under the seat.
- All odours transfer through a ventilation pipe and and clean air comes in

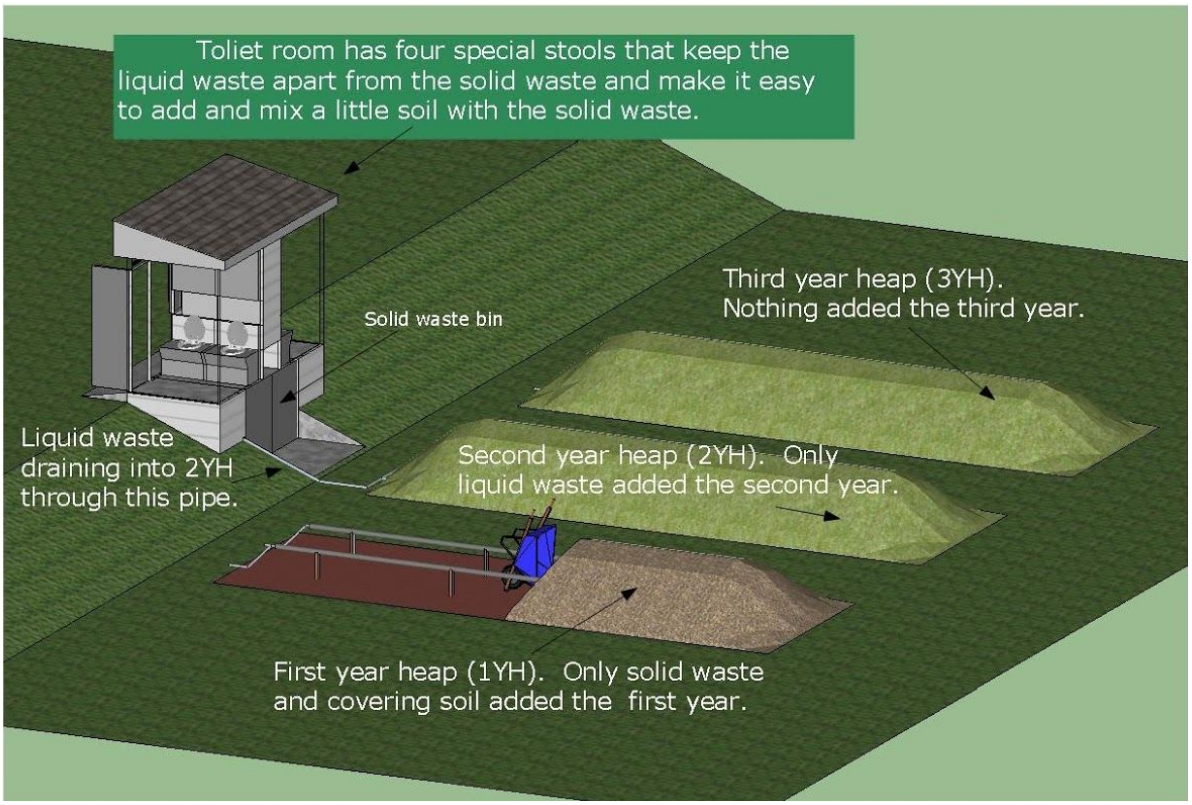
Name of Toilet	Cinderella
Company	Cinderella incarcerated toilets
Originating country	Denmark
Waterless?	Yes
Composting?	No
Pros	- Simple installation (no underground digging) - Independent (no need for piping or big composting bins) - Suitable for cold environments - Anti-bacterial seating options
Cons	- Better for indoors - Electric (needs to be plugged in) - Needs to be constantly emptied due to its small capacity
Cost	Not applicable (would have to contact company directly)
Odour control system?	Yes (through ventilation)

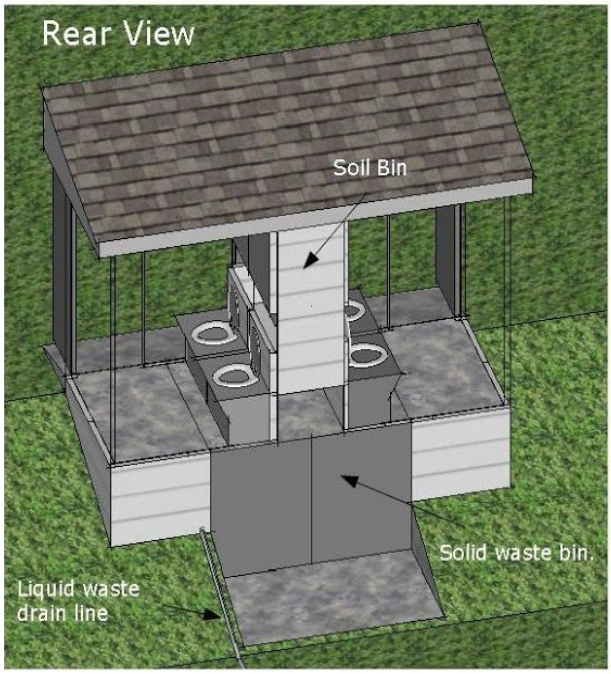
Comments?

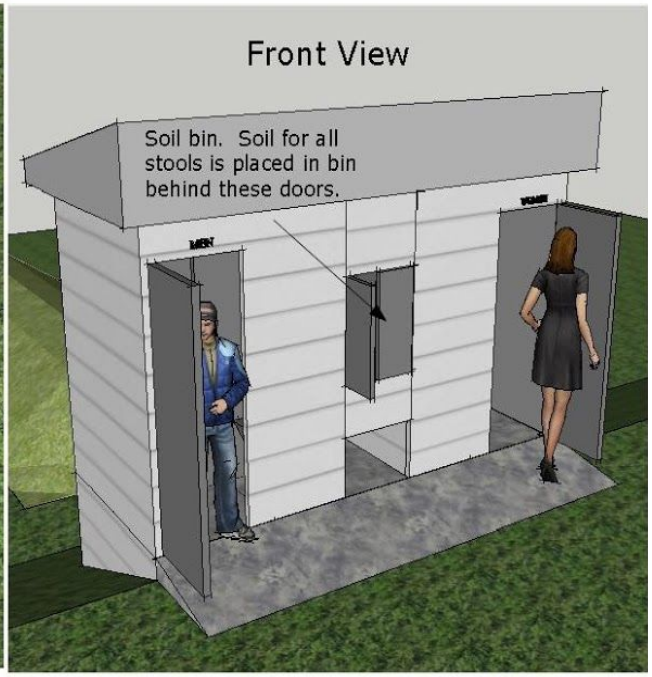
- This type of technology is ideal for areas of very low traffic because of its capacity and size.
- Because of its easy installation and simplicity of use, this could be ideal as an introduction to ecological toilet designs.

For more information: http://www.cinderellaeco.com/en/

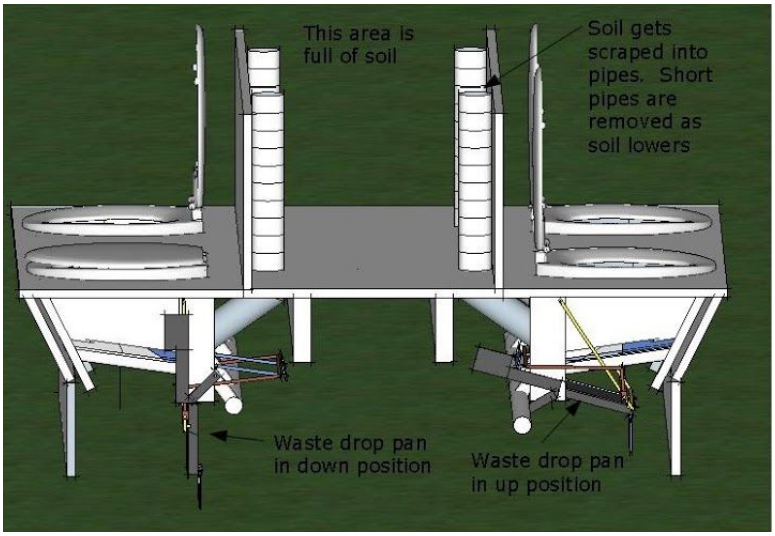
Amos Bender : Public Restroom







Privacy partitions not shown



All pictures taken from

Exploring Nature's Possibilities (n.d) retrieved from

https://sites.google.com/site/exploringnaturespossibilities/home/public-rest-room-or-area-system

How the technology works:

- When going to the toilet, liquids and solids are separated
- The solids fall into an underground composting basin that covers it in soils to prevent odours
- Liquids are diverted into second year heaps for fertilizer
- Solids need to be transported each year from the composting basins into the heaps for fertilizer production
- Heaps of fertilizers are placed behind the toilet
- Three heaps for 3 different years
    - First heap/ first year is made of solid compost waste with soil coverings (freshest)
    - Second heap is made up of the same solid waste that is 2 years old with the addition of liquid waste derived from liquid waste drain
    - Third Heap is made of 3 year old waste that is then transfered to use as fertilizer

Name of Toilet	Public Restroom
Company	Amos Bender
Originating country	N/A
Waterless?	Yes
Composting?	Yes

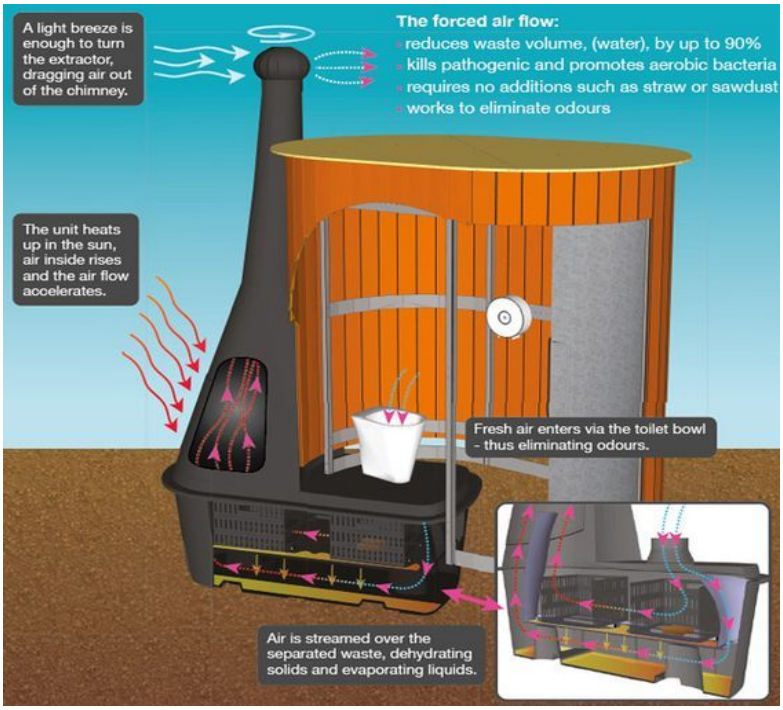
Pros	- Creates fertilizer for green agriculture - Makes use of both solids and liquids
Cons	- Takes a lot of space - A lot of construction needs to be done for this type of infrastructure - A lot of work and transportation to and from fertilizer heaps and the composting tanks
Cost	N/A
Odour control system?	Yes (with the use of soil that envelops solids and fecal matter as they are dumped)

Comments?

- This type of infrastructure is a good investment for rural regions because of how much space it needs and because it produces good amounts of fertilizer that can be used by small local farmers.

For more information:
https://sites.google.com/site/exploringnaturespossibilities/home/public-rest-room-or-area-system

WooWoo



How the technology works:

- Fresh air enters from toilet bowl
- Air streams dehydrates solids , while evaporating liquids and removing odours
- Heat from the sun cause the air inside to rise into the extractor fan
- Fan releases odours with wind power

Name of Toilet	Woowoo (Various styles with different names)
Company	Woowoo
Originating country	UK (London)
Waterless?	Yes
Composting?	No (dehydrating and evaporating unit)
Pros	- Doesn't need water, chemicals or electricity - Offers urinal and toilet options

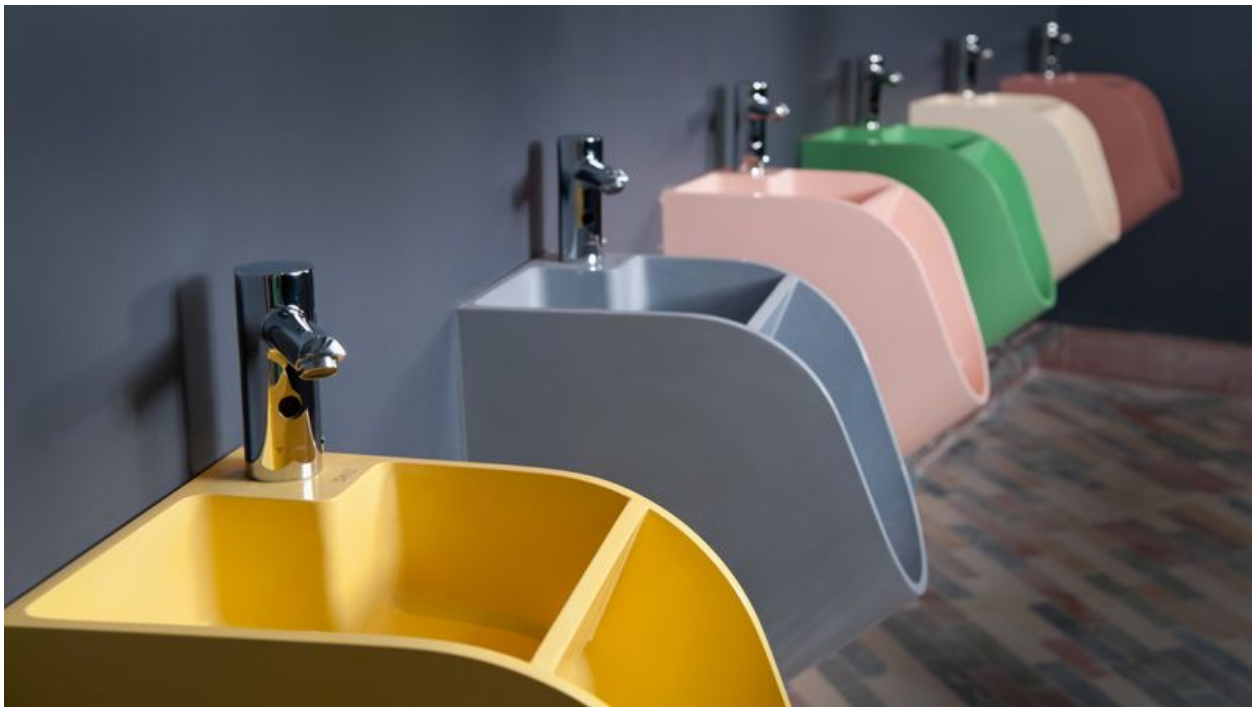
	- Does work in cold and wet climates - Structure is able to hold more than one toilet, and also has a urinal - Uses solar and wind energy - Structure is visually pleasing
Cons	- Has to be placed somewhere the sun hits 75% of the day - Has to be placed in a place where there is no obstruction from wind - Placed faced south direction - In extreme usage of toilets, maintenance would be bi-monthly - Not a lot of people can use the toilet , in comparison to other composting toilet models
Cost	Standard: £3,975 Accessible unit:£6,590 Luxury Unit (even more environmentally friendly): £7,990
Odour control system?	Yes (through an evaporating chimney)

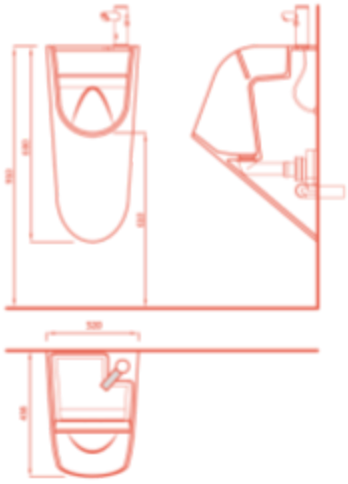
Comments?

- The placement of this toilet is very specific and eliminates it from being as effective in all public spaces in Ottawa
- It is a toilet that suits rural regions where there is no water source or electricity
- Very high maintenance due to its small capacity to hold solids
- Regarding seasonality, this design is more suitable for our climate and has been tested in climates similar to Ottawa's such as the UK.

To find out more : www.waterlesstoilets.co.uk

Sink-Urinal Combination





How the technology works:

- When done with using the urinal , men wash their hands on the sink attached at the top
- The water used to wash your hands is the water directed below to flush your urinal

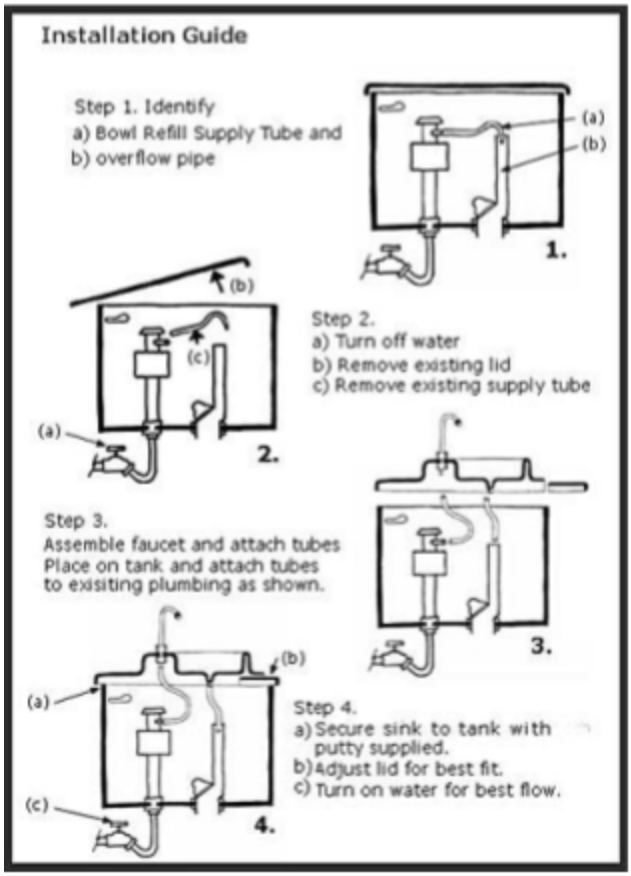
Name of Toilet	Stand
Company	Stand
Originating country	Latvia
Waterless?	No (but it is water reducing)
Composting?	No
Pros	- Very simple technology - Space saving - Water reusing - Fits American Culture - Inexpensive - Easy to use - Contemporary design
Cons	- All urinals would have to be replaced by this technology
Cost	Around $590 /unit
Odour control system?	No odour control needed

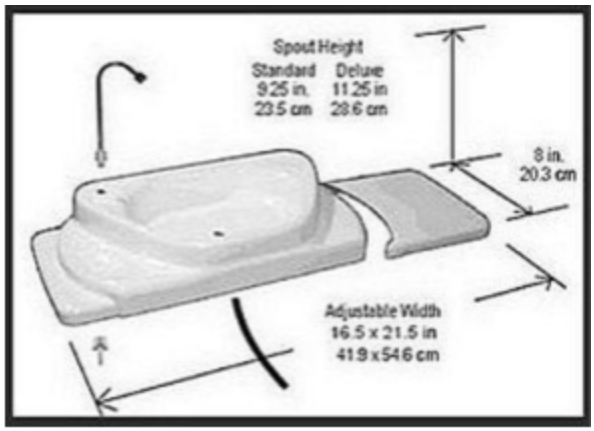
Comments?

- This technology is a very simple one that can easily save a lot of water from flushing urinals.
- It's not a drastic change from the current technology and what men use to pee.
    - This can be good because people won't have to completely change their habits and are less likely to complain
    - This can also be bad in terms of investing money in a technology that is only a little bit ecological
- This urinal can be a good starting point towards a change for more ecological practices when going to the toilet.
- Also addresses the issue of washing hands and reminding people to do so after using the urinal

For more information: https://standpage.com/product/stand-urinal-sink/

Sink- Toilet Combination





How the technology works:

- Sink positive is an attachment to already existing toilets
- The sink is placed on top of the toilet tank
- The water from the sink after washing hands goes into the toilet tank is used to flush the toilet.

Name of Toilet	Sink Positive
Company	Sink Positive
Originating country	US
Waterless?	No (but it is water conserving)
Composting?	No

Pros	- Addresses issues around water conservation - Small attachment - Space saving - Inexpensive - Adjustable for any tank sizes - Promotes washing hands - Very accessible for purchase
Cons	- The toilet needs to be already existing - Is automatic and the sink will run until the tank is full
Cost	Deluxe model : $149.99 (comes with an aerator on the tap to prevent splashing) Standard : $139.99
Odour control system?	No need for odour control

Comments?

- A good way to upgrade already existing toilets
- It addresses the issue of sanitation , which is very important for health
- With this technology water wasting is cut down significantly

For more information: www.sinkpositive.com

3. Odour Control

The idea of ecological toilets are stigmatized with the characteristic that they stink. Technologies today have come up with solutions to control odour and most are easy to implement and use. In this section, a number of techniques used to control odour will be highlighted.

1. **Ventilation Pipes.**

Ventilation pipes or fans are used to let odours escape into the atmosphere where wind blows and spreads out any stinks from the composting tanks or toilets. Most composting toilets in this report have ventilation mechanisms to control odour.

2. **Soil and sand**

These two are used for solids in composting tanks. The soil or sand sticks on the outer surface of solids and envelopes and therefore contains stinks from escaping. It also neutralizes odours.

3. **Vinegar**

Vinegar has become a household cleaner and has been praised for its odour removing abilities. For ecological toilets or toilets in general one thing is necessary and that is periodical cleaning. If a toilet isn't cleaned periodically or isn't cleaned with the right cleansers than odour is bound to happen. Vinegar is an all-purpose cleaner that could be used to clean toilets or even deep clean composting tanks.

4. **Sealants**

From liquids that prevent odours to escape or even rollers that leave no space for any odours to flow around (see Loowatt toilet as an example), there are ton of variations of sealants. The whole purpose of a sealant is to prevent odours to escape from tanks. Liquid sealants are used for urine. They float on top of urine preventing them from urine odours to escape into the toilet.

Although only 4 types of odour control mechanisms are listed, within each category there are many variations.

4. Considerations

Choosing a design to implement comes with many questions and considerations. In this section, a list of important considerations to think about when choosing the right design for specific environment is summarized.

1. **Seasonality**

Different areas have different weather patterns and seasons. It's important to consider this because depending of the weather will the different toilets work. Countries with dry climates might want to consider waterless toilets because of the lack of water supply. Humid climates might not want to opt for composting toilets or dehydrating toilets because it can increase odours and insects. In northern climates, it is important to consider the cold winters for different technologies can stand low temperatures. Depending on the location of the toilet, seasonality can play a huge role in decision making. If the plan is to implement a toilet outdoors, seasonality is key and determines the effectiveness of an ecological toilet and its usage by the public.

2. **Maintenance**

Maintenance plays another big role because none of the toilets are self-cleaning and self-healing. Employees or machines would have to periodically clean and check on the different technologies. Maintenance should be easy to do in terms of time and physically on the workers. Maintenance should also be accessible in terms of repairs and check-ups. If something happens and breaks, repairs are urgent and need to be done quickly.

3. **Availability of materials**

It is important that the materials involved in installing and building a specific toilet or infrastructure is available in the local country or easily accessible and transportable internationally. Using local materials will help speed up the process of implementation and is also a good safeguard if any repairs need to be done.

4. **Practicality**

Toilets need to be suitable for the local environment and should fit the culture using it. If the toilet isn't practical, it's not useable or useful. For example , it's impractical to implement a squatting toilet when everyone sits, and vise versa.

5. **Versatility**

The toilet should be low maintenance and should sustain a long period of time. Toilets are a big investment and should be sustainable throughout the years. This ties into maintenance and seasonality. If too much maintenance needs to be done on the toilet , it isn't versatile. The weather can also determine the versatility of certain technologies.

5. Projects under way

The Bill and Melinda Gates Foundation recently created an international challenge called "Reinvent the toilet". The purpose of this challenge was to find creative green and sustainable solutions for toilets that could be used and implemented in the near future for development. This section is dedicated to the ideas presented in this international competition. *

This section is taken from :
https://www.gatesnotes.com/Development/Reinvent-the-Toilet-Challenge-Photo-Gallery

A solar-powered toilet that generates hydrogen and electricity
California Institute of Technology, USA
A self-contained, solar-powered toilet and wastewater treatment system. A solar panel will produce enough power for an electrochemical reactor that is designed to break down water and human waste into hydrogen gas. The gas can then be stored for use in hydrogen fuel cells to provide a backup energy source for nighttime operation or use under low-sunlight conditions.

A toilet that converts human waste to fuel gas
Delft University of Technology, The Netherlands
A toilet system that applies microwave technology to transform human waste into electricity. The waste will be gasified using a microwave-induced plasma. This process will yield synthesis gas (syngas), a mixture of carbon monoxide and hydrogen. The syngas will then be fed to a solid oxide fuel-cell to generate electricity.

A toilet that produces biological charcoal, minerals, and clean water
Loughborough University, United Kingdom
A toilet that transforms feces into a biological charcoal (biochar) through hydrothermal carbonization (decomposition at high temperatures without oxygen and in water) of fecal sludge. The proposed system will be powered from heat generated by combusting the produced biochar and will be designed to recover water and salts from feces and urine.

A toilet that sanitizes feces and urine to recover resources and energy
University of Toronto, Canada

A technology for treating solid waste streams through mechanical dehydration and smoldering (low-temperature, flameless combustion) that will sanitize feces within 24 hours. Urine will be passed through a sand filter and disinfected with ultra-violet light.

* Many of these ideas are in the process of being concretized and have not yet been made into a product to be sold and implemented.

6. Bibliography

Barry, F. (2012, September 08). Drysan Waterless Toilet. Retrieved from https://www.slideshare.net/RedDiceEvents/drysan-waterless-toilet

CONSEILS D'INSTALLATION [PDF]. (n.d.). Ecodomeo.

Documents. (n.d.). Retrieved from http://www.ecodomeo.com/documents/

Drysan Waterless Toilet [Web log post]. (2012, September 07). Retrieved from http://drysan.blogspot.ca/2012/09/drysan-waterless-toilet-wwwdrysancoza.html

E TOILET ERAM. (2013, November 20). Retrieved from https://www.youtube.com/watch?v=Pl2rofTtHDM

Ecosan waterless toilet - product information. (n.d.). Retrieved from http://ecosan.co.za/product_info.html

ExploringNaturesPossibilities. (n.d.). Retrieved from https://sites.google.com/site/exploringnaturespossibilities/

Gardner, G. (1997, November). Recycling Organic Waste.*USA Today Magazine*, *126*(2630), pp. 1-6. Retrieved from https://app.vlex.com/#/vid/recycling-organic-waste-53751349

Gates, B. (n.d.). And the Winners of the Reinvent the Toilet Challenge Awards are...? Retrieved from https://www.gatesnotes.com/Development/Reinvent-the-Toilet-Challenge-Photo-Gallery

Home. (n.d.). Retrieved from http://www.cinderellaeco.com/en/

Home. (n.d.). Retrieved from http://www.waterlesstoilets.co.uk/

Installation [PDF]. (n.d.). Cinderella COMFORT.

Jorgensen, B. S., J. F. Martin, M. W. Pearce, and E. M. Willis. "Predicting Household Water Consumption With Individual-Level Variables." *Environment and Behavior* 46.7 (2013): 872-97.

Krogedal, T. (n.d.). Cinderella COMFORT. Retrieved from http://www.cinderellaeco.com/en/products/our-toilets/item/cinderella-comfort

Lau, K. F., & Suen, M. T. (2004). *Ventilation and lighting design for green and odourless public toilets* (pp. 1-8). Hong Kong: Building Services Branch, Architectural Services Dept.

NaturBauHof, A. W. (n.d.). Preisliste - AQUATRON. Retrieved from http://www.naturbauhof.de/lad_preis_aquatron.php

NaturBauHof, A. W. (n.d.). AQUATRON. Retrieved from http://www.naturbauhof.de/lad_komp_aqua7.php

NOTICE DE MONTAGE [PDF]. (n.d.). Ecodomeo.

NOTICE D'ENTRETIEN [PDF]. (n.d.). Ecodomeo.

Pinto, Diego Costa, Walter Meucci Nique, Edar Da Silva Añaña, and Márcia Maurer Herter. "Green Consumer Values: How Do Personal Values Influence Environmentally Responsible Water Consumption?" *International Journal of Consumer Studies* 35.2 (2011): 122-31.

Public Rest Room or Rest Area System - ExploringNaturesPossibilities. (n.d.). Retrieved April 14, 2017, from https://sites.google.com/site/exploringnaturespossibilities/home/public-rest-room-or-area-system

Revolutionizing the Sanitation Sector [PPT]. (n.d.). Eram Scientific.

Shaw, R. (2014, January 18). *A Collection of Contemporary Toilet Designs* [PDF]. Loughborough University: WEDC.

Sink & Urinal in One by STAND. (2014, May 11). Retrieved from http://www.jebiga.com/sink-urinal-stand/

Sink Positive Deluxe Toilet Tank Sink Review. (2014, May 02). Retrieved from https://www.youtube.com/watch?v=RshPpuS1Y7E

SinkPositive | The Water-Saving, Patented, Multipurpose Accessory Sink That Fits on the Tank of your Toilet. (n.d.). Retrieved June 05, 2017, from http://sinkpositive.com/web/

Technology Loowatt Luxury Waterless Toilet Technology. (n.d.). Retrieved from https://loowatt.com/technology/

Tilley, E., Ulrich, L., Lüthi, C., Reymond, Ph., Schertenleib, R. and Zurbrügg, C. (2014). *Compendium of Sanitation Systems and Technologies. 2nd Revised Edition.* (p. 1-176). Dübendorf: Swiss Federal Institute of Aquatic Science and Technology (Eawag). Retrieved from http://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/schwerpunkte/sesp/CLUES/Compendium_2nd_pdfs/Compendium_2nd_Ed_Lowres_1p.pdf

Urinal sink combo. (n.d.). Retrieved from https://standpage.com/

Wolters, Erika Allen. "Attitude–behavior Consistency in Household Water Consumption." *The Social Science Journal* 51.3 (2014): 455-63.