

Part 2: joint study

Self sufficient energy neutral

Toilet buildings



Possible solutions

- Dry or with water
- High or low tech

Concepts

Dry toilet



Dry toilet

The Bio-Cycle



I N N O V A
T I E C E N
T R U M D U
U R Z A A M
B O U W E N

Dry toilet

General

Advantages

- No use of water, electricity, sewage
- Little maintenance
- After 5-10 years 10% left from composting
- Raising awareness of visitors

Disadvantages

- Balance between feces and urine
- Compostingsproces sterk dependant on factors of moisture and temperature

Concepten

Hightech toilet general

Advantages

- Possibility of self clearance
- Traditional use (flush button)

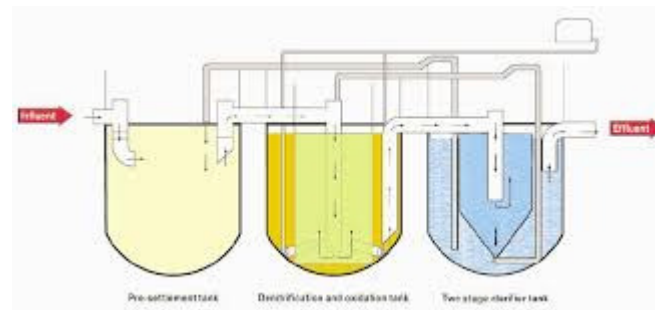
Diasadvantages

- Not vandalism proof
- Many technical parts
- Maintenance of installation
- More expensive to buy

Water clearance

Possibilities:

- Reed bed (Helofytenfilter)
- Septic tank
- IBA
- Osmose
- UV filter



Different solutions for different situations

- From private, little use to public, high peaks
- See report for details (English version ready this week)
- Energyneutral and self sufficient do not always go together
- Right use, emptying, dependance on rain/sun etc.
- Little CO2. Water saving by dry toilets, little maintenance (emptying) saves energy
- Costs investment/maintenance/user pay?
- (inter)national law

Scenario A (Biesbosch)

Characteristics:

- Holiday home for rent 4 – 8 persons
- 20-40 visits a day
- Isolated
- No electricity or sewage
- Whole year
- In building or outhouse

Solutions:

1. Compost toilet: self sufficient, energy neutral, fits in basic facilities cottages, danger of wrong use, needs to be emptied regularly
2. Traditional toilet with water clearance: pump water up, filter it with septic tank and reed bed or willows, create circle, balance between hygiene and user friendliness. Mind unbalance in clearance system when not regularly used



Scenario B: Biesbosch

- Characteristics:
 - Private cottage, isolated, vandalism, no electricity or sewage, mainly summer, outhouse
- Solutions:
 - 1. Compost toilet (as A): responsible owners
 - 2. Dry toilet:
 - like compost toilet but possibility of energy by biovergister (e.g. LooWatt).
 - Higher costs for buying, so maybe only toilet with bio bag for compost.
 - This solution more CO2 reduction

Mind installations and solar panels

Scenario C: Grevelingen

- Characteristics:
 - Day recreation in nature, intensive use, often near beaches, mainly summer, more toilets together, vandalism, electricity + sewage, possible shower
 - Solutions:
 - 1. self sufficient high tech
 - Dry/compost not suitable for intensive use
 - Higher costs but 'paying for peeing' possible
 - Hygienic – more water use, less maintenance
 - Make use of waterless urinoirs in separate place (more sustainable)
 - Not energy neutral but self sufficient
 - Recycle waste water (shower -> toilet)
 - Mind vandalism

Scenario D:

- Characteristics:
 - Intensive day recreation without electricity and sewage (isolated beaches), peak on summerdays, no use in winter, vandalism
- Solution:
 - Mobile technical solution, vandalism proof
 - Composttoilet: self sufficient, energy neutral, but mind wrong use.
 - Make mobile unit with waterless urinoirs. Tank needs to be emptied regularly but because of winterstop less often. Existing mobile unit like Nomade: selfsufficient and self clearance but maintenance for storage and water refill. Not fit for intensive use because of time for self cleaning.

Scenario E (Grevelingen/Biesbosch)

Characteristics:

- Public, isolated, walkers, no high peaks
 - No sewage, water, electricity
 - Vandalism
 - Use whole year
- Solution:
1. Compost toilet, mind wrong use
(high costs for emptying/cleaning)
 - Regularly empty
 - Mind capacity of tank, cleaning
 - Monitor amount of use
 2. Traditional toilet with water clearance
 - As A: pumpo up water, use reed bed
 - Raise awareness
 - Mind irregular use

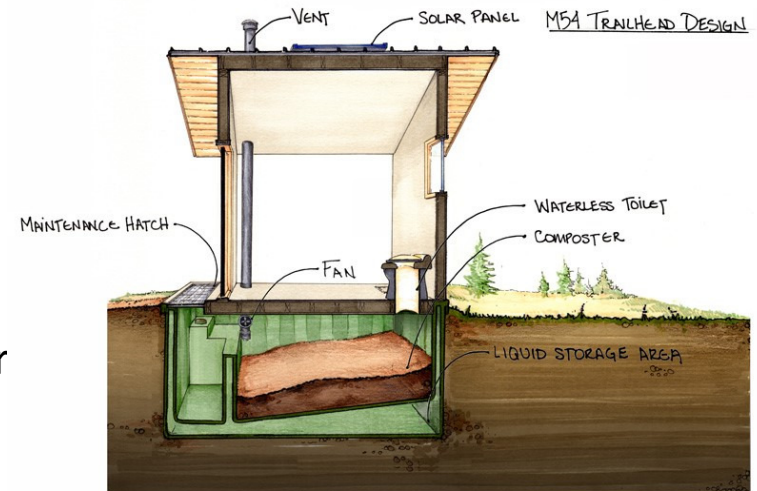


Scenario F: Grevelingen

- Semi public in fenced area (nature campsite 20 spots)
- No electricity, sewage
- Summer
- Extra: sink, shower
- No peaks

Solution: compost toilet e.g. Clivius, possibility of Extra facilities.

Reuse shower water, solar panels, waterless urinoir
Mind use of green cleaning products



Scenario G: Zoom-kalmthoutse Heide

- Characteristics:
 - Toilet building near holiday home for youth groups
 - 10-20 persons
 - Vandalism
 - No electricity, water, sewage
 - More use in summer

Solution:

See A.

1. Mind wrong use of youngsters
2. Septic tank + reed bed (vertical because of higher capacity)
3. Possible separation of faeces and urine for separate waste: Black water in septic tank, other by filtering.
Maybe peepower

Scenario H: Kent Downs

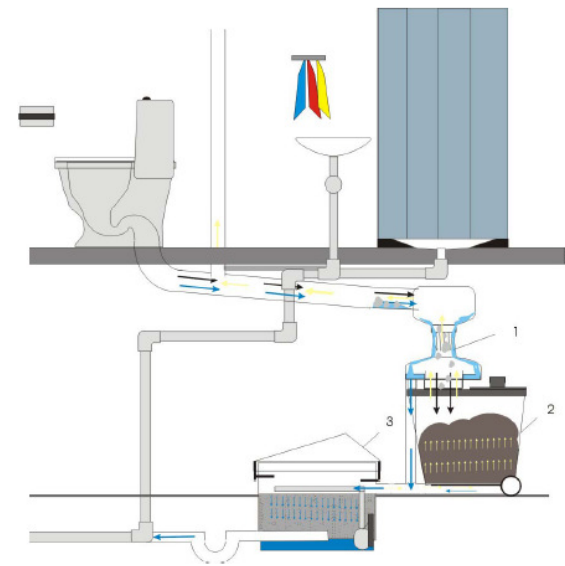
- Characteristics:
 - Whole year, more use in summer, groups up to 40 people several times a week for several hours (whole year)
 - Solution: See E
 - Mind peaks for groups but short stay so mainly urine
 - Compost toilet with separate urinoir
 - Clivius has large tank

Scenario I: Minsmere RSPB

- Characteristics:
- Minimal use by birders, isolated, no water, electricity, sewage, has to fit in landscape
- Solution:
 - Is a toilet necessary? Monitoring
 - Compost toilet (see Scenario H) with separate urinoir
 - No large system because of little use

Scenario J (West-Vlaanderen)

- Semi public (horeca)
- No sewage
- Summer
- Water clearance
- Peaks
- Solution: separate waste streams with septic tank and filtering, peepower
- 1. clearance in several fases; oil/grease, buffertank (for peaks), septic tank, vertical reed bed)
- 2. water clearance by compact system like biofilter. Not energy neutral but good for peaks and costs
- Mind correct working of system
- 3. All-in-one: container with everything in it.
- Mind use of green cleaning tools.



Next Step

- Biesbosch and Grevelingen may make next step.
- Biesbosch: inventarise sites for possible toilets, together with entrepreneurs/private owners.