Photo by: Sherpa, M.G.

STIMULATING FSM BUSINESS FOR EFFECTIVE SERVICE DELIVERY IN SUSTAINABLE SANITATION THROUGH PRIVATE SECTOR ENGAGEMENT IN KATHMANDU VALLEY

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BMGF-DFID City Partners Meeting

Hanoi, Vietnam

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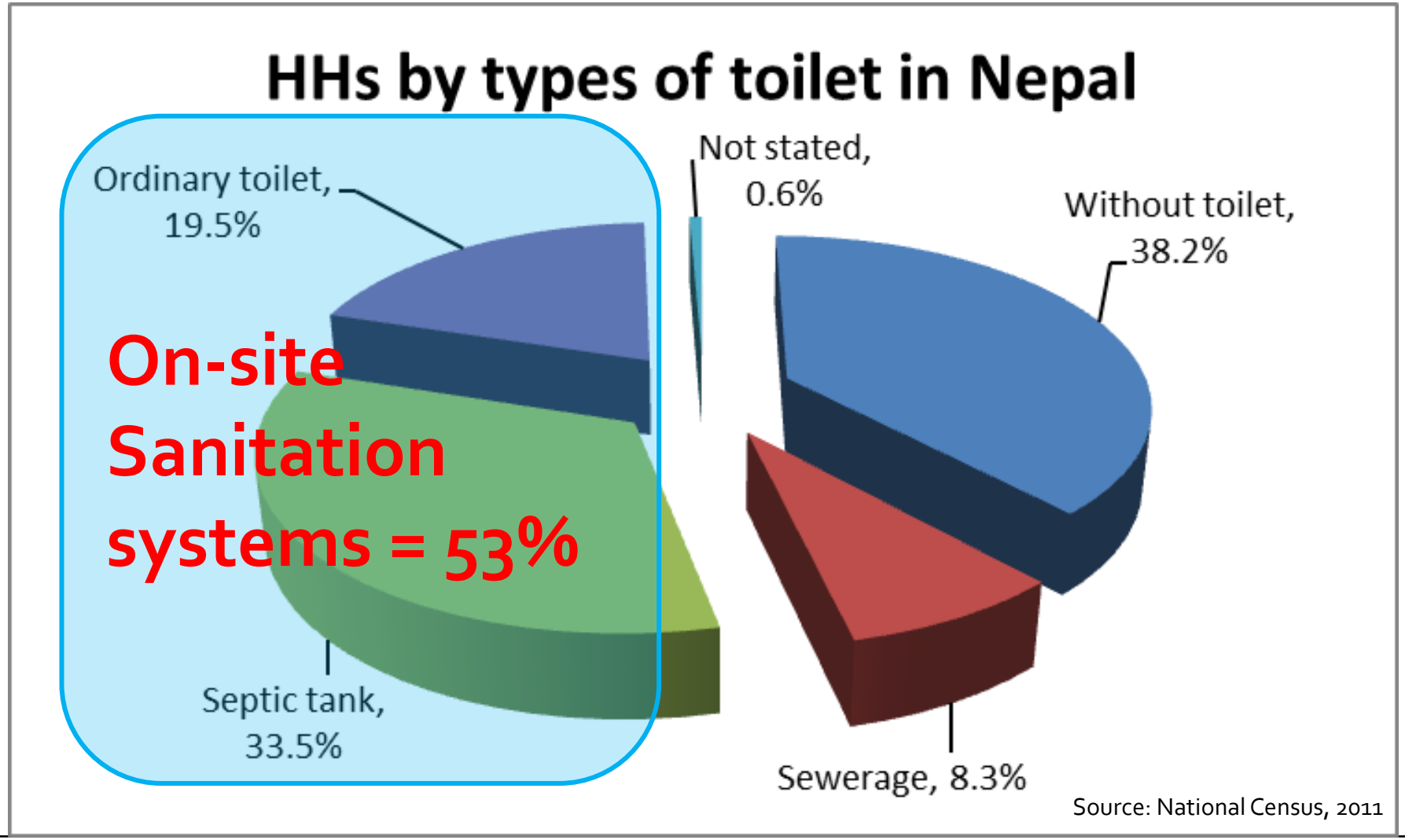
Presentation outline:

- Status of FSM in Kathmandu Valley;
  - Findings from household survey;
  - Private operators in FS services;
  - Current policies and by-laws;
- Challenges on FSM in Kathmandu Valley;
- Way forward

Types of Toilets in Nepal



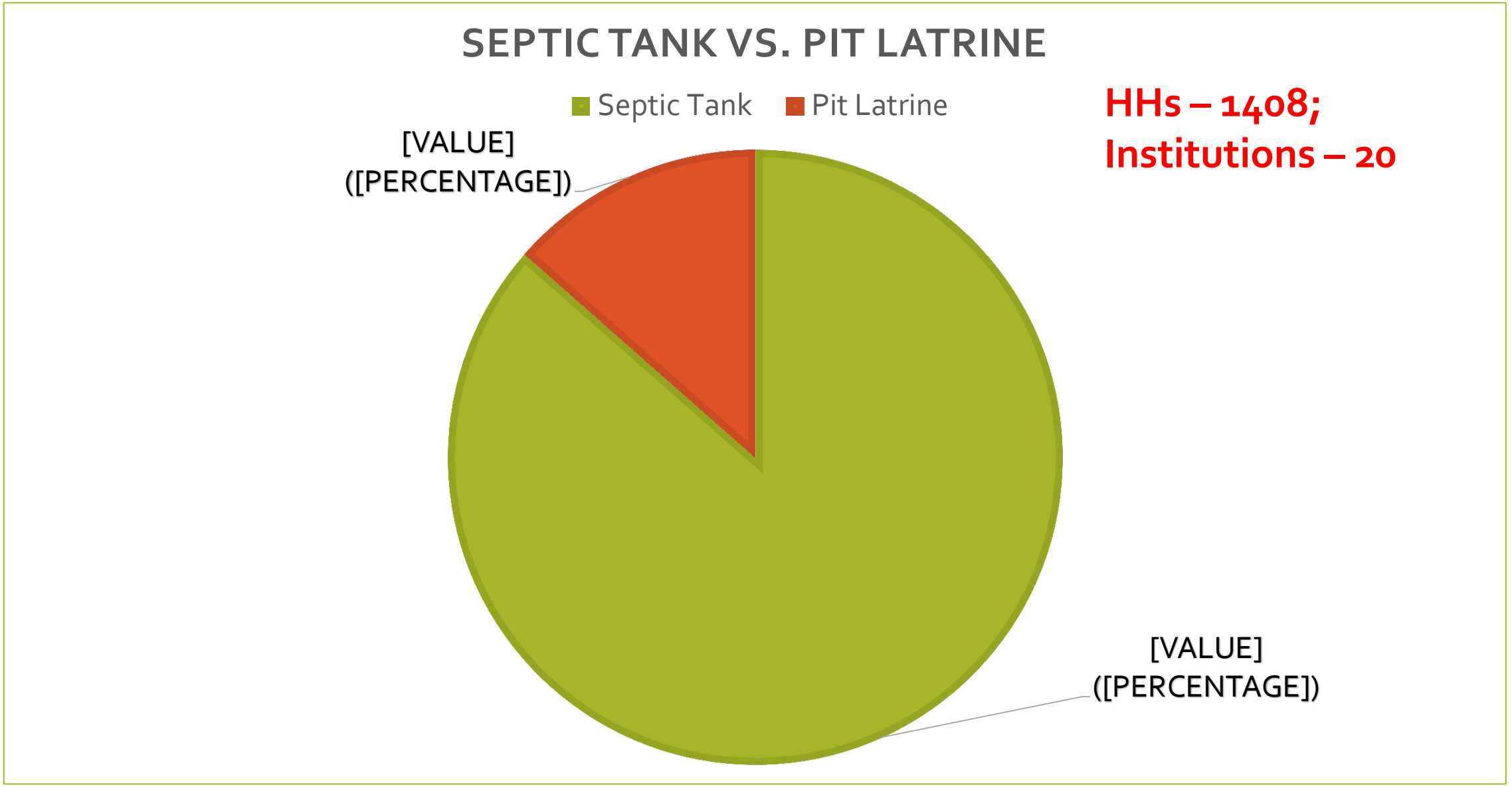
Kathmandu Valley

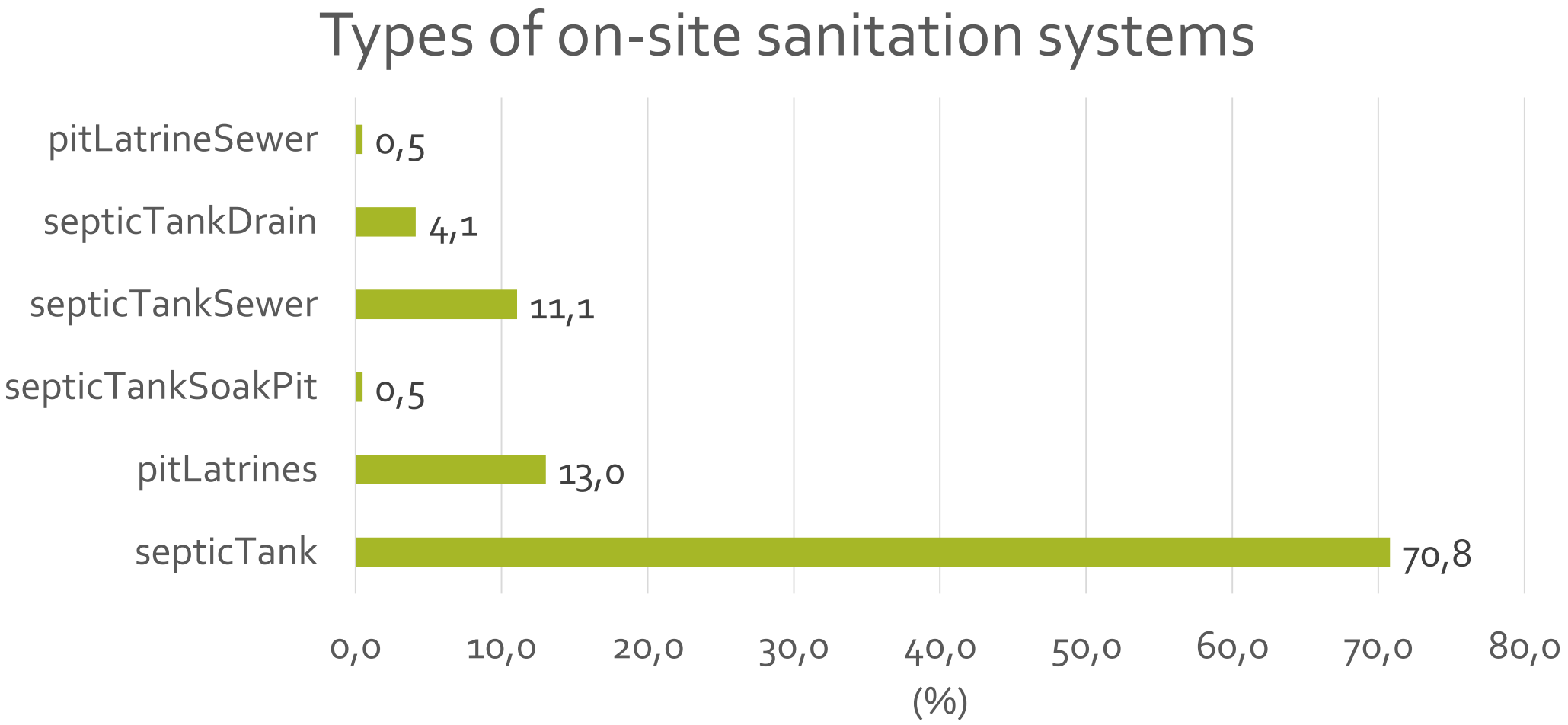
- Rapidly growing population;
- Previous study shows 30% of households have on-site sanitation systems;
- FSM is growing issue in Kathmandu Valley;

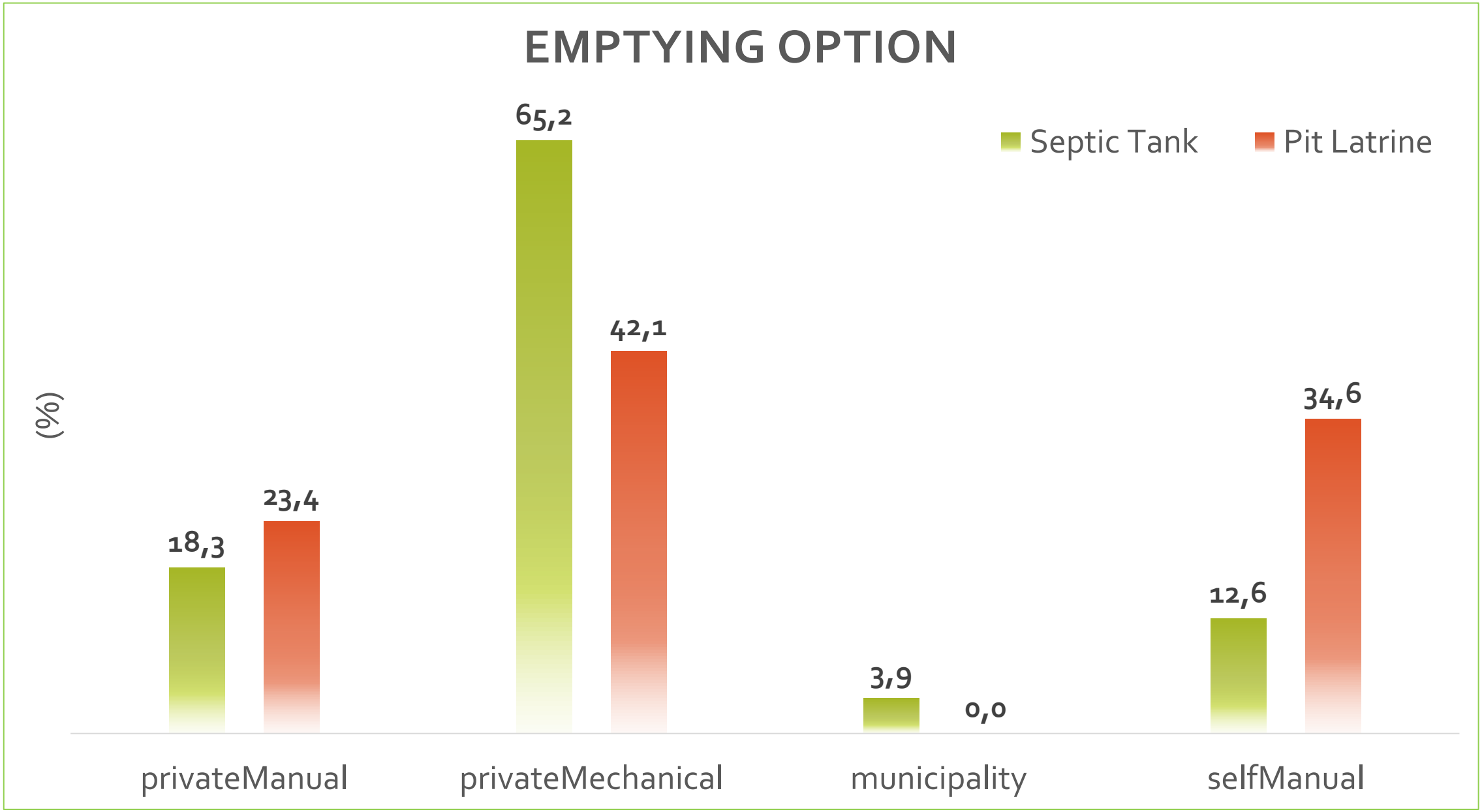
Objectives:

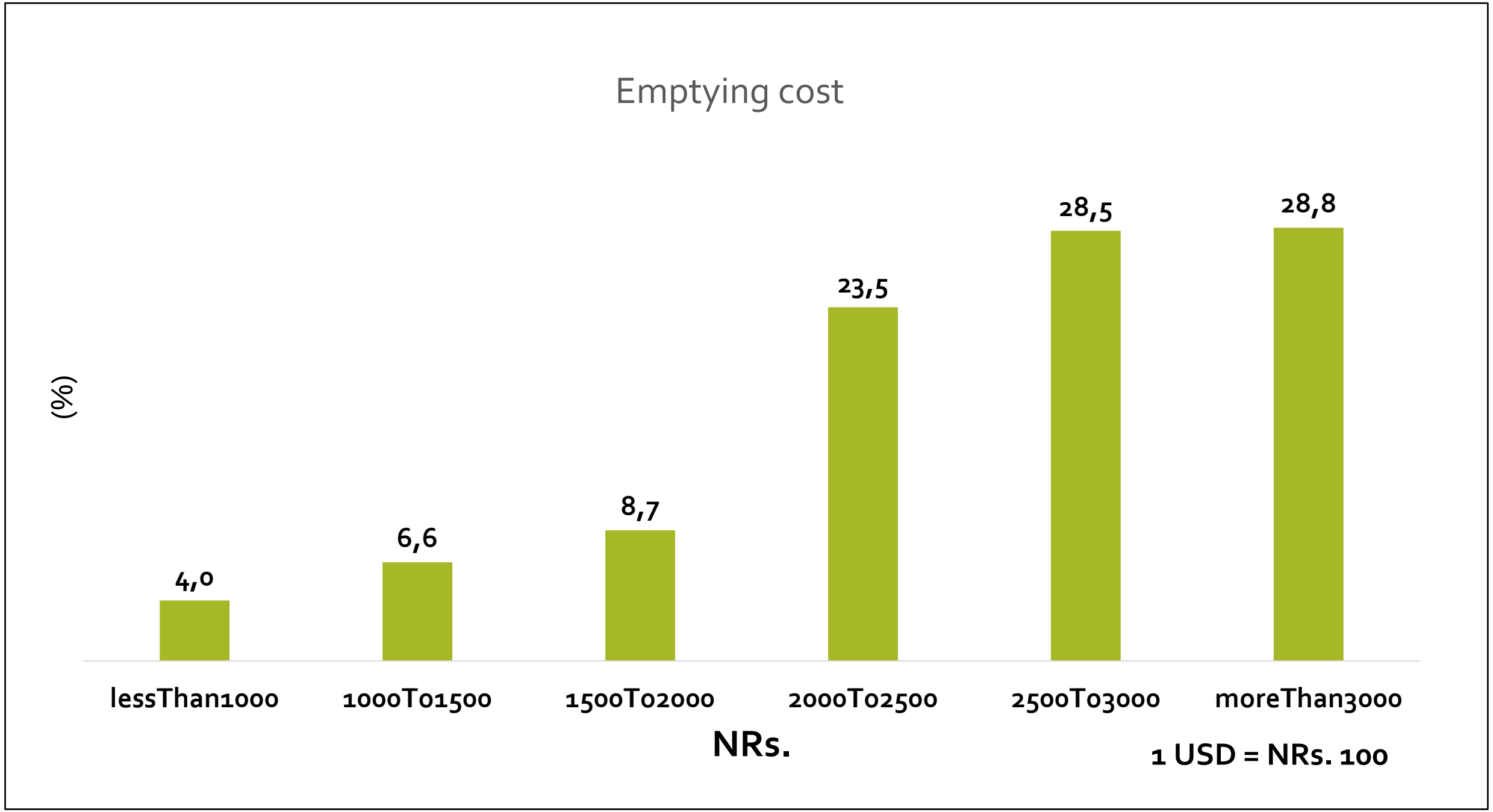
- To assess current status of FSM in Kathmandu Valley
- To formulate consolidated FSM strategy which will include effective FSM business plan and modality of engaging private sectors;

KEY FINDINGS

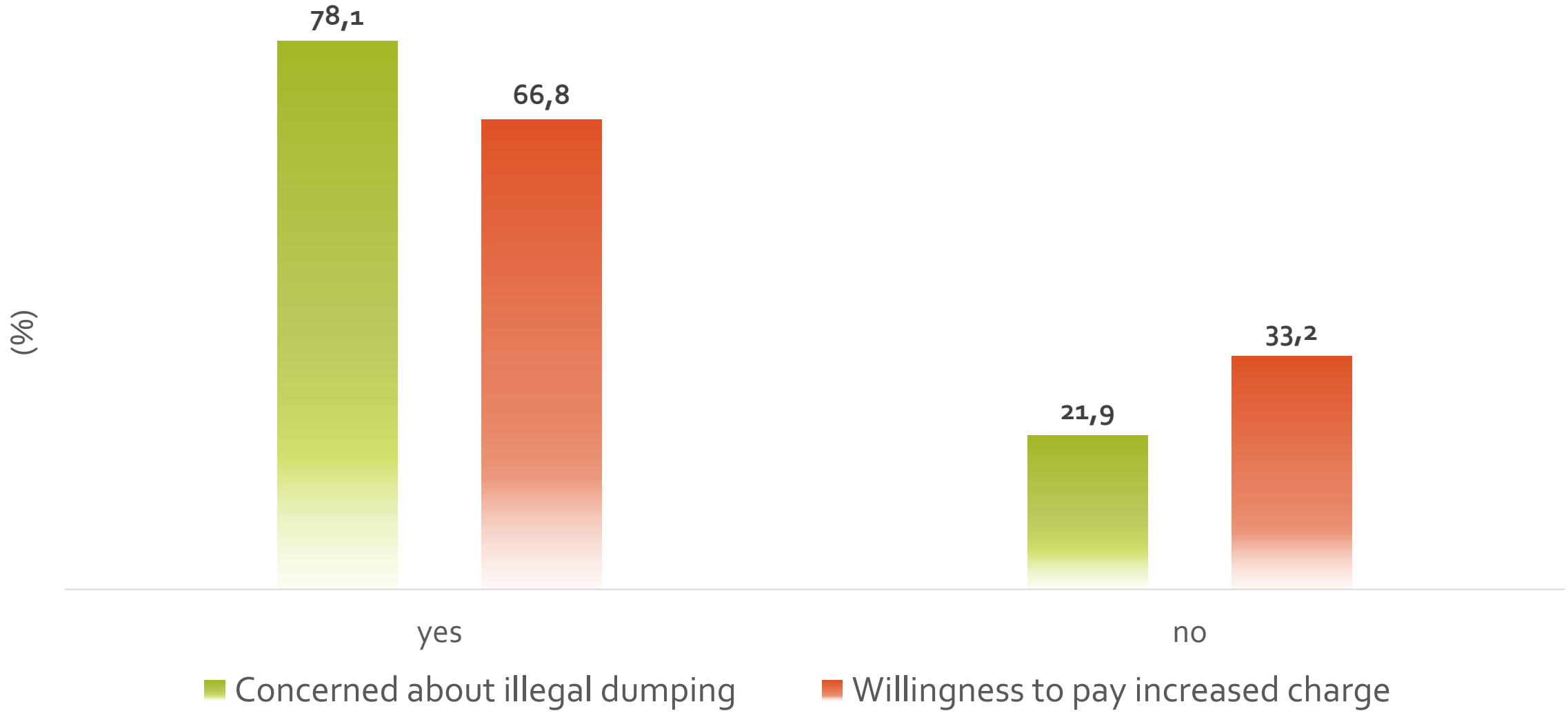

SEPTIC TANK VS. PIT LATRINE
Septic Tank
Pit Latrine
[VALUE] ([PERCENTAGE])
[VALUE] ([PERCENTAGE])
HHs – 1408;
Institutions – 20


Types of on-site sanitation systems
pitLatrineSewer
0,5
septicTankDrain
4,1
septicTankSewer
11,1
septicTankSoakPit
0,5
pitLatrines
13,0
septicTank
70,8
0,0
10,0
20,0
30,0
40,0
50,0
60,0
70,0
80,0
(%)

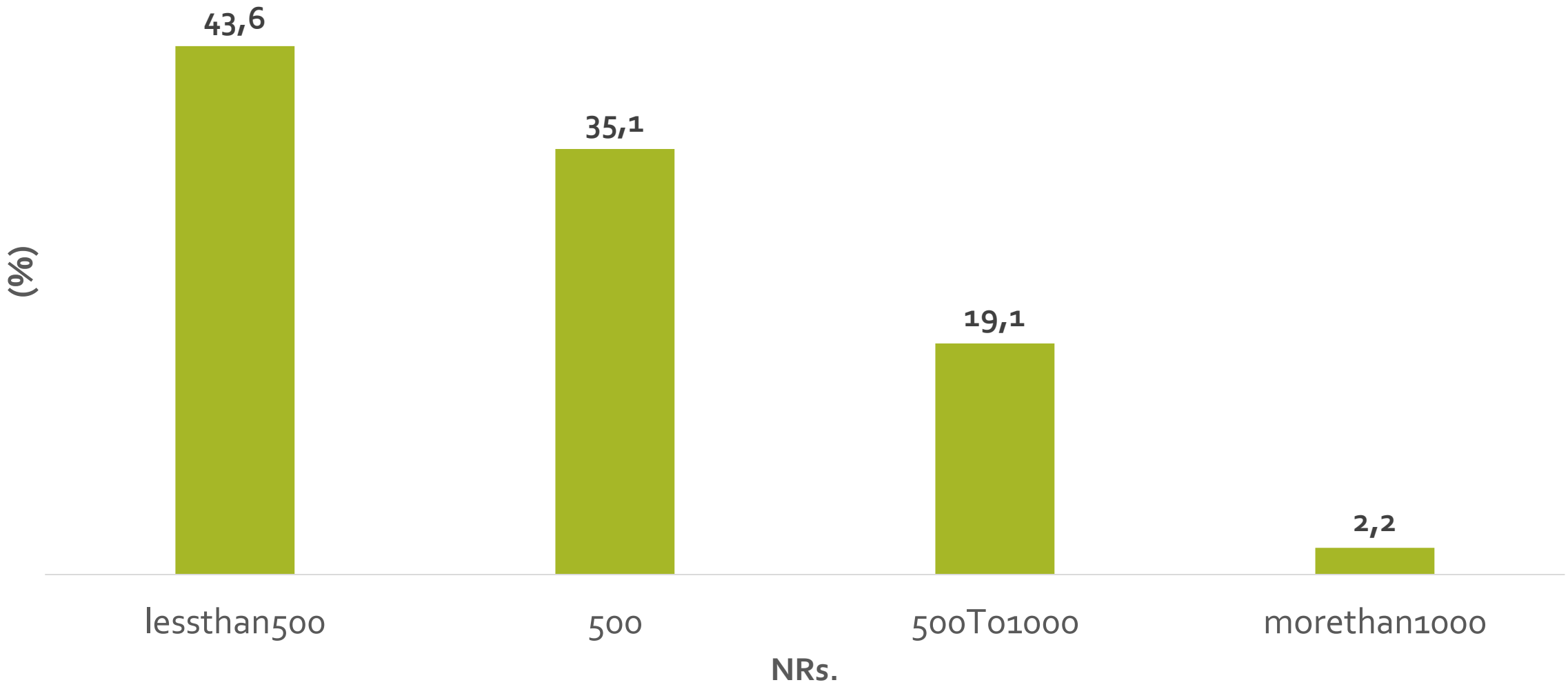

EMPTYING OPTION
Septic Tank
Pit Latrine
(%)
18,3
23,4
65,2
42,1
3,9
0,0
12,6
34,6
privateManual
privateMechanical
municipality
selfManual


Emptying cost
(%)
4,0
6,6
8,7
23,5
28,5
28,8
lessThan1000
1000To1500
1500To2000
2000To2500
2500To3000
moreThan3000
NRs.
1 USD = NRs. 100

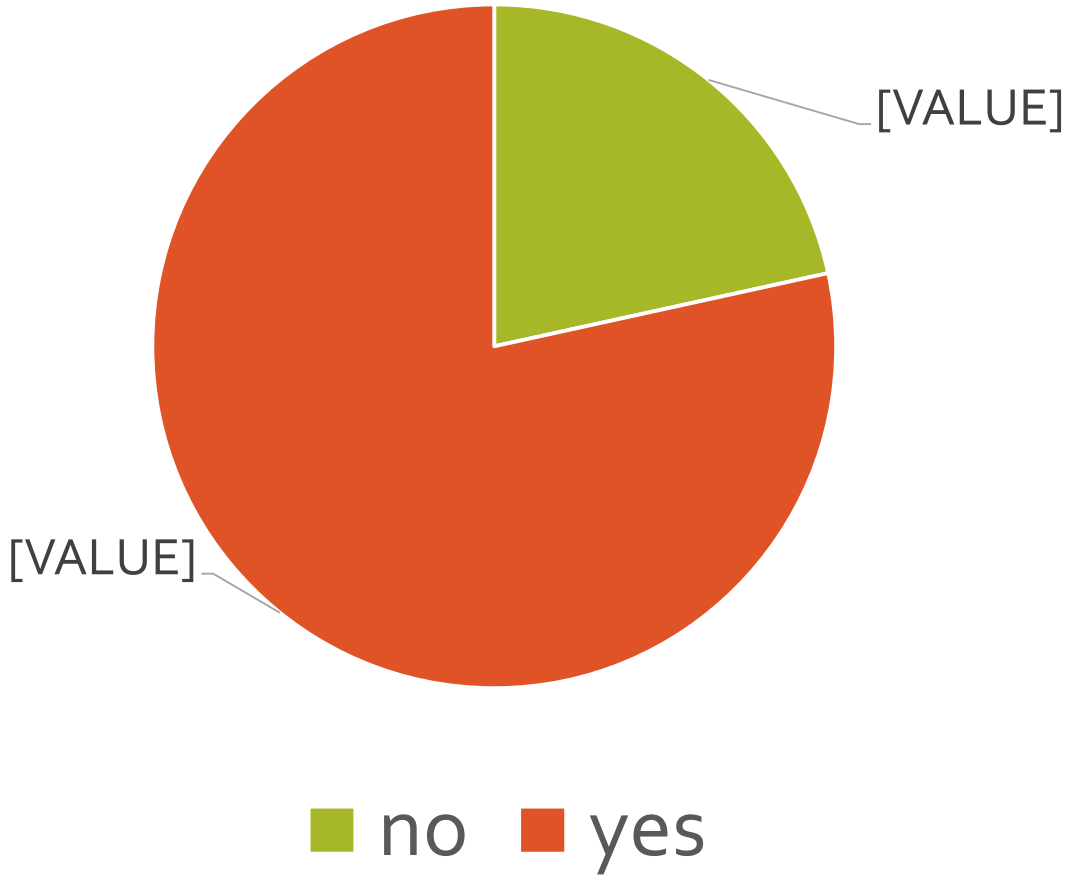
CONCERNED VS. WILLINGNESS TO PAY



Willing to pay additional charge for treatment system



Satisfied with FSM services?



Total yearly FS production in Kathmandu Valley

Method	Calculation	Total volume of FS produced (m3/year)
Sludge production method	Average emptying frequency	139,199
	Different emptying frequency	320,690
Sludge Collection Method	Number and volume of FS tankers and number of trips/day	52,560
	Average:	170,816

Private operators in FS services

- Altogether there are 12 private operators – total 15 operating FS vehicles (average volume of trucks = 4 m3);
- On average they have paid USD 13,000 for the vehicles. Seven of them took loan at the interest rate of 11-18% from the banks;
- Profitable business – On average USD 300/month (Max. USD 900/month)
- On average they make 2-3 trips per day to fulfill the demand of desludging;
- They are concerned about the unsafe disposal of FS and willing to financially contribute to establish FS treatment system in Kathmandu Valley;
- **The industry is unregulated, unorganized and competitive;**

Key Challenges of Private Operators

- Have to dispose FS unsafely due to lack of FS treatment facilities;
- Difficult to manage business as there is no clear policies and regulations;
- Inadequate support from concerned agencies;
- Unhealthy competition among the operators;
- No systematic business plan to expand the services.

Relevant Policies, Acts and Legislations

- **National Sanitation Policy (2002)**
  - 20 years vision on sanitation - 100% coverage
  - Does not address the issue of FSM
- **Environmental Protection Act and Rules (1997)**
  - Prohibits the disposal of waste
  - Does not categorise waste types
- **Environmental Standards**
  - No standards available on FS disposal, handling, treatment
- **National Building Code and by-laws**
  - Mandates the need to construct septic tanks
  - **Septic tanks are not constructed as per standard design**

Recognizing the importance of FSM

5th SOUTH ASIAN CONFERENCE ON SANITATION
22 - 24 October 2013
Kathmandu, Nepal
THE KATHMANDU DECLARATION

IV. *Recognize* the importance of sustainable environmental sanitation and hygiene in urban areas including solid and liquid waste and faecal sludge management for all urban dwellers, regardless of tenure.

- **FSM has been highly prioritized in Bagmati Action Plan**

Current challenges:

Policy:

- No clear policies, guidelines and by-laws on FSM;
- Policy regulation and monitoring

Technology:

- **Lack of appropriate, locally-suited technology;**
- **Technology requiring high O&M cost may not work;**
- **Inadequate technical capabilities to design, operate & maintain the system**

Social acceptance:

- **Lack of public awareness;**
- **Public opposition due to failure of previous/existing systems (Wastewater and FS treatment systems)**

Non-functioning FS treatment systems

Teku, Kathmandu

Pokhara leachate treatment system

WAY FORWARD

Policy:

- Formulate FSM policy and by-laws including enforcement mechanism;
- Dissemination & effective implementation of FSM policy (Policy advocacy);

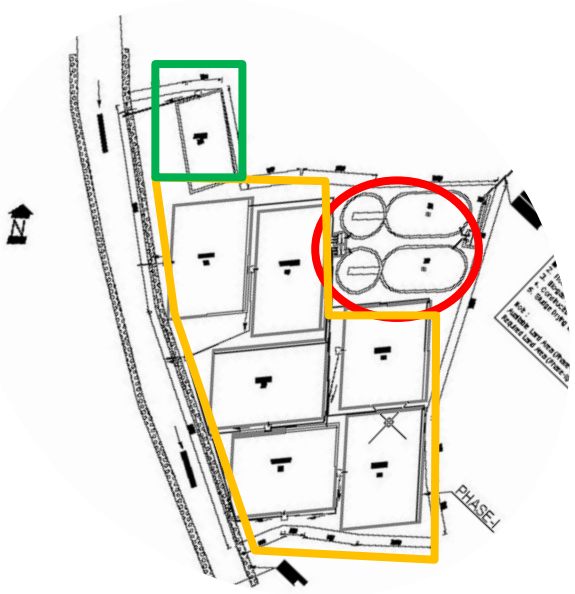
Technology:

- Successful demonstration of appropriate technology;
- Research to make technology locally viable;
- Develop business models for scaling up the appropriate technology;
- Develop local capacity

Social acceptance:

- Increase public awareness;
- Increase public engagement & participation;

Demonstration of small scale FSM system in Shreekhandapur Wastewater Treatment System



Components

- Primary treatment
  - Anaerobic bio-gas reactors (# 2 @ 75 cum)
- Secondary treatment
  - Horizontal flow constructed wetlands (# 6 @ 176 sqm)
- Sludge treatment
  - Constructed wetland sludge drying beds (# 2 @ 40 sqm)

- Currently unregulated discharge of FS being done into the manhole connected to the treatment system;
- Users' committee of WWTS seeks technical support to regulate the discharge and generate more biogas out of anaerobic biogas reactors

Key deliverables:

- **Determined technical feasibility of FS treatment in the existing system;**
- **Developed participatory FSM business model including SLAs**

Exploration for long term FSM solutions

- KUKL/PID (Utility operator) is going to rehabilitate 5 existing wastewater treatment systems in Kathmandu Valley with support from ADB (4 – activated sludge process; 1 – oxidation ditch)
- There is possibility of integration of FS treatment system in 3 wastewater treatment systems;
- The conceptual design for these WWTS is on-going and KUKL/PID will announce bidding for detail design;
- Designing of FS treatment system during the detail design would be the ideal case scenario for piloting and demonstrating required technological solutions;
- Viable business models can be developed, tested and established;
- **However, appropriate technology and technical feasibility is yet to be determined;**

THANK YOU VERY MUCH!!!

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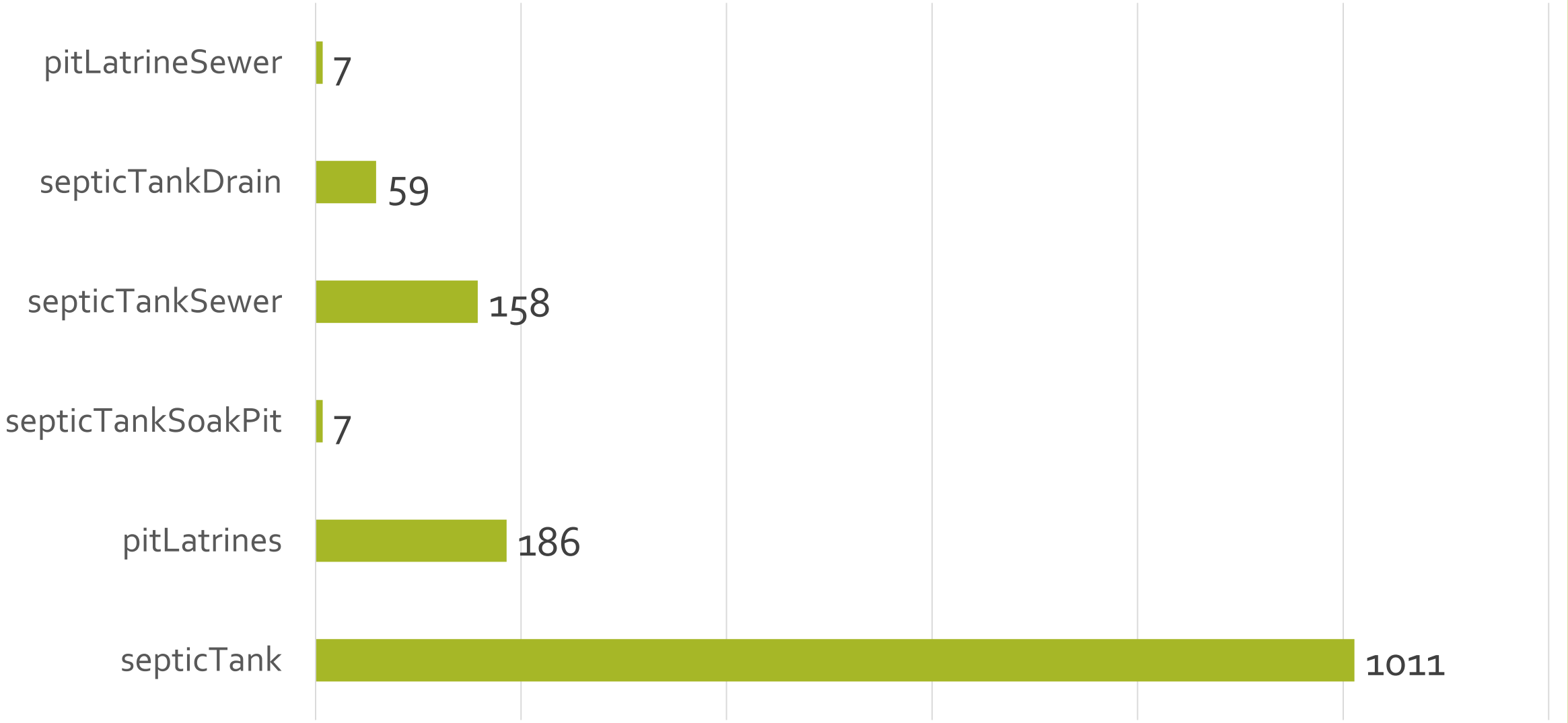
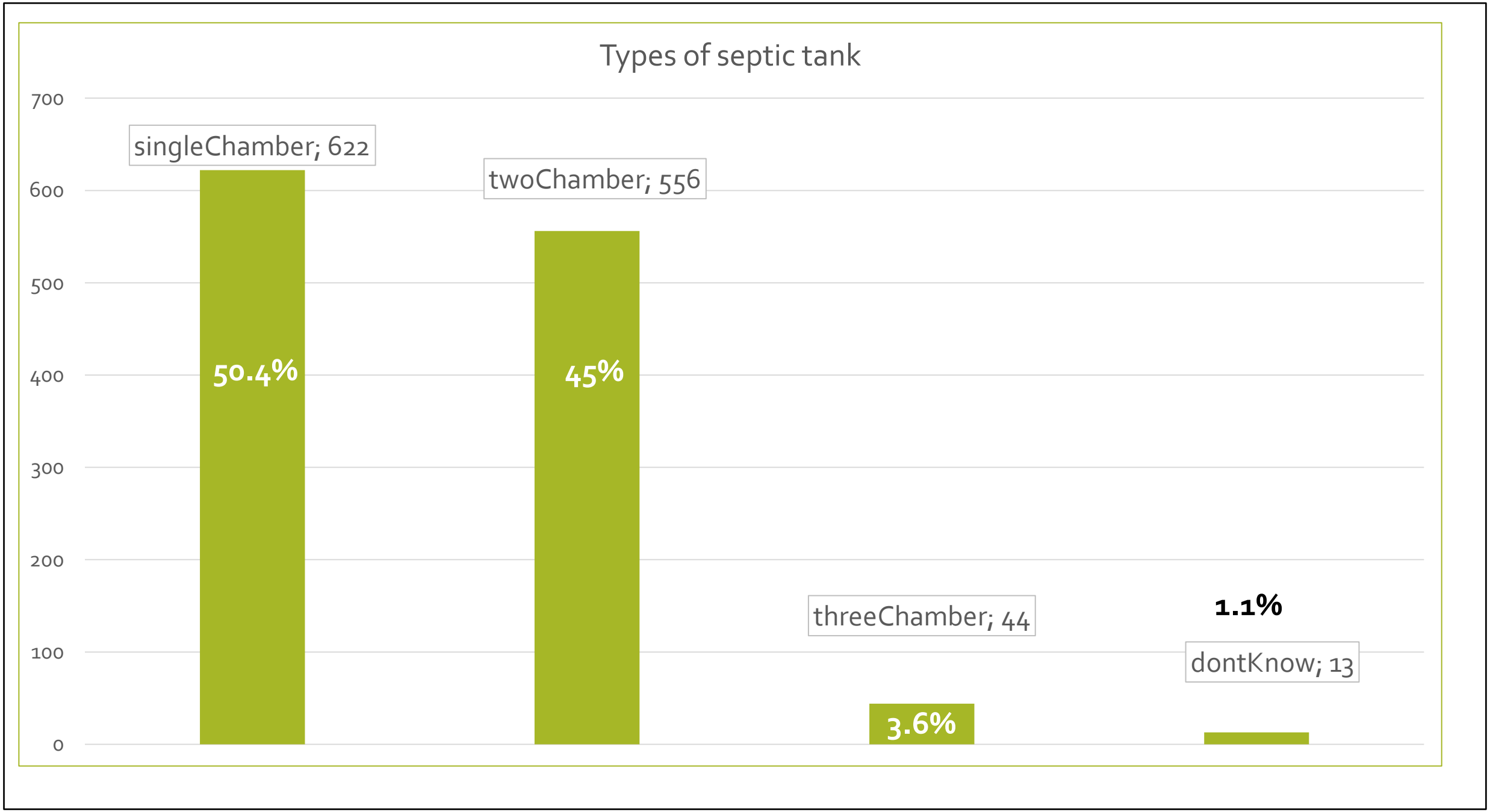
ADDITIONAL SLIDES

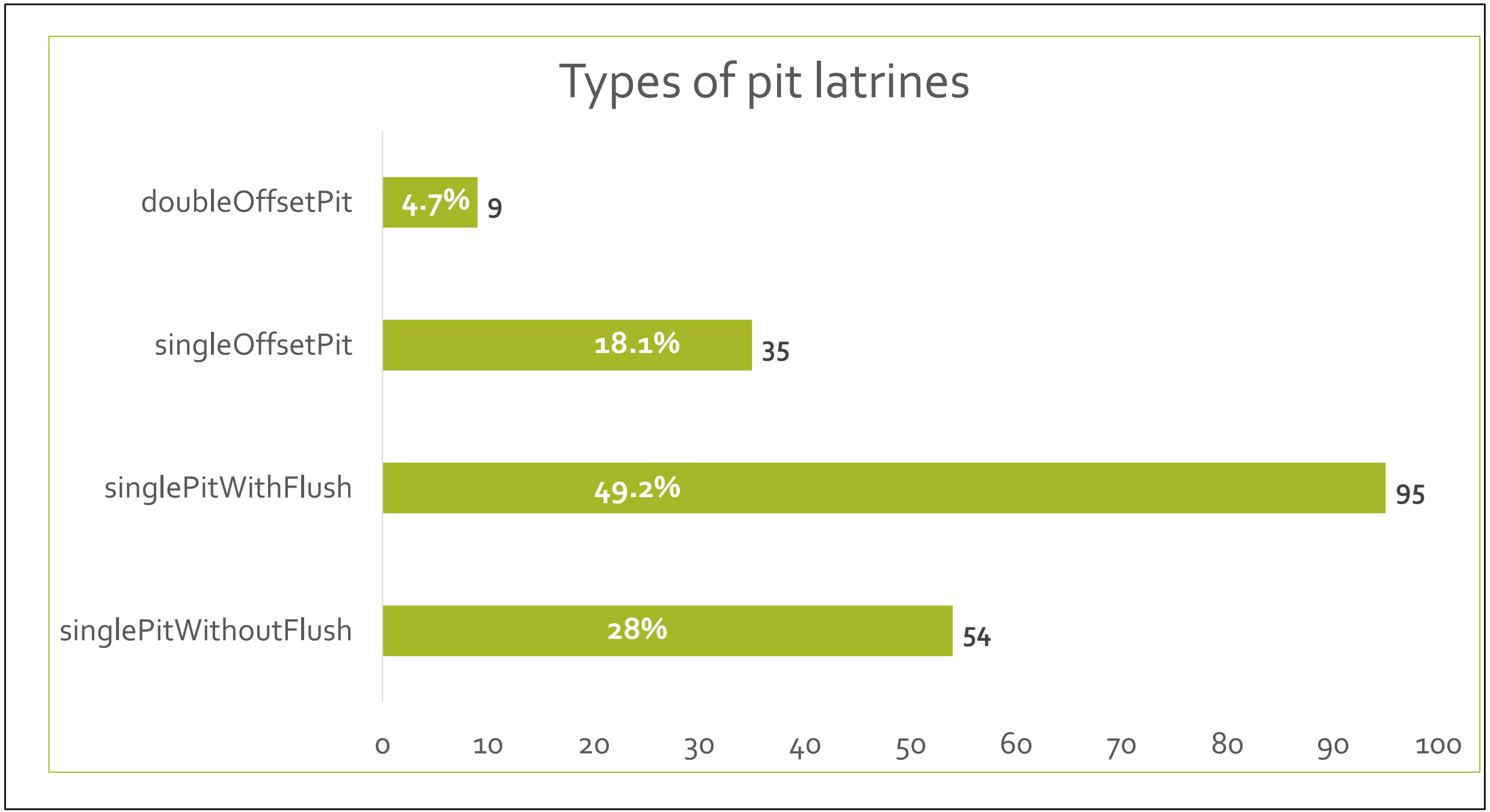
Household survey

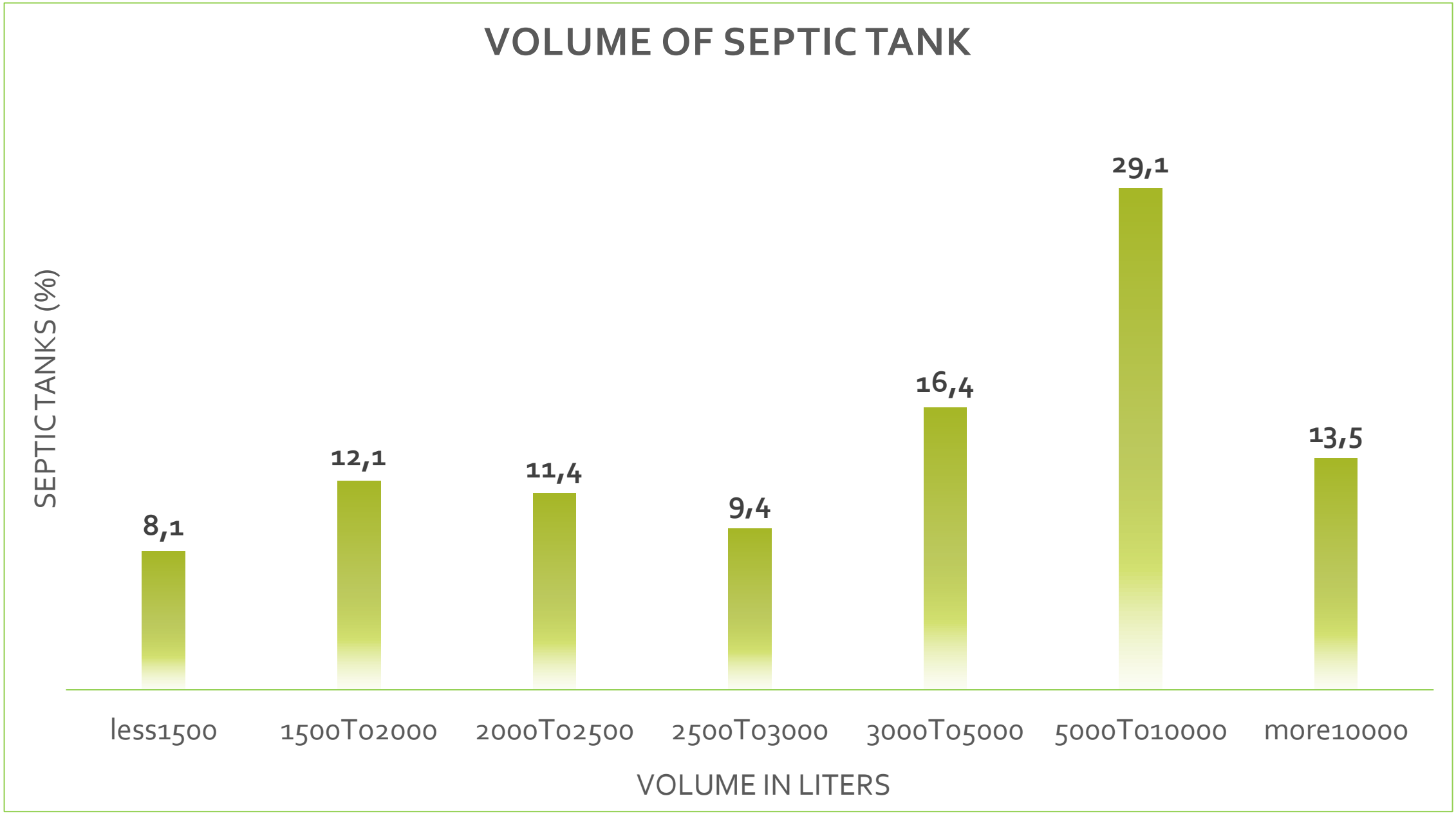
- Kathmandu Valley;
- Targeted to HHs having OSS (Septic Tank, Pit Latrines);
- Use of REMO – mobile based application for data collection, storage and analysis;
- Mainly focused in collecting following data:
  - Status and types of OSS in Kathmandu Valley;
  - Emptying practices and services;
  - Knowledge, attitude and perception of FSM including disposal and treatment;
  - Willingness to pay for better service and FS treatment;
  - Gather adequate data to calculate per annum FS production in Kathmandu Valley.
- Results will be used to formulate effective FSM plan and strategy;

Types of on-site sanitation systems

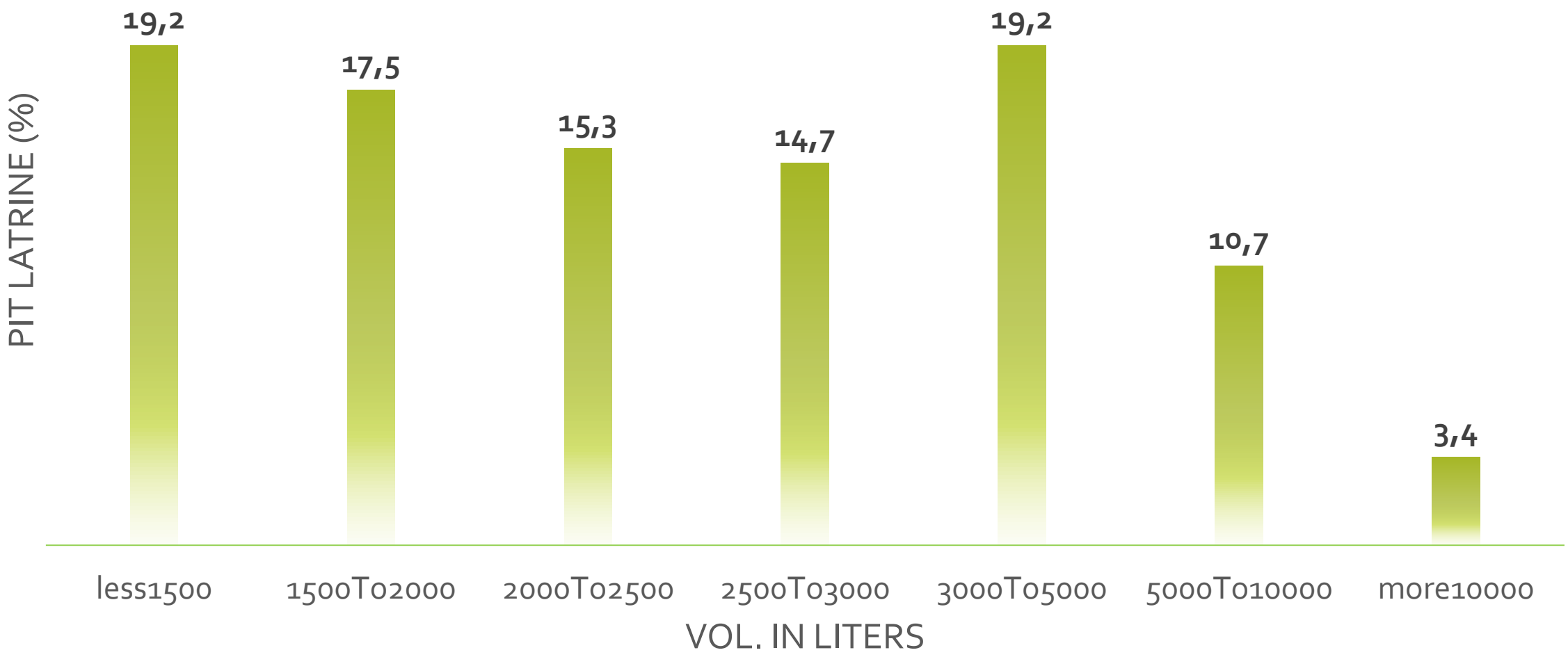


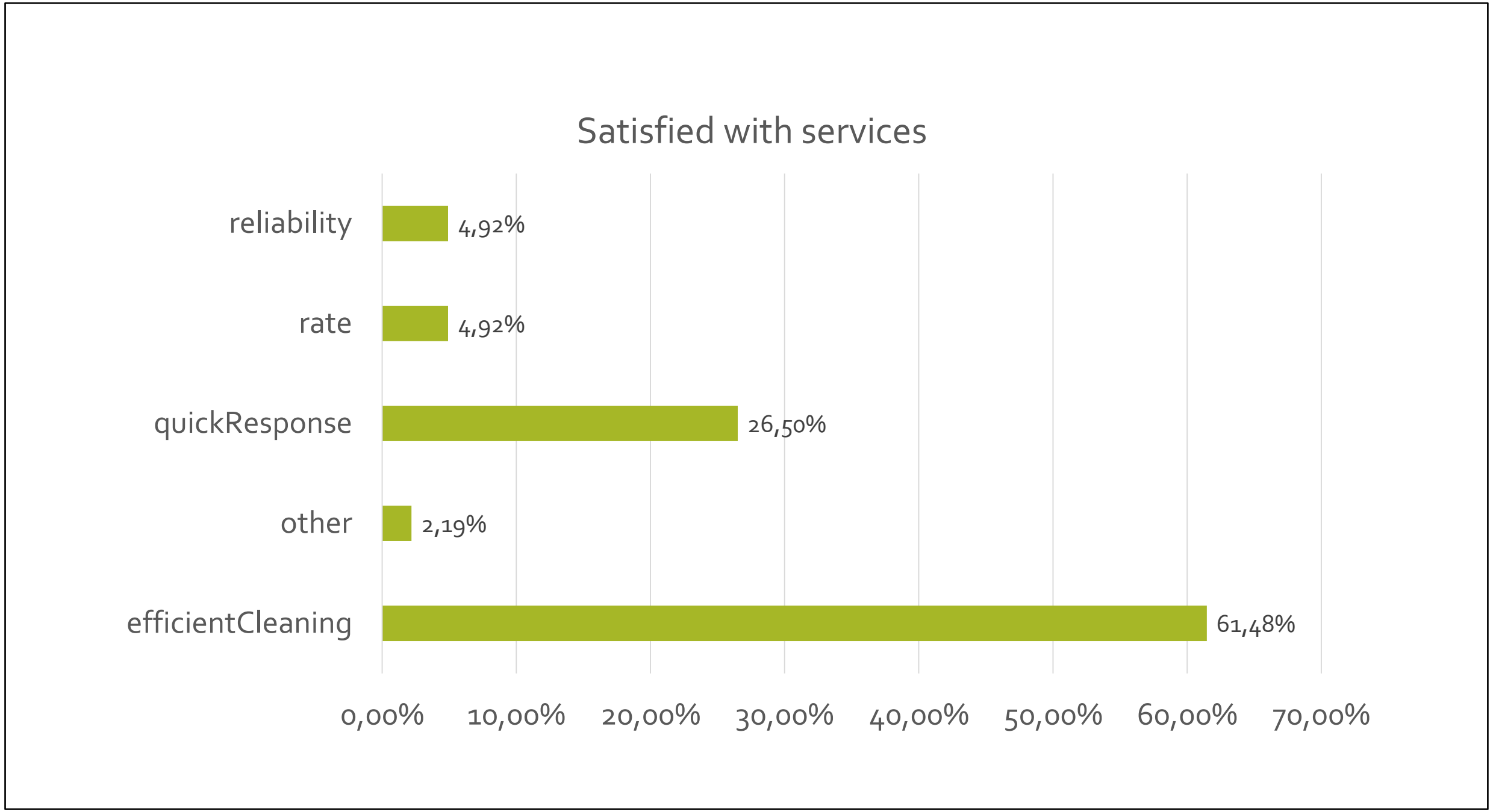

Types of septic tank
700
600
500
400
300
200
100
0
singleChamber; 622
50.4%
twoChamber; 556
45%
threeChamber; 44
3.6%
1.1%
dontKnow; 13

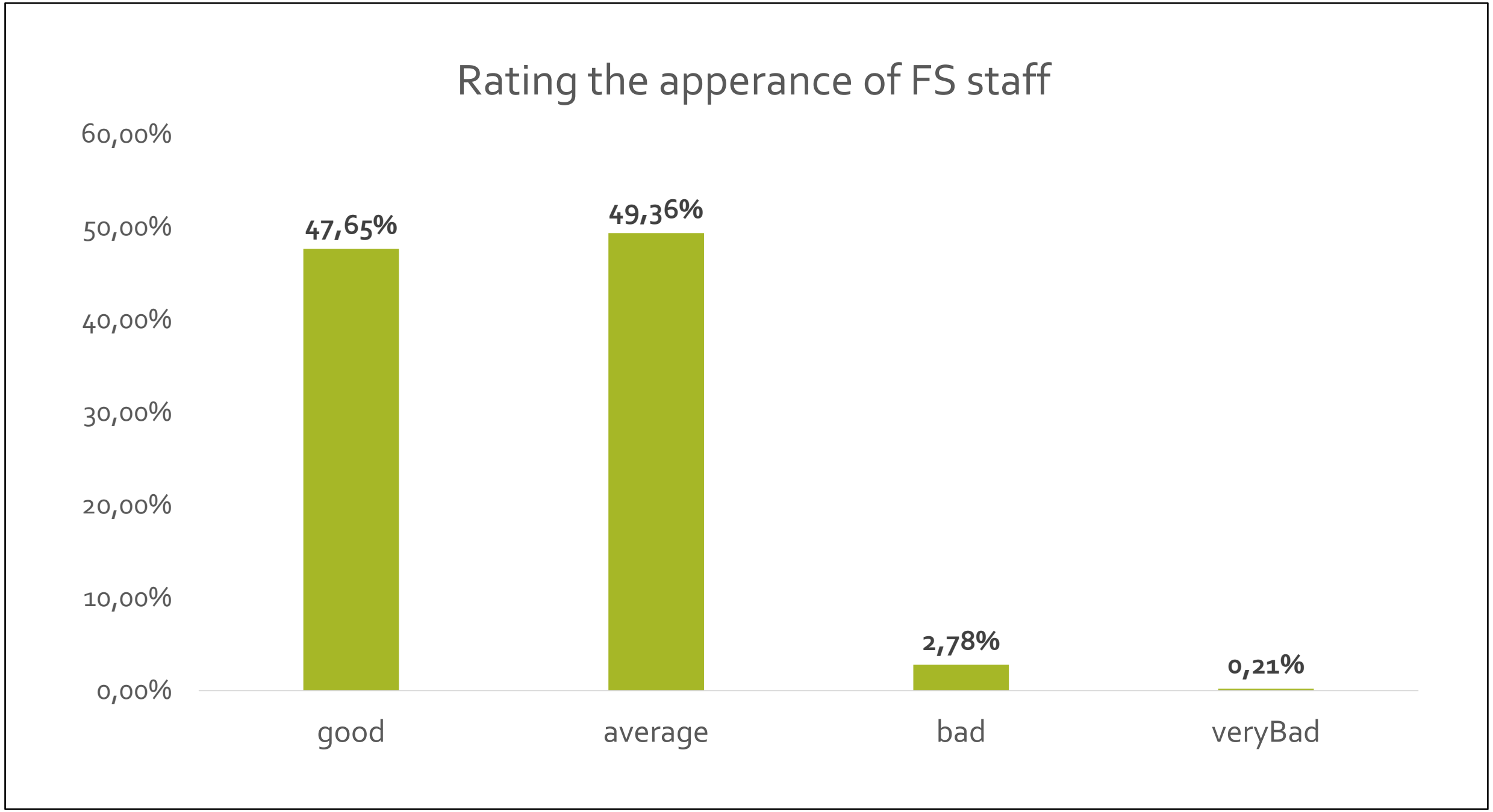

Types of pit latrines
doubleOffsetPit
4.7%
9
singleOffsetPit
18.1%
35
singlePitWithFlush
49.2%
95
singlePitWithoutFlush
28%
54
0
10
20
30
40
50
60
70
80
90
100

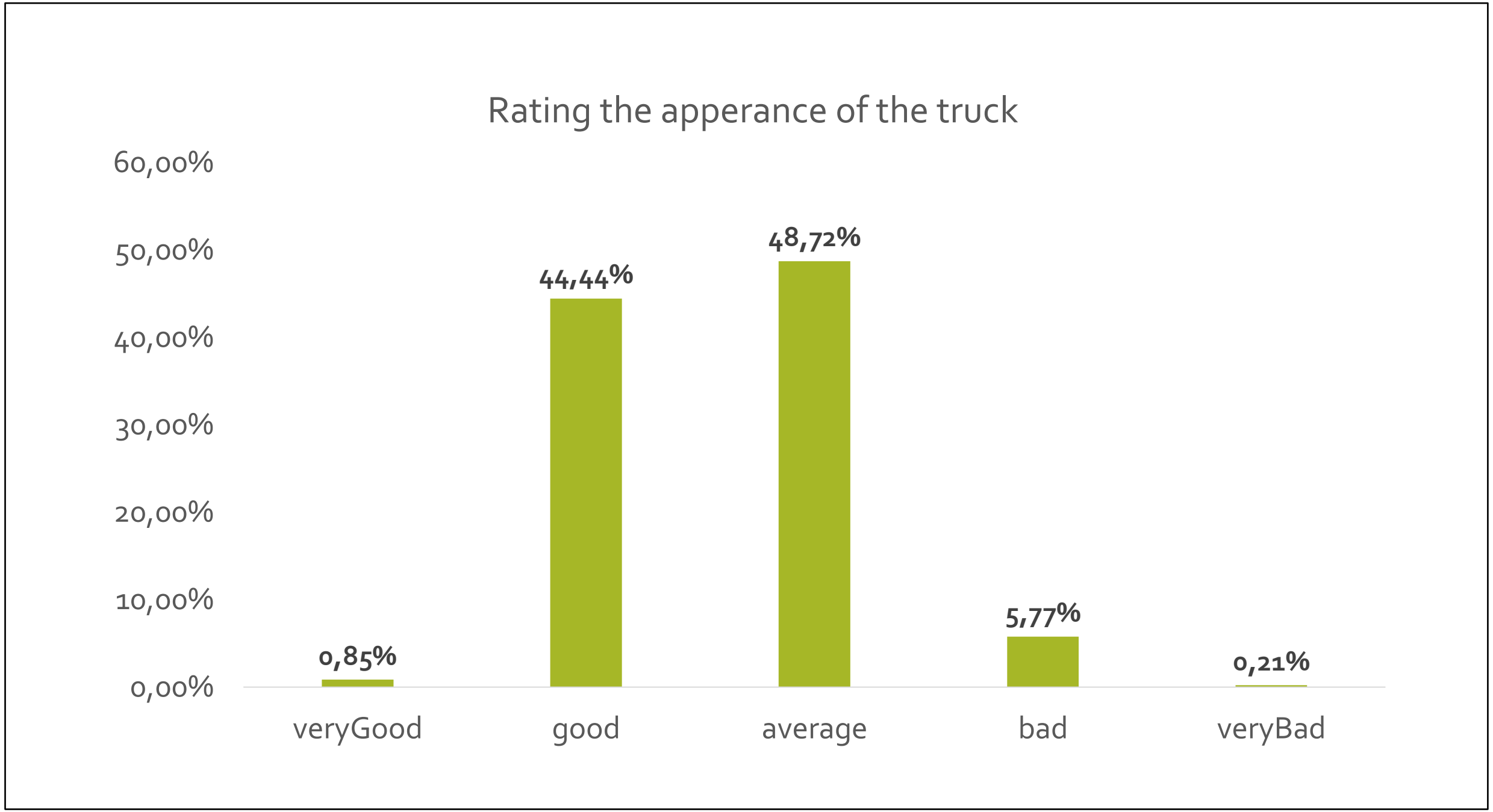

VOLUME OF SEPTIC TANK
SEPTIC TANKS (%)
8,1
12,1
11,4
9,4
16,4
29,1
13,5
less1500
1500To2000
2000To2500
2500To3000
3000To5000
5000To10000
more10000
VOLUME IN LITERS

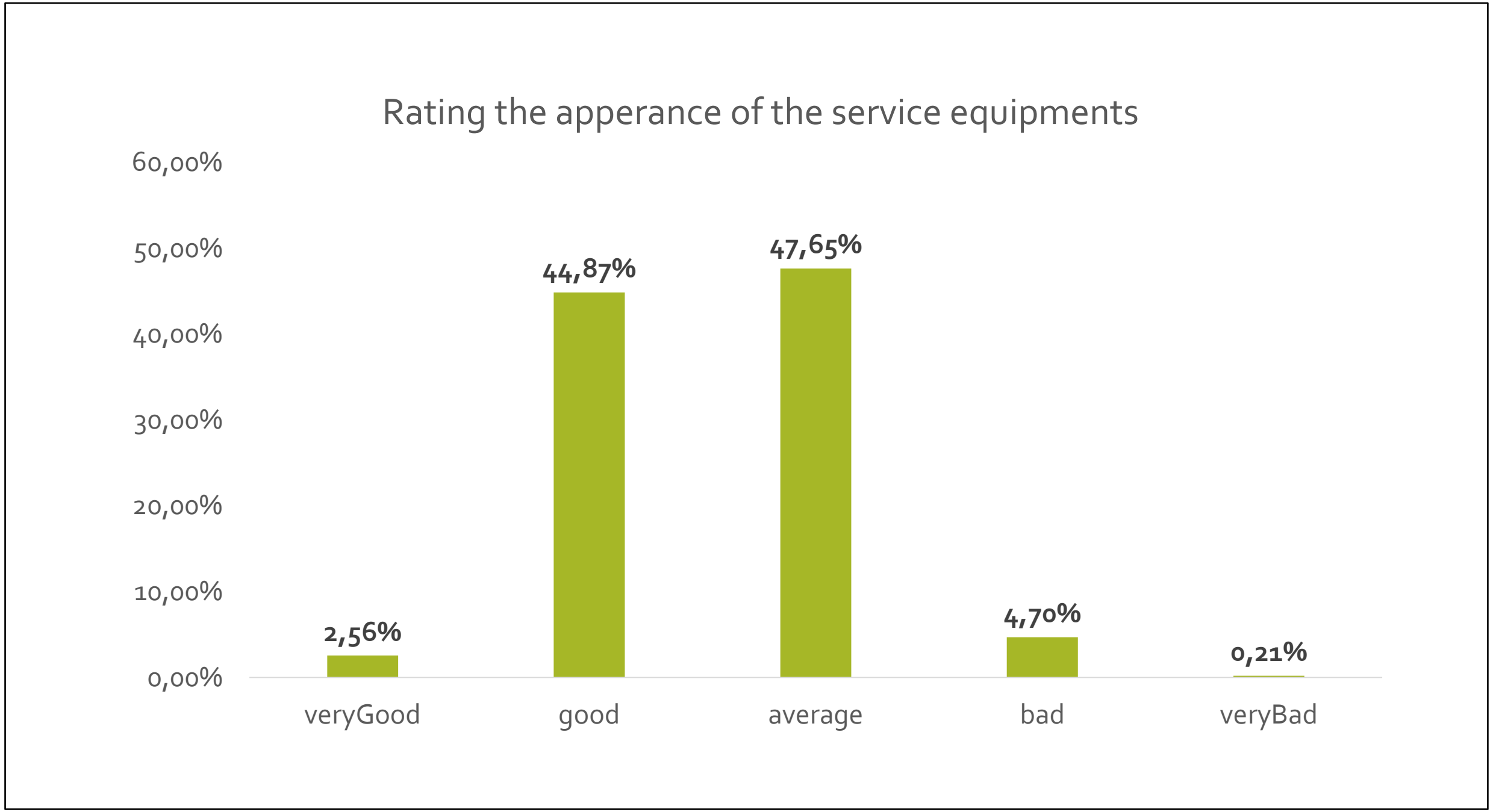
VOLUME OF PIT LATRINES

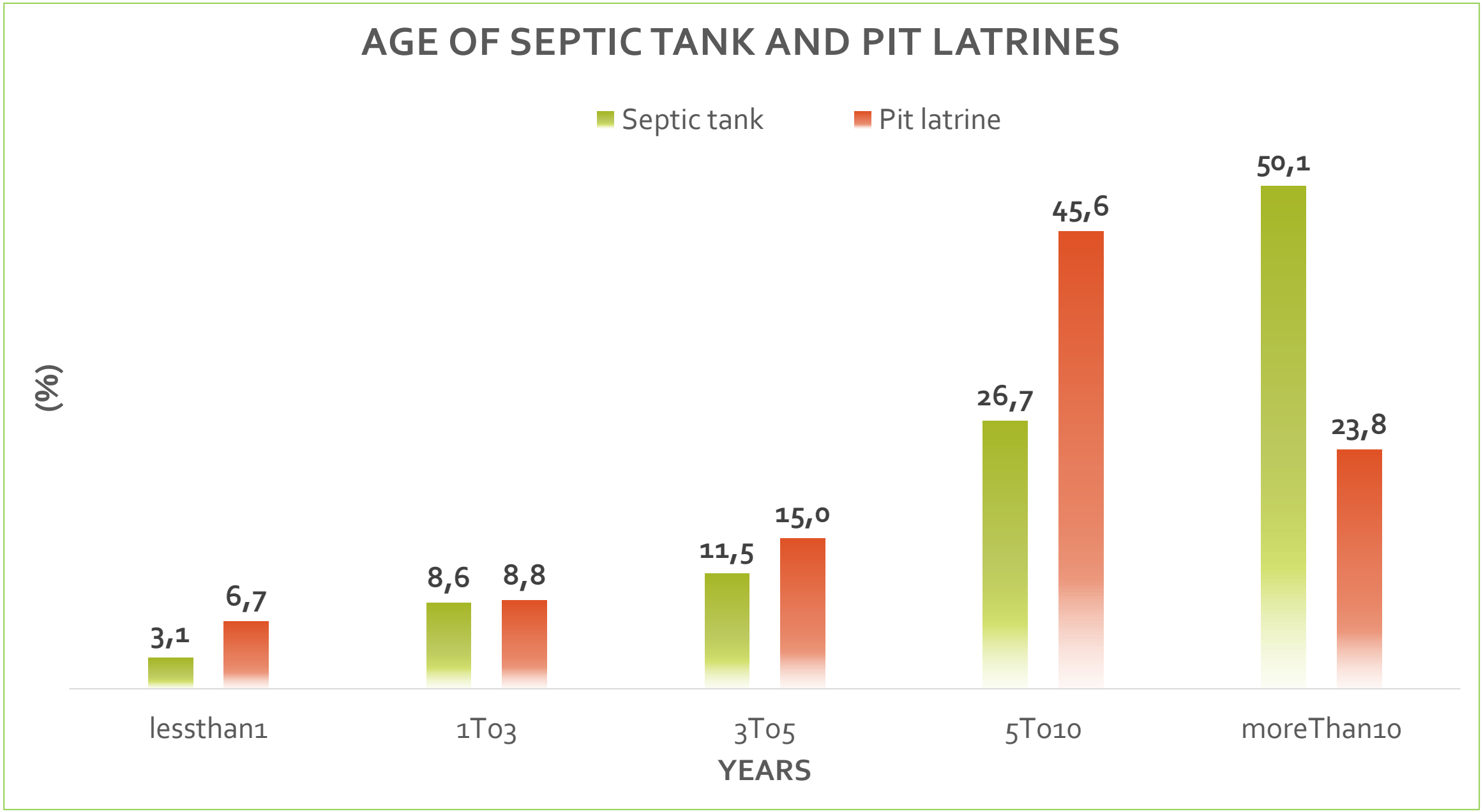



Satisfied with services
reliability
4,92%
rate
4,92%
quickResponse
26,50%
other
2,19%
efficientCleaning
61,48%
0,00%
10,00%
20,00%
30,00%
40,00%
50,00%
60,00%
70,00%

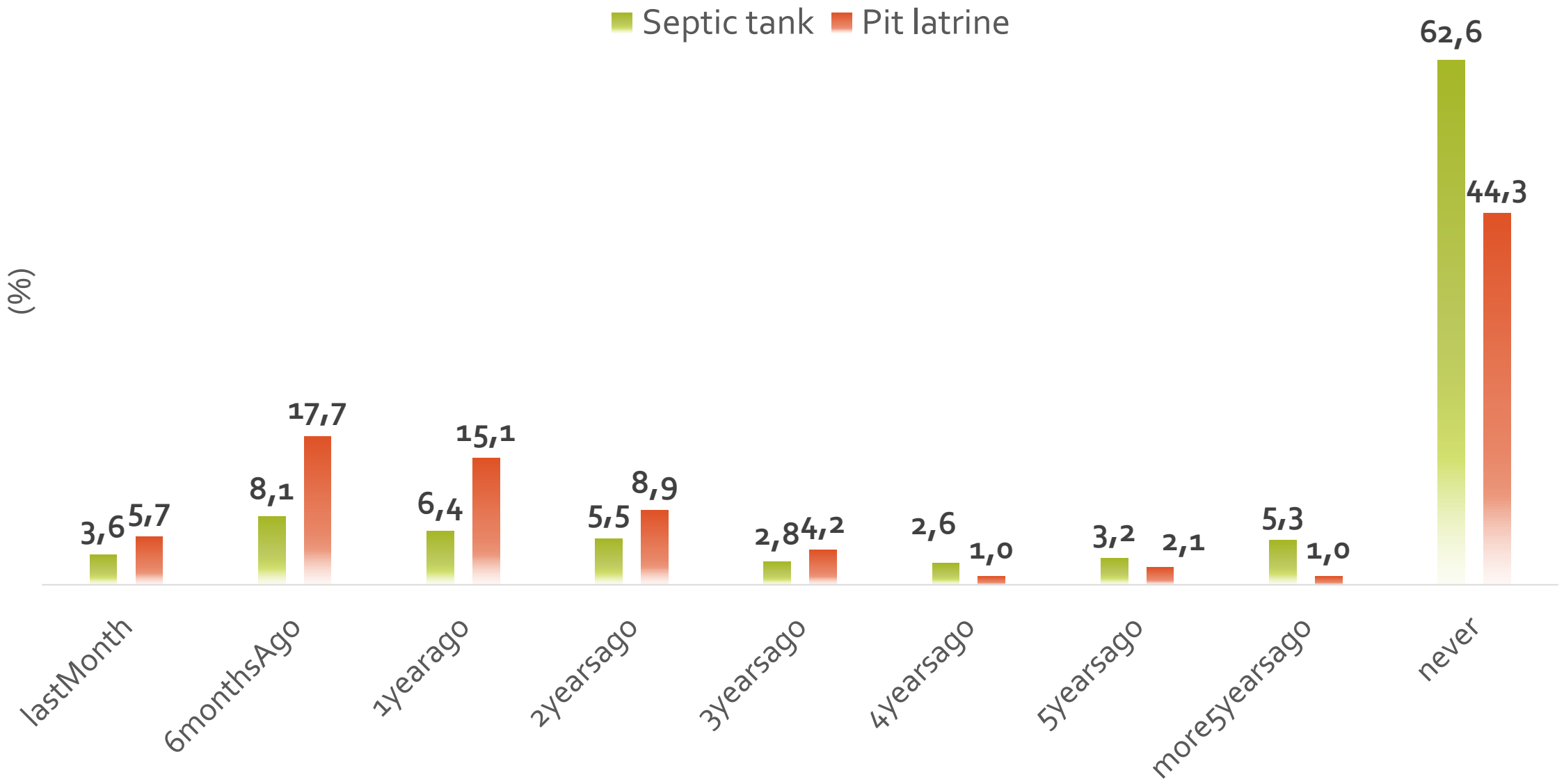

Rating the apperance of FS staff
60,00%
50,00%
40,00%
30,00%
20,00%
10,00%
0,00%
47,65%
49,36%
2,78%
0,21%
good
average
bad
veryBad

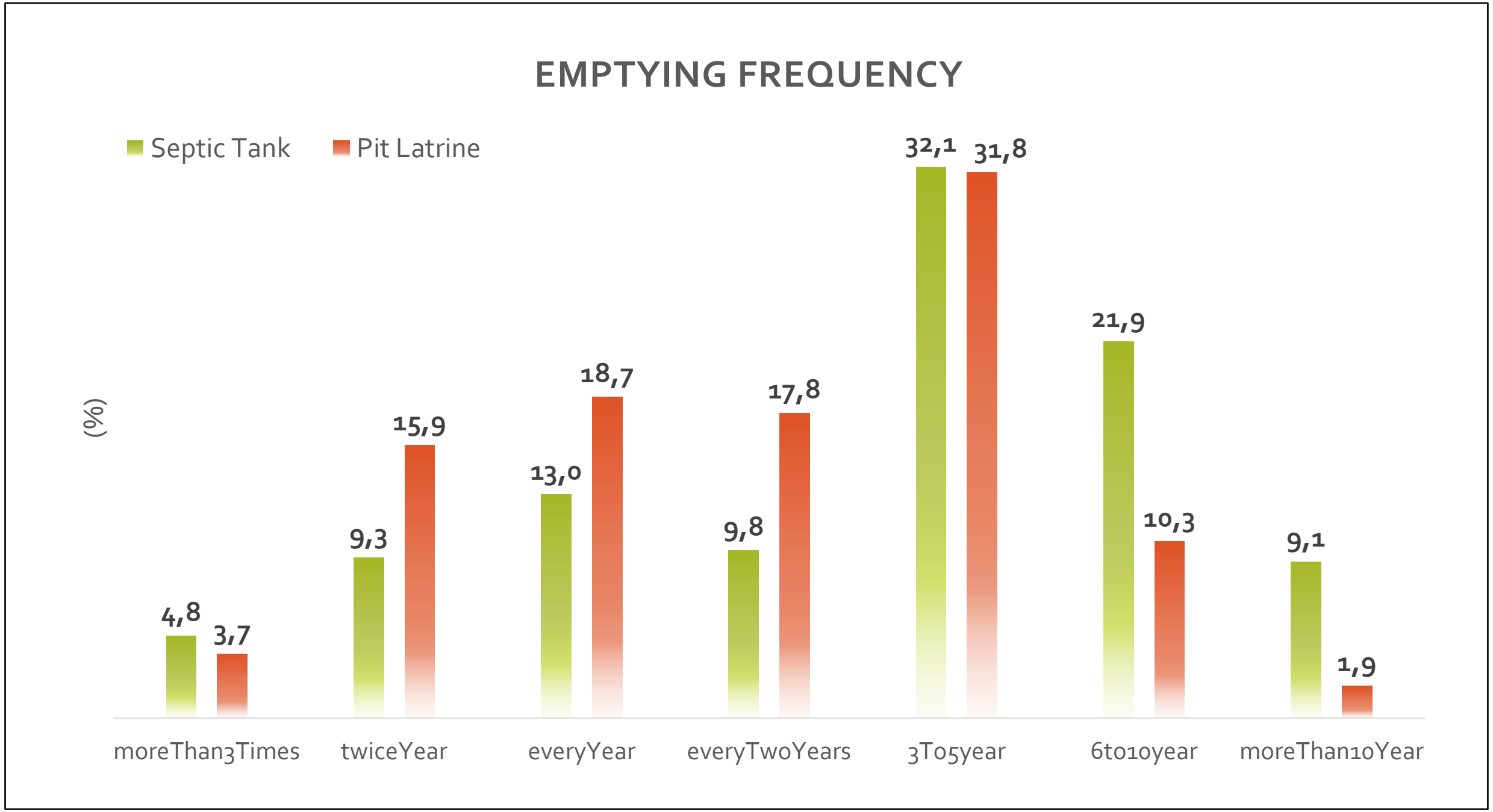

Rating the apperance of the truck
60,00%
50,00%
40,00%
30,00%
20,00%
10,00%
0,00%
0,85%
44,44%
48,72%
5,77%
0,21%
veryGood
good
average
bad
veryBad

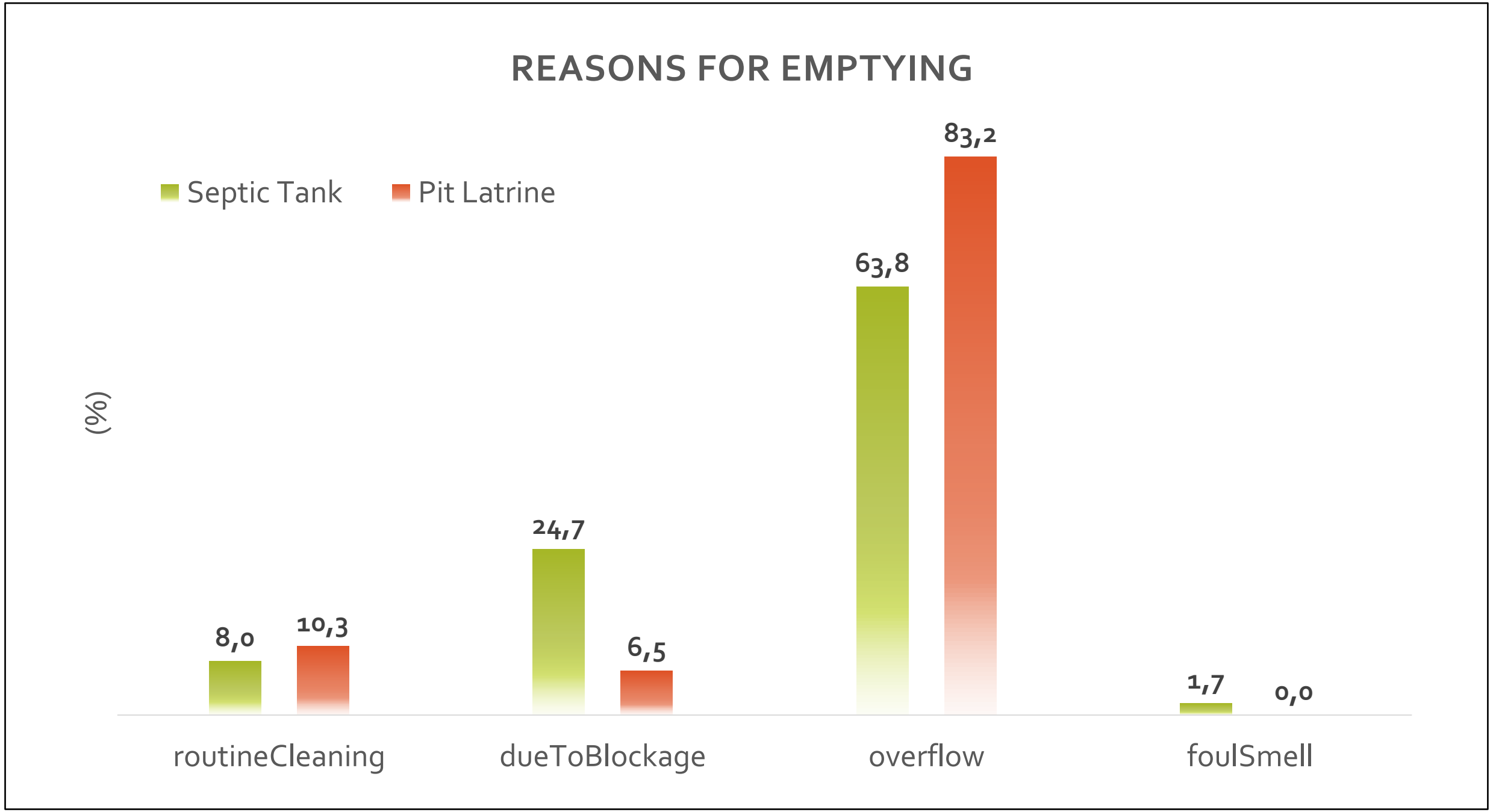

Rating the apperance of the service equipments
60,00%
50,00%
40,00%
30,00%
20,00%
10,00%
0,00%
2,56%
44,87%
47,65%
4,70%
0,21%
veryGood
good
average
bad
veryBad


AGE OF SEPTIC TANK AND PIT LATRINES
Septic tank
Pit latrine
(%)
3,1
6,7
8,6
8,8
11,5
15,0
26,7
45,6
50,1
23,8
lessthan1
1To3
3To5
5To10
moreThan10
YEARS

WHEN WAS THE SEPTIC TANK/PIT LAST EMPTIED?




EMPTYING FREQUENCY
Septic Tank
Pit Latrine
(%)
4,8
3,7
9,3
15,9
13,0
18,7
9,8
17,8
32,1
31,8
21,9
10,3
9,1
1,9
moreThan3Times
twiceYear
everyYear
everyTwoYears
3To5year
6to10year
moreThan10Year


REASONS FOR EMPTYING
Septic Tank
Pit Latrine
(%)
8,0
10,3
24,7
6,5
63,8
83,2
1,7
0,0
routineCleaning
dueToBlockage
overflow
foulSmell

FS characteristics:

	pH	TSS (mg/l)	VSS (mg/L)	Nitrogen-Ammonia (mg/L)	Total Phosphorous (mg/L)	TKN (mg/L)	BOD (mg/L)	COD (mg/L)
Average:	7.4	55,927	35,005	942	792	7,350	13,690	31,174
Maximum:	8.1	166,400	89,696	6,045	5,375	15,232	**40,500**	**120,640**
Minimum:	6.7	2,362	1,220	101	20	761	1,025	1,850

No. of samples (n) = 50