

THE NEW INCENTIVE FOR OPTIMIZING
WASTE COLLECTION-
Smart Collection using RFID
CITY OF BEACONSFIELD, CASE STUDY

EnviroRcube

La puissance du conseil



MARIE-CAROLINE BOURG ING., M.Sc.

What do we name it?

Pay as you throw, Pay as you trash, Incentive
Tariff...Tarification incitative, collecte intelligente
participative....

What do we name it?

“ Smart collection”:

S.M.A.R.T: Save Money And Reduce Trash

« When residential waste is measured on a per capita basis, PAYT communities generate about **49 percent less waste** than those leaving the cost of trash in the tax base or in a fixed fee »

Ref: « Get SMART with PAYT », U.S. Environmental Protection Agency, 2010

« Incentive tariff permits to reach a fast and strong domestic waste reduction, up to ...28%...and a recycling increase of 33% for packagings, newspapers and magazines. »

Reference: Commissariat général au Développement Durable, « *La tarification incitative de la gestion des ordures ménagères- Quels impacts sur les quantités collectées ?* », 2016

Various systems

PREPAID BAGS

PER TIP BASIS (BIN LIFT)

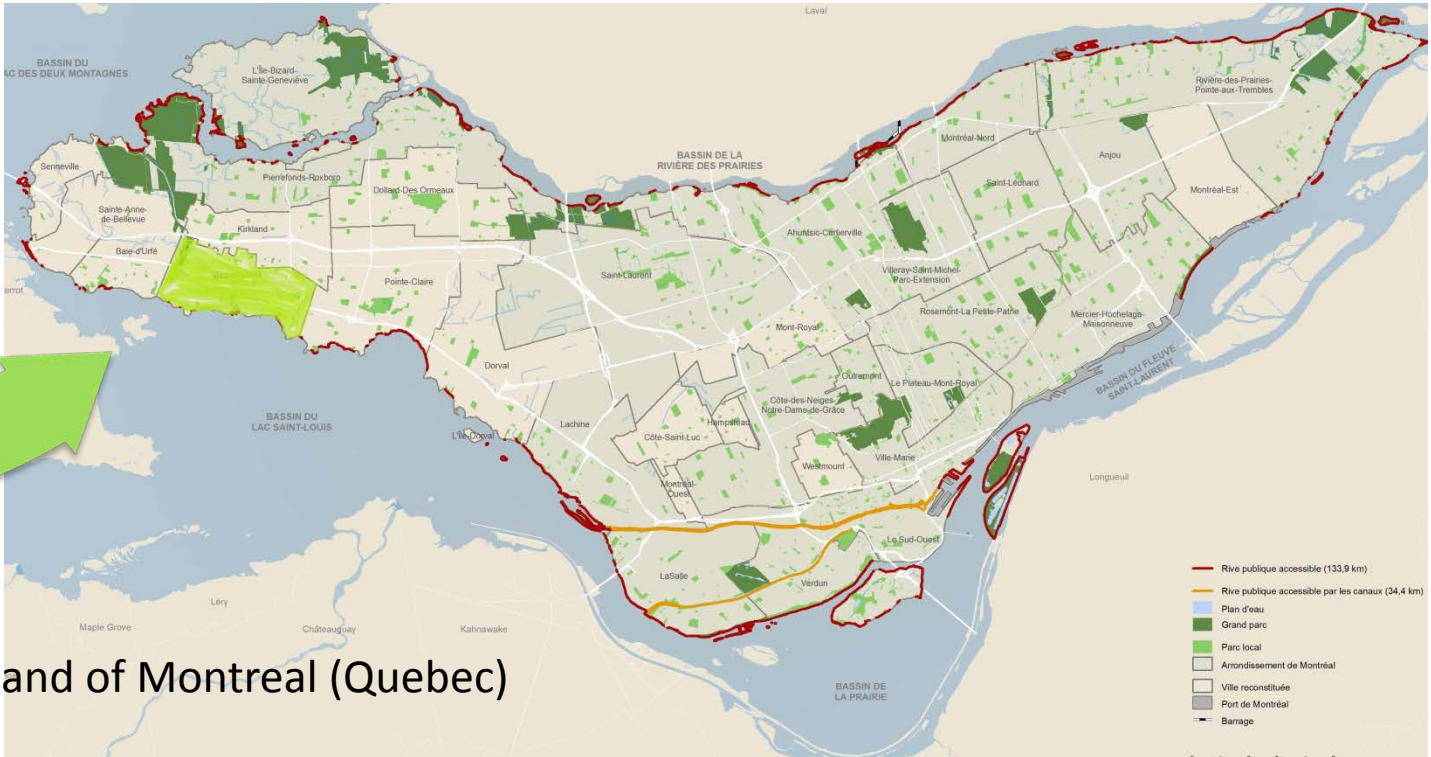


PER VOLUME





Beaconsfield-Case study



Island of Montreal (Quebec)

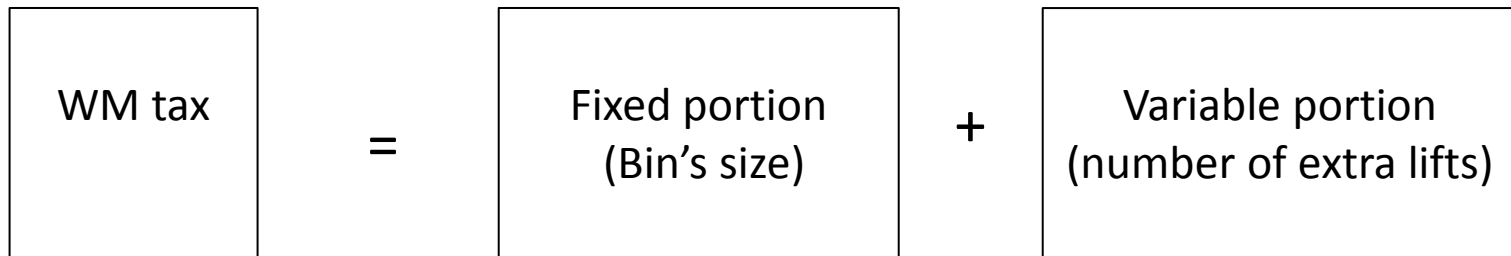
- Montreal West island suburbs
- 19 500 inhabitants/6 500 dwellings/ 92% single family homes
- High level of education
- Bilingual population



Beaconsfield-Case study



- Each dwelling was provided with a free waste bin, assigned to the address
- The choice of the bin's size belongs to residents.
- The WM tax is the addition of a fixed rate and a variable rate





Beaconsfield-Case study



Bin format chosen (Litres)	120 L	240 L	360 L
Fixed portion (includes 12 free lifts/year)	\$150	\$155	\$160
Variable portion (Unit bin cost of each additional collection (\$/bin pick-up))	\$0.40	\$0.80	\$1.20



Beaconsfield-Case study



RFID Tag



Lift registration



Registration of exceptions



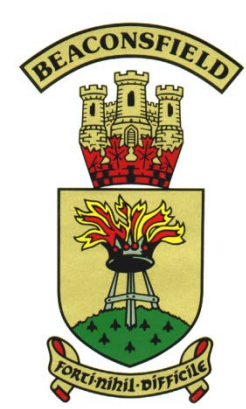
Pictures of the exceptions



LEFT

Collection report

Date & Hours	Adresse	Description	Photos	Type	ICarrier	Route	Route Name	#Serie	Note	Masse	Latitude	Long
18/10/2014 07:42:35	485 LAKE SHORE ROAD	Sec sans TAG		TRASH	801105	Alain Piquet	510CL	415 0114011	0		45.41520948054	-73.21844
18/10/2014 07:48:09	489 LAKE SHORE ROAD	Greenwrest		TRASH	801105	Alain Piquet	510CL	415 0114011	0		45.41748487908	-73.21802
18/10/2014 07:48:16	489 LAKE SHORE ROAD	Sec sans TAG		TRASH	801105	Alain Piquet	510CL	415 021538	0		45.41748487908	-73.21802
18/10/2014 07:48:52	525 LAKE SHORE ROAD	Sec sans TAG		TRASH	801105	Alain Piquet	510CL	415 0114001	0		45.41520948054	-73.21844
18/10/2014 07:58:34	28 LAURIER	TAG		TRASH	801105	Alain Piquet	510CL	415 021735	0		45.4171317160402	-73.22116
18/10/2014 07:59:23	523 LAKE SHORE ROAD	Sec sans TAG		TRASH	801105	Alain Piquet	510CL	415 012730	0		45.41520948054	-73.21844



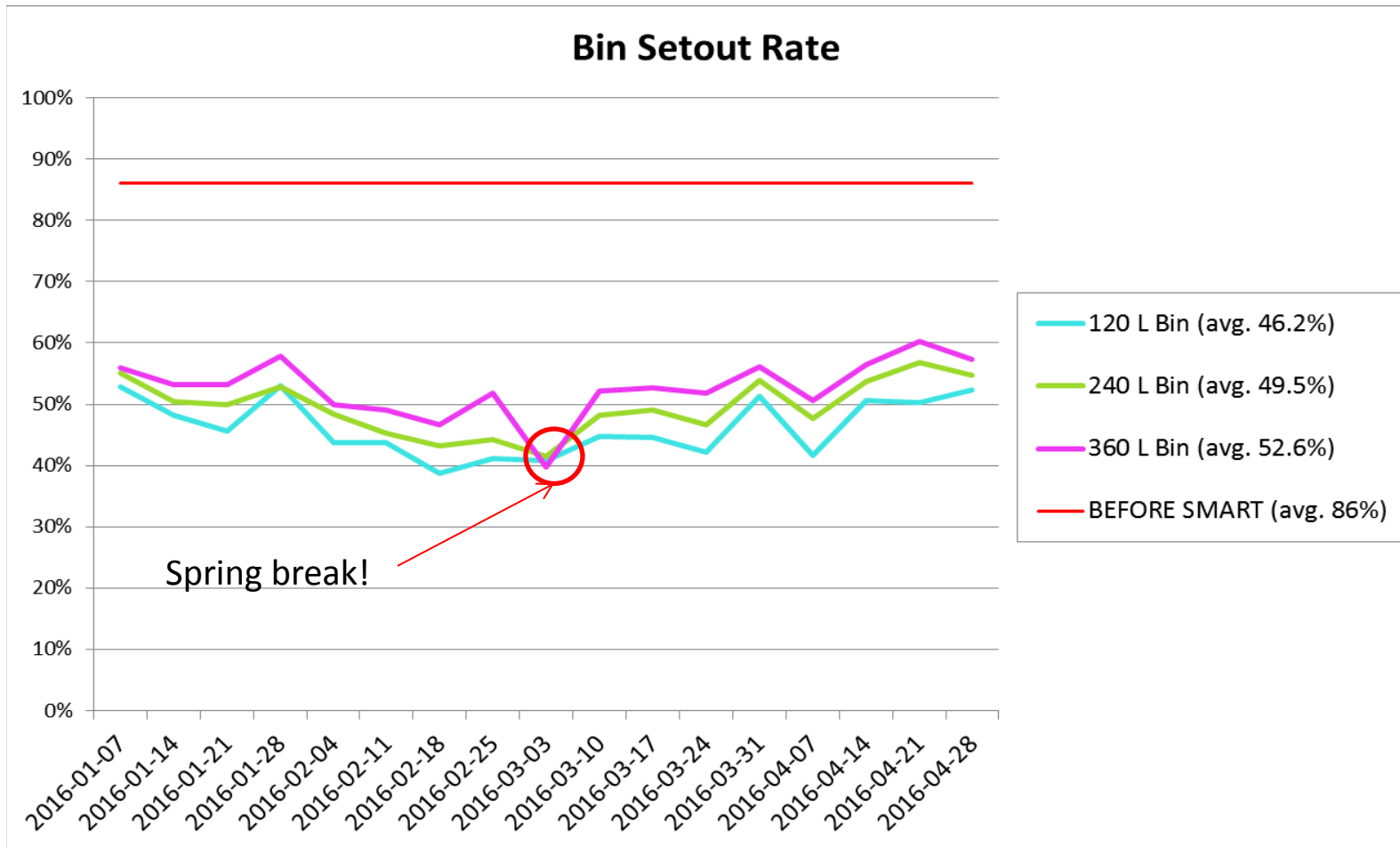
Beaconsfield-Case study

RESULTS IN 2015 **BEFORE** FULLSCALE IMPLEMENTATION OF SMART COLLECTION

- Recycling variations from 2013 to 2015:
 - - 54% **domestic garbage**
 - + 52% **organic waste**
 - - 6% **recycling material** (blue bin)

- -25% waste collection **cost**, compared to 2014 (8 to 4 collection trucks)
- High support from population
 - Door to door: 1% opposition (4014 citizens interviewed)
 - Phone survey: 69 % support the new waste management program

Beaconsfield-SMART collection first results

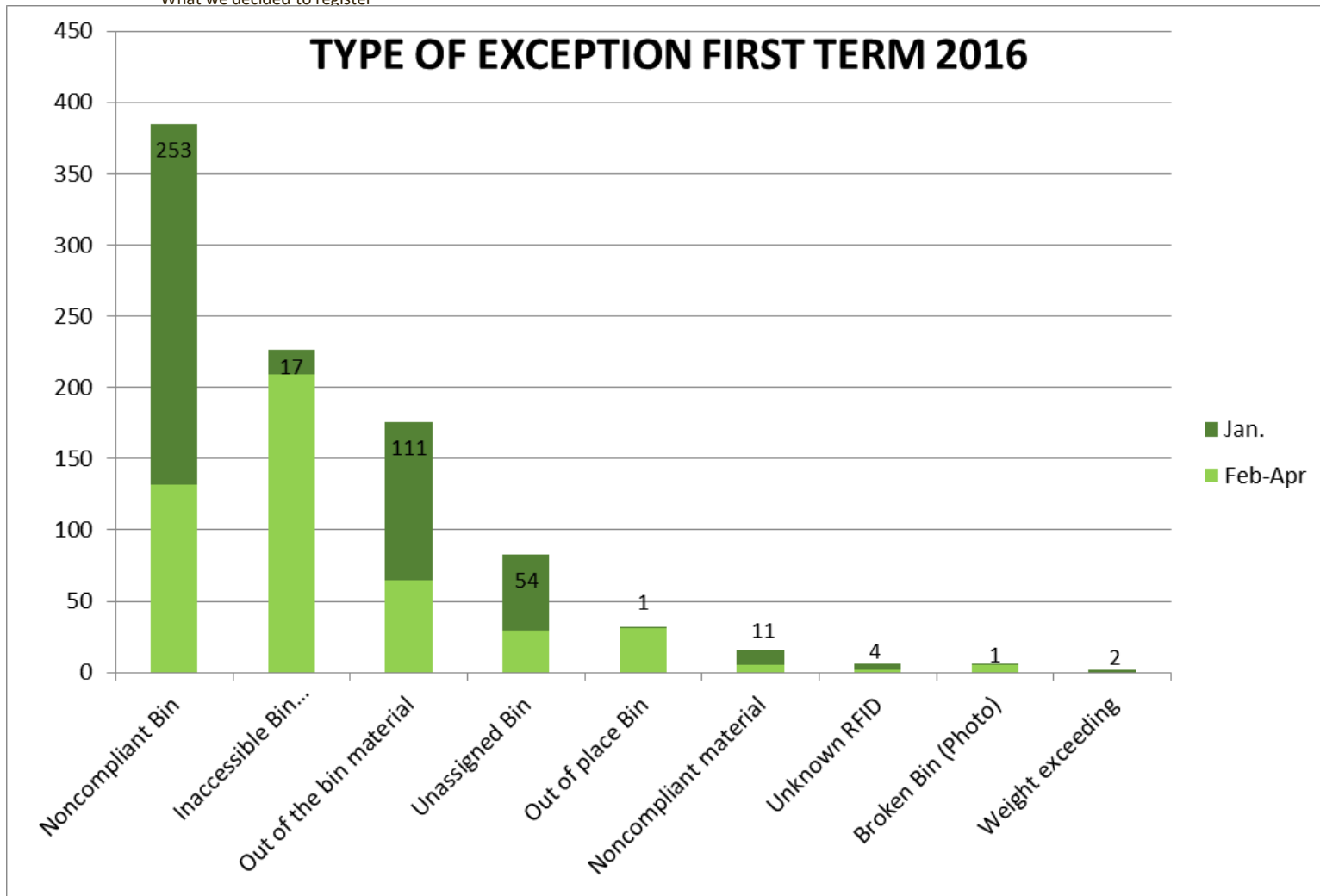


AVERAGE PARTICIPATION RATE FOR SINGLE FAMILY: 49.4%

Beaconsfield-SMART collection first results

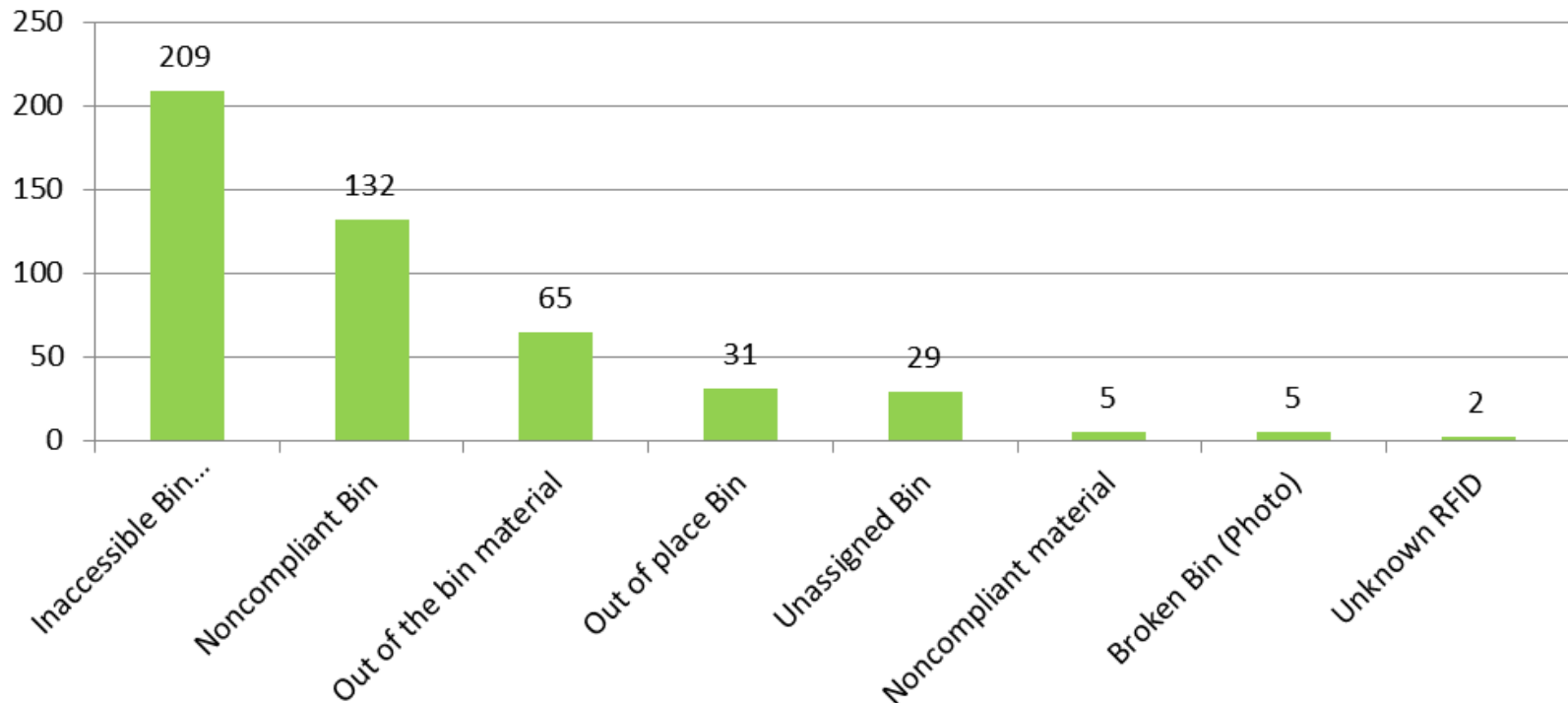
Types of exceptions –

What we decided to register

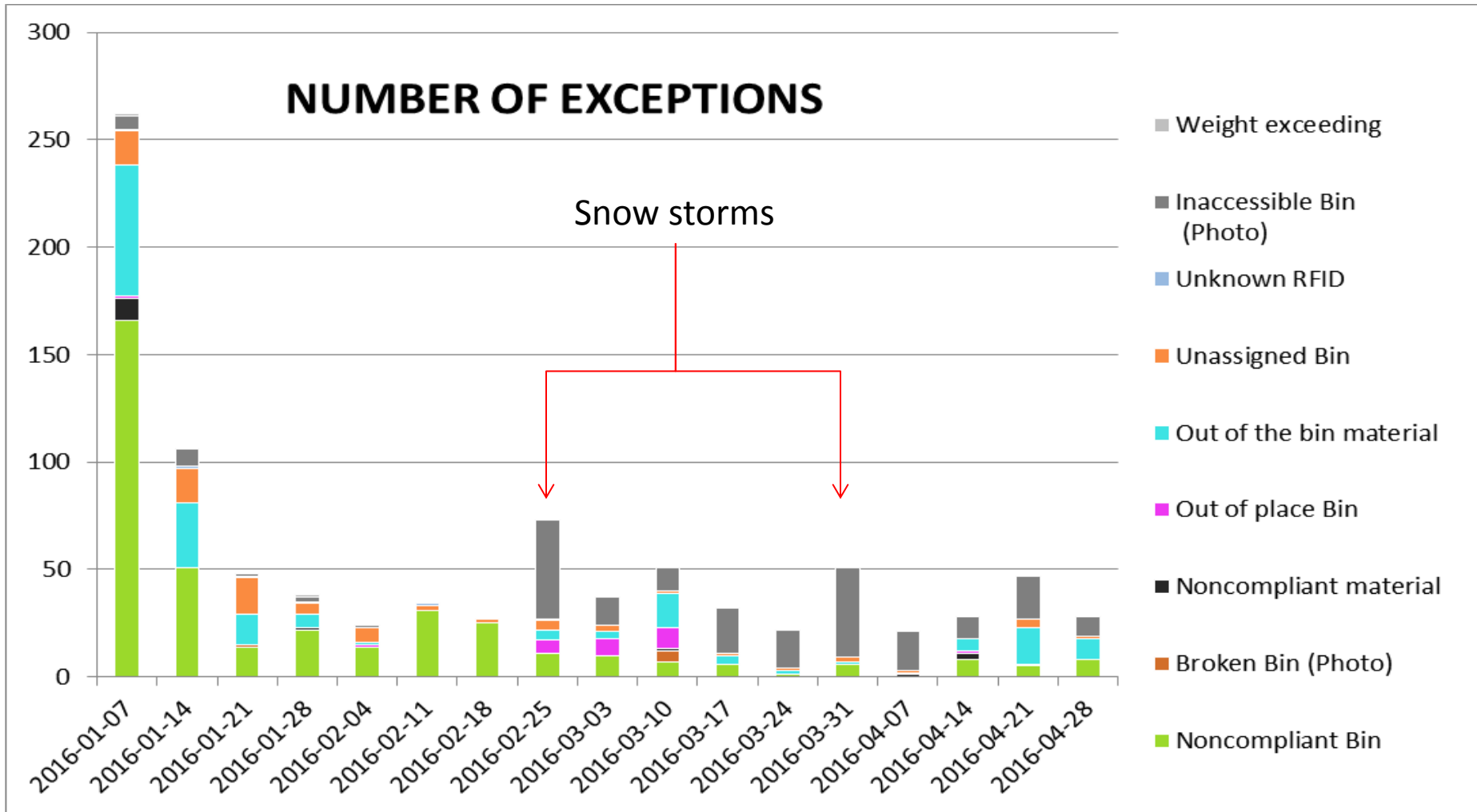


Beaconsfield-SMART collection first results

TYPE OF EXCEPTION (Feb.@Apr. 2016)



Beaconsfield-CIP first results



SMART collection report

TruckNumbe	SerialNumber	Lift Day	LiftHour	Longitude	Latitude	Exception type	BIN SIZE	RFID Number	Taxe Number	Address
MOBILE #2	D1500006963	2016-01-07	7:13:26 AM	-73.8463134765625	45.4317474365234	# LIFTS	360	260269000069602176041015	7732-64-6126-4-000-0000	BEACONSFIELD BLVD
MOBILE #2	D1500002293	2016-01-07	7:13:42 AM	-73.8462829589844	45.4317283630371	# LIFTS	360	2602690000022902176041015	7732-64-6126-4-000-0000	BEACONSFIELD BLVD
MOBILE #2	D1500002283	2016-01-07	7:13:59 AM	-73.8462753295898	45.4317283630371	# LIFTS	360	2602690000022802176041015	7732-64-6126-4-000-0000	BEACONSFIELD BLVD
MOBILE #2	D1500018432	2016-01-07	7:15:36 AM	-73.8495941162109	45.4304695129395	# LIFTS	240	560220000184302176061015	7732-43-7137-4-000-0000	KENWOOD ROAD
MOBILE #2	D1500018452	2016-01-07	7:15:59 AM	-73.8496246337891	45.4305267333984	# LIFTS	240	560220000184502176061015	7732-43-6464-3-000-0000	KENWOOD ROAD
MOBILE #2	D1500008731	2016-01-07	7:16:48 AM	-73.8488616943359	45.4312019348145	# LIFTS	120	360211000087302176091015	7732-54-1076-7-013-0001	PORTLAND PLACE
MOBILE #2	D1500008731	2016-01-07	7:17:11 AM	-73.8488006591797	45.4312477111816	Weight exceeding	120	360211000087302176091015	7732-54-1076-7-013-0001	PORTLAND PLACE
MOBILE #2	D1500020582	2016-01-07	7:17:26 AM	-73.8485641479492	45.4312782287598	# LIFTS	240	560220000205802176061015	7732-54-1076-7-014-0001	PORTLAND PLACE
MOBILE #2	D1500022542	2016-01-07	7:17:50 AM	-73.8480682373047	45.4314422607422	# LIFTS	240	560220000225402176061015	7732-54-1076-7-030-0001	PORTLAND PLACE
881621	D1500031872	2016-01-07	7:17:57 AM	-73.8626327514648	45.4317016601563	# LIFTS	240	560220000318702176061015	7632-44-5887-6-000-0000	WESTCROFT ROAD
MOBILE #2	D1500022552	2016-01-07	7:18:03 AM	-73.8480606079102	45.4314804077148	# LIFTS	240	560220000225502176061015	7732-54-1076-7-031-0001	PORTLAND PLACE
881621	D1500031862	2016-01-07	7:18:58 AM	-73.8626556396484	45.431770324707	Noncompliant Bin	240	560220000318602176061015	7632-44-5398-4-000-0000	WESTCROFT ROAD
881621	D1500031862	2016-01-07	7:19:02 AM	-73.8626556396484	45.431770324707	Lift with Photo	240	560220000318602176061015	7632-44-5398-4-000-0000	WESTCROFT ROAD
881621	D1500031852	2016-01-07	7:19:11 AM	-73.8626708984375	45.4318313598633	Noncompliant Bin	240	560220000318502176061015	7632-45-5105-0-000-0000	WESTCROFT ROAD
881621	D1500031852	2016-01-07	7:19:18 AM	-73.862678527832	45.4318389892578	Lift with Photo	240	560220000318502176061015	7632-45-5105-0-000-0000	WESTCROFT ROAD

- Which Day?
 - At what time?
- ==> Stat. on collection efficiency per sector (number of seconds/door)

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881621	D1500031852	2016-01-07	7:19:18 AM	-73.862678527832	45.4318389892578	Lift with Photo	240	560220000318502176061015	7632-45-5105-0-000-0000	WESTCROFT ROAD

- Which bin number?
- With which RFID tag?
- Assigned to which residency?

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- Where the bin was lifted (GPS coordinates) ?
- Where is it assigned?
- ==> Is it out of place?

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Who was driving with which truck?
==> Stat on Driver's efficiency and responsibility

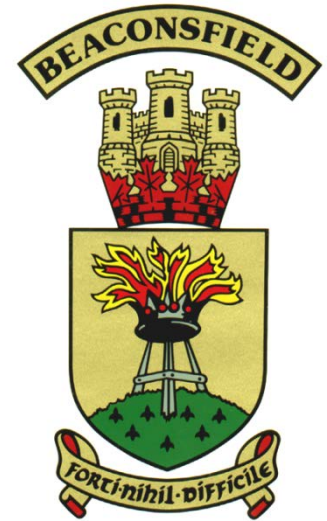
SMART Collection- Cost

Implementation costs	New waste bins with RFID tags	\$	336,505
	<i>Number of bins</i>		6,500
	<i>Bin's cost(\$/unit)</i>	\$	52
	RFID scanners (x2)	\$	4,500
	Professionnals, communication, studies (include grants)	\$	70,000
	Extra communication expenses	\$	9,100
	Waste audit (2015 and 2016)	\$	20,998
	Extra ressource for implementation (0,5 ressource)	\$	40,000
	Free composter bins	\$	64,880
	<i>Number of bins and kitchen catchers</i>		2000
	<i>Bin's cost(\$/unit)</i>	\$	32.44
	Total Implementation	\$	545,983
Operational expenses/savings			
	New participative smart waste collection		-\$134,000
	New yard waste collection (from 12 to 32)	\$	126,806
	New bulky and construction waste collection (8)	\$	34,221
	Cost of the organic NA pick-up (NA, saving)		-\$305,000
	Total operations		-\$277,973

SMART Collection - Conclusion

- Improving cost and performance of Waste management
- Bin management tool
- Complaints management tool
- **Communication** tool

Beaconsfield-What's next



- Impact of the **SMART collection** on the **quality** of recycling material?
- Set out rate of the recycling bins** (with and without RFID tags)
- Correlation between **set out rate** and GHG

SMART collection for multiple dwellings with shared containers



THANK-YOU!

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