Caribbean Regional Water Loss Conference (2023)

Key Performance Indicators in KSA & Portmore Non-Revenue Water Reduction Programs

NATIONAL WATER COMMISSION JAMAICA

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Presentation Outline

1. Overview – National Water Commission (NWC)

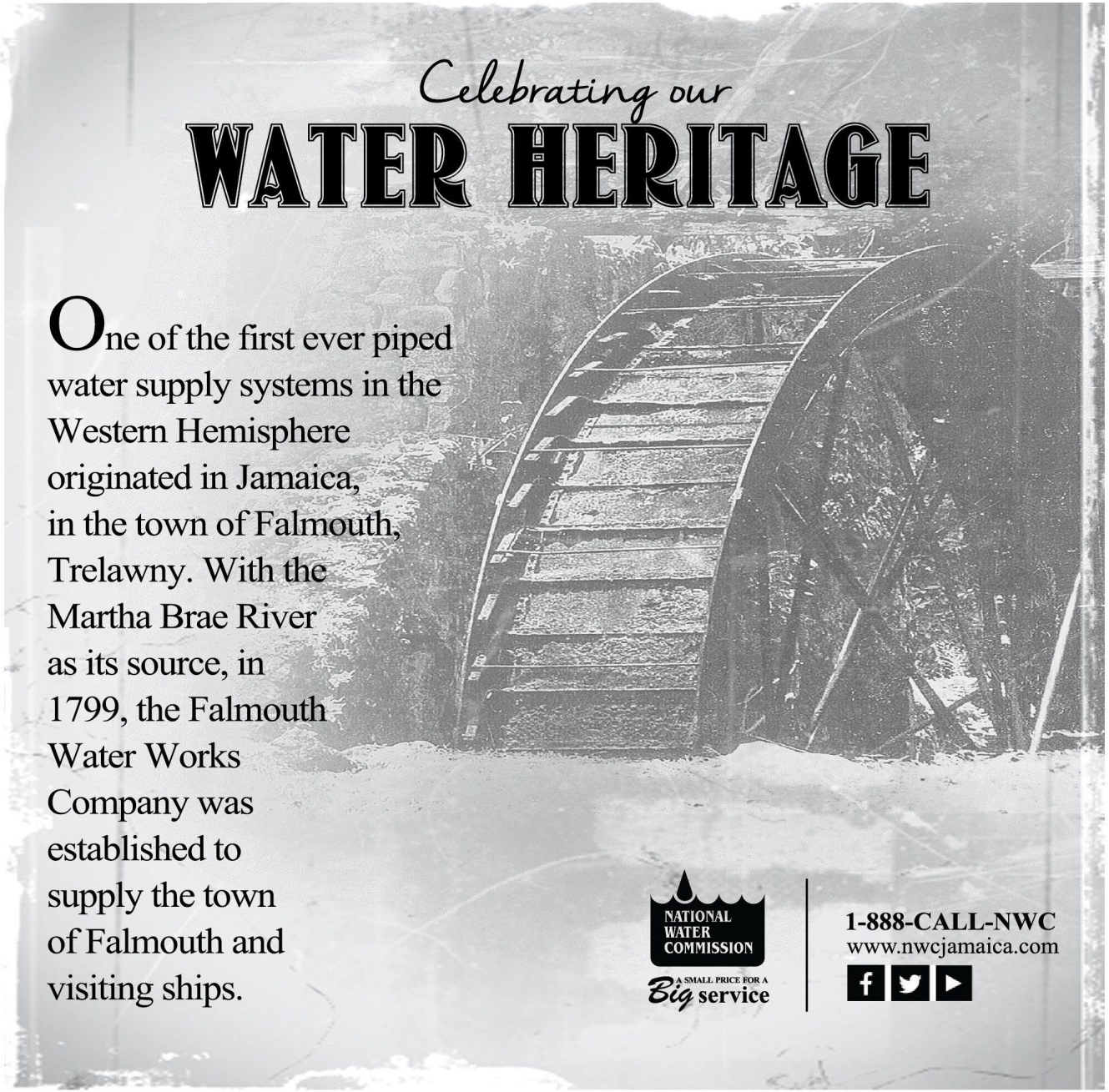
2. Summary of NRW Co-management Programs

   - Kingston & St. Andrew (KSA) NRW Co-Management Program
   - Portmore NRW Co-Management Program

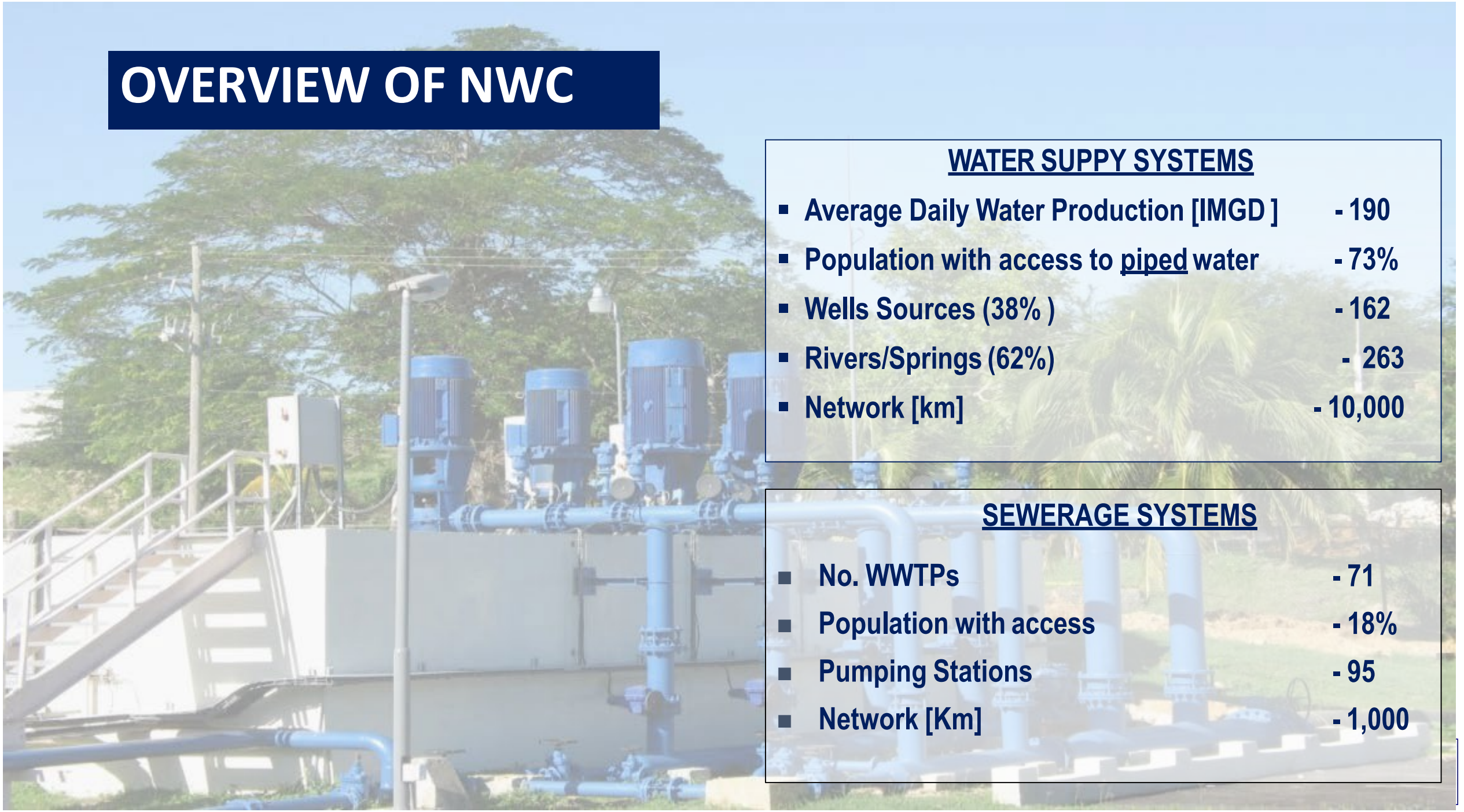
3. Key Performance Indicators for KSA & Portmore NRW Program

OVERVIEW OF NWC

- Est 1980 - Parliament Act
- Agency of the Ministry of Economic Growth & Job Creation (MEGJC)
- Jamaica's Main Provider of Water & Wastewater
- Over 1,000 Facilities
- Assets - US$1.0 Billion>
- Staff – 2k



OVERVIEW OF NWC



WATER SUPPY SYSTEMS

- Average Daily Water Production [IMGD] - 190
- Population with access to piped water - 73%
- Wells Sources (38%) - 162
- Rivers/Springs (62%) - 263
- Network [km] - 10,000

SEWERAGE SYSTEMS

- No. WWTPs - 71
- Population with access - 18%
- Pumping Stations - 95
- Network [Km] - 1,000

KSA NRW Reduction Program

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KSA NRW Reduction Program

Kingston & St. Andrew (KSA) Co-Management NRW Reduction Program (2015)

- Kingston & St. Andrew (KSA) Urban
- Duration: 5 + 1 Y Ext. (Sep. 2021)
- KSA Characteristics:
  - # of customers ~ 118,000
  - Size of network ~ 1,700 km
  - NRW: 117,061 m3/d → 48,784 m3/d
  - 1,039 l/c/d → 409 l/c/d

Portmore NRW Reduction Program

Portmore NRW Reduction Program

Portmore Co-Management NRW Reduction Program (2021)

- Duration: 5 Y (Feb 2026)

- Portmore Characteristics:
  - # of customers ~ 43,000
  - Size of network ~ 460 km
  - NRW: 25,525 m3/d → 10,000 m3/d

NRW Reduction Co-Management Approach

Co-management Approach

Common project team for NRW Reduction:

- NRW Specialists Firm (SF) act as Team Leaders
- NWC & SF Senior Management Teams Partner
- NWC Operational Staff (leak detection & repairs, GIS, etc.)
- NWC Equipment (Excavators, Backhoes, Trucks, Vans…)
- SF conducts Procurement & Management of Program Materials

Program Co-management responsibility matrix (CMRM)

Program Steering Committee

Why Co-management?

- NRW sustained after NRW SF depart
- Adequate involvement of NWC staff
- Exposure to international best practices
- Benefit of wider spectrum on water technologies

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Key Performance Indicators in KSA & Portmore Non-Revenue Water Reduction Programs

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KSA & Portmore KPIs

IWA Methodology - NRW reduction through effective control of physical & commercial losses

Physical Loss Management

Leak Detection

Leak Repair

Pressure Management

Pipelines & Asset Management (GIS)

Commercial Loss Management

Meter under Registration

Water Theft

Error in management of consumption data

Leak Detection

Target KSA	Target Portmore	KSA vs PORTMORE Active Leak Detection	Jan-18 KSA KPI Y1	Jan-18 KSA KPI Y2	Dec-19 PORTMORE KPI Y1	Dec-19 PORTMORE KPI Y2
			Jan-18	Dec-19	Mar-21	Feb-23
22	21	Working days in average per technician	22	21	19	22
10	10	Average leak detection technicians	15.7	15.5	10.2	10.7
5	8	Total leaks / day /technician	1.1	3.4	8.3	8.2
4	6	Visible leaks / day / technician	0.9	3.1	6.3	6.1
0.5	2	Non visible leaks / day /technician	0.3	0.4	2.0	2.1
2	3	Km survey / day / technician	1.4	1.5	2.5	2.9
2	3	Leaks detected / KM / technician	0.8	1.2	3.6	2.9
10%	20%	% of Non -Visible leaks	25%	10%	24%	26%

- KSA Leak detection Teams increased their performance in every KPI from Y1 to Y2.
- Although KSA team had significant improved KPIs, they didn't achieve the established targets.
- Due to an effective training and Audit phase the KPI's of Portmore are very similar from Y1 to Y2, with the teams achieving targets earlier, with higher target threshold for Portmore.

Leak Repair

Target	
KSA	Portmore
22	22
12	9
2	2
2	2

KSA vs PORTMORE

Leak Repairs	Jan-18	Dec-19	Mar-21	Feb-23
	KSA KPI		PORTMORE KPI	
	Y1	Y2	Y1	Y2
Working days in average	19.3	19.5	21.8	24.0
Total Teams (Ave)	10.0	12.0	6.9	9.0
Average days to repair main	4.4	2.8	30.2	5.4
Average days to repair SC	5.7	4.3	49.8	4.7
Total Repairs/ team	48	67	195	211
Mains/ team	17	34	9	12
Full replacement SC/ team	4	3	4	4
Local repairs SC/ team	52	115	186	204

- Average time to repair leaks (Mains or Service connection) reduced from Y1 to Y2, as expected, due to efficiency growth from repair teams.
- Portmore average time to repair leaks (Mains/SC) higher than KSA; the size of the backlog was significant early on, as compared to KSA; significant improvement of the leak repair teams reduced the backlog, thus improving on the average as shown.
- Number of repairs per team per Month has increased in all items, showing more effective teams and therefore higher number of repairs contributing to a reduction of backlog.

Pressure Management

Target	
KSA	Portmore
24	24
30	15
150	12

KSA vs PORTMORE

Jan-18	Dec-19	Mar-21	Feb-23

Pressure Management	KSA KPI		PORTMORE KPI	
	Y1	Y2	Y1	Y2
Average suply time (hours)	22.6	21.0	23.5	23.5
Average Pressure in the system (PSI)	30.6	27.9	13.2	11.9
Number Pressure Zones Operational	39%	22%	17%	50%

- **The KSA system has a higher average system pressure, once the water sources are elevated, compared to the main distribution network hence requiring more pressure zones to be established. (150 PZs for 1,700 km vs 12 PZs for 500 km).**
- **The KSA system only achieved 24 h supply in Y5, having only 21h of supply in Y2 due to drought conditions. Portmore started off with average supply time of 23 h with an increase to currently 24 h (March 2023).**
- **Whilst it is acknowledged that the length of network in KSA is larger than Portmore, the progress of PZs established has steadily increased in Portmore, thus having better pressure control of the network, in an earlier stage of the program.**

Metering in SCAs

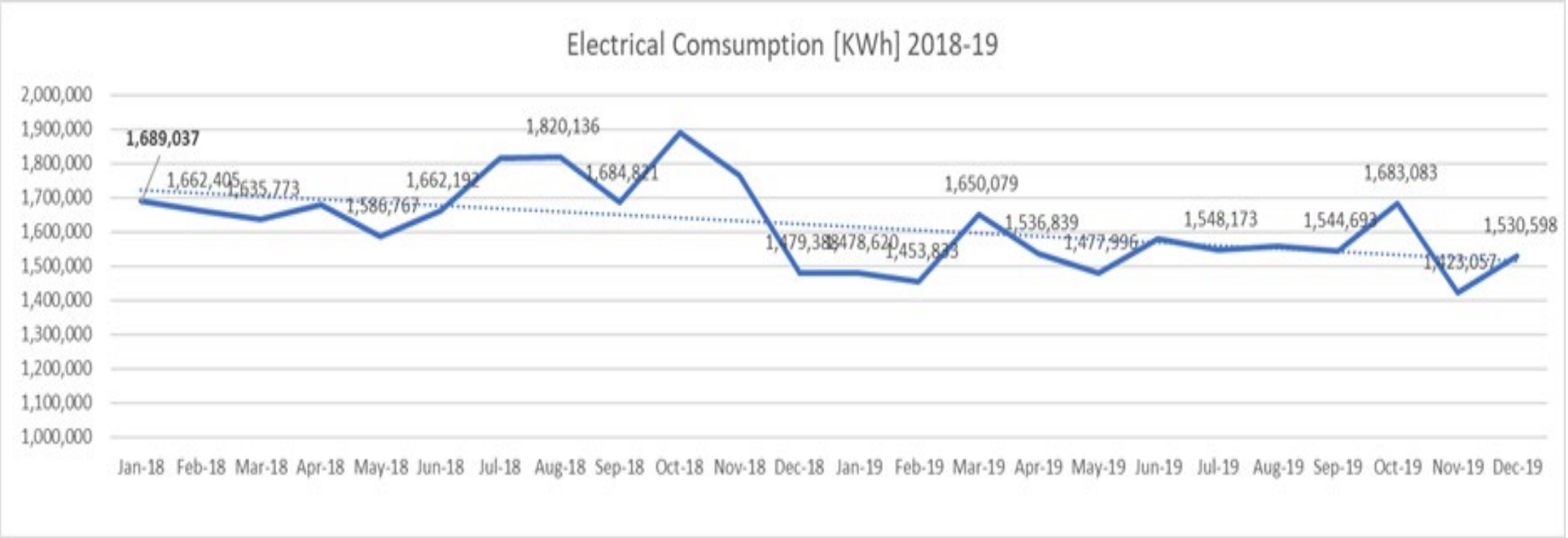
KSA vs PORTMORE

Jan-18 Dec-19 Mar-21 Feb-23

Target		SCA Implementation	KSA KPI		PORTMORE KPI	
KSA	Portmore		Y1	Y2	Y1	Y2
22	22	Working days	16.0	20.7	4.8	2.5
10	3	Number of teams /day	1.3	2.8	0.7	1.0
15	20	Meters installed / day / team	4.3	8.1	3.2	6.1
15	10	Disconnections /day	3.9	0.0	76.5	285.6
1000	1000	Ave Meters Installed / month	95.0	505.3	49.8	17.5

- In KSA the teams increased in the number of meters installed /day / team. However, in Portmore while there is an increase in number of meters installed/day/ team over the 2-year period, there is room for improvement in meeting the KPI.
- Regarding the disconnections, the Portmore project was more active in the commercial activities in tackling illegals and inactive customers that were found to be 'active' consumers. Hence, the average monthly disconnections in Portmore reflects the efforts of the team on the ground.

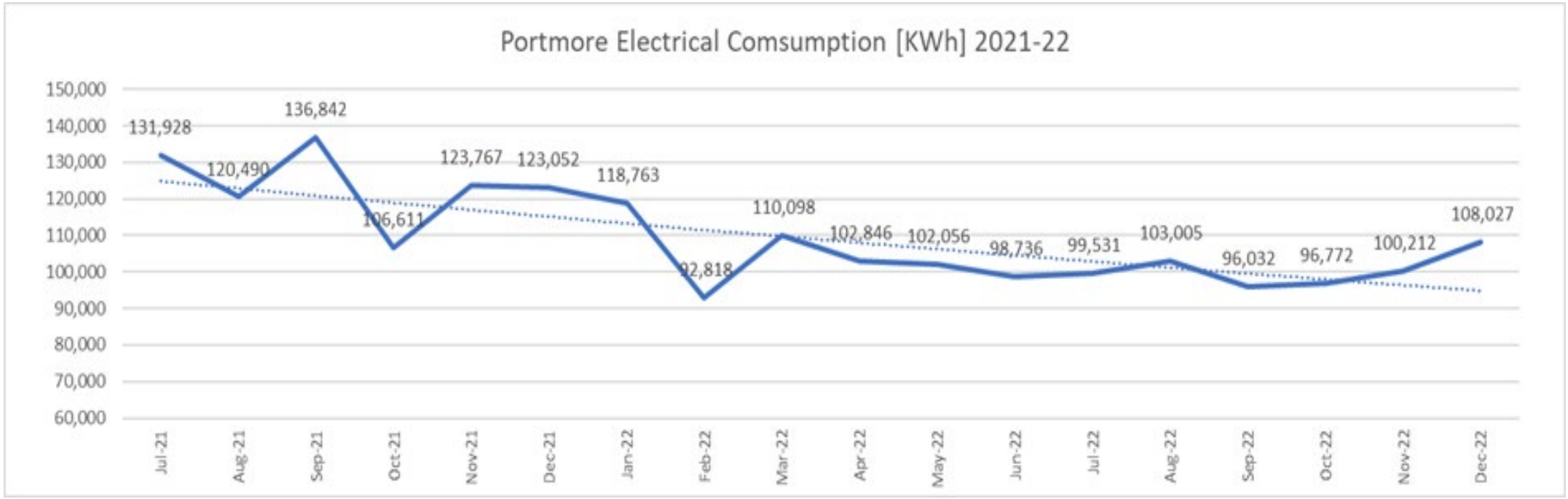
Energy Savings in KSA



The Electrical consumption [kwh] in KSA due to the co-management activities has reduced, as follows:

- Energy Jan-18 = 1,689,037 kwh
- Energy Dec-19 = 1,530,598 kwh
- Energy Savings ~ 150,000 kwh or $ 40,000 USD / month

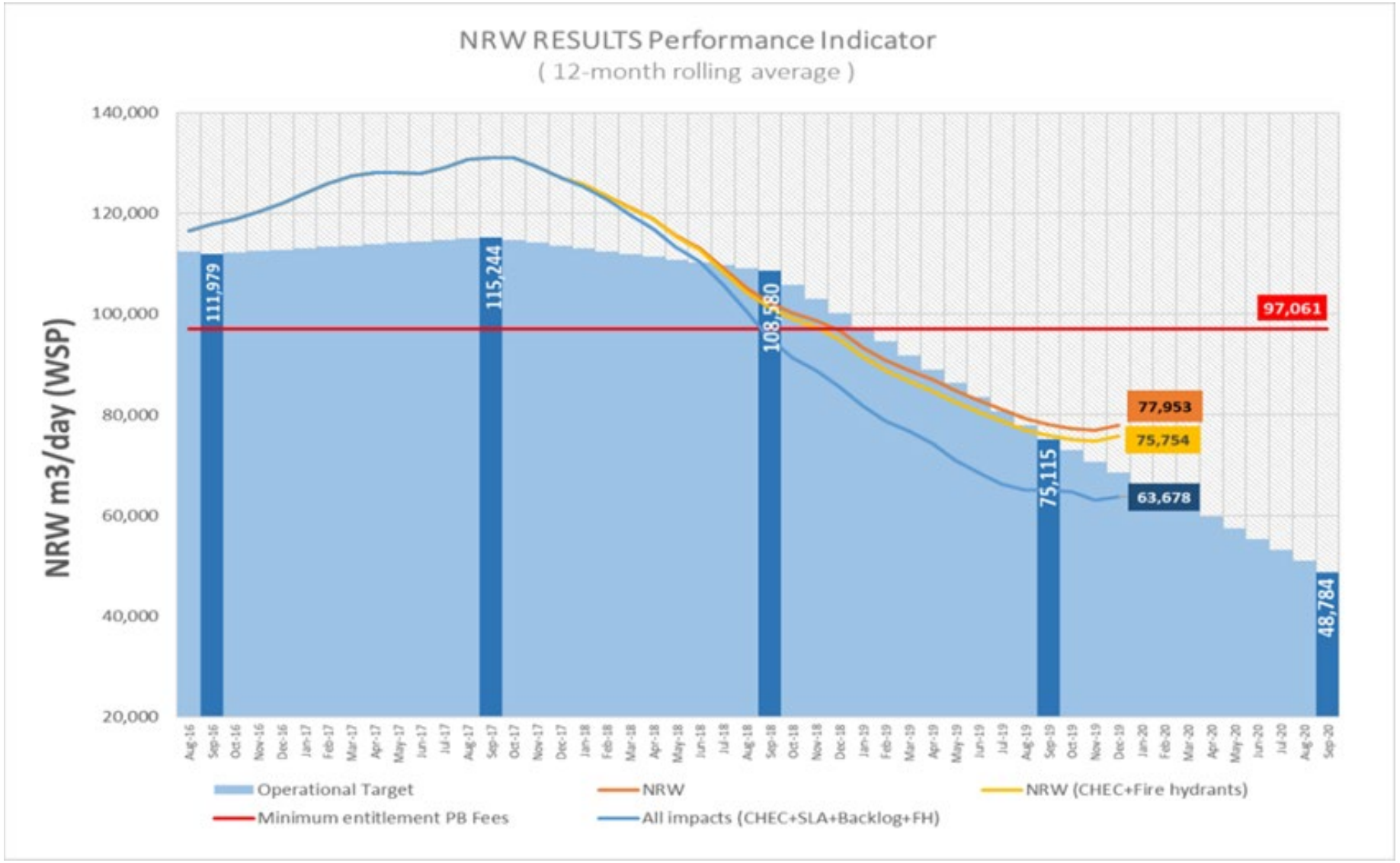
Energy Savings in Portmore



The Electrical consumption [kwh] in Portmore due to the co-management activities has reduced, as follows:

- Energy Jan-18 = 136,000 kwh
- Energy Dec-19 = 100,000 kwh
- Energy Savings ~ 40,000 kwh or $ 10,000 USD / month

KSA NRW Reduction Results



KSA

NRW Results
Reduction (16%)
from
115,864 m3/day
To
97,663 m3/day

SIV
Reduction (9%)
from
210,433 m3/day
To
190,909 m3/day

BV
Reduction (1%)
from
94,569 m3/day
To
93,246 m3/day

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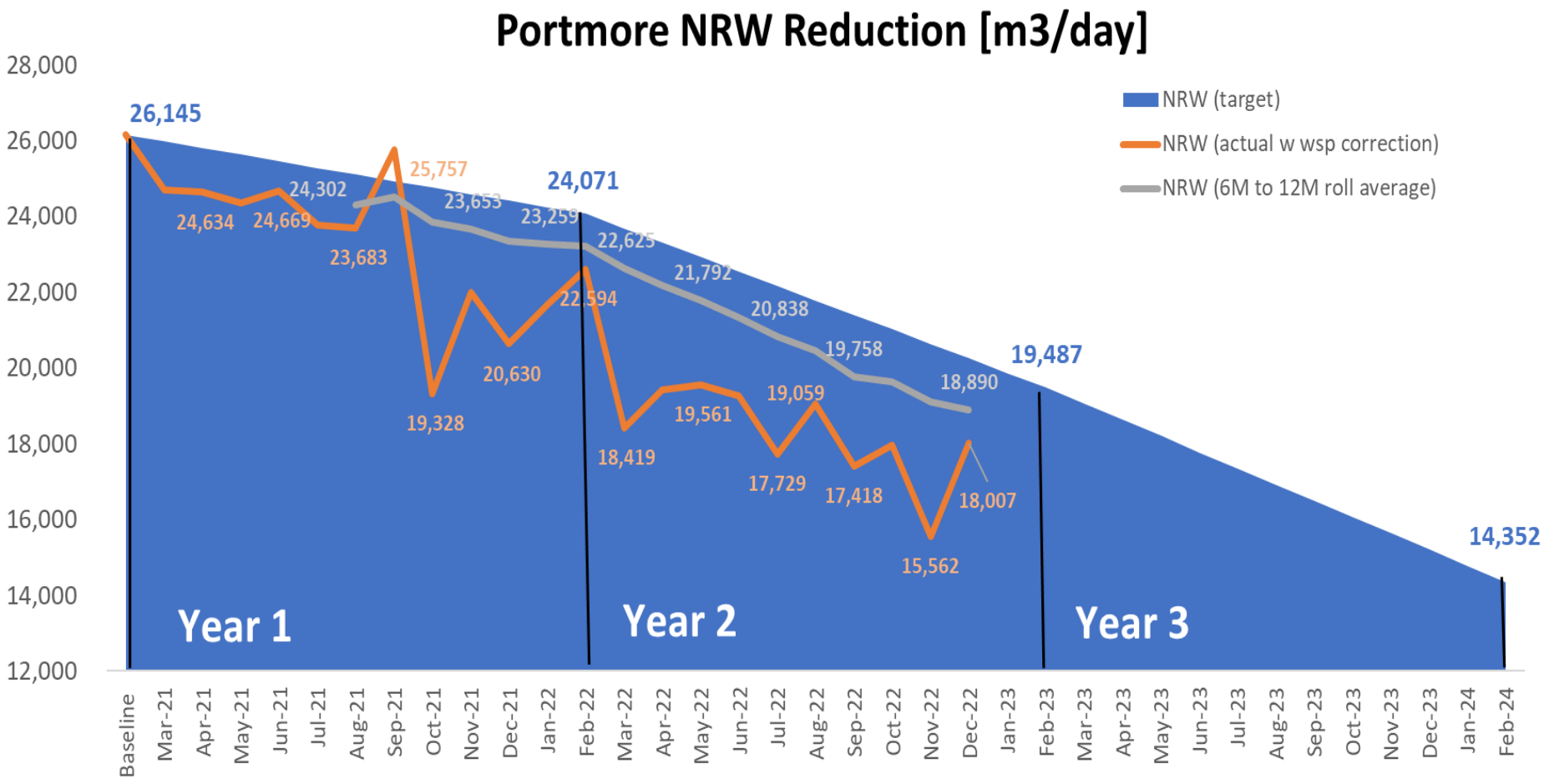
Portmore NRW Reduction Results



PORTMORE

NRW Results
Reduction (35%)
from
26,000 m3/day
To
17,000 m3/day

SIV
Reduction (24%)
from
42,000 m3/day
To
32,000 m3/day

BV
Reduction (6%)
from
16,000 m3/day
To
15,000 m3/day

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Conclusions & Takeaways NWC NRW Program

1. Holistic Approach Adapted in NRW Reduction (Physical & Commercial losses)
2. NRW Programmes Involves “ALL” Departments of Utility
3. Co-management Arrangement → Reap Desired Results
4. Properly/Suitably Sized Teams Needed
5. Establish Suitable KPIs to Monitor Team Efficiency
6. Top management “Buy-In” with Initiative

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THANK YOU

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