

Leakage Emissions Initiative Case Study: Jamaica

The Leakage Emissions Initiative (LEI) is a collaborative effort including members of the IWA Water Loss Specialists Group and the AWWA Water Loss Control Committee, which seeks to quantify the impact of unmanaged leakage on avoidable carbon emissions. The end goal is to more aggressively incentivize leakage reduction projects by creating access to new funding sources. To help accomplish this goal, the LEI developed a methodology to determine a utility's specific energy intensity, and apply this to the quantify carbon emissions for each component of the standard water balance. This calculation yields what is known as the standard carbon balance. When a standard carbon balance is conducted annually in conjunction with a leakage reduction project, a utility can track metric tons of carbon emissions avoided as a result of the leakage reductions. The LEI seeks to create a program which allows utilities to generate carbon offsets in the marketplace to represent each ton of carbon emissions reduced from leakage improvements. These carbon offsets can be contracted and sold to fund costs of the improvements, representing a new revenue source that will propel leakage reduction in the water industry.

Following the publication of a peer reviewed methodology, the LEI sought to gather and develop case studies which show defensible carbon reduction from utilities who have been reducing their leakage and tracking real loss reduction through their annual water balance. This case study details the results of leakage and carbon reduction for Kingston and Portmore in Jamaica. Kingston began their leakage reduction project in 2017 while Portmore began its project in 2020. As such, case studies were completed separately for both. The result of these case studies demonstrated that through leakage reduction, approximately 12,600 metric tons of carbon emissions have been avoided since 2016. Further emissions will be reduced as leakage reduction efforts continue in the coming years. A tabular summary of the case study results is presented below in *Tables 1 and 2*.

The results of this case study represent a compelling argument that leakage reduction is a reliable path for reducing carbon emissions. While Kingston and Portmore are the two largest cities on the island of Jamaica, they are relatively small compared to other urban utilities across the globe. There is tremendous opportunity for other utilities to follow in Jamaica's footsteps to achieve more carbon emissions than those seen here. The goal of these case studies is to continue to show interested parties the opportunity for carbon reduction through leakage reduction as the LEI continues to establish a program that will allow utilities to access new sources of funds for leakage reduction and system improvements.

Case Study Summaries

Kingston

	2016*	2017	2018	2019	2020	2021	2022
System Input Volume (ML)	81,223	77,582	68,017	58,698	57,253	57,817	56,082
Physical Losses (ML)	33,854	29,116	20,504	15,019	13,604	13,281	12,752
Leakage Carbon Emissions (MT)	5,336	4,797	3,877	3,047	2,870	2,498	2,472
Carbon Reduction Year-Over-Year (MT)		539	920	830	177	373	25
Carbon Reduction from Baseline (MT)		539	1,459	2,289	2,466	2,839	2,864
Cumulative Carbon Reduction (MT)		539	1,998	4,287	6,753	9,592	12,456

Notes:
 2018 electricity consumption was used in lieu of accurate data for 2016, and 2017
 2021 electricity consumption was used in lieu of accurate data for 2022.
 *Denotes Carbon Balance Baseline Year
 Energy and Emissions Factor source: irena.org

Table 1 Kingston LEI Case Study Results

Portmore

	2020*	2021	2022
System Input Volume (ML)	15,291	11,715	12,407
Physical Losses (ML)	5,918	4,152	3,951
Leakage Carbon Emissions (MT)	309	284	255
Carbon Reduction Year-Over-Year (MT)		26	29
Carbon Reduction from Baseline (MT)		26	54
Cumulative Carbon Reduction (MT)		26	80

Notes:
 2022 electricity data was used for 2020 and 2021
 *Denotes Carbon Balance Baseline Year
 Energy and Emissions Factor source: irena.org

Table 2 Portmore LEI Case Study Result