Levven® | Switched Right™

Emissions and Energy Performance Analysis of Switched Right®

What is Switched Right?

Levven’s innovative two-component switching system, featuring the wire-free switch and the power controller, revolutionizes home automation by eliminating the need for traditional wiring between switches and fixtures. This transformative approach significantly simplifies installation, reduces material costs, and enhances design flexibility.

Wire-Free Switch: Levven’s wire-free switch requires no in-wall electrical wiring, offering unprecedented installation ease and versatility. Homeowners can place or relocate switches anywhere in the home without the constraints and expenses associated with conventional installations. This flexibility allows for easy customization and adaptation to changing design needs.

Power Controller: Installed at the power source, the power controller communicates wirelessly with the wire-free switches to manage various home systems such as lighting and heating. This setup optimizes energy usage and centralizes control, significantly reducing energy costs.

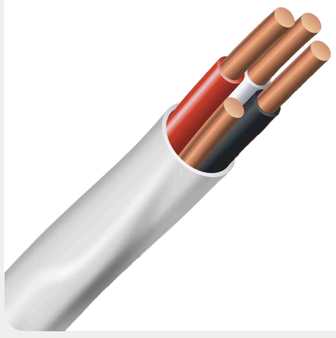
Advantages: Compared to traditional systems, Levven’s technology not only cuts down on labor and materials but also minimizes environmental impact by reducing the use of copper and plastic. The system’s ease of installation and modification provides unmatched adaptability for both new constructions and renovations, offering a modern, efficient solution for customizable home automation. This combination of simplicity, efficiency, and flexibility makes Levven a leader in the smart home industry.

Materials Conservation

1. Wire Savings

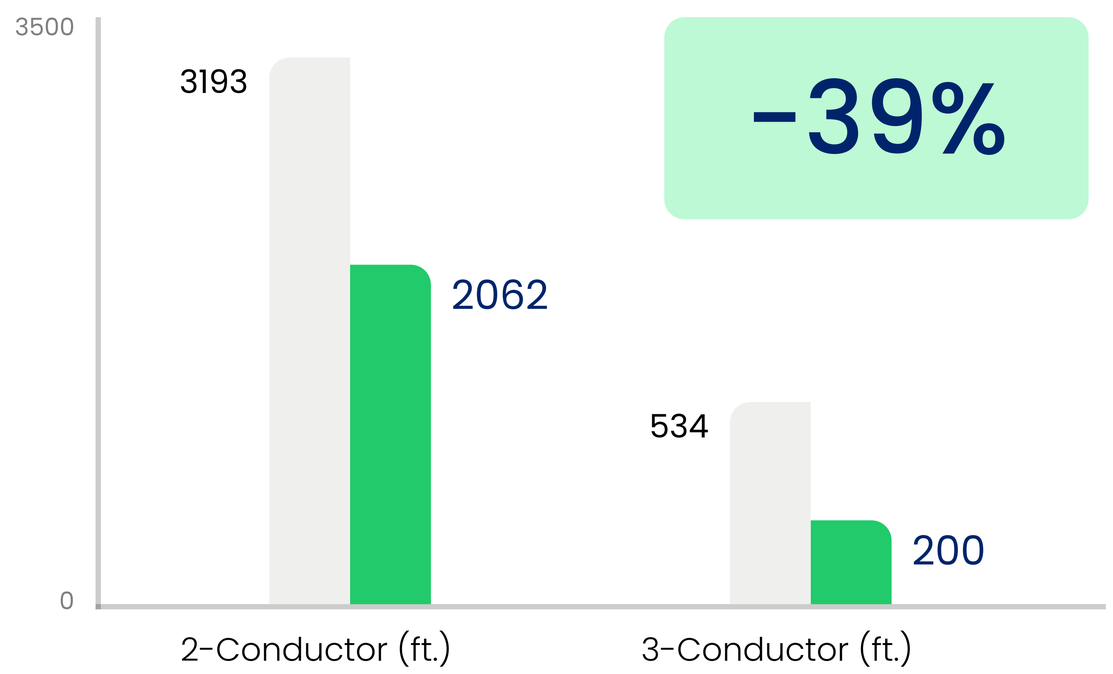
Switched Right reduces the amount of 2-conductor and 3-conductor wires traditionally used for switch legs during construction. By replacing wired connections with wireless communication, the system significantly reduces the amount of wire required, streamlining installations and lowering material costs while simplifying electrical layouts.

2-conductor wire, as the name suggests, typically refers to an electrical cable with two insulated conductors: hot wire and neutral wire.

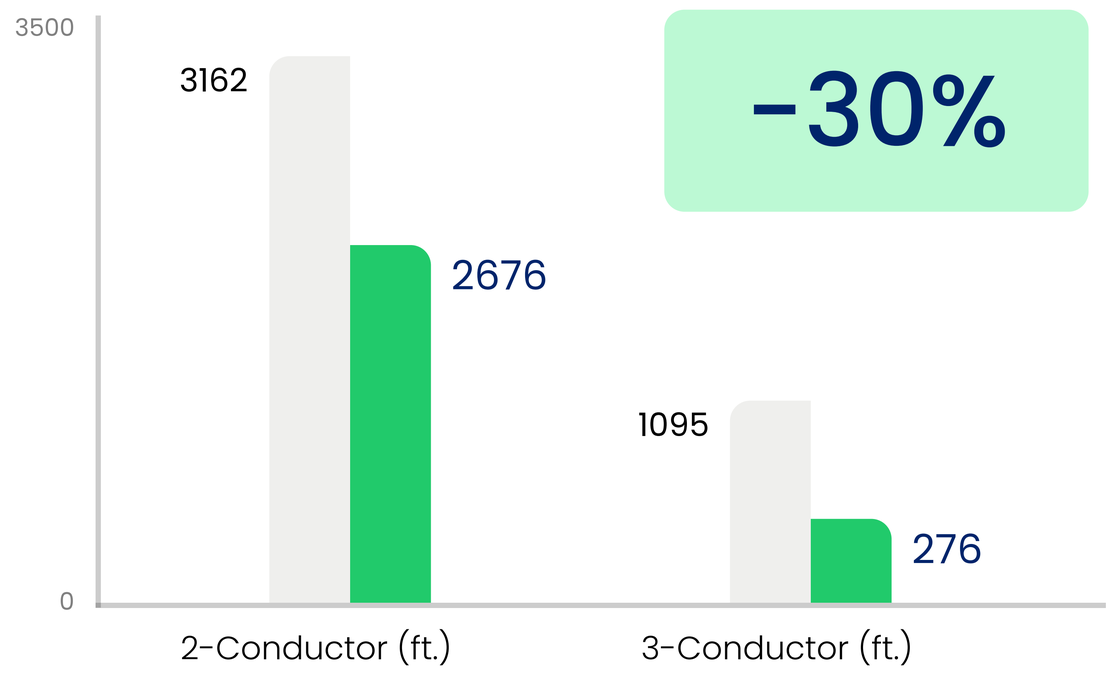


3-conductor wire, refers to an electrical cable with three insulated conductors: hot, neutral, and ground. The configuration might comprise of two hots and one neutral.

In Single-Story homes (43 switches):

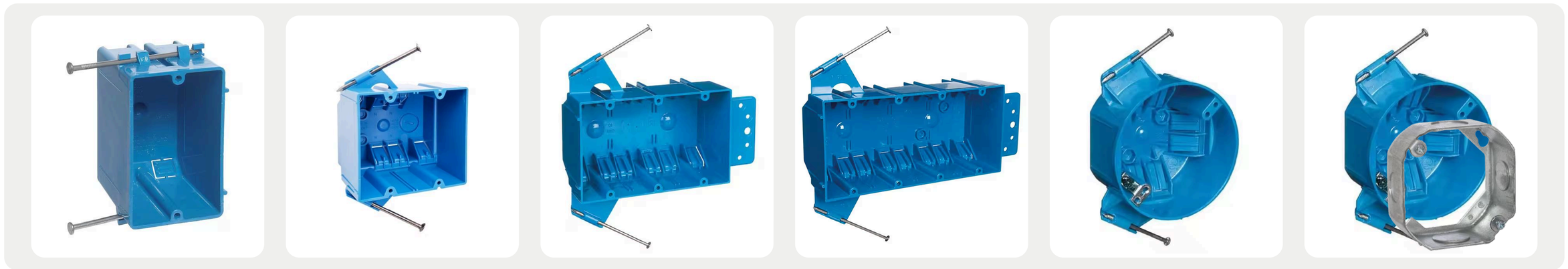


In Two-Story Homes (54 switches):



2. Electrical Junction Box Savings

Switched Right reduces the amount of electrical junction boxes, also known as *jboxes*, are enclosures that house electrical connections. They protect the connections from weather and accidental contact, which can cause electrical shocks and fires. Our system impacts the switch junction boxes, ceiling junction boxes, and plug junction boxes.



In Single-Story homes (43 switches):

	Traditionally Wired	Levven
Switches	18	**0**
Ceiling	44	44
Plugs	45	45

In Two-Story Homes (54 switches):

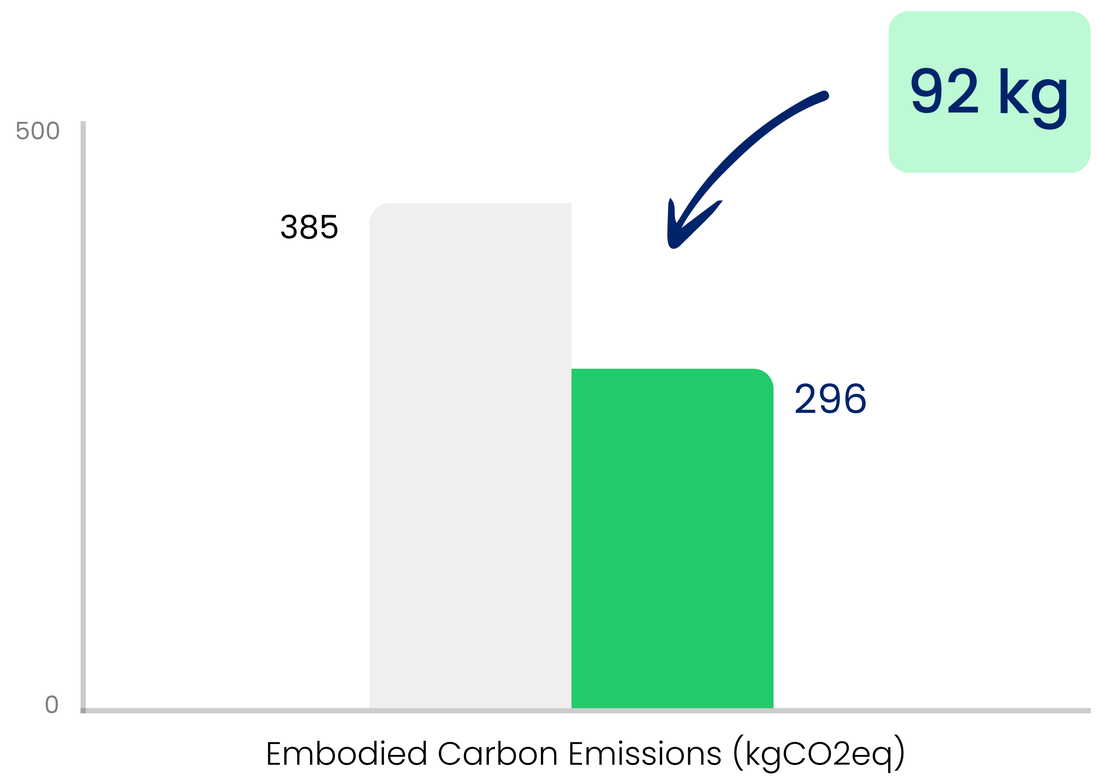
	Traditionally Wired	Levven
Switches	25	**0**
Ceiling	44	44
Plugs	65	65

Embodied Carbon Savings

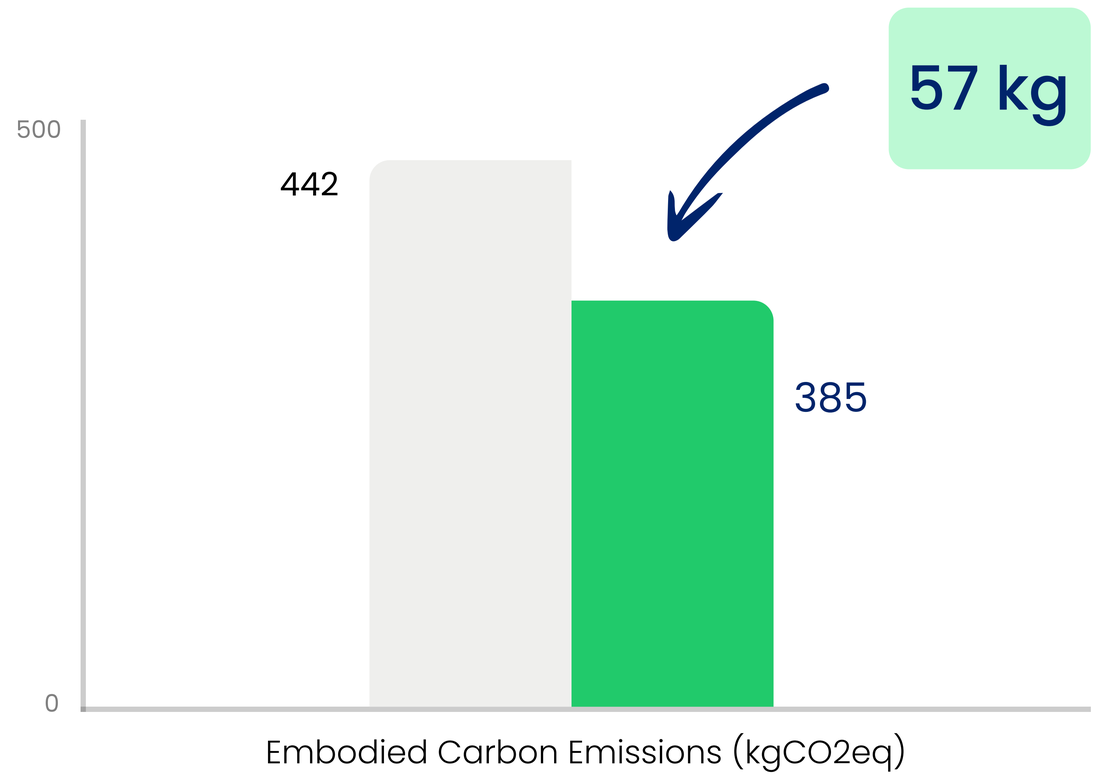
Levven's embodied carbon savings were calculated through a comprehensive cradle-to-gate environmental footprint assessment. This study evaluated the environmental impacts of Levven smart devices compared to traditional wired switch systems, focusing on embodied carbon, embodied energy, and material toxicity.

Material lists of both systems were analyzed, with embodied carbon calculated according to ISO14040 standards using industry-recommended databases and life cycle assessment software. Additionally, materials were reviewed for the presence of toxic or environmentally damaging substances using the Living Building Challenge Red List Material Inventory. Use case data was incorporated to assess the overall environmental performance of Levven products. Assumptions, in line with industry norms, were made to guide the analysis, and specific limitations of the study were clearly defined.

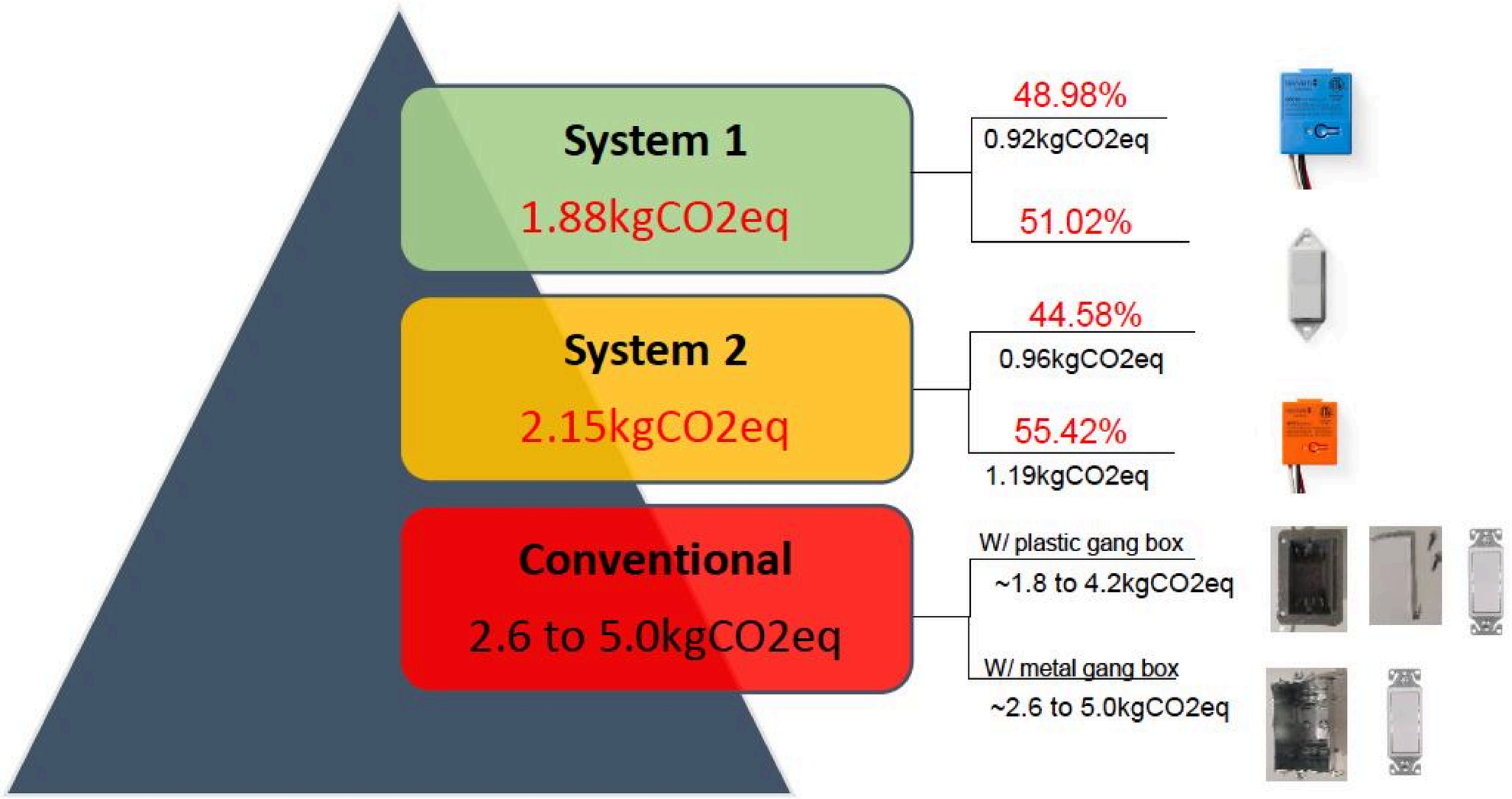
In Single-Story homes (43 switches):



In Two-Story Homes (54 switches):



Embodied Carbon Savings



Levven Systems (Smart Wire-free Switch + on/off power controller)

	Measured Mass of Component (g)	Mass of Accounted Materials (g)	Mass Unaccounted Before Modelling (g)**	Mass Used for Modelling (g)	Mass Unaccounted in Modelling (g)*	Embodied Carbon (g CO_2 eq)
Levven Switch	25.31	24.52	0.79	24.52	0.00	960
Levven on/off power control	48.35	43.7	4.65	42.84	0.86	920
Dimmer 15	44.26	38.75	5.51	38.30	0.45	1,190

Traditional Systems (Switch + Box + Wire)*

	Measured Mass of Component (g)	Embodied Carbon (g CO_2 eq)
12/2 wire (6” length)	8.09	60
14/2 wire (6” length)	6.14	46
14/3 wire (6” length)	6.84	52
Single Gang (Plastic)	107.08	183
Double Gang (Plastic)	157.35	235
Single Gang (Metal)	195.24	940
Double Gang (Metal)	293.00	1,410
Décora switch	50.60	237

Ongoing Energy-Savings

Levven's Switched Right systems significantly reduce material usage and improve energy efficiency in home construction. On average, single-story and two-story homes conserve up to 30% of electrical wire, 100% of switch electrical junction boxes, and 30% of wire connectors compared to traditional wiring. This reduction eliminates approximately 65 kg of CO2eq per home during construction. Additionally, fewer holes are drilled in studs and plates, improving the home's building envelope and long-term energy efficiency.

Smart automation powered by Switched Right systems, as validated by SSRIA and SAIT studies, delivers meaningful energy savings to homeowners. By enabling advanced control and automation of lights, fans, and other connected devices, these systems optimize energy usage across the home. On average, homeowners experience a 4% reduction in electricity bills compared to traditionally wired homes. These savings not only translate into lower utility costs but also contribute to a more sustainable energy footprint. By integrating smart automation features as a standard rather than an add-on, Switched Right systems ensure that every home is equipped to reduce energy consumption effortlessly while enhancing comfort and convenience for its occupants.

> *Homes fitted with the Levven Smart wire-free systems used, in average, a total of 7,450kWh while homes that used traditional wiring method and traditional switches consumed, in average, a total of 7,840kWh over a 12-month period.*
>
> -SSRIA & SAIT Report

References

Jacome de Paz, Julio, et al. "Environmental Footprint Assessment of a Novel Wire-Free Switch Method." Southern Alberta Institute of Technology, 28 June 2023.

Willson, Tyler, et al. Energy Performance, Emissions, and Labour Impact Analysis. Southern Alberta Institute of Technology, 12 Dec. 2023.