Mitrex Case Study

Myron and Berna Garron Health Sciences Complex (SAMIH) at University of Toronto Scarborough

Mitrex eFacade (BIPV Facade)

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Project Overview

The Myron and Berna Garron Health Sciences Complex (SAMIH) building at the University of Toronto Scarborough (UTSC) project is a dynamic initiative aimed at establishing a vital training facility for medical and healthcare professionals, and is a cutting-edge project driven by ambitious sustainability goals. EllisDon, a key construction partner, identified Mitrex's Building-Integrated Photovoltaics (BIPV) as an optimal solution to align the project with UTSC's aggressive carbon footprint reduction targets. Mitrex worked with the architects MVRDV and Diamond Schmitt Architects to bring the project to life. Initially, the project considered traditional rooftop solar panels, but through close collaboration and a design evolution, a full BIPV facade was selected, balancing aesthetic and energy performance requirements. The final installation has a power generation capacity of **632 kW**, producing approximately **420,000 kWh per year**—a significant step toward campus-wide sustainability.

PRODUCT USE:
eFacade PRO (BIPV Facade), Rooftop Solar Panels

PROJECT LOCATION:
Toronto, Canada

ARCHITECT:
MVRDV, Diamond Schmitt Architects

OWNER / DEVELOPER:
University of Toronto

GENERAL CONTRACTOR:
EllisDon

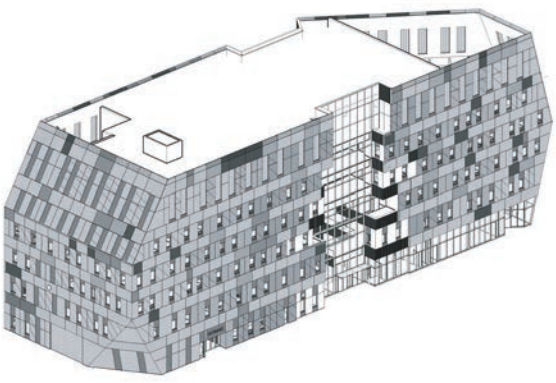
ENGINEER:
WSP

BUILDING TYPE:
University, Medical

PROJECT SIZE:
63,000 SQFT

POWER OURCOME:
Facade Power: ϟ 513kW
Rooftop Panel Power: ϟ 119kW

COMPLETION DATE:
2026



Project Challenges

- **Sustainability Goals:** The University of Toronto Scarborough set ambitious sustainability mandates, requiring all new buildings to have aggressive carbon footprint reduction targets; specifically, requiring at least 20% of building energy generation to come from renewable sources. To achieve this, the initial design of the SAMIH building was simple, considering rooftop solar panels to meet energy goals, and with a facade consisting of a single colour and two panel sizes.

Mitrex Project Solutions

- **Energy Generating Facade:** Mitrex provided a full-facade BIPV integration, replacing conventional metal cladding with PV panels to achieve both design flexibility and energy generation. The decision to reduce the number of rooftop solar panels while emphasizing BIPV integration into the facade required a strategic approach to energy optimization. The outcome was a system size of 632 kW, producing about 420,000 kWh per year, meeting the 20% renewable energy generation requirement for the University of Toronto.

- **Energy Challenges:** As the project progressed, the University Of Toronto opted for facade-integrated BIPV with reduced rooftop solar. This shift presented new challenges, including optimizing the energy efficiency of the facade while maintaining cost-effectiveness.The reduction in rooftop panels meant relying more heavily on the vertical facade to generate the required energy, which required a careful selection of panel orientations and materials to maximize solar exposure.

- **Design-Assist:** Mitrex worked closely with the architects MVRDV and Diamond Schmitt Architects team through a design-assist and energy management process, refining the facade's layout to accommodate the evolving architectural complexity. As the design transitioned from a simple panel arrangement to a mosaic pattern with eight different panel sizes and five colours, Mitrex provided technical expertise with extensive shop drawings, ensuring that the system remained cost-effective while maintaining efficiency.

- **Facade Design:** Due to the capabilities of Mitrex BIPV, the facade design evolved from one colour and two panel sizes into a more intricate mosaic pattern incorporating eight different panel sizes and five colours to meet architectural aspirations. The complexity of the evolving design required innovative solutions to balance aesthetics and energy production.

- **Energy Modeling and Colour Optimization:** Mitrex provided technical expertise to optimize both efficiency and aesthetics. The colours underwent a rigorous selection process with the architect where darker mosaic shades were chosen to enhance power generation. This improvement in efficiency allowed the project to meet stringent sustainability goals while still satisfying the architect's vision for a visually striking facade.

- **Installation & Labour:** EllisDon and the project team also had to ensure compliance with union labor standards while integrating cutting-edge solar technology seamlessly into the building envelope. Furthermore, the need for a high-quality rainscreen system that could support the BIPV panels added another layer of complexity. The project demanded a cost-effective solution that aligned with sustainability goals while ensuring a streamlined and efficient installation process.

- **Installation Ease:** To support the structural integrity of the BIPV panels, Mitrex collaborated with EllisDon in selecting a high-quality rainscreen system, ensuring durability, moisture control, and thermal performance. Compliance with union labor standards was another key consideration, reinforcing Mitrex's commitment to high-quality construction practices and seamless workforce integration.

Key Takeaway: *The combination of these solutions allowed the SAMIH building to meet its carbon reduction targets, optimize energy production, and maintain a visually compelling and high-performance facade. The successful integration of BIPV into the project stands as a testament to how sustainable technologies can be seamlessly incorporated into modern architectural design without compromising aesthetics or efficiency.*

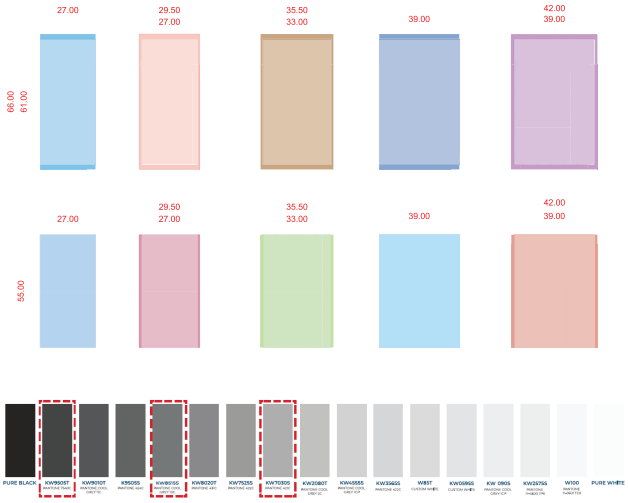
Facade Design Process

1. Original Design

The University of Toronto initially approached us with a simple facade treatment featuring a single color. The project's energy needs were originally planned to be met through rooftop solar panels. However, given the project's ambitious sustainability goals, Mitrex, working with EllisDon, proposed integrating Building-Integrated Photovoltaics (BIPV) into the facade, expanding energy generation beyond the rooftop to the building's vertical surfaces.

2. Incorporating BIPV

As the project evolved, the architects MVRDV and Diamond Schmitt Architects recognized the full potential of BIPV and reimagined the facade as a mosaic-like design featuring three shades of grey with two textures of glass (Satin and Glossy) resulting in five module variations. This adaptation resulted in a system size of approximately 500 kW, reducing the need for rooftop panels. Incorporating solar energy generation directly into the facade materials—rather than relying solely on rooftop panels—enhanced efficiency and aesthetics. Seeing the value of a BIPV-integrated facade, the University of Toronto moved forward with further design optimizations.

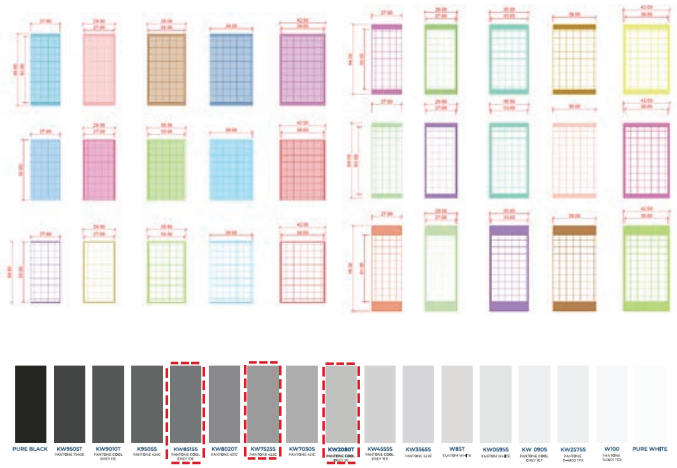


3. Optimizing the Facade

To maximize energy generation, Mitrex proposed design modifications that would enhance performance. This included optimizing panel sizes to align with standard dimensions, increasing the number of solar cells per panel, and ultimately capturing more energy. The design evolved from using just two panel sizes to eight, improving both efficiency and flexibility. Additionally, darkening the panel colors—which increases power output—further boosted energy generation. As a result, the system size increased to 587 kW, while the rooftop solar component was further reduced.

	MITREX		
	Active - Rainscreen (Sqft)	System Size (kW)	BIPV kWh
North	15240	224	70,344
South	9828	144	113,416
Southwest	6458	95	74,524
West	1279	19	11,943
East	7133	105	67,216
Roof	306 Panels	119	129,000
Total	46569	587	466,443
			BIPV

Facade Design Process

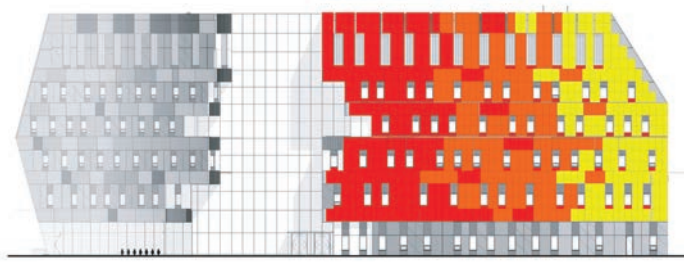


4. Perfecting the Design

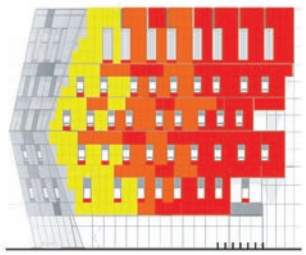
Once it became clear that the BIPV system met and even exceeded energy requirements, the University of Toronto and architects MVRDV and Diamond Schmitt Architects explored greater design flexibility. The architect ultimately chose to lighten the facade colors while still maintaining high energy efficiency. Mitrex optimized these selections to maximize power generation, resulting in a final system size of 632 kW.

	MITREX		
	Active - Rainscreen (Sqft)	System Size (kW)	BIPV kWh
North	14529	209	65,696
South	9404	135	106,300
Southwest	6172	89	69,773
West	1279	18	11,699
East	6955	100	64,193
Roof	306 Panels	119	129,000
Total	**44970**	**552**	**446,662**
			BIPV

South Elevation Panelization

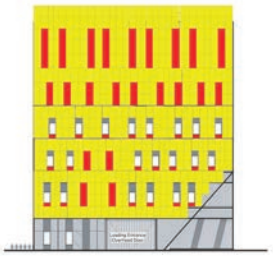


Southwest Elevation Panelization



North Elevation Panelization

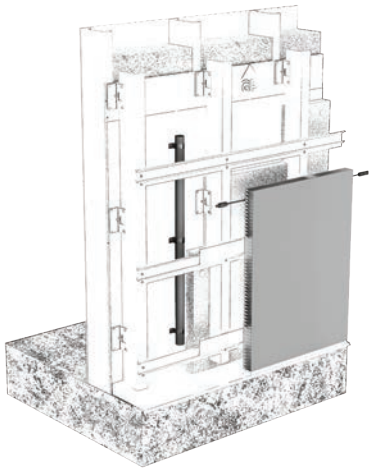
West Elevation Panelization

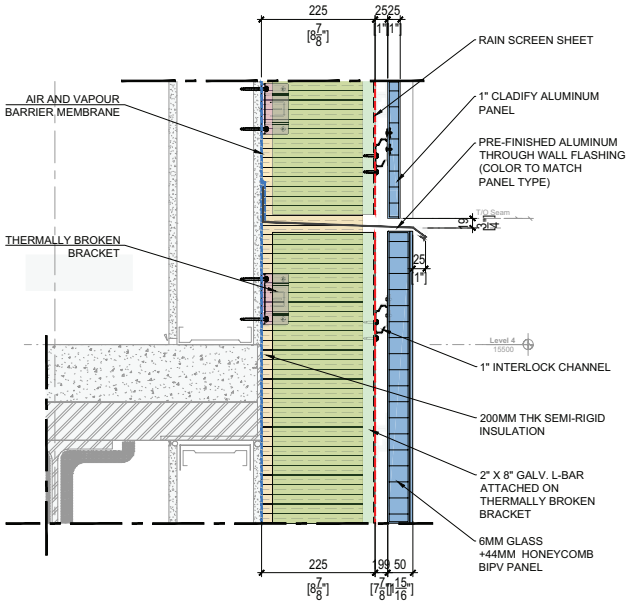


Colour Equivalence

Architectural Details

The project utilized a high-quality rainscreen system, ensuring proper moisture management and durability. The facade's modular panel system simplified installation without requiring special structural modifications, demonstrating the adaptability of Mitrex's BIPV solutions in modern construction. The design-assist process was crucial in balancing performance, cost, and aesthetics, ultimately delivering a cutting-edge solar facade without compromising architectural integrity.





6 MT-003 Exterior Section Detail - EW1E and EW1F Hor. Seam - Typ

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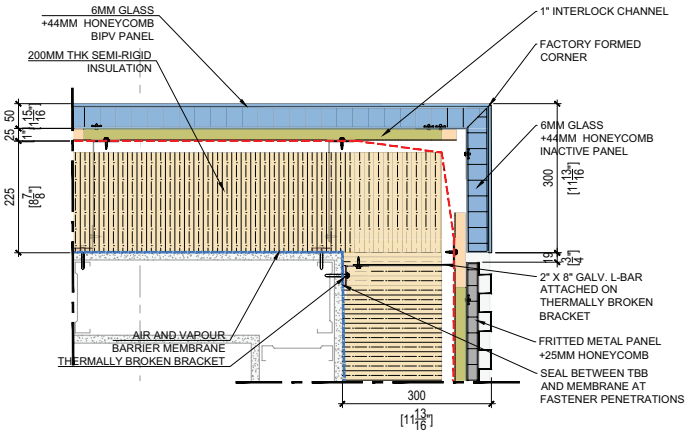

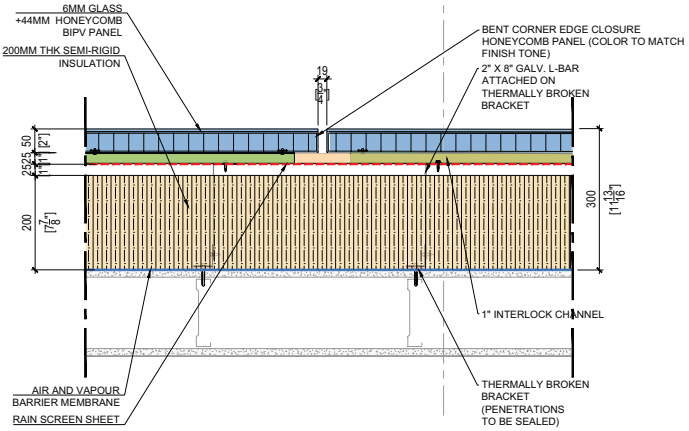

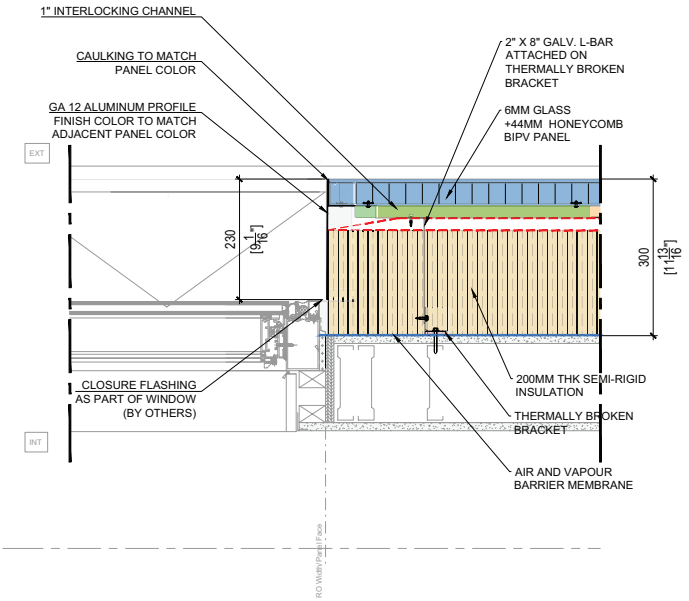

- CladiShield System (Rainscreen System)

ROI & Cost Comparison

Energy Generation

Orientation	System Size (kW)	Energy Estimation (kWh)
North	198	68,382
South	130	101,217
Southwest	85	66,363
East Tilted	47	38,026
East	42	23,042
West Tilted	14	12,134
Rooftop	119	128,649
Total	**636**	**437,813**

ROI and Cost Comparison

- Rapid Payback Period: With an estimated energy revenue of $80,000 per year, the ROI is expected in under one year.
- Comparable Cost to Metal Panels: The overall cost of Mitrex BIPV was similar to high-end metal panels, making it a viable alternative that delivers energy savings.
- Long-Term Value: Beyond initial savings, the project ensures long-term energy production, reducing operational costs and enhancing building performance.

Project Impact

The SAMIH project at UTSC serves as a model for educational institutions striving to balance sustainability, architectural excellence, and economic feasibility.

The integration of BIPV panels:

- Supports the campus expansion with a sustainable approach.
- Provides a renewable energy source that meets sustainability goals.
- Demonstrates that educational buildings can meet sustainability targets without compromising design goals.

This project reinforces Mitrex's leadership in sustainable building solutions, proving that design and energy efficiency can coexist seamlessly. By leveraging innovative facade-integrated photovoltaics, UTSC has set a new benchmark for future university projects looking to reduce carbon footprints while maintaining architectural integrity.

If this project was in a different city, here's how much energy and revenue it would produce.

Comparison: Project Energy Generation Per Location

Orientation	System Size (kW)	Los Angeles, CA (kWh)	New York, NY (kWh)	Miami, FL (kWh)	Denver, CO (kWh)	Chicago, IL (kWh)	Houston, TX (kWh)
North	198	72,343	65,208	74,920	70,956	63,820	72,343
South	130	125,088	115,446	103,458	141,766	114,794	102,416
Southwest	85	77,623	67,941	66,619	81,632	67,856	64,785
East Tilted	47	39,212	32,401	36,043	41,104	32,684	33,914
East	42	34,404	28,428	31,623	36,064	28,677	29,756
West Tilted	14	11,782	9,686	10,522	11,316	9,727	10,042
Rooftop	119	189,091	153,897	170,599	186,705	150,915	161,652
Total	**636**	**549,542**	**473,006**	**493,783**	**569,542**	**468,473**	**474,907**

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