

Existing Buildings Retrofit Survey Report

September 2013

Dear survey participant:

We thank you for responding to our online survey about building retrofit. A better than expected sampling has been provided by well over 200 completed surveys. The large majority of participants requested a report of the survey results, and expressed a willingness to participate in related future research.

Please find below a summary of the survey results, as promised. These are followed by relevant survey questions providing a more detailed response. Complete, unedited survey results are available on request.

Please note that the list of projects included herein has not yet been vetted beyond a simple address check. Over a dozen buildings were not included because we could not verify them with the information provided. Also note that because many of the questions reported following allowed multiple answers, so percentage responses will not total 100%.

Thank you again for adding your voice to this important research. Your feedback is most valuable to this effort. We encourage you to contact us with any additional comments or questions, or to provide us with additional information.

Best regards,

Andrea Martinez
PhD Candidate
University of Southern California
School of Architecture
asmartin@usc.edu



Mic Patterson
PhD Candidate
University of Southern California
School of Architecture
mrpatter@usc.edu



Existing Buildings Retrofit Survey Report

SUMMARY OF RESULTS

1. A total of 243 surveys were completed.
2. Over 300 buildings worldwide were specifically identified as having received some type of façade intervention.
3. The buildings reported represented over 30 countries, with 54% being in the USA and 8% being in the UK.
4. Most of the responder's experience was related to façade retrofits (91%). This reflects the experience of the largely façade related professional groups where the survey was distributed.
5. The leading role played by responders was during the execution stage of the retrofits (47%). Planning stage involvement and materials supply were the next largest areas of involvement (38% each).
6. Office buildings (72%) were the predominant building type cited in the survey.
7. The majority of buildings reported were mid-rise (62%) followed by high-rise (49%).
8. The largest group reported experience with curtainwall, window wall or storefront (67%).
9. Nearly as many responders (62%) reported experience with highly glazed curtain walls (over 50% WWR).
10. The major façade intervention types were; 1. total façade removal and replacement (68%) and, 2. the refurbishment or replacement of window systems (56%).
11. The primary motivation cited for the various retrofits was aesthetics or image update (74%), followed by energy performance (65%), and remediation (56%). (Multiple choices were permitted for each project.)

1. What was your company's role on the retrofit project(s)?

#	Answer	Response	%
1	Building owner or building management	14	4%
2	Retrofit design team (involved in the study or planning stage)	122	38%
3	Retrofit construction team (involved on the execution stage)	150	47%
4	Post occupancy evaluation team (Retro-commissioning, energy audits)	7	2%
5	Material or product supplier	120	38%
6	Other	19	6%

2. With which type of retrofit has your company been involved? (Check all that apply)

#	Answer	Response	%
1	HVAC retrofit	25	8%
2	Lighting retrofit	31	10%
3	Facade retrofit (i.e. film in windows, window replacement, re-cladding, over-cladding)	294	91%
4	Energy efficiency measures in building operation (i.e. adjusting thermostat set point, schedules)	35	11%
5	Digital controls (daylighting or occupancy sensors, other automatic controls)	24	7%
6	Other	21	7%



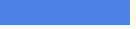






3. What were the reasons for the intervention of the building facade? (check all that apply)

#	Answer		Response	%
1	remediation of failure (water or wind infiltration, material failure, etc)		138	56%
2	aesthetics or image update		182	74%
3	energy performance		160	65%
4	code compliance		37	15%
5	Compliance to a standard (LEED, EnergyStar, Living Building Challenge, etc.)		34	14%
6	Other		16	6%





4. What kind of intervention was performed on the facade? (If multiple projects, include all that apply)

#	Answer		Response	%
1	film on windows was added/removed		29	12%
2	windows were renovated/replaced		136	56%
3	insulation was added		94	39%
4	sunshades were added		73	30%
5	a new cladding material(s) was added to the existing facade		107	44%
6	glass infill panels were replaced		81	33%
7	opaque infill panels were replaced		43	18%
8	the whole existing facade was removed and replaced		165	68%
9	double skin (a new layer was added to the existing facade)		64	26%
10	other		12	5%



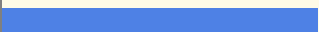


9. What was the building type? (If multiple projects, include all that apply)

#	Answer		Response	%
1	residential single-family		13	5%
2	residential multi-family		46	19%
3	mixed use		67	27%
4	office		178	72%
5	cultural		32	13%
6	government		77	31%
7	hospitality, entertainment, convention center		75	30%
8	educational		65	26%
9	transportation		17	7%

10. What was the building height? (If multiple projects, include all that apply)

#	Answer		Response	%
1	single-story		25	10%
2	low-rise (2-3 stories)		71	29%
3	mid-rise (4-12 stories)		153	62%
4	high-rise (over 12 stories)		121	49%

11. What is the building facade type? (If multiple projects, include all that apply)

#	Answer		Response	%
1	masonry facade with punched windows		97	39%
2	precast concrete		47	19%
3	curtain wall (including window wall and storefront type systems)		166	67%
4	highly-glazed curtain wall (over 50% glass)		154	62%
5	other		20	8%

Buildings identified as having a retrofitted façade:

100 Park Ave	New York, NY	USA
101 Marietta Street	Atlanta, GA	USA
1010 Wilshire	Los Angeles, CA	USA
1100 Wilshire	Los Angeles, CA	USA
11119 Torrey Pines	San Diego, CA	USA
1122 Harrison St	San Francisco, CA	USA
1200 19th Street	Washington, DC	USA
1200 Main	Dallas, TX	USA
123 Victoria Street	London	UK
1305 Euclid Ave.	Cleveland, OH	USA
1333 Bloor Street E	Mississauga, ON	Canada
150 Federal Street	Boston, MA	USA
1500 Ambassador	Kansas City, MO	USA
1775 Broadway	New York, NY	USA
1801 K St.	Washington, DC	USA
185 Wellington Street, Toronto	Toronto, ON	Canada
1900 West Loop South	Houston, TX	USA
1st Interstate Bank	Dallas, TX	USA
2 Bloor Ave.	Toronto, ON	Canada
2 Broadway	New York, NY	USA
201 East 57th Street	New York, NY	USA
2020 K Street	Washington, DC	USA
215 East 68th Street	New York, NY	USA
270 Park Ave (Conference Floor)	New York, NY	USA
300 Madison Avenue	New York, NY	USA
320 Park Avenue	New York, NY	USA
330 Madison Ave	New York, NY	USA
39 East 68th Street	New York, NY	USA
3M Headquarters	St. Paul, MN	USA
40 West 57th St	New York, NY	USA
400 Market Street	Philadelphia, PA	USA
450 Sansome Street	San Francisco, CA	USA
475 Park Ave South	New York, NY	USA
50 Monroe Place	Detroit, MI	USA
500 N. Capital Street, NW	Washington, DC	USA
500 Throckmorton	Forth Worth, TX	USA
54 Hagley Road	Birmingham, AL	UK
55 E. Monroe	Chicago, IL	USA
6 Battery Road		Singapore
608 Silver Spur	Palos Verdes, CA	USA
620 Newport Center Drive	Newport Beach, CA	USA
666 Fifth Ave	New York, NY	USA

680 Folsom	San Francisco, CA	USA
707 Wilshire Boulevard	Los Angeles, CA	USA
7550 Wisconsin Ave	Bethesda, MD	USA
7700 Arlington	Fairfax County, VA	USA
801 Skinker	St Louis, MO	USA
845 S. Figueroa	Los Angeles, CA	USA
888 O'Farrell St (Trinity Tower Apartments)	San Francisco, CA	USA
919 Third Ave	New York, NY	USA
A.J. Celebrezze Federal Building	Cleveland, OH	USA
Adani Gas Station	Ahmedabad, Gujarat	India
Ahmanson Theater	Los Angeles, CA	USA
Allianz	Madrid	Spain
Allied Bank Plaza (First Interstate Tower)	Dallas, TX	USA
Altius Centre	Calgary, AB	Canada
Alumet Offices, Southam	Warwickshire	UK
Amegy Bank Building, Downtown Houston	Houston, TX	USA
American Bankers Insurance(ABIG)	Miami, FL.	USA
Amoco Tower	Chicago, IL	USA
Area 2 Police Station	Chicago, IL	USA
Art Gallery of Alberta	Edmonton, Alberta	Canada
ATB Tower	Berlin	Germany
ATRIA SAN PEDRO GARZA GARCIA	Nuevo Leon	Mexico
Banco de España	Madrid	Spain
Bank of Canada Ottawa Ontario Canada	Ontario	Canada
Bank One	Rockford, IL	USA
Barnstable Town Hall	Barnstable, MA	USA
Barton School, Torquay	Torquay, Devin	UK
Bassett Clinic	Cooperstown, NY	USA
Bay County Courthouse,	Panama City, FL	USA
Bay Point	Miami, FL	USA
Beaudry Tower	Los Angeles, CA	USA
Beverly Hills Wilshire Hotel	Los Angeles, CA	USA
Blackrock, Drapers Gardens	London	UK
Bowen Building	Washington D.C.	USA
Bristol University	Bristol	UK
Broadway St	Winnipeg	Canada
BSNL office Building	Kolkata	India
Business Arts Plaza, Burbank	Los Angeles, CA	USA
BWI Airport	New York	USA
Cable Car Tower		Singapore
Calgary Zoo Administration Building	Calgary, AB	Canada
Canadian Embassy	Bucharest	Romania
Castellana 200	Madrid	Spain
Cathedral of Christ the Light	Oakland, CA	USA

CCK tower, Luxembourg (also called Alcide de Gasperi Tower)	Luxembourg City	Luxembourg
CEMEX IT Corporate HQ	Monterrey, Nuevo Leon	Mexico
Center on Halsted	Chicago, IL	USA
Central World Office Tower	Bangkok	Thailand
Charles de Gaulle Plaza	Bucharest	Romania
Charles E. Smith Center: George Washington University	Washington, DC	USA
CIA Headquarters	Langley, VA	USA
City Point	London	UK
Club Internacional del Libro: Avd de Manoteras 50	Madrid	Spain
CNBC Office Building	Englewood Cliffs, NJ	USA
Coathouse Trompeterbakken 11, DK 6000	Kolding	Denmark
Cobo Hall	Detroit, MI	USA
College of DuPage, Seaton Computer Center	Glen Ellyn, IL	USA
Constitution Center	Washington, DC	USA
Cornell University Research Building 61st Street,	New York, NY	USA
Crown Offices, Newport	Gwent	Wales
CTA, Red Line renovation	Chicago, IL	USA
Damasqino Mall	Damascus	Syria
Danwoody High School	Atlanta, GA	USA
D-Commerce Bank, Sofia	Sofia	Bulgaria
Dennison Mill	Marlborough, MA	USA
Deutsche Bank HQ	Frankfurt	Germany
Diamond Tower Beijing	Beijing	China
DLF Magnolias Residential Building, Gurgaon	Haryana	India
Dream Hotel	New York	USA
DUSIT Dubai, UAE. JUMAIRA Beach Hotel	Dubai	UAE
East end towers	Nairobi	Kenya
East Wing National Galery of Art	Washington, DC	USA
Eastern Village, Co-op Housing	Silver Spring, MD	USA
Edificio INE	Madrid	Spain
Edith Green Building	Portland, OR	USA
Eircom Telecommunications Exchange Building	Cork	Ireland
Empire State Building	New York, NY	USA
Energy Center	New Orleans, LA	USA
Esurance Headquarters	Miami, FL	USA
Everis Building, Avd Manoteras 52	Madrid	Spain
Exide Corporate Office Building	Kolkata	India
Farwell Building North Michigan Ave.	Chicago, IL	USA
FBI Building	Denver, CO	USA
Federal Building	Norfolk, VA	USA
Federal Office Building,	Des Moines, IA	USA
Federal Reserve Bank	Richmond, VA	USA
Fifth Avenue Place	Calgary, AB	Canada
First Canadian Place, King Street	Toronto, Ontario	Canada

First Equity Bank	Skokie, IL	USA
Foot Locker 34th st	New York, NY	USA
Fuji Xerox Tower, Singapore		Singapore
Germany, Berlin, Reichstag	Berlin	Germany
Germany, Leonberg-Stuttgart, Bosch	Bosch	Germany
Grand Hyatt	Seoul	Korea
Gulf & Western Bldg (Now Trump Plaza)	New York, NY	USA
Gulf Hotel		Bahrain
Guys Hospital	London	UK
Hallbrook House	London	UK
Harper College	Dallas, TX	USA
Hewlett Packard Headquarters	Mountain View, CA	USA
High Street Centre		Singapore
Hilton Hotel	San Francisco, CA	USA
Hiø Fredrikstad	Halden	Norway
Hoffman LaRoche Bldg. 76	Nutley, NJ	USA
Home and Dome Towers	Calgary, AB	Canada
Houston Community College Central Campus	Houston, TX	USA
Hull Royal Infirmary, Analaby Road	Hull	UK
Huntington Museum at Columbus Circle	New York, NY	USA
Hyde Park Schools - FDR High School Hyde park	New York, NY	USA
Ilie Oana Stadium	Ploiesti	Romania
Ilot B Building	Bordeaux	France
Imaginarium	Madrid	Spain
Indian Institute of management	Kolkata	India
Inland Revenue Office Cowglen	Glasgow	Scotland
INSS Coruña A	Coruña	Spain
ISCON Elegance	Ahmedabad, Gujarat	India
Jacob K. Javits Convention Center	New York, NY	USA
JFK federal office building	Boston, MA	USA
John Lewis Store, 1-11 Sidwell Street	Exeter	UK
Kauffman Stadium	Kansas City, MO	USA
Kevon Office Building	Pennsauken, NJ	USA
KFW Bank	Frankfurt	Germany
LaSalle Bank Majestic	Chicago, IL	USA
L'Enfant Plaza, Washington, DC	Washington, DC	USA
Lever House	New York, NY	USA
LIU PHASE II & III SAN PEDRO GARZA GARCIA	Nuevo Leon	Mexico
Long Beach Cruise Terminal Parking Structures	Long Beach, CA	USA
Long Beach Police Department HQ	Long Beach, CA	USA
Lyerly Housing Building	Houston, TX	USA
MacDonald Warehouses	Paris	France
Madrid City Hall. Plaza de Cibeles 1, Madrid. E-28014	Madrid	Spain
Mahatre hospital	Mumbai	India

Makhija arcade	Mumbai	India
Man Group, Riverbank House	London	UK
Mandarin Oriental Hotel	Hong Kong	China
Mangal City	Indore	India
Marks & Spencer, Stockley Park	London	UK
Marriott Kensington	Kensington	UK
MARTEL TOWERS SAN PEDRO GARZA GARCIA	Nuevo Leon	Mexico
McNeal Hotel	Dublin	Ireland
Memorial Hermann Memorial City Hospital	Houston, TX	USA
Miami Dade Cultural Center	Miami, FL	USA
Mickey Leland Federal Building(ongoing)	Houston, TX	USA
Millennium Towers @ 301 Mission, San Francisco, CA	San Francisco, CA	USA
Mobil Oil	Chicago, IL	USA
Moevenpick Hotel	Istanbul	Turkey
Montgomery Wards Tower	Chicago, IL	USA
Mony	Honolulu, HI	USA
Myzeil Mall	Frankfurt	Germany
Naniba Pathshala	Bhuj, Gujarat	India
National Gallery of Art	Washington, DC	USA
National or First Bank	Phoenix, AZ	USA
Natwest Tower	London	UK
Nautilus	San Diego, CA	USA
Nilamber Bellisimo	Baroda, Gujarat	India
Nomura, Watermark Place	London	UK
Nottinghill Gate	Nottinghill	UK
Nusco Tower	Bucharest	Romania
New York Hilton Rockefeller Center	New York, NY	USA
Old Mutual Tower	Durban	South Africa
Olive Harvey College	Chicago, IL	USA
One Commerce Plaza	Albany, NY	USA
One Embarcadero	San Francisco, CA	USA
One Houston Center	Houston, TX	USA
One Indiana Square	Indianapolis, IN	USA
One Shell	Houston, TX	USA
Orlando Federal Courthouse	Orlando, FL	USA
Oxford Building	Towson, MD	USA
Pacific Park Plaza	Berkeley, CA	USA
Park Pacific Place	Emeryville, CA	USA
Park towers	Dubai	UAE
Peter W. Rodino Federal Office Building	Newark, NJ	USA
Piazza	Paisley	Scotland
PIL Building		Singapore
Plaza del Norte	Hatillo	Puerto Rico
Plaza Singapura Atrium		Singapore

Port Canaveral Parking Structures	Port Canaveral, FL	USA
Project Building	Lille	France
Providence Tower	Dallas, TX	USA
Queen Alia International Airport	Amman	Jordan
Radio France HQ	Paris	France
Realtor Building	Chicago, IL	USA
Riverside Hospital	Riverside, VA	USA
Roosevelt University, Vertical Campus Building Wabash Ave	Chicago, IL	USA
Rothschild Hospital	Paris	France
Rotunda	Birmingham	UK
Round Valley Executive Center	Lebanon, NJ	USA
Rumford Mill	Rumford, RI	USA
San Francisco Public Utilities Building	San Francisco, CA	USA
Sanger Hall University	Richmond, VA	USA
Saturn Center	Koln	Germany
Schiphol Airport	Amsterdam	Holland
Science Park 1		Singapore
Willis (Sears) Tower	Chicago, IL	USA
Seine Arche at Nanterre (XTU Architecte)	Nanterre	France
Sentral Station	Oslo	Norway
Seventh Street Garage	St. Louis, MO	USA
Buildings at NCSU campus (one being Broughton hall)	Raleigh, NC	USA
Sham City Center	Damascus	Syria
Shaw Park Plaza	Clayton, MO	USA
Shell Oil	Houston, TX	USA
Singapore Land Tower		Singapore
Site 25 Goldman Sachs	New York, NY	USA
Span Center	Bangalore	India
St Patrick's Hospital	New York, NY	USA
St Thomas Hospital	London	UK
St. Mary Hospital	London	UK
Standard Chartered Building, Jalan Raja Chulan	Kuala Lumpur	Malaysia
Standard Oil Building	Chicago, IL	USA
State Law Building	Brisbane QLD	Australia
Sterling Condominiums		Singapore
Sun Life Plaza	Calgary, AB	Canada
Sunset & Vine Los Angeles	Los Angeles, CA	USA
Svend Oftedalsvei 10 0950	Oslo	Norway
Switzerland, Luzern, University	Luzern	Switzerland
Taj Sats Bangalore Airport	Bangalore	India
Tanarah Building, San Pedro Garza Garcea	Nuevo Leon	Mexico
TASC Building at Dublin Airport	Dublin	Ireland
Tata Raisena Noida	Delhi	India
Tate Britain, Vauxhall	London	UK

TCS, Old Rallis House, Fort	Mumbai	India
TD Center Towers	Toronto, ON	Canada
The Adress, Residential Building	Mumbai	India
The Artisan (915 E St.)	Washington, DC	USA
The Arts Tower, Sheffield University	Sheffield, UK	UK
The Foundry Building	Providence, RI	USA
Thunderbird Arena, University of British Columbia	Vancouver, BC	Canada
Time and Temperature Building	Raleigh, NC	USA
TMC Measuring Instruments Pvt Ltd	Pune	India
Torre XII San Pedro Garza Garcia	Nuevo Leon	Mexico
Tower Fifteen		Singapore
Trinity Towers (condominium)	San Francisco, CA	USA
Triple One Somerset		Singapore
Two Live Oak	Atlanta, GA	USA
Two Shell	Houston, TX	USA
UCLA CHS South Tower	Los Angeles, CA	USA
UCLA Wilshire	Los Angeles, CA	USA
Unilever	Durban	South Africa
Union Station	Toronto, ON	Canada
United Nations secretariat	New York, NY	USA
University of California at San Francisco / Medical Center	San Francisco, CA	USA
University of Chicago, Milton Friedman Institute	Chicago, IL	USA
University of Southern California - Heritage Hall	Los Angeles, CA	USA
Valley Baptist Medical Center	Harlingen, TX	USA
Veronia	Madrid	Spain
Warner Brothers Headquarters	Los Angeles, CA	USA
Welcome Building, Euston Square	London	UK
Wendco	Guaynabo	Puerto Rico
Westendgate	Frankfurt	Germany
Westfield Middle School	Bedfordshire	UK
Westin Hotel	Atlanta, GA	USA
Whitehall Road	Leeds	UK
Willard Ice Building - Department of Revenue	Springfield, IL	USA
Wilshire Center 10920 Wilshire Blvd	Los Angeles, CA	USA
Windsor	Madrid	Spain
Wit Hotel	Chicago, IL	USA
Wrigley Building	Chicago, IL	USA
YVR (Vancouver Airport)	Vancouver, BC	Canada
Zac Borderouge for Nexity	Toulouse	France
Zacharias Residence	Atlanta, GA	USA
Zuelling House	Bangkok	Thailand
Zürich University	Zurich	Switzerland