
OpenAire
Add sky to your design
TOP 10 reasons to put a Retractable Roof on your Restaurant
www.openaire.com | 2020

General Construction Trends

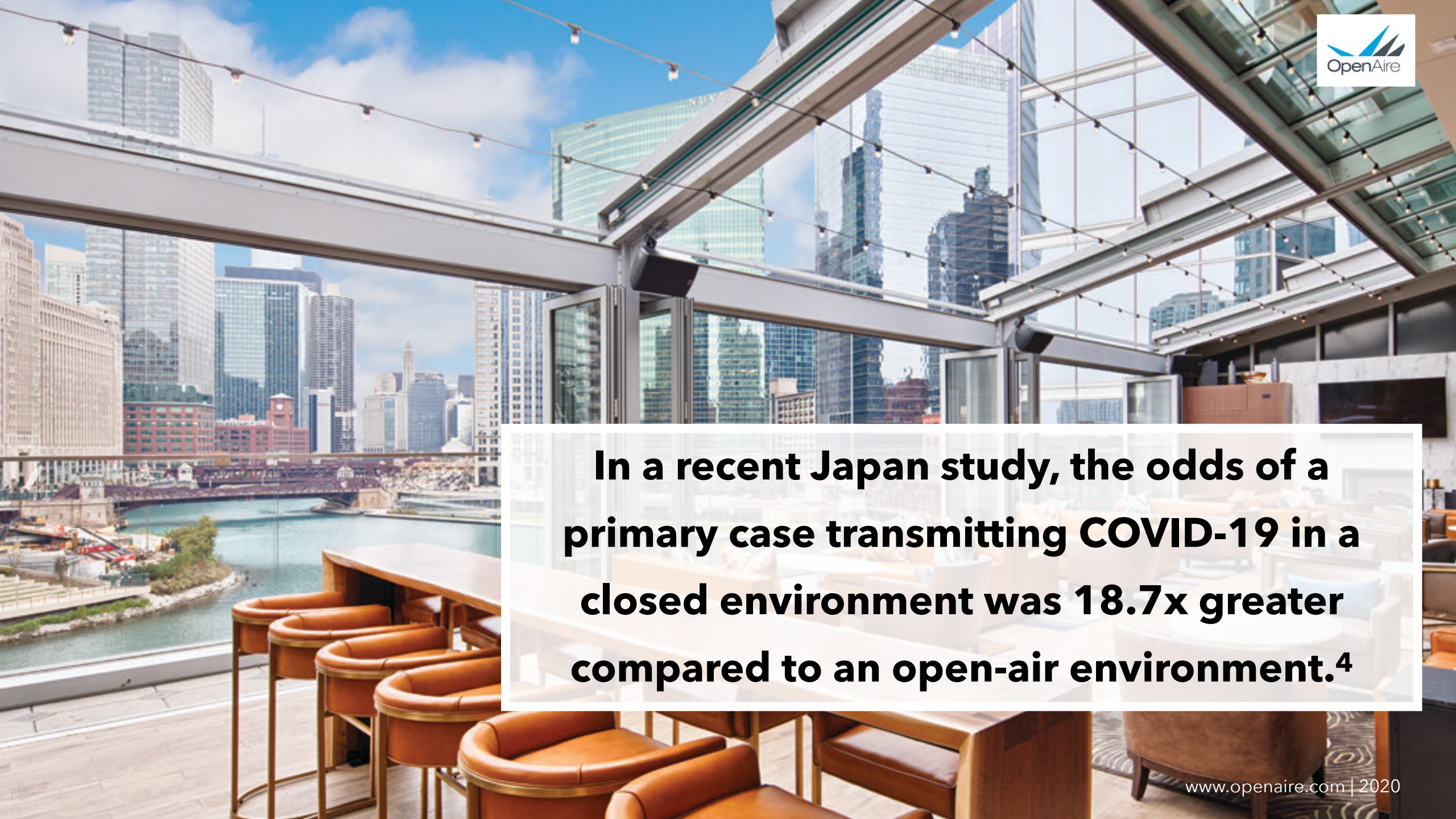
- Pandemic Readiness is front of mind
- The ability to make guests feel safer is key!
- Multi-functional spaces are critical for financial viability
- More resilient buildings able to handle the weather and other unforeseen issues
- Increase in offsite construction methods to reduce construction time, waste and unnecessary expenditures: OpenAire builds in a Factory
- Emphasis on Eco Friendly processes and buildings that reduce energy costs and boost building efficiency[1]

10 REASONS

You need to add a Retractable Roof to your Restaurant!

1. Natural Ventilation

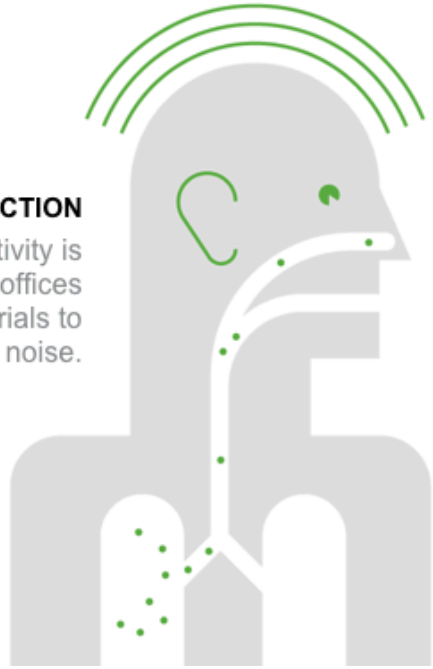
- Natural Ventilation = reduced reliance on mechanical air handling systems which result in:[2]
  - Save money (due to reduced running costs) can be **up to 30% every year** (location dep.)[3]
  - Reduce electricity load
  - Reduce greenhouse gas emissions
  - Reduced Carbon Footprint



In a recent Japan study, the odds of a primary case transmitting COVID-19 in a closed environment was 18.7x greater compared to an open-air environment.[4]

2. Health/Hygiene

- Natural ventilation/Fresh Air: recommended to reduce the spread of airborne viruses[5]
- Insufficient ventilation increases disease transmission.[6]
- Aluminum is easy to clean/disinfect and reduces the use of porous materials per CDC guidelines [7]
- Compared with mechanical ventilation, natural ventilation can provide much higher ventilation rates[8] (Simply: a higher ventilation rate equals more air turn overs per hour) This means more fresh air - FASTER



NOISE REDUCTION

Productivity is improved in offices using materials to reduce noise.

PRODUCTIVITY

In one study, cognitive function doubled with enhanced ventilation.

MAXIMIZE NATURAL LIGHT

Workers who sit near windows get more light and sleep an extra 46 minutes at night. Light helps regulate sleep cycles.

FEWER AIR POLLUTANTS

Green buildings can reduce illnesses caused by air quality issues.

Regulatory efforts focus on outdoor air, even though people spend most of their time indoors, where air quality and other aspects can impact both physical health and mental functioning[8].

90%

TIME SPENT INDOORS

Workers in green buildings have fewer complaints about air quality and humidity.

3. Energy Savings

- Building Codes Globally Say: **Use less Energy**
- Opening the Roof means: turning off air handling (heating and cooling) and lights
- When the roof is closed, thermal breaks and vapour barriers help control condensation and air filtration.
- In northern climates, some of the solar heat gain through a transparent or translucent roof can offset some of winter heating requirements (ambient heat gain)
- Savings can be **up to 30%** on energy bills

3. Energy Savings Example

Sample Site: 60 Vines Restaurant, Dallas, Texas

"The requirements for this analysis are outlined in the City of Dallas – Commercial Energy Compliance Path utilizing the ASHRAE 90.1 Section 11.

Although the insulating value of the OpenAire envelope is less than that of a traditional building, the OpenAire building provides for significant levels of natural ventilation. It is assumed, and found in practice, that the roof of the OpenAire structure can be open the majority of time during the summer months meaning the HVAC system can be shut down. No mechanical HVAC system is required. In contrast, a traditional building would require some form of mechanical HVAC system year-round, but most notably during the summer months. The comparison in this report assumes a traditional building with a standard dedicated HVAC system. The OpenAire building will be have the HVAC off the majority of time from May to September, and will run normally the rest of the time in heating mode only.

The results of the modelling indicate that the ***OpenAire structure will save about 15% in total energy usage*** *when operated in the manner described above."*

** Results from Study by Third Party - not OpenAire*

3. Energy Savings Example

This is the OpenAire Building

OpenAire Energy Consumption & Energy Demand

ENERGY CONSUMPTION SUMMARY
By Ramaker & Associates, Inc

	Elect Cons. (kWh)	Gas Cons. (kBtu)	% of Total Building Energy	Total Building Energy (kBtu/yr)	Total Source Energy* (kBtu/yr)
Alternative 1					
Primary heating					
Primary heating		28,813	16.4 %	28,813	30,330
Other Htg Accessories			0.0 %	0	0
Heating Subtotal		**28,813**	**16.4 %**	**28,813**	**30,330**
Primary cooling					
Cooling Compressor	26,182		50.8 %	89,360	268,107
Tower/Cond Fans	3,987		7.7 %	13,607	40,826
Condenser Pump			0.0 %	0	0
Other Clg Accessories	694		1.3 %	2,367	7,103
Cooling Subtotal....	**30,863**		**59.8 %**	**105,335**	**316,036**
Auxiliary					
Supply Fans			0.0 %	0	0
Pumps			0.0 %	0	0
Stand-alone Base Utilities			0.0 %	0	0
Aux Subtotal....			0.0 %	0	0
Lighting					
Lighting	12,288		23.8 %	41,938	125,827
Receptacle					
Receptacles			0.0 %	0	0
Cogeneration					
Cogeneration			0.0 %	0	0
Totals					
Totals**	**43,151**	**28,813**	**100.0 %**	**176,086**	**472,192**

TOTAL CONSUMPTION IS 15% LESS

* Note: Resource Utilization factors are included in the Total Source Energy value.
** Note: This report can display a maximum of 7 utilities. If additional utilities are used, they will be included in the total.

Project Name:
Dataset Name: 38130 TRACE.TRC

TRACE® 700 v6.3 calculated at 04:14 PM on 03/26/2018
Alternative - 1 Energy Consumption Summary report page 1

Standard Building Energy Consumption & Energy Demand

ENERGY CONSUMPTION SUMMARY
By Ramaker & Associates, Inc

	Elect Cons. (kWh)	Gas Cons. (kBtu)	% of Total Building Energy	Total Building Energy (kBtu/yr)	Total Source Energy* (kBtu/yr)
Alternative 2					
Primary heating					
Primary heating		30,157	14.6 %	30,157	31,744
Other Htg Accessories			0.0 %	0	0
Heating Subtotal		**30,157**	**14.6 %**	**30,157**	**31,744**
Primary cooling					
Cooling Compressor	35,546		58.6 %	121,319	383,994
Tower/Cond Fans	3,307		5.5 %	11,288	33,867
Condenser Pump			0.0 %	0	0
Other Clg Accessories	704		1.2 %	2,403	7,210
Cooling Subtotal....	**39,558**		**65.2 %**	**135,010**	**405,071**
Auxiliary					
Supply Fans			0.0 %	0	0
Pumps			0.0 %	0	0
Stand-alone Base Utilities			0.0 %	0	0
Aux Subtotal....			0.0 %	0	0
Lighting					
Lighting	12,288		20.3 %	41,938	125,827
Receptacle					
Receptacles			0.0 %	0	0
Cogeneration					
Cogeneration			0.0 %	0	0
Totals					
Totals**	**51,845**	**30,157**	**100.0 %**	**207,105**	**562,642**

* Note: Resource Utilization factors are included in the Total Source Energy value.
** Note: This report can display a maximum of 7 utilities. If additional utilities are used, they will be included in the total.

Project Name:
Dataset Name: 38130 TRACE.TRC

TRACE® 700 v6.3 calculated at 04:06 PM on 03/20/2018
Alternative - 2 Energy Consumption Summary report page 1

** Results from Study by Third Party - not OpenAire*

Energy Savings Case Study Subject
60 Vines Uptown
(22X62) 1364 sf bldg, Dallas TX

** Results from Study by Third Party - not OpenAire*

4. Carbon Reduction

- In the US alone, nearly 40% of greenhouse gases can be attributed to carbon produced by buildings during construction and everyday heating, cooling, and lighting[9]
- When the roof and walls are open, the mechanical systems for heating and cooling are turned off. An indoor space becomes outdoor. Greenhouse gas emissions are reduced

WHAT MAKES A GREEN BUILDING?

- Though standards for green buildings vary, they are generally designed to use less energy and water and improve the indoor environment, including air quality.[10]

5. Daylight

- Day-lit spaces hold the potential to yield substantial benefits:
    - Increased energy savings
    - Reduced lighting loads on power grids
    - Increased revenue in retail applications,
    - Improvements to human health, mood, behaviour and productivity[11]
        - Daylighting helps create a visually stimulating and productive environment for building occupants, while reducing as much as one- third of total building energy costs[12]
- Daylight is the third most important factor in improving retail sales, behind hours of operation and years since last renovation[11]

6. Maximize Revenue

- Naturally, adding an enclosure can increase the physical space you occupy (and therefore occupant loads) but allow you to offer use of the space year round for any type of programming
- Seasonal spaces can become a thing of the past
- **Covid Impact:** the first places that citizens have been allowed to congregate are open and outside. Both as a mandate from local governments and as citizens express their concern for personal safety, small enclosed spaces are simply being avoided due to perceived health risks. A retractable roof changes the picture. Indoor is now Outdoor!

7. Maintenance Free

- No more closures and maintenance days. Aluminum is:
  - Corrosion Resistant / Will not rust
  - Does not need finish to be corrosion resistant[13]
  - Critical for coastal locations, locations with snow, rain etc…
- No maintenance aside from standard day to day cleaning, upkeep
- All required service covered by OpenAire's 5-15 year warranty

Aluminum is lightweight, high-strength, corrosion-resistant and widely recycled. It maximizes building efficiency by balancing the functions of heating, cooling, lighting, shading and ventilation. In addition, aluminum in buildings has been proven to last for multiple decades with minimal maintenance, lowering the lifecycle footprint of a building.[13]

8. Speed of Construction

- Trend towards pre-fabricated elements designed, built in warehouse ensures:
  - Better upfront planning, improved consistency
  - Elimination of on-site weather factors
  - Elimination of subcontractor scheduling delays
  - Quicker fabrication as multiple pieces can be constructed simultaneously
  - Green Building: less waste

50'x26' telescope skylight

9. Occupant Satisfaction

- People in brightly lit spaces are more inclined to act in a socially conscious manner. Meaning they have will have an increased tendency to act more in accordance with others views rights and needs. Specifically, the findings suggest that, assuming a friendly social environment, placing people in brightly lit spaces can lead to more focus on others' needs, rights and views[14]
- This can lead to the development of more effective public policies promoting pro-social behaviour, tackling the obesity epidemic, decreasing risky behaviour among vulnerable populations, improving consumer welfare guidelines, and providing crucial recommendations for buildings and product design

10. Perfect Conditions

- You will never again be at the mercy of bad weather.
- Business owners can expect to: reduce Cancellations, refunds, returns
- Allow the retractable space to be conditioned separately from areas not under the retractable roof, creating temperature zones for maximum comfort and usability
- Treat the indoor space as outdoor when the roof is open!
- Use your space any time!

OpenAire
Add sky to your design

30 YEARS & 1000 PROJECTS SO FAR…

OPENAIRE DESIGNS, ENGINEERS, FABRICATES, SHIPS AND INSTALLS RETRACTABLE ROOFS, WALLS AND SKYLIGHTS

CALL US TO GET STARTED TODAY!

OpenAire
Add sky to your design

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References

1. Looking Ahead: 8 Architecture and Construction Industry Trends for the Next 30 Years, Traci Beilharz https://architizer.com/blog/inspiration/industry/looking-ahead-construction-industry-trends/

2. Natural Ventilation: A Review for Buildings in Rio de Janeiro, https://riorenewables.com/efficient-design/ventilation-airflow

3. Natural Ventilation, Andy Walker, National Renewable Energy Laboratory, August-02-2016 https://www.wbdg.org/resources/natural-ventilation

4. Closed environments facilitate secondary transmission of coronavirus disease 2019 (COVID-19) Hiroshi Nishiura, Hitoshi Oshitani, Tetsuro Kobayashi, Tomoya Saito, Tomimasa Sunagawa, Tamano Matsui, Takaji Wakita, MHLW COVID-19 Response Team, Motoi Suzuki, medRxiv 2020.02.28.20029272; doi: https://doi.org/10.1101/2020.02.28.20029272

5. Study: Restaurant Outbreak In China Suggests Limits To Airborne Transmission of COVID-19, 22 APRIL 2020, SF NEWS, Jay Barmann, https://sfist.com/2020/04/22/study-restaurant-covid-19-outbreak-in-china/

6. WHO; Natural Ventilation for Infection Control in Health-Care Settings, Edited by: James Atkinson, Yves Chartier, Carmen Lúcia Pessoa-Silva, Paul Jensen, Yuguo Li and Wing-Hong Seto, ISBN 978 92 4 154785 7 (NLM classification:WX 167), © World Health Organization 2009

7. Reopening Guidance for Cleaning and Disinfecting Public Spaces, Workplaces, Businesses, Schools, and Homes, May 7, 2020, Content source: National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases, https://www.cdc.gov/coronavirus/2019-ncov/community/reopen-guidance.html

8. Ventilation control for airborne transmission of human exhaled bio-aerosols in buildings, Hua Qian, Xiaohong Zheng, School of Energy and Environment, Southeast University, Nanjing 210096, China, http://dx.doi.org/10.21037/jtd.2018.01.24

9. https://www.aia.org/resources/77541-where-we-stand-climate-change

10. https://www.nationalgeographic.com/environment/urban-expeditions/green-buildings/benefits-of-green-buildings-human-health-economics-environment/ GRAPHIC: ÁLVARO VALIÑO. SOURCES: U.S. GREEN BUILDING COUNCIL; WORLD RESOURCES INSTITUTE; UNITED NATIONS; U.S. DEPARTMENT OF ENERGY; STUDY ON THE IMPACT OF GREEN BUILDINGS ON COGNITIVE FUNCTION, HARVARD UNIVERSITY/ T.H. CHAN SCHOOL OF PUBLIC HEALTH, SUNY UPSTATE MEDICAL UNIVERSITY

11. The Benefits of Natural Light: Research supports daylighting's positive effect on building performance and human health. Kevin Van Den Wymelenberg. architecturallighting.com; March 19, 2014

12. Daylighting, Gregg D. Ander, FAIA, Southern California Edison, Updated by U.S. Department of Energy Federal Energy Management Program (FEMP) Updated: 09-15-2016, https://www.wbdg.org/resources/daylighting

13 - https://www.aluminum.org/aluminum-advantage/aluminum-101

14. Architecture of Choice: Exploring the Impact of Built Environments on Consumer Behaviour by Sina Esteky, https://deepblue.lib.umich.edu/bitstream/handle/2027.42/136963/sinaest_1.pdf?sequence=1&isAllowed=y