

LEED v4:

How to integrate LEED v4 Indoor & Outdoor Air Quality requirements into a project?

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Short Profile: GhaithMoufarege is a **Senior Sustainability Engineer** at EcoConsulting since 2013 working on BREEAM and LEED assessments, as well as other eco-building services. He has led or been involved in over 40 projects in Lebanon and abroad ranging from small residential houses to large developments, comprising BREEAM Very Good and LEED Platinum assessments. In his previous position, Ghaith was managing ISO 9001 / ISO 14001 and LEED certifications for Oger International Beirut office.

Ghaith holds a **Master’s Degree in Environmental & Chemical Engineering** from the “Ecolesupérieure de chimieorganique et minérale” – France – and is a **LEED Accredited Professional**.

Ghaith is also a lecturer on various workshops with EcoConsulting, including the “Eco-Building & LEED Green Associate Training” series of seminars.

Definition / Benefits	Constraints / Challenges / Barriers
<ul style="list-style-type: none">✓ Green Building rating System by USGBC – since 1998✓ Levels: Certified, Silver, Gold, Platinum✓ LEED v4 available since Nov 2013 Mandatory since Oct 2016✓ Indoor Environmental Quality is 1 of the Environmental Categories that tackles Indoor Air Quality✓ Point Based: related Prerequisites / Credits:<ul style="list-style-type: none">• Minimum Indoor Air Quality Performance• Enhanced Indoor Air Quality Strategies	<p>Air pollution: VOC: volatile organic compounds, Formaldehyde, Particulate Matters (PM10 & PM 2.5), Carbon monoxide (CO), Ozone (O3)</p> <ul style="list-style-type: none">✓ Pollutants created by a building’s occupants✓ Other contaminant sources✓ Fresh Air Ventilation levels / design – mechanical or natural✓ Removing contaminants from outdoor air✓ Interior cross contamination (eg. Garage containing fuel)✓ Exposure to environmental tobacco smoke / s

<ul style="list-style-type: none"> • Environmental Tobacco Smoke Control • Low-Emitting Materials • Construction Indoor Air Quality Management Plan • Indoor Air Quality Assessment (or Flush Out) 	<p>secondhand smoke</p> <ul style="list-style-type: none"> ✓ Offgassing from building materials containing VOC / formaldehyde: paints, coatings, adhesives, sealants, flooring, composite wood, Ceilings, walls, thermal, and acoustic insulation, Furniture ✓ Contamination of HVAC system during construction: dust, toxic substances, mold
Best Practice / Solutions / Tools	Resources / Local Availability
<ul style="list-style-type: none"> ✓ Follow standards for minimum ventilation rates ✓ Increased ventilation strategy is a plus ✓ Monitor the rates of fresh air provided + alarm ✓ Monitor CO2 levels +alarm (natural / densely occupied) ✓ Demand-controlled ventilation ✓ Entryway systems – min 3 meter long ✓ Interior cross-contamination prevention: exhaust rates / negative pressure. ✓ Outdoor air filtration media : MERV 13 / Class F7 ✓ Non smoking signage interior / exterior – 7.5 m distance ✓ Meet VOC content limit + VOC Emissions requirements (TVOC in mg/m3). ✓ Follow SMACNA IAQ during construction: clean / protect HVAC duct ✓ Fresh air Flush out before handing over (4,300 m3 of outdoor air / sq meter) ✓ Measure contaminants levels before handing over: VOC, PM, Ozone, formaldehyde 	<ul style="list-style-type: none"> ✓ Websites: usgbc.org, leeduser.com ✓ LEED Consultants ✓ LEED GA / LEED AP (Accredited Professionals) ✓ Mechanical Engineers showing compliance with <ul style="list-style-type: none"> • ASHRAE STANDARD 62.1–2010 • CEN STANDARDS EN 15251–2007 AND EN 13779–2007 • CIBSE Applications Manual AM10, 2005 & Manual 13, 2000 ✓ SMACNA IAQ strategies ✓ Datasheets of materials / Labels/ Test reports ✓ VOC testing labs