



AN EXAMINATION OF WOOD RECYCLING PROVISIONS IN NORTH AMERICAN GREEN BUILDING PROGRAMS

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21 FEBRUARY 2013

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Introduction

Recycled content is a prominent aspect of many North American green building standards, with use of such materials awarded or specified. Construction and demolition (C&D) waste reduction is also a prominent part of most green building initiatives.

This report examines green building programs, model codes, and standards to identify provisions targeting wood re-use and recycling. About 90 green building standards were examined. Current green building programs were determined based on a review of the literature, and on a state-by-state web-based information search. Provisions of each program were reviewed and those related to material recovery, reuse, recycling, and recycled content were identified and are summarized in this report.

Definitions of the terms *recovered material*, *reuse*, *recycled*, and *recycled-content* are inconsistent between various green building programs; some programs differentiate materials using these terms, while others tend to combine recovery, reuse, and recycling under the general terms “recycling,” “reclaimed,” and “recovered from landfill.” However, for those that do make distinctions between these various types of material, definitions provided within the 189.1 Standard of the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) come closest to universally describing the differences between these terms:

Recovered Material – Material that would have otherwise been disposed of as waste or used for energy recovery (e.g. incinerated for power generation), but has instead been collected and recovered as a material input, in lieu of new primary material, for a recycling or manufacturing process.

Reuse – includes donation of materials to charitable organizations, salvage of existing materials onsite, and packaging materials returned to the manufacturer, shipper, or other source that will reuse the packaging in future shipments.

Recycled material – Material that has been reprocessed from recovered (reclaimed) material by means of a manufacturing process and made into a final product or into a component for incorporation into a product.

Recycled content – The proportion, by mass, of recycled material in a product or packaging. Only pre-consumer and post-consumer materials shall be considered as recycled.

In addition to reviewing provisions of various green building programs, the extent of wood recycling in North American wood products manufacturing was also reviewed.¹ Recovered wood use in production of standard particleboard, core stock, hardboard, medium-density fiberboard (MDF), high-density fiberboard (HDF), and in finger-jointed wood was specifically considered, as these were judged to be the product categories most likely to incorporate significant quantities of this material.

¹ Information about the use of recovered wood in North American wood products manufacturing was obtained from the Composite Panel Association, the American Fiberboard Association, and the Western Wood Products Association. Published literature was also examined.

Recycling in Green Building Standards

To understand how wood recycling is addressed in green building standards, about 90 green building standards used in various parts of North America (U.S and Canada) were examined. After accounting for those standards or local green building initiatives based wholly on one or more national or regional scope programs, and paring the list to avoid double counting of the base-standards, a total of 42 distinct green building programs were identified as in current use in the United States and Canada.² For each of these programs, provisions related to construction waste reduction, materials re-use, and use of recycled content materials were summarized by program and by state or province (see following tables).

The focus of the review was on provisions for recycling and reuse within green building, and it should be noted that those green building programs focused exclusively on energy efficiency were excluded. Had such programs been included, the list would have been much longer, as there are many dozens of green building programs dedicated to energy efficiency alone. There are, in addition, scores more that are wholly based on one or more national or regional-scope green building programs. One recent evaluation (Gruder 2007) identified 148 such programs based on LEED alone, and another 29 that wholly mirror one or more other green standards. A second recent assessment revealed more than 20 California cities that utilize the Green Points Rated System for residential construction (Office of the Attorney General of California 2012). In this assessment, the LEED and Green Points rated programs are counted only once. LEED Canada, which is different than the form of LEED as promulgated by the US Green Building Council, is counted separately.

Recycled Content, Reuse, and Related Provisions of Green Building Programs

Of the 42 distinct green building programs identified, 41 award reuse, and/or reclamation or recovery of materials for reuse. The use of recycled content construction materials is specifically recognized in 38 programs. Two-thirds of these do not differentiate between pre- and post-consumer recycled content, while most of the other programs award twice (2x) the credit for use of post-consumer content than for pre-consumer (post-industrial) content. In many cases, specific products are identified as ones for which recycled content is recognized. Third-party certification of recycled content is sometimes required. Use of finger-jointed materials is singled-out in quite a few programs as an awarded or specified practice.

One initiative identified is not a green building program, but a comprehensive plan for reducing the quantity of material accepted at landfill sites. The initiative, that of the city of Boston, is included because it is indicative of other such initiatives across North America, and because a primary focus is reduction of wood C&D waste in landfills. A key objective of the Massachusetts initiative is to increase the recycling rate for C&D materials to 50% by 2020. For Boston alone this translates to an objective of reducing C&D disposal by a total of 400,000 tons (of which wood is 31 percent) within a decade. Considering this and other objectives in green building programs of reducing C&D waste, it is likely that interest in recovery/recycling solutions for wood and wood products will increase.

² Green building programs focused exclusively on energy efficiency (i.e., no material or content provisions) were not considered further, nor were the various federal, state, regional, and municipal green building initiatives that have adopted by local ordinance or statute one or more green building programs (such as LEED, Green Globes, Built Green, or Green Points Rated). In the latter case, the program is listed only once, in either the national or regional listings.

Examples of provisions regarding recycled content in 42 different green building programs:

<u>Provision</u>	<u>Number of Programs That Contain Such a Provision</u>
Reuse/Reclaimed/Recovered	41
Recycled content	37
Recycled content for specific products	
Cabinets/Countertops/Shelving	13
Siding/cladding	11
Decking	8
Interior trim	9
Sheathing	8
Exterior trim	6
Underlayment	6
Flooring	6
Doors	6
Subfloor	1
Use of finger-jointed materials	
Framing, other structural lumber	13
Interior or exterior trim	12

Recycled Content of Wood Building Materials

As mentioned, nearly all (93%) of the identified green building programs award the use of recycled content materials and two-thirds do not differentiate between pre- and post-consumer recycled content. Recycled content provisions in most standards call for 20 to 40% recycled, with several specifying 50% recycled when pre-consumer recycled content is involved. Building materials that commonly contain pre-consumer (post-industrial) recycled content in sufficient proportions to qualify for recycled content provisions of most green building programs include insulation board, medium density and high density fiberboard (MDF and HDF), and particleboard. Recycled content certification certificates published on-line by Temple-Inland (2012) provide an indication of recycled content for these products. These certificates show at least 75% pre-consumer recycled content in particleboard products; up to 97% pre-consumer recycled content for fiberboard products; and 78% pre-consumer recycled product in medium density fiberboard products. This means that these products would generally qualify for recycled content provisions. This also means, based on 2005 U.S. production statistics (Howard 2009), that the overall recycled content of U.S. produced wood building products was about 10-11%. Canadian figures were likely in the same range.

As reported by the North American Fiberboard Association (Wagner 2012), the largest input for fiberboard mills is in the form of chips from local sawmills that are classified as post-industrial or pre-consumer waste. Other inputs include recycled cardboard and recycled paper (both office waste and newsprint), and almost anything else that can be re-pulped. Recycled cardboard and paper, when used, qualifies as post-consumer recycled content.

Another product that is widely recognized in green building programs is finger-jointed wood, primarily based on recognition that this technology allows the use of short wood pieces that would otherwise go to waste or less desirable uses. Finger jointing in framing and other structural lumber, exterior and interior moulding and trim, and several other product categories is

widely awarded or specified, with no caveat in any green standard as to whether materials used in the finger-jointed products are actually recovered scraps. Production of finger-jointed studs and other forms of finger-jointed framing and structural lumber totaled about 700 million board feet in 1998 (Wood Resources International 2008), and about 800-900 million board feet annually in the period 2006-2007 (various sources). As recently reported (Anon. 2012), paint-grade mouldings are the preferred choice of consumers, accounting for more than 80 percent of U.S. moulding consumption. In recent years MDF has increased in popularity over finger-jointed stock, with the trend toward MDF continuing (Baumeister and Beaulieu 2009, Butzelaar, and Taylor 2008).

Summary

Reuse of building materials is encouraged and/or rewarded in the vast majority of North American green building standards. Similarly, recycled content of materials is a prominent aspect of many such standards, with use of such materials awarded or specified. Wood products that in general currently satisfy recycled content provisions include fiberboard, medium and high density fiberboard, and standard particleboard. In addition, finger-jointed wood products receive recognition as green products in a number of standards.

Reduction of wood volume in C&D waste is a clear objective in landfill waste reduction programs such as that of Boston, Massachusetts. C&D waste reduction is also a prominent part of most green building initiatives. The implication is that interest in recovery/recycling solutions for wood and wood products is certain to increase going forward.

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	Post-consumer recycled content + post-industrial recycled content	
United States – National				
ASHRAE 189.1	<p>A minimum of 50% non-hazardous construction and demolition waste shall be diverted from disposal in landfills by recycling and/or reuse.</p> <p>The sum of <i>post-consumer recycled content</i> plus one-half of the <i>pre-consumer recycled content</i> shall constitute a minimum of 10%, based on cost, of the total materials in the <i>building project</i>. The <i>recycled content</i> of a material shall be determined by weight. The recycled fraction of the material in an assembly shall then be multiplied by the cost of assembly to determine its contribution to the 10% requirement.</p>	v		
Earth Advantage Home	<ul style="list-style-type: none"> - Recycle 100% of wood and cardboard construction waste. - Structural lumber and siding – reclaimed/recycled 5-25%/26-50%/51-75%/76-100%. - Recycled content countertops – 25% post-consumer content. - Plastic lumber decking – 50% post-consumer content. - Millwork and interior trim – MDF or finger-jointed. 			Post-consumer recycled content awarded only.
EarthCraft	<ul style="list-style-type: none"> - Divert 75% of wood construction waste from landfill. - Install ≥75% of exterior cladding and trim with ≥25% recycled content material (pre or post-consumer). Recycled content must be certified by Scientific Certification Systems (SCS). - Exterior soffit, fascia, and trim - finger-jointed, MDF, or HDF with no added urea formaldehyde in non-solid sawn wood for ≥75% of mat'l. - Interior trim finger-jointed, MDF, or HDF with no added urea formaldehyde in non- solid sawn wood for ≥80% of trim. - Cabinet faces and countertops - reclaimed wood, MDF with no added urea formaldehyde, or FSC certified. Reused cabinet faces and countertops or the use of material with ≥25% recycled content also qualify for credit. - Outdoor decking and porches - ≥40% recycled content on ≥90% of area. Recycled content must be confirmed by SCS. 		v	
Enterprise Green Communities	<ul style="list-style-type: none"> - Requires that at least 25% of construction waste be diverted from landfill by recycling, salvage, or other waste diversion strategies. - Use recycled content materials. To gain points, recycled materials must constitute at least 90% of the project materials by either weight or volume. 	v		Recycled content materials defined as materials with at least 25% post-consumer recycled content, or at least 50% post-industrial recycled content.

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	Post-consumer recycled content + post-industrial recycled content	
Green Globes	<ul style="list-style-type: none"> - Points are awarded for demolition and construction waste being diverted from landfill. - Recycled post-industrial (pre-consumer) or post-consumer content materials account for 1-20% or more of building materials, calculated on the basis of either total cost or weight of all building materials. - The same guidelines as above apply independently to furnishings, fitting, and fit-outs. 		√	
International Green Construction Code (IgCC)	<ul style="list-style-type: none"> - Divert at least 50% of construction, deconstruction, or demolition waste from landfill (may be increase to 65 or 75% by local jurisdiction). - As part of requirement that 55% of total materials used in a project (measured by mass, volume, or cost) meet specific guidelines, one option is to use recycled content materials, defined as containing at least 25% combined post-consumer and pre-consumer recovered material AND must be recyclable (meaning that a minimum of 30% of materials are, in fact, routinely recovered and recycled for reuse), OR must contain ≥50% combined post-consumer and pre-consumer recovered material. 		√	
LEED	<ul style="list-style-type: none"> - Recycle or reuse 50% of construction waste (1 pt.) or 75% (2 pts). - Salvaged/reclaimed materials account for ≥5% of the total value of materials (excluding mechanical, electrical, plumbing components) – (1pt); ≥10% (2pts). - The total value of materials used in a project is 10% recycled Content (where recycled content is calculated as post-consumer recycled % + ½ post-industrial recycled %) – (1pt.); 20% (2pts). 	√		
Living Building Challenge	<ul style="list-style-type: none"> - 80% of wood construction waste must be diverted from the landfill by recycling, reuse, salvage, or composting. - The use of salvaged materials is encouraged to acknowledge the considerable value of a material's embodied energy. 			No precise definition of recycled or recycled content provided.
National Green Building Std. (ICC 700)	<ul style="list-style-type: none"> - Points awarded for use of existing or recycled materials as follows. (Points awarded for every 10 percent of total building construction and demolition materials that are reused, deconstructed, and/or salvaged. The percentage is consistently calculated on a weight, volume, or cost basis.) 		√	
Sustainable Project Rating Tool (SPIRiT) (US Army)	A project rating tool based on LEED. Provisions related to materials reuse, recycling, and recycled content are the same as in current versions of LEED.	√		

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	Post-consumer recycled content + post-industrial recycled content	
United States – State/Regional				
Alabama				
Earth Craft House	See details under United States - National		√	
Alaska				
Arizona				
Arizona Green Builder	<ul style="list-style-type: none"> - Separate wood product waste on site - Use finger-jointed studs or wood certified under FSC, SFI, CSA or comparable. - Offer reclaimed or renewable wood flooring as an option. 			
Phoenix Green Builder	Based on the International Green Construction Code (IGCC) for commercial and the National Green Building Standard for residential construction. Recycled content provisions for materials used in construction are the same as in these programs (see details under United States – National)		√	
Scottsdale Green Building Program	<ul style="list-style-type: none"> - At least 75% of roof structure is non-solid sawn lumber (metal, engineered lumber, recycled content materials). This item does not include concrete slabs on grade or conventional wood trusses. <u>Additional points</u> for at least 75% of floor structure <u>Additional points</u> for at least 75% of beams, headers and columns <u>Additional points</u> for at least 75% of interior framing - Dwelling uses reconstituted or recycled-content siding (minimum 50% pre-or post-consumer). - Fascia, soffit and trim elements are made of recycled-content materials (including metal) or engineered wood products such as finger jointed trim, fiberboard, laminated strand lumber or OSB. - All interior trim is finger-jointed/engineered wood, domestic hardwood, from an FSC- or SFI- certified sustainable source, is a rapidly renewable material or contains min. 20% recycled content. - No wood base, cove, crown molding, door or window trim is used in the entire home, unless it is recycled or salvaged material. 			No precise definition of recycled or recycled content provided.
Arkansas				
California				
Calabasis Green Building Ordinance	Modified LEED – No change to recovery, recycling, recycled content provisions.		√	

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	Post-consumer recycled content + post-industrial recycled content	
California				
California Green Building Standards Code	<p>Divert to recycling or salvage for reuse a minimum of 50% of the non-hazardous construction and demolition debris or meet local ordinance, whichever is more stringent (Tier I – 65%; Tier II – 80%).</p> <p>Use ≥10% post-consumer or pre-consumer recycled content materials on the project (percentage based on value). (Tier I – 10%; Tier II – 15%).</p> <p>Use salvaged, refurbished, refinished, or reused materials (≥5% based on total materials cost).</p>		v	
Earth Advantage	See details under United States - National			Post-consumer recycled content awarded only.
Green Point Rated Homes/Green Building Alameda County	<ul style="list-style-type: none"> - Recycle ≥50% (or ≥65 or ≥80%) of job site construction waste (by weight). - Use recycled content or FSC certified wood decking. - Use engineered or finger-jointed studs for vertical applications. - Use FSC certified wood, rapidly renewable, recycled content, finger-jointed, or local materials for interior finish: 50% minimum for cabinets, interior trim, shelving, doors, and countertops. - Use FSC certified wood, reclaimed or refinished, rapidly renewable, recycled content, or local materials for flooring: minimum 15% of floor area. 			No precise definition of recycled or recycled content provided.
Santa Barbara Innovative Building Review Program (Santa Barbara County)	<ul style="list-style-type: none"> - Recycle and/or salvage for reuse a minimum of 50% (or follow local requirement if more stringent) of the non-hazardous construction and demolition debris, or meet a local construction and demolition waste management ordinance, whichever is more stringent. (Excavated soil and land-clearing debris excluded). - Reuse dimensional lumber (must be re-graded for structural use). - Recycle wood scrap and pallets. - Use re-milled salvaged lumber. - Use finger-jointed framing material (e.g. risers and studs) longitudinal compression loads only. - Use recycled content underlayment for subfloor. - Use recycled-content sheathing. - Use siding with reclaimed or recycled material. - Use finger-jointed trim for cabinetry and wood trim. 			No precise definition of recycled or recycled content provided.
West Hollywood Green Building Ordinance	Uses the Green-Points-Rated checklist (see above)			No precise definition of recycled or recycled content provided.

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	Post-consumer recycled content + post-industrial recycled content	
West Hollywood Green Building Ordinance	Uses the Green-Points-Rated checklist (see above)			No precise definition of recycled or recycled content provided.
Colorado				
Built Green Colorado	<ul style="list-style-type: none"> - Finger-jointed material used for plate material and studs. - Recycled-content sheathing where shear corners and shear walls are not required (minimum 50% post-consumer content by weight). OSB does NOT qualify for this point. - Non-structural elements of decking materials <ul style="list-style-type: none"> ≥ 50% or greater recycled content by weight – 3 pts ≥ 80% or greater recycled content by weight – 4 pts Add points for ≥ 25% post-consumer recycled material – 1 pt Add points if product is 100% recyclable (≥ 50% of decking material must be from post-consumer recycled sources to take this point) – 1 pt - Natural cork or 100% recycled or recovered content underlayment. - Doors in home must use non-urea formaldehyde based binders, and constitute one or all of the following: (1 pt per door, max 4 pts) <ul style="list-style-type: none"> • Recycled content doors (≥ 25% post consumer) • Recovered content doors (e.g. agri-fiber, re-milled wood products) • Reclaimed/reused doors - Recycled and/or recovered-content siding (minimum 40% pre- or post-consumer) on 50% or more of exterior wall area. - Fascia, soffits or trim made of (choose one) <ul style="list-style-type: none"> Recycled and/or recovered-content materials (minimum 40% pre- or post-consumer) Treated engineered wood from 100% third party certified sustainably harvested sources (note: OSB, natural wood and MDF can take these points). - Cabinet frames, doors and drawer fronts with low-VOC finishes (≤ 250 grams/liter), made from 100% reclaimed or salvaged wood, or 100% agri-fiber composite material (w/ no added urea-formaldehyde resins), or 100% bamboo or other rapidly renewable resource, or third-party certified sustainably harvested sources. - Trim made from SCS Certified composition wood used for trim (i.e. fiber board/MDF) or finger-jointed trim. 		v	

	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	Post-consumer recycled content + post-industrial recycled content	
Green Building Program				
City of Boulder Green Points Program	<ul style="list-style-type: none"> - demonstrate that a minimum of 50 percent of construction waste is recycled. Recycling ALL clean wood, cardboard and metal will count for 50% waste diversion. - divert from landfill ≥75% of the waste generated on site. Points will be awarded according to the following: 2 points—Divert 75 percent of construction waste generated on site; 3 points—Divert 85 percent of construction waste generated on site. - For exterior and interior framing use finger-jointed studs (vertical use only for structural components). - For exterior siding use recycled content or FSC certified material. - For decking use FSC certified or recycled-content material. - For countertops use recycled content material. - For cabinets and trim use recovered, recycled content, or FSC-certified material. - For doors use FSC certified or recycled-content material. - For roof, wall, and floor sheathing use FSC certified or recycled-content material. 			No precise definition of recycled or recycled content provided.
Eagle County EcoBuild Program	<ul style="list-style-type: none"> - Use of Colorado beetle kill pine salvaged wood, 3 pts. per material used in over 50%. - Wood, cardboard recycled (2 points per material recycled, must document). - Reclaimed a/o recycled content materials (2 pts per material used in over 50% of building). 			No precise definition of recycled or recycled content provided.
Connecticut				
Delaware				
District of Columbia				
Florida				
Earth Craft House	See details under United States – National		√	
Florida Green Building Coalition	<ul style="list-style-type: none"> - Use recycled content siding or soffit material. - Use finger jointed or laminated products. - 50% of all doors are reused doors or 50% of all windows are reused windows. 			No precise definition of recycled or recycled content provided.
Georgia				
Earth Craft House	See details under United States – National		√	

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	100% of post-consumer recycled content + ½ of post-industrial recycled content	
Hawaii				
Hawaii Built Green	<ul style="list-style-type: none"> - Install recycled content fascia, soffits, or trim. - Use recycled content sheathing. - Use recycled content underlayment. - Window and door frames are wood/composite with recycled content. - Cabinets are made with medium density fiberboard or wheatboard. - Use finger-jointed or engineered wood trim (including MDF). - Use countertops with recycled content. - Recycled content materials used for fences, benches, decking, docks, retaining walls, picnic tables, and landscape borders. 			No specific definition provided RE recycled content.
Idaho				
Illinois				
Indiana				
Iowa				
Kansas				
Green Building Program of Kansas City	Based upon the National Green Building Standard for residential structures (See details under United States – National).			No precise definition of recycled content provided.
Kentucky				
Louisiana				
Maine				
Maryland				
IgCC	For details, see United States – National.		v	
Massachusetts				
Solid Waste Master Plan	In 2008, Massachusetts construction and demolition (C&D) materials were recycled at a rate of 66 percent. While this recycling rate is high, the bulk of the recycled tonnage is asphalt, brick, and concrete (ABC), which is routinely recycled (2,330,000 out of 2,520,000 tons). When the ABC tonnage is excluded from the C&D data, the remaining material is only recycled at a rate of 14%. Considering that about 700,000 tons of Massachusetts C&D material is disposed of each year and an additional 400,000 tons is managed as fines and residuals (a relatively low value use), there is considerable room for increased C&D recycling. <i>(continued on next page)</i>			Not a green building program, but an example of waste reduction initiatives that are beginning to gain momentum among jurisdictions across the U.S. and Canada.

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	100% of post-consumer recycled content + ½ of post-industrial recycled content	
Massachusetts Solid Waste Master Plan (Continued)	<i>(continued from previous page)</i> A 2007 report conducted for MassDEP estimates that the three largest components of building related C&D material by weight are wood (31%) , asphalt roofing materials (11%), and drywall (gypsum wallboard) (10%). (This does not include asphalt paving and concrete, which are already recycled at a high rate from road and bridge construction projects.) These three materials represent the top targets for increased C&D diversion from disposal. Increasing C&D recycling will require diverting materials from low value uses such as fines and residuals as well as diverting materials from disposal. A key objective is to increase the recycling rate for C&D materials excluding ABC to 50% by 2020. Based on 2007 C&D generation, this would mean reducing C&D disposal and landfill uses such as alternative daily cover and grading shaping materials by a total of 400,000 tons annually by 2020.			Not a green building program, but an example of waste reduction initiatives that are beginning to gain momentum among jurisdictions across the U.S. and Canada.
Michigan				
Green Built Michigan	Based on the National Green Building Standard – for details see United States – National.			No precise definition of recycled or recycled content provided.
Minnesota				
Minnesota Green Star	<ul style="list-style-type: none"> - Divert ≥70% of wood scrap and broken pallets from landfill. - Decking or patio material is made from recycled content and has low- toxicity Use of reclaimed (a.k.a. re-used) materials: - Beams & Headers in walls & floors (50% to 69%, 70-89%, ≥90%) - Floor Joists (50% to 69%, 70-89%, ≥90%) - Subfloor (50% to 69%, 70-89%, ≥90%) - Wall framing (30% to 49%, 50-69%, 70-89%, ≥90%) - Roof beams & headers (50% to 69%, 70-89%, ≥90%) - Rafters or trusses (50% to 69%, 70-89%, ≥90%) - Roof sheathing (50% to 69%, 70-89%, ≥90%) Use of recycled content materials: - Decorative coverings for walls and ceiling contain minimum 25% post-consumer recycled content or 40% post-industrial recycled content for 50 or 90% or more of wall/ceiling area. - Flooring contains minimum 25% post-consumer recycled content or 40% post-industrial recycled content for 50 or 90% or more of floor area. - 50% or 90% of millwork, and/or doors, and/or countertops contain ≥25% post-consumer recycled content or 40% post-industrial recycled content. - Cabinetry contains ≥40% post-industrial recycled content. 			Both pre-consumer and post-consumer recycled content awarded, but greater credit give to post-consumer recycled.

	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	100% of post-consumer recycled content + ½ of post-industrial recycled content	
Green Building Program				
Minnesota Green Communities	- Credit given for materials reuse and use of recycled content materials.			
Minnesota Sustainable Building Guidelines	<ul style="list-style-type: none"> - Divert at least 75% (by weight) construction, demolition, and land clearing debris from landfill disposal. - Divert an additional 15% (90% total) construction waste. Reuse, recycle and/or salvage an additional 15% (90% total by weight) of construction, demolition, and land clearing waste. - Use salvaged or reused materials for 5% of the total (weight or value) of materials used in the project. - Use materials that contain, in aggregate, a minimum weighted average of 20% post-consumer recycled content , OR, a minimum weighted average 50% post-industrial recycled content. 			Recycling is defined as the process of collecting and preparing recyclable materials and reusing them in their original form or in manufacturing processes that do not cause the destruction of recyclable materials in a manner that precludes further use.
Mississippi				
Missouri				
Montana				
Nebraska				
Nevada				
Southern Nevada Green Building Partnership	- Use recycled content materials: oriented strand board (OSB), medium density fiberboard (MDF), etc.			No precise definition of recycled or recycled content provided.
New Hampshire				
New Jersey				
New Mexico				
Santa Fe Residential Green Building Program	<ul style="list-style-type: none"> - Waste generated during construction is recycled. - A construction waste management plan is developed, posted at the jobsite, and implemented with a goal of recycling or salvaging a minimum of 50 percent (by weight) of construction and land-clearing waste. 			No precise definition of recycled or recycled content provided.
New York				
Battery Park City Authority Residential Environmental Guidelines	<ul style="list-style-type: none"> - Whenever on-site reuse is not possible, recycle cardboard, metals, concrete, brick, asphalt, clean dimensional wood, plastic, glass, gypsum board, carpet, ceiling tile, etc. - Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 12% of the total value of the materials in the project, Excluding mechanical, electrical, and plumbing. 	v		Recycled content is determined by dividing the weight of recycled content in an item by the total weight of all material in that item, then multiplying the resulting percentage by the total value of the item. Recycled content materials are defined in accordance with ISO 14021.

	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	100% of post-consumer recycled content + ½ of post-industrial recycled content	
Green Building Program				
NYC High Performance Building Guidelines	<ul style="list-style-type: none"> - Prepare a materials resource plan that identifies materials for reuse in the project, for removal, and for recycling. - If an existing building is to be rehabilitated, maintain and reuse 75-100% of the existing building's structural shell. - Based on total materials cost, between 20-50% of the materials (excluding costs for mechanical and electrical systems, plumbing systems, labor, overhead fees etc.) shall contain at least 20% post-consumer recycled content OR a minimum of 40% pre-consumer recycled content. 	v		
North Carolina				
Green Built North Carolina	<ul style="list-style-type: none"> - Outdoor structures, decking, and landscape materials made from recycled materials (min. 40% recycled content). - Recycled and/or recovered-content siding (minimum 50% pre- or post-consumer) on 50% or more of exterior wall area. - Use natural cork / 100% recycled or recovered content underlayment. - Recycled and/or recovered content components (credit available for ALL of the following) <ul style="list-style-type: none"> >Doors (Min. 50%) >Closet shelving (Min. 90%) >Kitchen casework (Min. 90%) >Flooring (Min. 25 or 75%) Engineered flooring satisfies this requirement. 		v	Program was formerly known as NC Healthy Built Homes.
Triangle Region Public Facilities High Performance Building Guidelines	<ul style="list-style-type: none"> - Recycle/salvage 50% (or 75%) of construction debris. - Specify 25% (or 50%) of materials as 20% post-consumer recycled. 			Recycled content based on post-consumer content only.
North Dakota				
Ohio				
Oklahoma				
Oregon				
Earth Advantage	For details see United States – National.			
Pennsylvania				
Rhode Island				
South Carolina				
EarthCraft House	For details see United States – National.			
South Dakota				
Tennessee				
EarthCraft House	For details see United States – National.			

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	100% of post-consumer recycled content + ½ of post-industrial recycled content	
Texas				
Austin Energy Green Building Program	<ul style="list-style-type: none"> - Minimum 50% by weight of construction waste is recycled/reused, not landfilled. Documentation required. - Engineered finger-jointed studs used for a minimum of 80% of wall construction. - Use of recycled-content products. - Use of reclaimed/reused materials for doors, hardware, flooring, and trim. 			No precise definition of recycled or recycled content provided.
Utah				
Vermont				
Vermont Builds Greener	<ul style="list-style-type: none"> - Create and implement a plan for construction to provide for the efficient separation of materials which are reusable or recyclable, including separate containers, covered where required, for wood and a number of other materials. - 2 points for each 5% of total value of materials in the building products made with salvaged, recycled or waste-stream content. Examples include re-habilitation of a used house, used doors or cabinets, straw-particle-board, re-sawn salvaged wood, recycled plastic lumber, etc. - Non-wood outdoor decking - minimum 50% (value) recycled content of non-wood decking (1 point per 33% of total decking area). OR 1 pt. if FSC Certified using same percentages. - Install countertops made from recycled materials minimum 75% of countertop area). 			
Virginia				
Arlington County Green Home Choice Program	<ul style="list-style-type: none"> - All kitchen cabinets must be reclaimed or constructed of reclaimed wood; constructed of FSC certified wood; or constructed of biobased materials, such as wheatboard. - Countertop materials with a minimum of 40% recycled content may be used in one or more room applications, with the kitchen counter counting as 2 points and bath vanities counting for one point each up to a total of three points. - All siding is either reclaimed from on-site or elsewhere or has a recycled material content of at least 40%. - Outdoor decking shall have a minimum of 50% recycled material content with one point granted for each feature up to a total of 3 points. - Minimum of 80% of interior and/or exterior wood trim shall be non-solid sawn wood (such as finger-jointed or urea formaldehyde free non-wood materials, such as MDF or HDF. - Minimum of 25% (or 80%) of the total wall framing materials shall be manufactured from non-solid sawn wood, such as laminated or finger-jointed studs. Exterior steel studs are not eligible for this credit unless the entire exterior surface of the studs is covered with a minimum R10 insulated sheathing. 			No precise definition of recycled or recycled content provided.

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	100% of post-consumer recycled content + ½ of post-industrial recycled content	
Virginia (Continued)				
Arlington County Green Home Choice Program (continued)	<ul style="list-style-type: none"> - Send all non-reusable wood from a deconstruction project to a recycling facility. Receipts from the recycling facility must be presented to earn this credit. - The builder shall deliver at least two (or four, or six) of the above waste items (the list includes wood) to a recycling facility and arrange for the recycling of said items. A receipt from the recycling facility is required to earn this credit. 			
EarthCraft House	For details see United States – National.			
Washington				
Built Green Washington	<ul style="list-style-type: none"> - Recycle clean scrap wood and broken pallets by source separation, 85% minimum recycling rate. - Practice waste prevention and recycling and buy recycled Products. - Use finger-jointed studs. - Use recycled-content sub-floor. - Use siding with reclaimed or recycled material on at least 20% of solid wall surface. - Use finger-jointed wood windows. - Use finger-jointed or MDF trim with no added urea formaldehyde, 90% minimum. - Use 100% recycled-content HDPE, salvaged lumber or lumber that is third-party certified sustainably harvested wood that meets the Tier 1 requirements outlined in the Handbook for Decking and Porches. 			No precise definition of recycled or recycled content provided.
Earth Advantage	For details see United States – National.			
Sea Green (Seattle)	<ul style="list-style-type: none"> - Provide a waste plan that diverts 50% (or 75%) of the construction waste from the landfill. - Framing/wall structure: FSC-certified or reclaimed or finger-jointed studs. - Siding recycled content, reclaimed, or FSC-certified. - 50% (or 75% or 100%) of flooring linoleum, cork, bamboo, FSC-certified or reclaimed wood, sealed concrete, recycled-content flooring, or combination. - Decking recycled content, FSC-certified, or reclaimed. - Cabinets, counters, and trim recycled content, FSC-certified, or reclaimed and composite materials must contain no added urea-formaldehyde resins. - Doors(not including garage or insulated doors) recycled Content, FSC-certified or reclaimed. - Window framing recycled content, FSC-certified, or reclaimed. - Sheathing recycled content FSC-certified, or reclaimed. 			No precise definition of recycled or recycled content provided.

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	100% of post-consumer recycled content + ½ of post-industrial recycled content	
West Virginia				
Wisconsin				
Wisconsin Green Built Home	<ul style="list-style-type: none"> - Use reused timber or framing lumber (min. 25% lb. usage). - Use reused hardwood trim, cabinets, and/or doors (min. 25% of stock). - Decks, site furnishings, and other outdoor structures constructed using sustainable, low toxicity materials including reused wood and certified sustainable wood. - Finger-jointed studs, engineered stud material, or plate materials used in constructing the structural frame. - Recycled content sheathing (min. 50% pre- or postconsumer recycled content). - Recycled content siding (min. 50% pre-consumer). - Recycled content siding (min. 50% post-consumer). - Recycled content fascia, soffit, or trim (min. 50% pre-consumer – 1pt.) or (min. 50% post-consumer – 2 pts). - Recycled content underlayment (100% of underlayment used). - Flooring made from reclaimed (recycled) wood (min. 50% of wood flooring). - Recycled content doors or MDF. - Finger jointed trim or MDF (min. 75% of trim stock). - Recycled content countertops. 			Credit given for both pre- and post-consumer recycled content, but twice the credit given for post-consumer recycled.
Wyoming				

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	Post-consumer recycled content + post-industrial recycled content	
Canada – National				
Built Green Canada	<ul style="list-style-type: none"> - Finger-jointed plate material and/or engineered plate material used for all framing plates. - Finger-jointed studs for 90% of non-structural and/or 90% of structural wall framing. - Recycled content exterior wall sheathing (minimum 50% pre- or post-consumer). - Overhead garage door is made of 75% or greater recycled raw material. - 100% agricultural waste or 100% recycled wood particleboard used for shelving. - Exterior and interior doors with a minimum of 15% recycled and/or recovered content. - Exterior window frames contain a minimum 10% recycled content. - Minimum 25% recycled or reclaimed exterior cladding for 1/3, 2/3, or 90% of exterior. - Recycled and/or recovered content fascia and soffit (minimum 50% pre- or post-consumer). - Exterior trim materials have recycled and/or recovered content (minimum 50% pre- or post-consumer). - MDF and/or finger-jointed casing and baseboard used throughout home, and all jambs. - Domestic wood from reused/ recovered or re-milled sources, 500 ft² minimum for Flooring or all cabinets and all millwork. - Verify that a minimum of 25% of the materials collected from the construction site are recycled. - Suppliers and trades recycle their own waste, including leftover material and packaging. 		v	
BOMA BEST (Building Environmental Standards)	<ul style="list-style-type: none"> - Consider among other factors the following criteria in materials selection: <ul style="list-style-type: none"> • Reused materials. Salvage durable products during demolition. • Recycled content of (new) product. • Ability to recycle product when no longer in use. • Renewable materials. • Life-cycle and maintenance requirements. - Reuse of construction and demolition wastes is encouraged. 			No specific definition of recycled materials provided.
BREEAM	<ul style="list-style-type: none"> - 75% (or 90 or 95%) by weight or 65% (or 80 or 85%) by volume of non-hazardous construction waste diverted from landfill and either: <ol style="list-style-type: none"> a. Reused on site (in-situ or for new applications) b. Reused on other sites c. Salvaged/reclaimed for reuse d. Returned to the supplier via a 'take-back' scheme e. Recovered from site by an approved waste management contractor and recycled. - BREEAM does not specify recycled/reused content for various materials but instead requires certification of recycled content via an EMS, with verified recycled/ reused content materials counting toward the total percentage of responsible materials used. To achieve points for any given building element, at least 80% of the materials that make-up that element must be responsibly sourced. 		v	Recycled materials are defined as materials diverted from pre-consumer and/or post-consumer waste streams that require significant processing before they can be used again.

		Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	Post-consumer recycled content + post-industrial recycled content	
Green Building Program	Recycled Requirements			
Green Globes	<ul style="list-style-type: none"> - Points are awarded for demolition and construction waste being diverted from landfill. - Recycled post-industrial (pre-consumer) or post-consumer content materials account for 1-20% or more of building materials, calculated on the basis of either total cost or weight of all building materials. - The same guidelines as above apply independently to furnishings, fitting, and fit-outs. 		√	
LEED Canada (CAGBC)	<ul style="list-style-type: none"> - Construction waste management: Of the solid waste (including land-clearing debris) that is generated by construction, renovation, and demolition activities divert more than 50% or 75% from landfill through reuse and recycling. - Materials re-use 5% or 10% of materials used in the project are reused. (1, 2pts.) - Recycled content of construction materials Recycled content of materials used in the project is ≥7.5% or 15% (1, 2 pts.) 	√		
LEED - USGBC	See details under U.S. summary. Canadian projects may use the USGBC program where the CAGBC does not have an applicable rating system, such as in the case of LEED for Retail, Healthcare, or Schools. Alternatively, Canadian projects in the areas of retail, healthcare, or schools may be registered under an existing LEED Canada rating system.	√		
Living Building Challenge	<ul style="list-style-type: none"> - 80% of wood construction waste must be diverted from the landfill by recycling, reuse, salvage, or composting. - The use of salvaged materials is encouraged to acknowledge the considerable value of a material's embodied energy. 			No precise definition of recycled or recycled content provided.
R – 2000 (Natural Resources Canada)	<p>Environmental features (the following are included in a short list of features from which at least two must be incorporated into a project):</p> <ul style="list-style-type: none"> - Cellulose insulation used that meets or exceeds requirements of the EcoLogo Program for recycled raw material. - Sheathing and drywall (product must replace equivalent conventional product throughout the house. <ul style="list-style-type: none"> - Fibreboard made from recycled newsprint and/or wood fibres. - Siding manufactured from factory and sawmill waste. - Drywall contains recycled gypsum and/or newsprint. - Interior framing and trim (product must replace equivalent conventional product for an entire floor. <ul style="list-style-type: none"> - Studs and trim are manufactured from sawmill cut-offs and waste and are urea-formaldehyde free. 			No specific definition of recycled materials provided.
SB Tool	Use materials with recycled content such that the sum of postconsumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost or weight) of the total value of the materials in the project; in compliance with the facility Environmental Management System, document purchase of EPA-designated products included in all solicitations relevant to construction, operation, maintenance of or use in the building.	√		

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	Post-consumer recycled content + post-industrial recycled content	
Canada –Regional /Provincial				
Alberta				
British Columbia				
Metro Vancouver BuildSmart	<p>Program does not have specific requirements, but instead a guide to best management practices. Included in the listing of best management practices are the following guidelines:</p> <ul style="list-style-type: none"> - Select materials that have recycled content, and that are recyclable. - Make a distinction between post-industrial and post-consumer recycled content, selecting post-consumer whenever possible. - Consider use of cellulose insulation with 75-95% post-consumer recycled content. - Select interior materials with recycled content. - Use gypsum board with 100% recycled kraft paper for face and back. - Use mineral wood ceiling panels and tiles with 4-21% recycled newsprint as a filler or binder. - Specify MDF with post-consumer recycled content (35%), recycled content (65-100%), or made from wood waste (post-industrial) recycled content. 			No explicit definition of recycled content or how it is calculated is provided.
Residential Environmental Assessment Program (REAP) (UBC Campus)	Modeled after LEED, with recycled content, reuse, and material recovery from construction waste provisions the same as in LEED-H.			
UniverCity (Simon Fraser University)	Built in accordance with the Living Building Challenge standard. (See Living Building Challenge, U.S. National)	v		
Vancouver Green Building Strategy	Under the program project developers must submit a completed LEED Canada or Built Green Canada checklist for large projects or a Built Green Canada checklist for single family buildings.			Definitions of recycled content differ depending upon whether the building developer opts for compliance with LEED or Built Green.

Green Building Program	Recycled Requirements	Method of Determining Recycled Content		Remarks
		100% of post-consumer recycled content + ½ of post-industrial recycled content	Post-consumer recycled content + post-industrial recycled content	
Whistler Green	<ul style="list-style-type: none"> - Submit receipts indicating recycling of construction waste by volume: >50% (1 point); > 65% (2 points); >80% (3 points). - Two materials (each covers a main surface, >10% of floor area, or >3% of material costs excluding plumbing and wiring) are certified for recycled content. An additional credit if four materials meet the same guidelines. 			No explicit definition of recycled content or how it is calculated is provided.
Labrador				
Manitoba				
Newfoundland				
New Brunswick				
Northwest Territories				
Nova Scotia				
Nunavut				
Ontario				
Toronto Green Standard for New Low-Rise Non-Residential Development	<ul style="list-style-type: none"> - Ensure that at least 5% of a project's materials (based on value) comprise salvaged, refurbished or reused materials. - Ensure that at least 15% of a project's construction materials (based on value) comprise recycled content. - Recycle at least 75% of non-hazardous construction and demolition debris. (Recycling is defined as breaking down and reprocessing materials. This is different from reuse, in which whole components are reused. For this target, materials salvaged for reuse can be included). 			
Prince Edward Island				
Quebec				
Saskatchewan				
Yukon				

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This report was prepared with support from:

BSLC Binational Softwood
Lumber Council
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