

**VELUX America Inc.**

Comments Regarding:

**ENERGY STAR<sup>®</sup> Product Specification  
Residential Windows, Doors, and Skylights**

**Eligibility Criteria  
Final Draft Version 6.0**

Submitted September 12, 2013

The following comments are in response to the above document issued by the U.S. Environmental Protection Agency (EPA) on July 31, 2013. They focus on the most critical issues VELUX America Inc. believes remain unresolved from our previous comments on prior drafts and modification letters issued by EPA since September 2011.

VELUX is proud to have actively participated in the skylight-related program throughout its evolution, and much appreciates EPA's continuation of the collaborative process that has yielded such amazing results over the many years ENERGY STAR products have been promoted.

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**Skylight U-factor Criteria**

EPA was asked in our earlier submissions to perform an updated market and economic analysis which would follow the same underlying principles as were used in the "Windows" analysis presented in their Draft 1 Criteria and Analysis Report. Those principles are best described in this excerpt from Section 3.2 of that report:

"... EPA focused its analyses on double-hung windows, as these are the most commonly sold type of window and are also typically the worst performing by virtue of their low glass-to-frame ratio. By basing its decisions primarily on the performance of double-hung windows, EPA is taking a conservative approach towards specification development."

We previously provided comments and market data clearly indicating that there are distinct types of residential skylights. The main skylight types are: fixed curb mount, fixed deck mount, venting curb mount, venting deck mount, self-flashed, and TDD. Complete interchangeability between these types was assumed by EPA in the original skylight analysis. This assumption might be reasonable for windows, where the majority of window types are interchangeable with double-hung, but it is not valid for skylights. Some types of skylights cannot be readily replaced with other types. Curb mount skylights, for example, are not interchangeable with deck mount, since an additional site-built element is required to use a curb mount. If such a curb is already present, a homeowner will have to remove it and will have to order a more costly, special size deck mount replacement or modify the opening to accept a standard stock size deck mount.

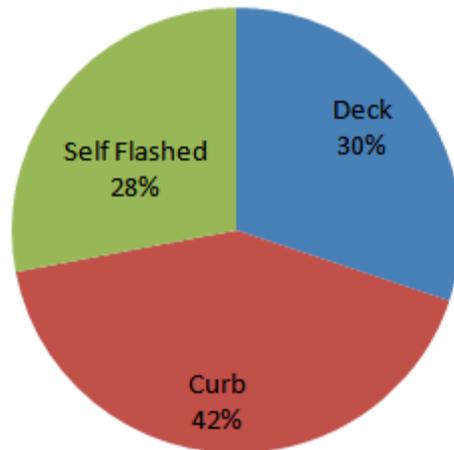
The implication of this reality for EPA's analysis is that the use of a dataset containing multiple types of skylights will understate average incremental cost to

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the consumer, and result in overly optimistic conclusions related to cost-effectiveness and product availability.

The curb mount type's share of the market is indicated here:

### Residential skylight market 2012 850,000 units



(Total from Ducker, breakdown estimated by VELUX market analysis)

The curb mount types are the most popular for these reasons:

1. Lower price point, compared to other types
2. West and south regions prefer this type
3. Essential for flatter roofs
4. Best, and often the only, option on tile and metal roofs
5. Installed base is a preponderance of curb mounted plastic

The curb mount types also happen to be the worst apparent energy performing types, especially the venting group, even though they allow more light and passive heat into a space than the other types of the same size.

If EPA had been aware of all of this at the outset, and wished to be fair-minded between fenestration categories that could be considered in competition with each other for effectively providing natural light and fresh air, they would have performed a more appropriate skylight criteria analysis that would be based on the following paraphrased "window" premise:

"EPA focused its analyses on **curb mount skylights**, as these are the most commonly sold type of **skylight** and are also typically the worst performing by virtue of **their installation details**. By basing its decisions primarily on the performance of **curb mount skylights**, EPA is taking a conservative approach towards specification development."

On the assumption that new analyses are not likely to be forthcoming, given EPA responses to prior requests, we would like to offer the following as a meaningful substitute for in-depth analyses:

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- We noted previously the percentages of qualifying CPD listings in the Draft 1 dataset for the double-pane curb mount type. By raising the criteria in increments, we show the following progression:

U-Factor	0.45	0.47	0.48	0.49	0.50	0.55
Qualifying listings (% of all listings)	0.7%	1.9%	3.5%	6.0%	13%	28%

This shows that the currently available double-pane ENERGY STAR products qualified in the North and North Central zones make up only 28% of all curb mount CPD listings. The Final Draft criteria would disqualify over 85% of those options, and would essentially eliminate the venting subset from providing cost-effective ENERGY STAR options.

- Our prior suggestions to set the bar at 0.50 in the North were offered in the spirit of meeting EPA halfway to the very aggressive range in the Framework document, with the knowledge that something significant would have to be sacrificed. This compromise was offered even with the realization that cutting that much out of an essential skylight type is not economically justified, unfair, and runs counter to EPA's goals for the ENERGY STAR brand. If our best venting curb mount option, using vinyl frames with foam-filled cavities, triple silver Low-E in an argon-filled double-pane IGU cannot qualify at the proposed U-factor level, there is a serious problem with the criteria.

Especially in the Northern zones, where enhanced natural daylight and ventilation from above is most useful in reducing cooling energy and providing better indoor air quality, we urge EPA to reconsider allowing this product to qualify. It carries a U-factor of 0.53, without further enhancements such as fourth-surface Low-E, or installation of a shade, both very costly options you have not factored into your analysis.

If EPA elects to continue their stance against this reasonable approach for giving consumers a full plate of ENERGY STAR options, by no means should the U-factor in the Northern zone be lower than 0.49. This will at least allow the best-selling curb mount product to continue to be available on the shelf next to the plastic replacements. ENERGY STAR has received several comments to this effect from major retailers addressing the price premiums they think their customers will or will not tolerate.

- In the midst of completing this document, we received a copy of the brand new *AAMA/WDMA 2012/2013 U.S. Industry Statistical Review and Forecast* in which Ducker Worldwide, LLC forecasts building construction trends affecting fenestration markets. From the data listed in that report for residential skylights, we find that since 2006, skylights used in remodeling and replacement continue to make up a larger and larger share of the total skylight market. The share in 2006 was 55%, and by 2015 it is expected to reach 80%. This is the main playground for curb mount skylights, especially those sold through retail outlets, and we urge EPA to factor this trend into their final decisions.

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Once a consumer has decided it is time to install a new skylight, there should be an affordable, high quality ENERGY STAR product available to him that meets his needs. This is what we think is true to the program's objectives. Even to VELUX, the major skylight provider in the residential market, it is not clear who will be there with such product if our company has none to offer

- Even in the Northern and North Central zones where energy efficiency is most valued, the top retailers of skylights typically stock non-ENERGY STAR as well as ENERGY STAR qualified skylights. Based on comments ENERGY STAR previously received from such retailers, they will be challenged to continue to stock even a light level of ENERGY STAR inventory.

[http://www.energystar.gov/ia/partners/prod\\_development/revisions/downloads/windows\\_doors/Lowes\\_spec\\_windows\\_doors\\_skylights\\_v6.pdf?0eb0-09e7](http://www.energystar.gov/ia/partners/prod_development/revisions/downloads/windows_doors/Lowes_spec_windows_doors_skylights_v6.pdf?0eb0-09e7)

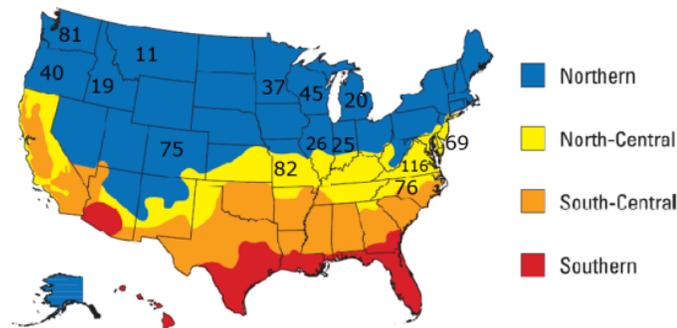
[http://www.energystar.gov/ia/partners/prod\\_development/revisions/downloads/windows\\_doors/AlliedBuilding\\_Products\\_spec\\_windows\\_doors\\_skylights\\_v6.pdf?0eb0-09e7](http://www.energystar.gov/ia/partners/prod_development/revisions/downloads/windows_doors/AlliedBuilding_Products_spec_windows_doors_skylights_v6.pdf?0eb0-09e7)

[http://www.energystar.gov/ia/partners/prod\\_development/revisions/downloads/windows\\_doors/LMC\\_spec\\_windows\\_doors\\_skylights\\_v6.pdf?0eb0-09e7](http://www.energystar.gov/ia/partners/prod_development/revisions/downloads/windows_doors/LMC_spec_windows_doors_skylights_v6.pdf?0eb0-09e7)

[http://www.energystar.gov/ia/partners/prod\\_development/revisions/downloads/windows\\_doors/AWL\\_spec\\_windows\\_doors\\_skylights\\_v6.pdf?044e-6ffc](http://www.energystar.gov/ia/partners/prod_development/revisions/downloads/windows_doors/AWL_spec_windows_doors_skylights_v6.pdf?044e-6ffc)

With a U-factor of 0.48, the added cost is expected to result in an estimated 1,000 top retailers ceasing to carry ENERGY STAR stock, of which 722 are large stores under The Home Depot, Lowe's, and Menards banners.

ENERGY STAR Climate Zone Map



722 retail locations of Home Depot, Lowe's and Menards that will no longer stock an Energy Star Curb mounted skylight

In addition, management of another 300+ ABC Supply, Allied Building Materials, LMC, and AWL stores have stated they would not continue to stock ENERGY STAR curb mount units at the currently proposed criteria and the associated price change. Here is an example of the concerned sentiment in those comments:

(From Tim Williams, Director of Marketing, Allied Building Products Corp.)

"...After reviewing your recent Version 6.0 proposal, I felt it was important to comment on your proposed skylight standards. In the version 6.0 of your proposed ENERGY STAR criteria, we were surprised to discover that the EPA's own analysis reveals our customers will pay over \$20-\$40 more than the cost of skylights that meet the current standards. Furthermore, the skylight

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changes will have over a 30 year payback period in our markets. Our customers have been willing to pay more for products with a reasonable payback period, but this seems to be an unreasonable proposition.

We believe this added cost will cause some homeowners to change from the already energy efficient product they buy today to a less energy efficient product at a lower cost, defeating the initial purposes of establishing the ENERGY STAR criteria.

In addition, this change will likely reduce or eliminate, in most of our locations, ENERGY STAR qualified products. As I have understood in the past, ENERGY STAR wanted to support energy efficient products that are readily available in the market. This new standard will likely change that position.

We at Allied Building Products Corp. encourage you to reconsider the value proposition on skylights. In discussing with our skylight suppliers, we believe you can improve the energy efficiency of skylight with incremental steps that offer a good payback. The current proposal, though, seems to be too large a step at this time."

- In most retail stores today the consumer's "on the spot" choice is between a plastic double dome skylight and an ENERGY STAR labeled glass skylight. If double-pane, argon-filled, low-E<sup>3</sup> glass skylights are no longer qualified to carry the ENERGY STAR label under the Final version 6.0 Specification, the consumer will likely choose less expensive and very inefficient plastic options, whether the shopping happens in person or online. This is counter to the preferred choice the ENERGY STAR Guiding Principles aim to encourage.



A typical Home Depot or Lowe's store in the North or North Central zone.

- VELUX has a basic fixed curb mount unit, currently ENERGY STAR qualified, that will not meet the proposed 0.48 U-Factor. The nearest readily available version that will qualify carries a price premium of \$30 in the most popular size, even more at the NFRC standard size. This is the lowest cost product that we offer to compete with the much cheaper plastic options, and it needs

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to carry the ENERGY STAR label to be a serious contender to those energy hogs.

The screen shot below shows that the marginal cost (MC) between what is widely available for replacement (not typically required to be code compliant) and the best selling qualified model is \$79, and the incremental cost (IC) for the version 6.0 qualified product is \$30. At these costs, payback to replace a skylight is significantly higher than the already high values included in the Analysis document, which were based on a maximum \$0 marginal cost + \$20 incremental cost. Justifying a glass product to replace a plastic product becomes near impossible for the buyer if ENERGY STAR is not a readily visible differentiator.

The screenshot shows the Home Depot website interface. At the top, there is a navigation bar with links for 'Tool & Truck Rental', 'Get It Installed', 'For the Pros', 'Gift Cards', 'Help', and a 'Cart' icon. Below this, a location indicator shows 'Your Store: Camarillo #1012 (Change)'. A search bar contains the text 'skylights'. Below the search bar, there are links for 'Store Finder', 'Local Ad', 'Credit Center', and 'Savings Center'. The main content area is titled 'Product Comparison' and features three product listings:

Product	Price	Model #	Rating
VELUX 22-1/2 in. x 46-1/2 in. Fixed Curb-Mounted Skylight with Tempered LowE3 Glass	\$188.00	Model # FCM 2246 0005	★★★★★ (16)
Gordon Skylight 22-1/2 in. x 46-1/2 in. Fixed Curb-Mount Skylight	\$109.00	Model # 2852MFCMWCCD	★★★★★
VELUX 22-1/2 in. x 46-1/2 in. Fixed Curb-Mounted Skylight with Laminated LowE3 Glass	\$218.00	Model # FCM 2246 0004	★★★★★

- We also looked back at the Draft 1 Cost Effectiveness analysis and discovered a serious deficiency that, if corrected, would drastically affect the credibility of the conclusions drawn from the data used, especially for the Northern and North Central zones:

Unlike the Windows analysis, which used base products that would not have even been 2009 IECC code compliant, let alone Version 5 qualified, the base skylights were assumed to have exactly Version 5 minimum compliance. To be fair and consistent, EPA should have used predominantly available double glazed plastic as the base skylight. While this would have resulted in significantly higher energy savings, it would also have introduced a very significant "marginal cost" that would have tilted the payback years to much higher values than the "reasonable" ones listed.

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**Bottom Line**

By reducing the two northern zone U-factor limits below 0.53, EPA's current proposal virtually eliminates the venting curb mount type from being able to qualify. In the spirit of compromise with EPA, and being a company focused keenly on energy efficiency, VELUX proposed a stringent U-factor limit of 0.50 in the Northern zone throughout the Framework and Draft review processes. VELUX requests EPA to seriously reconsider the many listed merits for having a U-factor limit of at least 0.50 in the Northern zone, and 0.53 in the North Central zone.

However, should EPA continue down this path of insisting on a limit below 0.50, VELUX has determined that any U-factor limit less than 0.49 is detrimental to VELUX, to the glass skylight category in general, to consumers, and to the ENERGY STAR brand.

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In addition to these comments filed on behalf of VELUX, we are an active participant in the groups at both AAMA and WDMA that are formulating separate comments from the overall fenestration industry perspective. We concur generally with further comments being submitted by those associations on general program issues and processes.

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In closing, we remind EPA that VELUX holds a long-standing affinity with the entire set of principles espoused by ENERGY STAR, and that our preference is to continue our partnership with the ENERGY STAR brand for a long time to come. Please keep in mind that nothing worthwhile gets sold and used unless the perceived value of the transaction is sufficient to both the buyer and the seller.

Thank you again for the opportunities to share our insights and our analysis.

Submitted by:

Tim Miller, President VELUX America, Inc

John Lawton, Manager – Skylight Global Product Management

Roger LeBrun, Senior Product Certification Engineer

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On September 4, subsequent to the development and internal review of the foregoing, EPA issued via email "Additional Skylight Information for ENERGY STAR Final Draft Version 6.0 Windows, Doors and Skylights".

The following addendum is in response to the content of the document referenced in that email...

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Addendum Comments Regarding:

### **Additional Research on Skylight Availability and Cost**

Issued by EPA on September 4

General Observations:

- There are two entries identified as being from Fakro, which are listed as “curb mount” type. This is erroneous, as can be verified on the Fakro website which clearly shows these models as deck mounted skylights. (The error most likely occurred in the webpage development process, and is not the fault of EPA.)

Therefore, only **one** remaining curb mount product listed meets the proposed Northern and North Central U-factor criteria, and this product is not the lower cost model usually stocked in the home center stores. The lower cost tempered glass version costs \$30 less than the qualifying laminated glass version, and is the predominant curb mount product stocked in these stores, other than regionally-sourced plastic options. This tempered glass curb mounted skylight version typically stocked by the home center stores **will not meet** the proposed Northern and North central criteria. EPA has already heard from home center management that they cannot justify stocking a glass product with such a price jump.

(Note that the cost difference for the Fakro entries is also \$30, where the glass changes from tempered to laminated, and the U-factor difference is also 0.01.)

- At first VELUX found it strange that no plastic skylights appeared in the table with fewer than three layers of plastic. After further investigation, VELUX found that the products returned from a Homedepot.com website search engine inquiry are tailored to the specified “home store location” of the user. In many regions, the same search will show a much wider variety of available products, including plastic domed skylights with one or two plastic layers, which have poorer energy efficiency than the products shown in the table and much lower average cost than those listed there.
- The home center distribution chain handles a significant portion of our U.S. skylight sales. However, the portion of those home center unit sales initiated online is historically not more than 5%. There are no expectations that this level will change significantly for the foreseeable future, largely due to the shipping costs that typically are added for bulky, relatively fragile products sold online.

What the “Amended” Research says:

- Even the very limited data listed in EPA’s table serve to strongly reinforce the concerns stated in our main comments regarding the serious negative implications due to the lack of qualifying double-pane, argon-filled, Lo-E<sup>3</sup> curb mount options widely available today.
- The data also verified that the EPA used understated “Incremental Costs” when performing the cost analysis. If the search had also included the step of finding shipping costs for getting an online order delivered, EPA would have seen there are significant additional cost implications exceeding “incremental costs” when

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products typically available only in regional markets are expanded (in theory) to supply national demand through online sourcing. Paybacks are therefore proven to be unreasonable based on this research effort.

- EPA has verified, even in this limited and somewhat flawed desktop survey, that they have set the U-factor bar too low for curb mount skylights in the Northern and North Central zones. Thus, VELUX urges EPA to raise the Version 6.0 specification for the Northern zone to 0.50, or at least no lower than 0.49. There should also be a place for a venting curb mount in the north zones, so we think 0.53 is the right level with current double-pane technology in the North Central. Given the significant demand for curb mount skylights in the marketplace, and the difficulty in replacing this type with other types, EPA should not finalize the specifications at a level of stringency that excludes these essential products from qualifying to use the ENERGY STAR label. If EPA maintains the currently proposed values, the result will be increased sales of non-ENERGY STAR skylights and significant lost energy savings for many years to come.

The prior recommendations VELUX has continually offered in good faith are presented for the final time, with a slight adjustment in the spirit of further compromise:

Item	ENERGY STAR 5.0	ENERGY STAR 6.0 VELUX Proposal	ENERGY STAR 6.0 EPA Final Draft
<b>Max. U-Factor</b>			
Northern Zone	0.55	0.49*	0.48
North-Central Zone	0.55	0.53	0.48
South-Central Zone	0.57	0.55	0.50
Southern Zone	0.70	0.60	0.60
<b>Max. SHGC</b>			
Northern Zone	Any	Any	Any
North-Central Zone	0.40	0.35	0.35
South-Central Zone	0.30	0.30	0.28
Southern Zone	0.30	0.28	0.28
* 0.50 is still the best choice for the program, but we can live with 0.49			