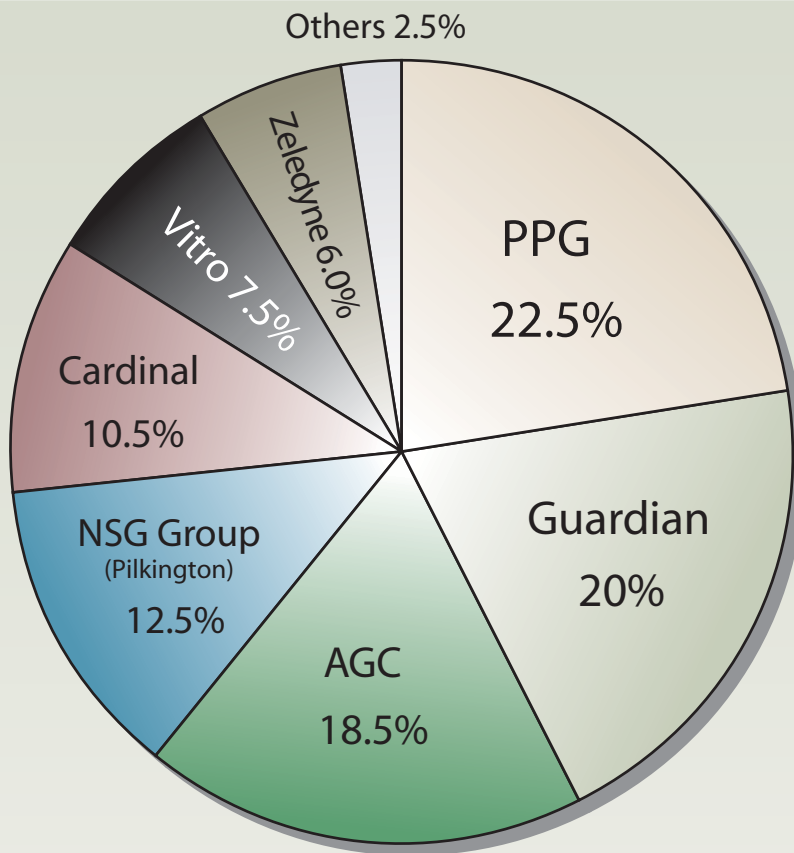


# The State of Glass Production in the United States

**While Residential Remains Weak,  
Architectural Glass Users Ask “What’s Next?”**

by Megan Headley

**North American Float/Sheet Capacity by Company**



Source: Pilkington and the Flat Glass Industry 2007

**T**here's absolutely no hiding the fact that the residential construction market has had a troubled year. But the question now haunting many architectural glass professionals is: will the commercial construction market follow? USGlass sat down with several glass manufacturing professionals for their insight into how they're preparing for the year ahead.

"The commercial [market] tends to follow residential eventually," points out Mauro DiFazio, vice president of float glass sales for Zeledyne in Tulsa, Okla., "but so far I haven't seen it. Maybe a little bit, but not dramatically."

While DiFazio say he's seen signs of a very "slight slowdown," some of this could be the result of an industry that expects further tightening.

"We continue to hear from major forecasting institutions, such as Global Insights, forecasting a downturn in 2009. I will be honest with you, our book of business is still very strong in the commercial market," says Vicki Holt, senior vice president of glass and fiberglass for Pittsburgh-based PPG Industries. "Now we're realists; there's bound to be a slowdown around the corner, but I will tell you we have not seen it yet. Our plans for 2009 do incorporate Global Insights' projections, which do have demand slowing down for next year. So far we just have not seen it in our book of business."

"Speaking generally, commercial [construction] has been strong last year, continues to be strong," adds Russell Ebeid, president of Guardian Industries Corp.'s Glass Group in Auburn Hills, Mich. "I do see it starting to taper off slightly, looking ahead. I think for this year we're pretty well locked in as an industry—I'm not talking Guardian per se, but as an industry I think this year's pretty well locked in. I think next year things will be a little bit softer but not

as dramatic as residential has been this past year as a half.”

“We see some of those leading indicators dipping but we also see others that are still strong,” says Rob Struble, manager of business communications for PPG. “We’re hoping for the best—and we’re prepared for softening.”

“There is no industry consensus regarding the future of commercial construction,” says John Hughes, commercial segment manager for AGC Flat Glass North America in Alpharetta, Ga., adding, “AGC forecasts a slight downturn, but growth of other segments and capacity adjustments that have been implemented should have no significant impact on AGC’s supply and demand.”

While these manufacturers remain confident that commercial construction isn’t on the verge of dramatic slowing, that brings up another question. If demand is expected to remain steady—what about supply?

### Is There a Glass Shortage?

Could a glass shortage really be on the way? Rumors of such have been growing for months.

“We are hearing the rumors,” comments Christine Shaffer, marketing manager of glass fabricator Viracon in Owatonna, Minn. “We do take them for what they are. We keep our focus on providing accurate material forecasts to our suppliers to minimize supply constraints.”

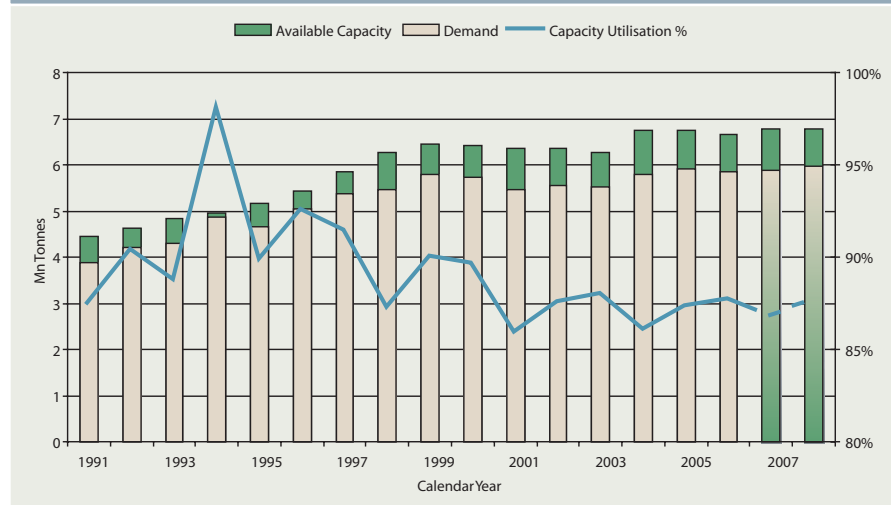
At this point rumors seem to be just that, since there is some question as to how a shortage could be possible when residential construction remains so low.

“[Production of] housing and cars has been down dramatically in the United States. Despite that, though, this industry was running at 88 percent capacity,” Ebeid says.

The key word being “was.” Has there been a change?

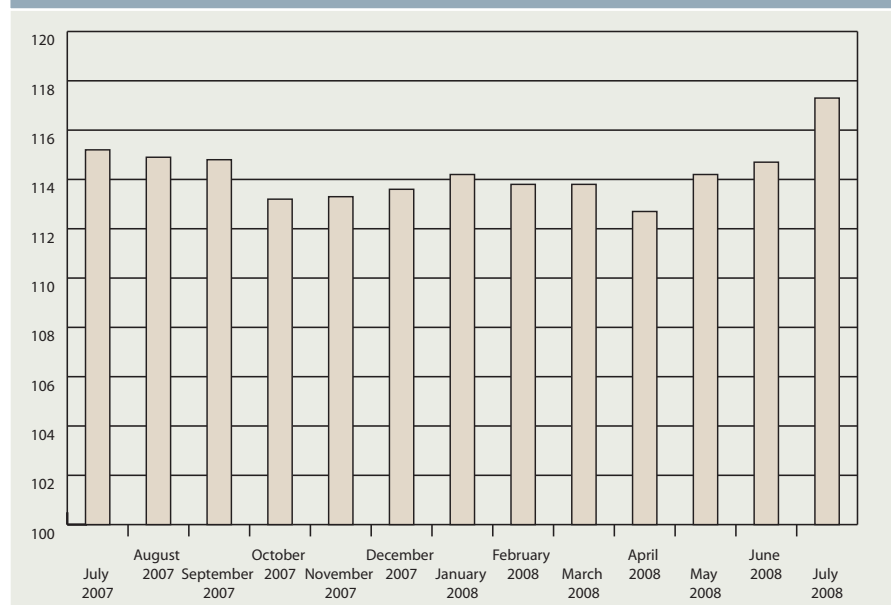
“It’s pretty obvious. Asahi Glass. Co.

## North America Capacity Utilization



Source: Pilkington and the Flat Glass Industry 2007

## Flat Glass Producer Price Index



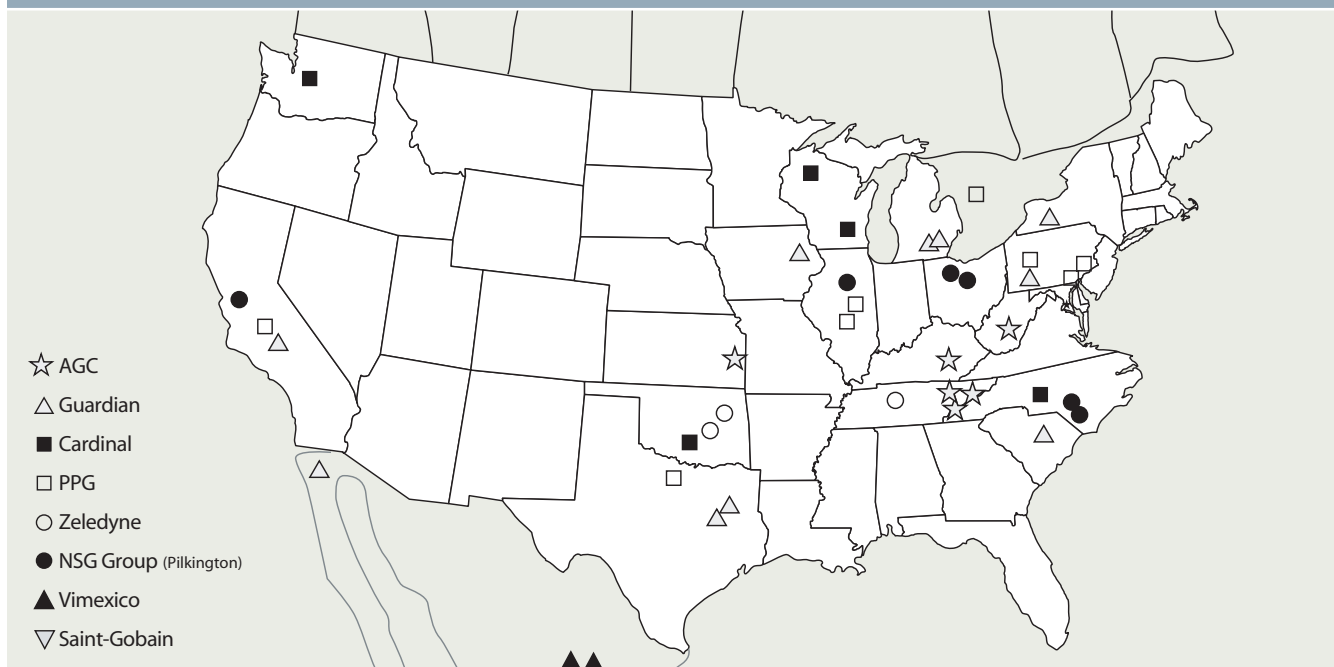
Source: Bureau of Labor Statistics

has taken three tanks out of the industry. There was a huge surplus of clear. There is not anymore. My understanding is . . . that the clear market is sold out,” says DiFazio.

Beginning in April, AGC Flat Glass North America’s (AFGNA) parent company, Japan-based Asahi, closed the doors of float glass facilities in

Victorville, Calif., and St. Augustine, Quebec, and one production line at its Greenland, Tenn., manufacturing plant (see May 2008 *USGlass*, page 16). According to a press release issued by the company, the move was expected to reduce Asahi’s production in North America by approximately 40 percent.

## North American Float Glass Plant Locations



Source: Pilkington and the Flat Glass Industry 2007

### Major Imports of Float Glass and Surface Ground or Polished Sheets (value in USD)

	May 2008 YTD	2007	2006	2005	2004
Belgium	2,107,912	5,281,472	5,901,465	4,539,246	3,445,209
Brazil	378,837	8,196	16,392	78,492	30,113
Canada	14,432,482	38,208,009	41,763,648	30,622,947	31,816,836
China	4,255,435	9,709,156	8,373,098	5,593,943	4,880,670
Federal Republic of Germany	13,569,560	18,400,020	16,750,732	9,914,875	6,453,548
Finland	441,425	1,262,227	1,444,721	1,107,153	1,096,917
France	538,618	976,103	1,066,547	220,937	457,427
Indonesia	124,479	578,035	1,537,311	1,236,689	1,112,828
Italy	409,281	1,029,166	688,014	526,902	821,720
Japan	5,817,616	12,739,292	10,735,561	11,385,918	10,945,765
Mexico	10,962,584	36,020,415	42,784,823	50,428,233	43,198,153
Netherlands	63,446	124,282	444,284	481,310	544,710
Spain	150,066	180,750	170,734	312,034	227,041
Switzerland	556,611	786,590	738,356	761,287	847,550
Taiwan	83,433	44,485	274,052	146,625	320,386
United Kingdom	477,765	2,425,678	3,100,898	3,662,670	4,322,758
World Total	54,656,684	128,388,360	136,620,693	122,429,344	112,150,331

Source: the U.S. Census Bureau

“The downturn in the residential market resulted in a significant overcapacity situation,” explains Hughes. “This supply/demand situation resulted in AGC temporarily reducing its capacity.”

Others worry about what may happen should residential market begin to pick up while commercial holds steady.

“With the downturn of [AGC] and shutting down of three of their float lines we’re now running at about 98-percent of capacity as an industry,” says Ebeid. “So any little blip is going to affect supply of glass to the trade. Looking forward, it’s hard to see housing getting any worse than it is and it’s hard to see automotive getting worse than it is. So, unless there’s new capacity coming on, I believe this will get tighter and tighter. And any little hiccup in the industry, where you’ve only got two percent slack, is going to affect the customer base with timely deliveries,” says Ebeid.

Hiccups such as the torrential rains in August that left parts of Wichita Falls, Texas, under as much as 15 inches of water—and left PPG minus one float glass line. Rains flooded the plant’s basement and damaged critical process

## Survey of Glass Manufacturers

Description	3272 - Glass & glass product manufacturing		327211 - Flat glass manufacturing		327215 - Glass product manufacturing made of purchased glass	
	2005	2006	2005	2006	2005	2006
Number of employees	101,905	100,919	11,412	10,658	56,943	57,314
Production workers, average per year	82,282	81,061	9,246	8,522	44,727	44,748
Total compensation (\$1,000)	5,757,768	5,831,207	742,840	712,094	2,760,148	2,856,624
Annual payroll (\$1,000)	4,199,577	4,274,973	505,572	495,191	2,103,914	2,172,596
Total fringe benefits	1,558,191	1,556,234	237,268	216,903	656,234	684,028
Production workers wages (\$1,000)	3,067,782	3,135,183	365,310	366,743	1,428,599	1,465,510
Production workers hours (1,000)	175,793	173,055	19,386	18,088	96,002	96,570
Total cost of materials (\$1,000)	10,705,153	10,779,864	1,562,463	1,583,795	5,488,303	5,595,156
Materials, parts, containers, packaging, etc. used (\$1,000)	8,109,049	8,174,681	906,487	927,748	4,771,931	4,917,287
Cost of resales (\$1,000)	383,664	403,379	D	D	236,899	256,787
Contract work (\$1,000)	262,955	192,331	D	D	204,830	110,559
Purchased fuels consumed (\$1,000)	1,274,235	1,287,810	441,353	450,515	73,671	78,460
Cost of purchased fuels and electric energy (\$1,000)	1,949,485	2,009,473	563,274	579,623	274,643	310,523
Quantity of electricity purchased for heat and power (1,000 kWh)	12,651,145	12,739,317	2,013,284	1,927,864	3,824,016	3,981,645
Purchased electricity (\$1,000)	675,249	721,663	121,921	129,109	200,972	232,063
Value added (1,000)	12,608,538	13,072,084	1,919,084	1,839,490	6,122,803	6,364,057
Total value of shipments (\$1,000)	23,335,945	23,684,921	3,462,130	3,374,069	11,592,733	11,885,600
Value of product shipments	22,825,443	23,116,212	3,352,619	3,278,232	11,256,596	11,508,813
Total miscellaneous receipts (\$1,000)	510,502	568,709	109,511	95,837	336,137	376,787
Value of resales (\$1,000)	485,568	519,965	D	D	302,189	337,835
Contract receipts (\$1,000)	6,916	20,850	0	0	6,916	D
Value of interplant transfers	2,444,900	2,404,042	548,930	545,046	998,065	1,088,565
Total inventories, end of year (\$1,000)	2,643,034	,804,912	355,481	409,380	1,037,098	1,099,759
Finished goods inventories, end of year (\$1,000)	1,580,445	1,684,144	255,424	290,934	405,351	435,572
Work-in-process inventories, end-of-year (\$1,000)	267,932	275,057	22,922	26,492	156,012	150,965
Materials and supplies inventories, end of year (\$1,000)	794,658	845,710	77,135	91,954	475,735	513,222
Total inventories, beginning of year (\$1,000)	2,633,637	2,544,619	331,792	337,499	993,984	967,123
Finished goods inventories, beginning of year (\$1,000)	1,591,185	1,525,568	227,987	245,541	392,554	369,201
Work-in-process inventories, beginning of year (\$1,000)	274,291	261,451	30,942	22,669	156,280	149,568
Materials and supplies inventories, beginning of year (\$1,000)	768,161	757,600	72,863	69,289	445,150	448,355
Total capital expenditures (new and used) (\$1,000)	1,089,925	1,382,030	204,599	303,065	477,723	601,127
Buildings and other structures (new and used) (\$1,000)	91,266	244,196	8,207	42,551	63,324	181,620
Capital expenditures on machinery and equipment (new and used) (\$1,000)	998,659	1,137,833	196,392	260,514	414,399	419,507
Capital expenditures on automobiles, trucks, etc. for highway use (\$1,000)	9,941	13,431	740	1,997	8,561	10,290
Capital expenditures on computers and peripheral data processing equipment (\$1,000)	23,984	30,796	2,883	6,128	14,678	16,953
Capital expenditures on all other machinery and equipment (\$1,000)	964,734	1,093,606	192,769	252,389	391,159	392,264

D= Withheld to avoid disclosing data for individual companies; data are included in higher level totals

Source: U.S. Census Bureau's 2006 Annual Survey of Manufacturers (last data available)

“Now we’re realists; there’s bound to be a slowdown around the corner but I will tell you we have not seen it yet.”

—Vicki Holt, PPG

### Major Exports of Float Glass and Surface Ground or Polished Sheets (value in USD)

	May 2008 YTD	2007	2006	2005	2004
Canada	96,192,915	236,012,514	240,511,508	222,667,955	237,399,816
Japan	10,894,142	34,169,850	39,773,247	41,584,073	30,836,569
Mexico	11,324,910	30,692,486	25,059,394	14,538,024	17,072,238
United Arab Emirates	9,957,647	30,209,983	22,756,943	15,339,654	11,034,586
China	18,431,368	27,437,862	26,379,872	15,392,956	13,649,450
Spain	6,245,960	20,750,098	13,212,304	12,050,961	5,443,229
Colombia	9,076,792	19,561,061	10,998,641	6,944,679	8,704,150
Brazil	10,021,940	16,248,606	7,098,063	7,858,523	7,960,476
Italy	5,096,583	13,917,935	6,124,928	6,590,730	3,967,516
Turkey	6,193,480	12,332,315	9,911,130	9,508,295	8,444,300
Australia	6,463,958	11,918,748	7,662,020	6,640,461	6,361,313
Federal Republic of Germany	4,343,878	11,254,537	4,746,223	4,241,661	5,683,674
United Kingdom	7,242,863	9,235,101	4,393,917	3,560,176	2,738,669
Korea, South	8,478,454	6,473,955	4,475,381	7,668,009	10,329,981
Belgium	4,387,436	6,429,955	4,558,126	3,605,532	7,345,266
Luxembourg	3,788,489	6,285,496	3,584,991	3,044,594	472,304
Sweden	2,813,236	6,085,386	4,717,059	3,772,418	2,134,361
Saudi Arabia	3,632,015	5,577,527	6,095,745	4,537,515	3,286,729
Costa Rica	2,494,937	5,062,670	4,551,956	2,540,187	2,295,577
Poland	1,316,989	3,586,090	2,838,328	1,620,943	1,429,949
Chile	1,647,718	3,268,183	2,932,192	2,212,440	1,715,307
France	2,045,902	3,148,127	260,789	57,812	145,733
Ecuador	1,962,312	2,748,282	1,372,926	2,180,113	1,996,453
Singapore	591,772	2,712,907	2,932,346	507,341	839,712
Argentina	6,886,113	2,691,245	928,921	901,312	919,992
India	4,650,601	2,064,557	3,111,847	1,608,917	655,268
World Total	270,993,364	576,199,849	491,314,497	435,502,299	427,765,201

Source: the U.S. Census Bureau

equipment, temporarily halting production (see *September 2008 USGlass page 18*).

“This has the potential to impact all PPG glass customers in all segments nationwide,” Struble says, adding “our logistics groups and sales groups are working with our customers to minimize the disruption nationwide.”

The disruption came shortly after the company began making repairs to other lines.

“We actually took down one of our two tanks in Carlisle, Pa., early,” says Holt. “We shut it down in April. That tank is scheduled to be repaired next year but with the demand as weak as it is in the U.S. market we just didn’t need that capacity right now, and taking it down allowed us to better utilize our remaining capacity.”

PPG certainly is not alone in its need for repairing the long running lines as continuous upgrades must be made to furnaces around the world. But for companies such as PPG where, Holt points out, “the residential segment is actually the largest user of glass, in terms of tonnage,” now may be just the time to repair lines when less demand is being heard from the residential sector.

“We’ve been taking steps as well to better match our capacity to the demand in the marketplace,” says Holt. “I think the glass industry is taking steps to make sure supply and demand are in balance. I think it’s very important that supply and demand be in balance because this is an industry that’s also being faced with significant inflation in terms of energy, batch ingredients—which are also tied to energy—the transportation of that, and then also transportation and freight . . . all three of those categories are highly impacted by fuel, by natural gas and electricity cost. Therefore it is critical that this industry begin moving pricing to pass that on and to do that it’s usually best to have supply and demand relatively in balance.”

She adds, "You've already seen all the announcements with Asahi's capacity rationalization."

Indeed, at the time AGC president and chief executive officer Brad Kitterman had commented that "these decisions were made to minimize the impact of ongoing market trends, by eliminating glass overcapacity and non-core product segments."

Among those trends was the continued decline of the North American housing market. A company press release stated: "the earnings structure of AFGNA excessively depends on clear float glass—general-purpose glass that is difficult to differentiate from products of competitors. This, combined with higher costs driven by a price surge in raw materials, has been squeezing Asahi Glass' profitability in the region."

Hughes adds, "AGC will be bring up the lines once demand warrants it."

While the decision was a necessity for Asahi, "Three tanks made a huge impact on availability of glass," as DiFazio points out.

## Energy Costs

In addition to the demands on available supplies, energy costs are proving to be a challenge across the board—and are providing yet another reason for rising prices on the glass that is available.

It's a concern for nearly every industry and glass manufacturing is no exception, as Holt pointed out above.

"We have active, aggressive transportation teams that are constantly re-viewing how our product is moved, where it is moved and, frankly, even what business you take or don't take with respect to the transportation costs as it becomes a bigger and bigger piece of our overall costs," Holt says. "Distribution costs play into a lot of our decisions around our mix and the customers we serve."

"Obviously the cost of containers and freight and trucking and diesel

## Global Demand

While supply and demand struggles play out in North America, close attention is being paid to glass exports.

"Beyond some short-term uncertainties about the recovery of the residential and automotive markets, there are more positives than negatives on global glass demand," says John Hughes, commercial segment manager for AGC Flat Glass North America in Alpharetta, Ga. "Fast growing segments such as the solar glass market, and growth in emerging markets are driving an increase in demand on a worldwide basis."

"We play globally in a couple of ways," says Vicki Holt, senior vice president of glass and fiberglass for Pittsburgh-based PPG Industries. "We do some export out of North America; we also license our technology, particularly in emerging regions, to companies that actually offer partnership opportunities for us in the future. We've got licensees in China, we've got licensees in the Middle East and we are also working with potential licensees in Eastern Europe. Clearly the growth in float is in taking place in emerging regions."

Emerging regions, where democracy is emerging, are especially attractive, adds Russell Ebeid, president of Guardian Industries Corp.'s Glass Group in Auburn Hills, Mich.

"I'll just say 'follow the path of democracy.' As the money trickles down to people, what's the first thing you spend it on? A house and a car—and that's 80 to 90 percent of the usage of glass. So all you have to do is follow where people are getting true democracy and you will find the growth of glass," says Ebeid.

According to Holt, "Float demand in developed regions is pretty similar to gross domestic product (GDP.). You see the impact here in North America with the potential recession—everybody hates to use 'the R word' but I'll tell you in my businesses, we're in 'the R word' in the United States—so you see a softening in demand for float because the GDP is off. As GDP recovers, the demand in developed regions will recover with it. But the real growth is occurring in emerging regions," says Holt.

"We're starting to read articles that Europe is finally starting to slow down a little bit, but South America is still strong, the Middle East is still strong," adds says Mauro DiFazio, vice president of float glass sales for Zeledyne in Tulsa, Okla. "Although things are slowing down in China—I'm not sure if that's real or artificial because of the Olympics. They just shut all those factories down; once the Olympics are over is everything going to gear back up again in China? It's hard to say."

For more information about where float glass is going, turn to the float glass imports and exports charts on the previous pages.

charges have all been increasing quite a bit," Ebeid adds. "What that means is you want to ship your product closer to home to minimize the cost. That's closing the patterns of trade in this industry."

According to Ebeid, "Ideally you'd like to ship your product within 500 miles of where it's being manufactured."

In addition to distribution costs, the cost of manufacturing itself is an

energy intensive process and, from the cost of running a furnace to the price of raw materials, and these costs must be passed onto customers as well.

"Glass is a big consumer of natural gas as well as electricity, and those costs have gone up dramatically. The cost of glass, energy-wise alone—irrespective of raw materials—has gone up pretty dramatically," Ebeid says. "To some ex-

tent, some of our raw materials have gone up because they have been fuel-based as well.”

“Manufacturers continually work to reduce costs associated with the melting and distribution of glass products—although cost improvements have not been offset due to increased energy and raw material costs,” Hughes adds.

“Obviously energy costs is a huge concern for all of us,” DiFazio agrees. “We use a lot of energy as an industry, and as a manufacturer we’re constantly looking for ways to reduce our costs. [But] it seems like with all of the efficiencies that we keep seeing, the increase in [energy] costs is more than gobbling up the efficiencies we come up with. It’s just gone crazy.”

## Greening Manufacturing

Despite the seemingly endless chase of struggling to reduce energy costs with new technology and upgrades, only to have costs rise further still, glass manufacturers have slowly begun turning attention to remaking their energy intensive manufacturing process. For an industry where much of the product development is focused on improved energy efficiency, it seems a natural step for the manufacturing process itself to become more energy-efficient.

“You’re starting to see more and more investment in technology that allow you to use less energy when making the glass,” says Holt. “Oxygen firing within glass plants is one of those.”

Holt adds, “We continue as we repair all of our tanks we deploy the latest technologies that reduce mostly our gas consumption but also electricity.”

As Ebeid points out, it’s a continual process “and there is constant improvement.”

Perhaps it is a natural step, but it’s not an easy one. It’s also a slow process, since in most dramatic instances a furnace must be taken of-

fline temporarily for updates and repairs. “These furnaces generally last, depending on the manufacturer, from 12 to 18 years,” Ebeid says. “So even if you have a good idea you cannot implement it until the furnace wears out, and then you repair it. And then when you repair it, you obviously put in the latest updates and efficiencies.

“It’s just like there are newer cars coming out with better car mileage. Do you change your car every year? No, only when it wears out or you’re tired of it or what have you. Then you upgrade,” he says.

According to DiFazio, these upgrades are more of a necessity than ever.

“With the cost of fuel going up we have to figure out ways to be able to offset some of those increases by making our processes more energy-efficient so we can stay competitive,” he says.

## Research & Development

As may be suspected, energy efficiency is the key for a vast majority of future research and development endeavors in the glass industry as well.

For PPG, the focus “is around enabling energy generation and conservation. When you look at the opportunities with alternative energy—like solar, also wind energy in our fiberglass businesses—we’re putting a lot of R&D in those two arenas,” Holt says. “The other [focus] is all around energy conservation, places where our technology can, in fact, improve the energy efficiency of both commercial and residential buildings.”

Energy conservation has been a long-time focus for the architectural glass industry, but energy generation has become the newest hot topic (see July 2008 *USGlass*, page 42).

“The other thing that’s growing is the use of glass for solar photovoltaics, and solar thermal or concentrated solar power, and I think that’s going to be the next phase of growth for the glass industry, sim-

ilar to what’s happened with thin glass for LCD screens. We’re going to start seeing growth in glass for the solar market, and that’s going to happen probably both in developed and developing regions,” says Holt (see *Global Demand sidebar on previous page*).

“On the solar side, advanced coating technologies will make photovoltaic electricity an increasingly competitive source of energy,” Hughes says. He adds, “AGC ... believes that solar growth can change the dynamics of the flat glass market.”

More traditional avenues for energy conservation are expected to be further explored as well, if in untraditional ways.

“Research will yield products that continue to be more adaptive to the environment they will be installed: capturing free solar gain in the North, providing the highest level of solar protection in the South. Triple glazing technology that can be scaled up to mass production should also emerge,” Hughes says.

“We’re going to more energy-efficient glasses, in the composition and in coatings,” says DiFazio.

“Tremendous growth in coatings in many, many different directions,” says Ebeid. “I would say you’re going to see a tremendous burst in coatings on glass and that coatings are in terms of obviously solar—in terms of building-integrated photovoltaics, in terms of ultraviolet protection of furniture and interior designs, coatings for interiors of the buildings, as well as different types of glasses for exteriors of building that are higher transmission that keeps the heat in and the heat out from the outside if it’s a hot day.” ■

## the author



Megan Headley is the editor of *USGlass*.