

**Summative Evaluation of**

# **Climate Change**

**A threat to life  
and a new energy future**

**at the  
American Museum of Natural History**

**Analysis by:  
People, Places & Design Research**

**Summative Evaluation of the Exhibition:  
*Climate Change*  
 at the American Museum of Natural History**

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prepared by  
**People, Places & Design Research**  
 Northampton, Massachusetts  
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## Executive Summary

This summative evaluation was commissioned by the American Museum of Natural History (AMNH) to explore visitors' perceptions of the exhibition, "Climate Change: " – which was installed from October 2008 through August 2009. This report provides systematic information about visitors' perceptions of the intended messages and about the different types of exhibitry used to create the educational and experiential value of the exhibition. The information can be used to reflect on the exhibit development and design process, to consider whether to rent the traveling exhibition, and to inform future exhibition planning.

### Goals for this evaluation

The analysis of visitor experiences is driven by the host institution's (AMNH) goals, based on decision-makers' sense of the challenges they faced, the strategies they used to present information and interpretive messages, and questions they have which could inform future exhibit development and design. In this project, there were five principal goals that were used to structure the evaluation:

- ◆ **Define the characteristics of the audience:** How does this audience compare to the audience for the previous special exhibition, *Water?* Is *Climate Change* primarily attracting people who are already interested and knowledgeable about environmental issues? (in colloquial terms in the conservation field: are we "preaching to the choir" – the 'active' or 'committed' portion of the public), or is the exhibition also attracting more 'mainstream' visitors (less environmentally-oriented, not 'active')?
- ◆ **Find the educational value of seeing this exhibition:** What are the impacts of seeing this exhibition? Does *Climate Change* have something of value regardless of people's interest in the topic (or pre-existing environmental beliefs) or is it more effective for some people and not for others?
- ◆ **Assess whether the "big messages" are being communicated, e.g., that:**
  1. there is evidence that climate change is already happening
  2. climate change is a serious problem with many consequences
  3. the best solution to the problem is global adoption of alternative energy sources, and
  4. individual actions can also help
- ◆ **Explore visitors' feelings about climate change in general and as a result of experiencing the exhibition:** Is the exhibition "a downer" or do people leave with a sense of optimism about the opportunities for solutions?
- ◆ **Provide feedback about the use and effectiveness of specific exhibit components:** Do people use and appreciate the audio-visual media, the interactives, etc., and do they understand the point of exhibits such as the polar bear or tree rings?

### Methods used for this evaluation

Three research methods were developed to investigate visitors' experiences in the *Climate Change* exhibition:

1. **Entrance interviews** were conducted with a random sample of 'general public' adult visitors as they were entering the exhibition (in family groups or adult-only groups, 1 adult interviewed per visitor group, n = 137);
2. **Exit interviews** were conducted with a separate random sample of 'general public' adult visitors as they were leaving the exhibition (in family groups or adult-only groups, 1 adult interviewed per visitor group, n = 299); two different interview forms were used in order to increase the number of questions and issues that could be addressed;
3. **Observations** of use of three parts of the exhibition: the introductory area (n=56), the actions wall (n=54), and the behavior change computer stations (n=48).

In this collaboration, the research strategy and research instruments were developed by People, Places & Design Research (PPDR); the data collection for all methods was primarily conducted by AMNH staff and interns with training and assistance from PPDR; PPDR also monitored the quality of work as it progressed. Data entry, coding, analysis and interpretation of results was PPDR's responsibility.

The cooperation rate (proportion of visitors who agreed to be interviewed) was 93% on the Entrance interviews and 77% on the Exit interviews. The fact that cooperation was lower on the Exits introduces some possibility for bias, e.g., those who agreed to do Exit interviews may have been more committed to the museum (repeat visitors) and may have been more environmentally-oriented. However, detailed analysis by audience segments, as presented in this report, eliminates the possibility that such bias (if it existed) might have been masked by overall averages in the visitor data.

### Visitor sample characteristics

The random sample of people contacted entering or leaving this exhibition may or may not be representative of AMNH's total audience, but it was sufficiently diverse for some in-depth analysis – containing substantial numbers of first-time visitors to the Museum as well as repeat visitors, New York City and tri-state residents as well as US domestic visitors and foreign visitors, people who belong to any kind of environmental organization (about half of the sample do, and half do not), a wide range of ages of adults, family visitors as well as adults visiting without children, and relatively equal proportions of men and women. In addition, the sample contained some people who were already knowledgeable about climate change but most had modest levels of awareness.

Overall, the sample composition is considered to be reasonable for an evaluation of this type, including the high degree of similarity between the characteristics of the Entrance Interview sample and the Exit Interview sample -- on 4 of 5 visitor characteristics, the samples were statistically similar (details in Section A).

## Highlights of the Findings

The evaluation yielded a substantial amount of data, with findings on all goals.

- ◆ *Climate Change* attracted people who are interested in environmental issues-- about half of whom are 'active' and committed, and half are more mainstream in the sense of being interested and 'sympathetic but not active' (terms for audience segments that will be used in this report).
- ◆ *Climate Change* has demonstrated educational value to almost all visitors who saw this exhibition. 'Mainstream' visitors substantially increased their understanding of how many topics are related to climate change, and even 'active' visitors added to their already-higher understanding. Visitors' grasp of the intended interpretive messages was good in some cases (that climate change is already affecting the planet, that it's a serious problem, that there is tangible evidence for it); however, the message about alternative energy sources as the biggest solution seemed to compete with the more familiar message that visitors brought with them, namely that changes in individual behavior and lifestyles is the big factor.
- ◆ This exhibition did not connect with most visitors in an emotional way, and overall would be described as having a neutral affective impact. However, some visitors expressed feelings ranging from being tired from all the reading, to being mildly encouraged about alternative energy solutions, to being discouraged at how complex and extensive the problem is (including, for some people, the clear and dramatic evidence of increasing carbon emissions over centuries), to being glad that the exhibition exists and that people (and some children) were seeing it.
- ◆ There are obvious successes in the exhibit design layout and components, as well as intentions and experiments that did not work out so well. Among the more effective presentations were the first space (presenting a red neon line as a graph tracking carbon emissions as influenced by the Industrial Revolution), the 'actions wall' (7 domains of human activities; also euphemistically called the 'mind map'), the small animated globes, the two video theaters, the polar bear setting, and various examples of evidence for climate change measured scientifically (e.g., ice cores, tree rings). The theory of a large alternative energy area as the last space of the exhibition storyline did not turn out to be the 'punch line' for visitors, probably for a variety of reasons (e.g., people were tired of reading by that point and at least one-fifth of the audience walked through without stopping, there were no interactives to engage visitors, the 3-D models were difficult for most people to recognize). Other aspects of the exhibit design that visitors thought were less effective were the text panels (hard to read due to the graphic style, hard to understand, too much text to read), and the interactives (people wanted more hands-on experiences, and some were not so engaging).

The remainder of this Executive Summary provides further detail about these findings.

### **PROFILE OF THE AUDIENCE:**

Visitors to *Climate Change* were similar, demographically, to the audience for *Water*. About half of the visitors described themselves as ‘very interested and active’ in environmental concerns, which is a very high proportion of a visitor audience. The other half were ‘sympathetic but not active’ so they are not the ‘active’ committed audience, more like a mainstream educated museum-going audience. However, both of these halves of the audience knew that with the title of ‘Climate Change’ this would be an exhibition about environmental issues, and they were likely to be receptive to the messages presented. There were very few visitors (5%) with low environmental interest (too few for reliable statistical analysis) and yet those are the people who need to be convinced. It is not clear how one might have drawn a broader range of people, but since the title itself probably inhibited or didn’t appeal to people who were not already interested in global environmental issues, perhaps if there was not an extra fee for tickets to *Climate Change* (especially considering the current economic downturn) that would help to broaden the audience and spread the educational messages.

### **EDUCATIONAL VALUE:**

Finding the educational value of visitor experiences in an exhibition can be pursued in a variety of ways. For example, people may be conscious of learning something new or getting a different perspective on a topic, or their responses to questions about specific topics may indicate changes in awareness or knowledge, or questions could investigate whether people were aware of the ‘main messages’ implicit or explicit in the exhibition’s displays and interpretation, or they could be tested to see if they understood the point of specific exhibit components. All four of these approaches were used in this evaluation; results of the first two are discussed here; the third one (‘main messages’) is presented beginning on the next page, and the fourth one (understanding specific exhibit components) is presented later in this Summary.

Self-defined learning: Although about three-fourths of the exiting visitors felt that they were already familiar with at least half of the exhibit content before they arrived, most (82%) were able to cite at least one piece of information that was new for them. This self-defined educational value is different for people with different levels of experience. Even among ‘active’ visitors, the vast majority of them (85%) were able to cite some details that were new to them, including tree rings, carbon capture, alternative energy sources, and impacts on oceans.

Assessing knowledge of topics: This exhibition was designed primarily to reach a mainstream audience who may have varying levels of knowledge about climate change issues, so it is good that substantial educational impacts were evident among the ‘sympathetic but not active’ visitor segment. By contrasting audience awareness at the Entrance and Exit, it was found that ‘sympathetic’ visitors had increased awareness of how seven issues were related to climate change after seeing the

exhibition: severe storms, coral reefs, consumer choices, polar bears, ice cores, coal, and tree rings. ‘Active’ visitors were more likely to feel that most of the information in the exhibition was not new to them. However, there were a few content areas where the ‘active’ audience segment showed significant gains: knowledge about coal and awareness that climate change is already affecting the planet.

### COMMUNICATING THE ‘BIG MESSAGES:’

Another aspect of ‘educational value’ is whether the major interpretive messages intended by the exhibit team were in fact perceived by visitors. This evaluation focused on four such messages:

**1. Big message: there is evidence that climate change is already happening.**

This message was assessed in two ways: focusing on whether visitors believed the evidence, and their awareness that climate change is already affecting the planet.

- Asked about believing the evidence: About half of the visitors (56%) completely believed the arguments for climate change *before they saw the exhibition*; the proportion of visitors who completely believed after seeing the exhibition increased to 71% (not quite a statistically significant increase). The increase was somewhat more pronounced among ‘mainstream’ visitors (‘sympathetic but not active’: 45% vs. 62%), although they still came out of the exhibition less convinced than the ‘active’ committed visitors (62% vs. 81%). People cited four exhibits as doing the best job of showing the evidence: Ice Cores, Polar Bear, Tree Rings, and the CO<sub>2</sub> Timeline.
- Already affecting the planet? Three-fourths of the visitors (72%) were already aware of some impacts of climate change *before seeing the exhibition*. Awareness increased slightly, but not significantly at the Exit (86%). The effect was most pronounced among ‘active environmental’ visitors (71% Entrance vs. 93% Exit), indicating that this message was not an obvious message for less-knowledgeable visitors, or that the examples of change were too insignificant for the mainstream audience to be concerned about. The most often mentioned examples of current climate change were: more storms, polar ice melt, warmer temperatures, and more erratic weather patterns.

- 2. Big message: climate change is a serious problem.** This was one of the top two messages visitors expressed in open-ended descriptions of the exhibition (28% gave answers such as: worrying, urgent crisis, scary, I didn’t realize climate change was dangerous). However, this idea was not top-of-mind when asked about the main idea of the exhibition (only 6% mentioned it). The sense from visitors’ comments was that this exhibition was intended to be more informative, rather than attempting to invoke a sense of urgency. A few visitors (~5%) were disappointed that the exhibition was “not alarming enough.” Visitors most often selected the New York City Flood Model and the Polar Bear as doing the best job of showing that climate change is a serious problem. Note that these two exhibits

are highly visual and can connect with people emotionally (popular endangered animal and potential disaster in the city).

3. **Big message: alternative energy sources are the primary solution.** The results are mixed: although some people clearly got this message, it was not strongly perceived as a main message of the exhibition and in some cases it was overshadowed by the message that individual action is the answer. Both messages are represented in the exhibition and they are competing with each other in visitors' "top-of-mind" responses. When visitors were asked what is the most effective solution to climate change, about half said "alternative energy" (#1 answer), but almost as many people gave answers about consumer lifestyle choices or energy conservation.
4. **Big message: individual action is also necessary.** This message is more familiar to people (especially the 'active' environmental visitors), so it was easy for visitors to see it and talk about it in various interview responses. The concept that people need to change their habits was cited as one of the main ideas of the exhibition. This idea was also the #1 message that visitors hope *other people* get from seeing the exhibition. The Actions Wall was an important contributor to this message – it was selected most often (more than the Alternative Energy Area) as doing the best job of showing solutions.

#### AFFECTIVE REACTIONS:

The exhibition didn't appear to have much of an effect on people's feelings about climate change. The good news for the exhibit team is that they were successful in designing an exhibition that was not a "downer;" the bad news is that the exhibition didn't connect with people emotionally, and some visitors complained about this. Many people came out of the exhibition with neutral feelings (or somewhat discouraged and somewhat optimistic at the same time), and there was no change in ratings compared with people's feelings when entering the exhibition. Among the affective reactions that were expressed, some people were tired out from this experience (some said from all the reading, some perhaps from the seriousness and extent of the issues); some people were pleased that *other people* were presumably getting educated by the exhibition, and some people were disturbed by their realization of the impacts or likely impacts of climate change (e.g., on polar bears, on poorer cultures around the world, and potentially in the future on NYC).



## FEEDBACK ABOUT SELECTED EXHIBIT COMPONENTS

The fifth goal of the evaluation was to investigate and analyze visitors' experience with some of the specific exhibit components, in order to provide feedback for the exhibit team on various innovations and experiments they had created. Four "types" of exhibit components are reviewed first, then several specific spaces or features in the exhibition are reviewed, in the order of their sequence from entrance to exit.

### "Types" of exhibit components

**Animated Globes:** These installations were very popular – they were the #1 answer for "most interesting display," and only 8% of visitors thought they could be improved.



**Videos:** People also liked the two video 'theaters' – the #2 answer for "most interesting display," and only a few visitors offered any suggestions about how the films could be improved.



**Interactives:** People appreciated the hands-on exhibits but two-fifths of the visitors thought they could be improved – suggesting that there should be more interactives, that some were hard to understand, or that they weren't very engaging.



**Text Panels:** There was little enthusiasm for the 'text heavy' character of the experience, and about two-fifths of visitors thought this aspect could be improved, primarily by having fewer text panels, less text on each panel, and some said the graphic style made it hard to read.



### "Spaces" and clusters of exhibits

**First Area /Introduction** (timeline through the Industrial Revolution, four vitrines, two big message panels):



This area did engage people as they entered the exhibition; most visitors spent time in this area (average = 3 minutes) and stopped to look at multiple displays (average = 5). Most visitors walked along the timeline, stopping intermittently to look at some dates or at the vitrines in the center. Only 13% of visitor groups

breezed through without stopping anywhere. The one piece that did not attract as much use as it should was the main message panel – only 20% looked at it. This is clearly a location problem because 52% looked at the other text panel (greenhouse gas), which is in the sight line as people walk away from the end of the timeline.

- ◆ **Feature:** Neon CO<sub>2</sub> Timeline: This part of the intro area was very effective – it came up often in people’s open-ended responses, for example: “most interesting or surprising” (#1), a topic you “found out about” (#2), “most discouraging thing” (#3), “showing that climate change is a serious problem” (#3), “showing evidence for climate change” (#3). When exiting the exhibition, the vast majority of visitors looked at a photo of this element and understood what it represented.



**Conservation Behaviors Area** (Actions Wall, Behavior Change computer stations, and Built Environment panel):



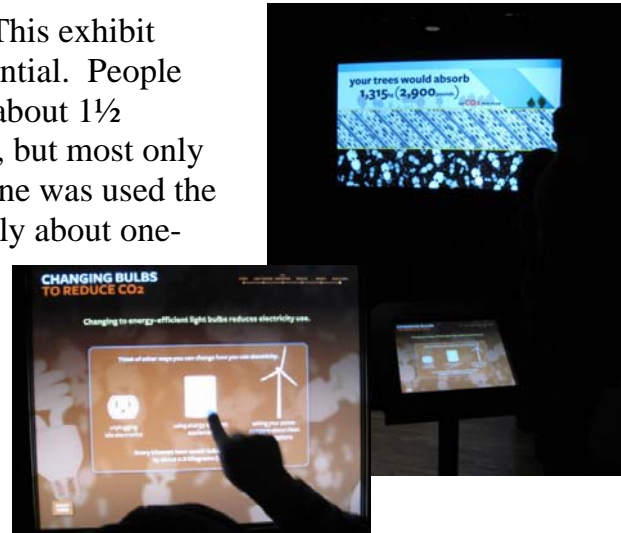
Although components are engaging, the layout of this area is problematic because most visitors start at the Actions Wall, and many proceed to the end of that wall and then leave, missing the other two exhibits. The ‘behavior change’ computer kiosks

would probably have attracted more use if turned either 180 degrees to pick up on the visitor path at the end of the Actions Wall, or turned 90 degrees to the left so the large screen could have been hung on the wall opposite from the Actions Wall.

- ◆ **Feature:** Actions Wall: This is a very engaging component – most visitors stopped here, spent a reasonable amount of time (average = 2 minutes), looked at multiple sections (average = 5 stops), and half (54%) looked at the entire wall. About half of the visitor groups pushed one or more of the buttons. Additionally, there was a high level of social interaction among visitors at the wall (79% talked about it). At the end of the exhibition, when asked which exhibits did the best job of talking about solutions to climate change, visitors most often pointed to the photo of this exhibit (44%).



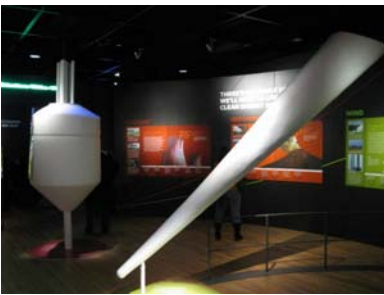
- ◆ **Feature:** Behavior Change Computers: This exhibit component did not seem to fulfill its potential. People who stopped to use a touch screen spent about 1½ minutes, on average, which is reasonable, but most only used one of the stations – the light bulb one was used the most and the tree one was least used. Only about one-third of the computer users looked up at the big screen across from the computer stations, so most visitors are not getting that message (anecdotal comments also suggest that the big screen was so visually busy that people had a hard time understanding it).



**Polar Bear:** This was a popular display – nearly everyone saw it. It connected with people on an emotional level, even if not everyone understood the interpretive message exactly (60% got the connection between polar bears and loss of habitat due to climate change; 20% thought the point was to show that our trash is polluting their habitat). People often mentioned this display in their open-ended comments – it was the #3 answer for “*most interesting display,*” #1 answer for “*most discouraging thing,*” #2 answer for “the best job of *convincing* people that climate change is a serious problem” and #2 answer for “did the best job of showing *evidence* for climate change.”



### **Alternative Energy Area:**



The results for this area are mixed – most of the visitors who stopped here had a reasonable idea of what it was about, but 20% of the visitors apparently walked through without looking at anything (being the last area, some people mentioned being tired of reading, overwhelmed by all the information in the rest of the exhibition). Also, there were a lot of displays and information but nothing interactive or engaging to attract visitors to stop (except for the comment board, but that has a different message). For people who did stop to read the displays, there was some interesting and surprising information here about how other countries are using alternative energy sources more than we are – the #1 answer for “*most surprising information,*” #2 answer for “something that was new for you,” #1 answer for “which of these 12 topics did you find out something about.”

## **A. Who is the audience for this exhibition?**

This full research report starts with a demographic and psychographic profile of the *Climate Change* audience, which serves as an important source of context for interpreting the results. One question of interest: is this exhibition “preaching to the choir” (in the sense of an audience who are already aware of and believing in the seriousness of climate change)? Some highlights of the results are:

- The audience for this exhibition was similar to the audience for *Water*, demographically and environmentally. The visitors were highly educated (82% have college degrees), there were equal proportions of NYC residents, regional residents, people from other parts of the U.S. and people from other countries, and three-quarters were adults visiting without children.
- About half of this audience can be considered the committed audience, and half are more mainstream. The data show that half belong to environmental organizations, half consider themselves ‘very interested and active’ in environmental issues, and 56% completely believed the arguments for climate change before seeing the exhibition.
- A segmentation of the audience by ‘active’ vs. ‘sympathetic’ people (in terms of their self-described environmental orientation) is introduced as a helpful way to look at the results presented in subsequent sections of the report – was the exhibition equally successful for both types of visitors? (There were too few ‘disbelievers’ for their reactions to be analyzed.)

### A.1. Demographic characteristics

OVERVIEW: The demographic characteristics of visitors to *Climate Change* are fairly similar to those of people who came to the previous special exhibition, *Water*. In general this means that there were more repeat visitors to the Museum than there were first-time visitors,<sup>1</sup> many more adult visitor groups than family groups, and slightly more women than men were encountered. Visitors from local to international were among the audience for this exhibition, and a full range of adult ages was represented (although there were more younger adults than older adults). One of the distinctive characteristics was how highly educated this audience was: 55% had some type of graduate school education, and total of 82% had a college degree.

The Entrance and Exit samples were reasonably similar in most respects (residence, group composition, gender, and age). However, the proportion of repeat visitors in the Exit sample (70%) was significantly higher than in the Entrance sample (57%), possibly reflecting a tendency for committed visitors to be more cooperative with Exit interviews.

	Climate Change Exhibit		Water Exhibit	
	<u>Entrance</u> (n=138)	<u>Exit</u> (n=299)	<u>Entrance</u> (n=152)	<u>Exit</u> (n=316)
<u>Familiarity with AMNH:</u>				
first-time visitor	43%	30%	40%	40%
repeat visitor	57%	70%	60%	60%
<u>Residence:</u>				
NY city	25%	34%	33%	28%
other NY, CT, NJ	28%	23%	18%	15%
other US	23%	23%	29%	33%
other countries	24%	20%	20%	24%
<u>Group composition:</u>				
adults-only	74%	75%	74%	68%
families with children	26%	25%	26%	32%
<u>Gender:</u>				
male	42%	47%	37%	46%
female	58%	53%	63%	54%

\*\* Asterisks indicate statistically significant differences (p<.05) between columns of figures. On this page there is a difference between the Entrance and Exit samples in the proportion of first-time vs. repeat visitors.

<sup>1</sup> In analyzing audiences to museums, the proportion of repeat visitors is usually higher for special temporary exhibits, and is usually higher in winter (when this evaluation was conducted).

**Demographic characteristics (continued)**

	Climate Change Exhibit		Water Exhibit	
	<u>Entrance</u> (n=138)	<u>Exit</u> (n=299)	<u>Entrance</u> (n=152)	<u>Exit</u> (n=316)
<u>Age:</u>				
20's	33%	30%	18%	20%
30's	26%	20%	25%	20%
40's	19%	20%	21%	18%
50's	13%	14%	22%	19%
60+	9%	16%	14%	23%
<u>Education level:</u>				
high school	n/a	4%	n/a	n/a
some college		14%		
college graduate		27%		
graduate school		55%		
<u>Day type:<sup>2</sup></u>				
weekday	54%	54%		
weekend	33%	33%		
school vacation	13%	13%		

<sup>2</sup> The entrance sample originally had significantly more data from school vacation weeks (36%), so it was statistically weighted to be the same as the combined Exit interview sample in terms of the proportion of weekday, weekend, and vacation days.

## A.2. Environmental attitudes and knowledge

OVERVIEW: One of the questions for this study is whether the *Climate Change* exhibition is drawing a broad audience or a narrower audience of people with a special interest in environmental issues (is this exhibition “preaching to the choir?”). The data indicate that this audience is similar to the audience for the *Water* exhibition in terms of environmental orientation – about half identify themselves as environmentally active, about half belong to or donate to environmental organizations, and about half came into the exhibition already convinced that climate change is real. So, it can be said that about half of the audience represents “the choir” and the other half is sympathetic to environmental concerns, but not yet active. Very few visitors (5%) expressed low interest or concern for environmental issues.

One additional interesting finding is that the pattern of results about attitude toward the environment is different than what was seen in the evaluation of *Water*: with the previous exhibition, there was a slight (non-significant) decrease in the proportion of people who considered themselves ‘active’ in the Exit sample, but with *Climate Change*, there is an increase (almost statistically significant) in ‘actives’ in the Exit sample. A possible explanation is that people saw conservation actions represented in the *Climate Change* exhibition (e.g., Actions Wall) that they are already doing, so they walked out feeling more environmentally active (see data in the next section A.3. for additional information).

	Climate Change Exhibit		Water Exhibit	
	Entrance (n=138)	Exit (n=299)	Entrance (n=152)	Exit (n=316)
<u>Attitude toward environment:</u>		++		
very interested & active	47%	56%	43%	34%
sympathetic but not active	48%	40%	48%	61%
somewhat or not interested	5%	4%	9%	5%
<u>Belong to environmental organizations:</u>				
yes	n/a	54%	n/a	51%
no		46%	n/a	49%
<u>Knowledge of climate change before seeing exhibition:</u>				
I already knew a lot	21%			
I knew some	68%			
I didn’t know much	11%			
<u>Believe arguments for climate change?</u>				
completely believe	56%			
moderately believe	33%			
some doubts	11%			

++ Plus signs are used in this report to indicate patterns of differences which are not quite statistically significant (milder differences, which may have occurred by chance), but which suggest a trend and may have some intuitive value in some circumstances.

### A.3. Profile of environmentally-oriented and sympathetic visitors

OVERVIEW: ‘Active’ visitors are found in all demographic categories because demographic characteristics do not necessarily predict environmental attitudes. Similar proportions of visitors entering the exhibition declared themselves ‘active’ regardless of familiarity with AMNH, residence, group composition, or gender. However, a few distinctive patterns did emerge: young adults in their 20’s and older adults (age 60+) were less likely to describe themselves as ‘active’ upon entering the exhibition, while adults in their 50’s were more likely to be ‘active;’ but this pattern changed and differences were not significant among exiting visitors. Other differences seen in the Exit sample were: people from other countries were more likely to identify as ‘active,’ and families with children were less likely to be ‘active.’

READ THIS TABLE AS PERCENTS ACROSS THE ROWS

Demographics:	Entrance		Exit	
	<u>Active</u> (n=64)	<u>Sympathetic</u> (n=72)	<u>Active</u> (n=166)	<u>Sympathetic</u> (n=129)
<u>Familiarity with AMNH:</u>				
first-time visitor	43%	57%	53%	47%
repeat visitor	50%	50%	58%	42%
<u>Residence:</u>				
			**	
NY city	45%	55%	51%	49%
other NY, CT, NJ	42%	58%	49%	51%
other US	60%	40%	57%	43%
other countries	42%	58%	<b>72%</b>	28%
<u>Group composition:</u>				
			**	
adults-only	47%	53%	<b>64%</b>	36%
families with children	49%	51%	36%	<b>64%</b>
<u>Gender:</u>				
male	47%	53%	54%	46%
female	47%	53%	58%	42%
<u>Age:</u>				
		**		
20’s	34%	<b>66%</b>	61%	39%
30’s	57%	43%	46%	54%
40’s	49%	51%	58%	42%
50’s	<b>75%</b>	25%	54%	46%
60+	31%	<b>69%</b>	62%	38%
<u>Education level:</u>				
high school / some college	n/a	n/a	46%	54%
college graduate			56%	44%
graduate school			60%	40%



**Profile of environmentally oriented visitors (continued)**

OVERVIEW: ‘Active’ visitors are different from ‘sympathetic’ visitors on other environmentally-oriented measures. ‘Active’ visitors are more likely than ‘sympathetic’ to belong to nature organizations (65% of ‘actives’ belong). They also rated themselves as more knowledgeable about climate change as they entered the exhibition (but two-thirds of ‘actives’ said they knew some, not a lot). The majority of ‘active’ visitors (70%) completely believed in climate change when they entered the exhibition, compared with only 45% of ‘sympathetic’ visitors.

READ THIS TABLE AS *COLUMN* PERCENTS

**Psychographics:**

	<b>Entrance</b>		<b>Exit</b>	
	<u>Active</u> (n=64)	<u>Sympathetic</u> (n=72)	<u>Active</u> (n=166)	<u>Sympathetic</u> (n=129)
<u>Belong to organizations:</u>				**
yes	n/a	n/a	65%	40%
no			35%	60%
 <u>Knowledge of climate change</u> <u>before seeing exhibition:</u>				**
I already know a lot	30%	15%		
I know some	66%	70%		
I don’t know much	4%	16%		
 <u>Believe arguments for climate change?</u>				**
completely believe	70%	45%		
moderately believe	27%	37%		
some doubts	3%	18%		

## **B. Overall perceptions of the exhibition**

This section summarizes people's perceptions of *Climate Change*, including descriptions in visitors' own words, ratings of how worthwhile it was, what was most interesting to visitors, and the overall messages that people got. Some highlights of these results are:

- Top-of-mind descriptions of the exhibition included words such as: informative, scary, good, interesting, enlightening, and too much information.
- Ratings of the exhibition on a scale of 1 to 10 were moderately favorable: 45% gave a high rating, 43% gave moderate ratings, and only 11% gave low ratings. The level of satisfaction was the same across virtually all audience segments, although 'active' visitors rated the exhibition more highly than 'sympathetic' visitors.
- Displays that people mentioned as most interesting included the animated globes, the timeline, films, and the polar bear. The information that people found most interesting or surprising was: alternative energy, ocean effects, and how we can save energy.
- The main ideas of the exhibition were expressed by visitors as: raising awareness about climate change, getting people to change, the causes of climate change, that it's happening, and that there are solutions.

## B.1. Top-of-mind descriptors of the exhibition

OVERVIEW: When asked to describe the exhibition, the top two categories of answers were “informative” and “scary.” Some other frequent answers were general positives (“good” or “I like it”), “interesting,” and some negative comments such as “too much information,” “not enough depth” or “not alarming enough.” Only 2% indicated disbelief.

### *What 2 words or phrases come to mind to describe this Climate Change exhibit?*

[FORM B; n=101]

28%	educational, informative
28%	urgent problem, scary, worrying
18%	general positive (excellent, clear, well-done, good graphics)
12%	interesting
11%	negative (not alarming enough, not enough info, too much text, confusing)
9%	enlightening, thought-provoking
8%	believable, helpful, needed
7%	solutions: save energy, alternative energy, reduce CO <sub>2</sub>
5%	complete, balanced presentation
4%	hopeful, we can make a difference
3%	human activity is to blame
3%	interactive
2%	propaganda, inaccurate (disbelievers)
12%	other general about the content (global warming, CO <sub>2</sub> , energy)

### Sample of answers

*Horrible, climate change is dangerous*

*We need to change; new solutions*

*CO<sub>2</sub> is not main source of temperature increase, there is complicated science going on*

*Concrete; interactive*

*Clean coal; wind turbines*

*Pollution; global warming*

*Excellent; informative*

*Informative; interactive (kid)*

*Ecosystem; recycling*

*Urgent; crisis*

*I liked it; wished I had more time to read everything*

*Awesome; very informative, thought provoking*

*Scary; information*

*I like it; awesome*

*Incomplete; troubling*

*Scary; I didn't realize as much was going on*

*Human's fault*

*Immediate, continuous*

*Emissions, energy*

*Worrying, researching*

**Phrases to describe the exhibit** (continued)

*Informative; balanced*

*Sensational*

*Responsibility; timeliness*

*Informative; thorough*

*Informative; impressive, but could have more depth*

*Downer; lot to learn*

*Carbon dioxide; energy*

*Global warming; threatening our earth; conserve our energy*

*Realistic; scary*

*Good; educational*

*Interesting, I liked it*

*Thought provoking; enlightening*

*Too much information; unimpressed with attendance of exhibit*

*Scary; it's getting hotter*

*Immediate; important*

*Light bulbs; we can do it*

## B.2. Was it worthwhile?

OVERVIEW: Ratings of the exhibition (how worthwhile was it?) show moderately high satisfaction overall – 45% gave high ratings and 43% gave medium ratings. This level of satisfaction was the same across virtually all audience segments (first-time and repeat visitors, families and adults, all age and education levels, and those who were knowledgeable about climate change as well as those who were not). ‘Active’ visitors gave significantly higher ratings than ‘sympathetic’ visitors. Women gave higher ratings than men (it is not unusual in museum studies for women to express more positive opinions, especially about nature or environmental exhibits).

*On a scale of 1 to 10, how worthwhile was this exhibit?*<sup>3</sup>

[EXIT A]

	<u>Overall</u> (n=196)		<u>Active</u> (n=111)	<u>Sympathetic</u> (n=85)
very worthwhile (9-10)	45%		57%	** 31%
worthwhile (7-8)	43%		33%	56%
not so worthwhile (1-6)	11%		10%	13%

	<u>Men</u>		<u>Women</u>
very worthwhile (9-10)	39%	**	54%
worthwhile (7-8)	44%		41%
not so worthwhile (1-6)	17%		4%

<sup>3</sup> Interpreting visitors’ ratings on 10-point scales is based on years of experience with museum visitors, using follow-up questions to ask what their ratings mean, or why they gave a particular number. Consistently over time and a variety of settings, we have found that ‘9’ or ‘10’ means an excellent experience which is completely positive, a ‘7’ or ‘8’ means a moderately positive rating which can be accompanied by some misgivings or not-so-enthusiastic support, and a ‘6’ or lower number indicates a disappointing experience or one with substantial misgivings. The highest ratings we’ve seen (national award winning exhibitions, and very popular among visitors) have been in the range of 75%-80% nines and tens.

### B.3. What was most interesting?

OVERVIEW: People mentioned a lot of ideas, as well as specific display elements that they thought were interesting or surprising. The most interesting content areas included: alternative energy, ocean phenomena and other consequences of climate change, and suggestions of what people can do to conserve. Some of the most interesting displays mentioned were: the animated globes, the red CO<sub>2</sub> timeline, the films, and the polar bear on the garbage pile.

#### *What was most interesting or surprising for you?*

[FORMS A&B; n=304]

#### Content:

20%	information about alternative energy sources
15%	effects on the ocean (acidification, ocean stores CO <sub>2</sub> , coral reefs dying)
15%	effects on wildlife, weather, etc.
14%	suggestions, how we can save energy (actions wall, computers)
11%	information about coal
10%	measuring climate change: tree rings, ice cores
10%	solutions & adaptations, green building, what people are doing already
7%	ice melt, permafrost
6%	carbon capture
2%	trees and CO <sub>2</sub>
2%	amount of energy we use
2%	information, facts, statistics, explanations

#### Displays:

13%	animated globes
13%	timeline, red line, CO <sub>2</sub> rising
9%	films and videos
9%	polar bear on garbage
6%	flooded NYC model
4%	interactives (solar reflection of ice caps, tilt of earth)
3%	temperature change graph
2%	graphics, displays, visuals
2%	rain falling
10%	other answers (comment board, antique instruments, concrete, methane, etc)
3%	don't know, nothing, knew it already

**Sample of answers: what was most interesting?**

*The ocean is acidifying leading to increase in plankton size; coral bleaching  
America's selfish use of energy; practical measures to save energy  
Information about coal; ice cores  
Initial video; globes - animated, attention getter  
All the energy generating alternatives; globes where you press buttons to change patterns  
Carbon capture; how clean natural gas was  
Ice cores; first carbon chart at entry  
Luminous exhibit of the globe; motion of clouds and whole earth concept  
Malaria; tree rings  
Lights at night, a waste of energy, polar  
Coral, polar bear  
The globes, the interactive (ice sheets moving), the solutions section  
The first movie, polar bears, the contrast between before and now  
Ocean part (changes in acidity); how winds move  
Transfer of disease from one to another; deforestation  
Globe showed different parts of the world, polar bear  
Severe weather stuff; different ways to help or change own way of living to help  
The peepers being two weeks early; G-cans in Tokyo  
How people have taken steps to stop global warming; the timeline red line  
Surprised they are advocating nuclear power; history of coal  
That we can curb the effects of climate on earth; alternative energy  
The greenhouse effect; coal  
Ocean currents on animated globe, little current warms east coast  
More data on ocean ph, there wasn't enough  
Carbon capture; level of CO<sub>2</sub> in the atmosphere  
The amount of CO<sub>2</sub> released; polar bears, changing habitats of animals  
Thing about coal, US has biggest reserves; floating gardens  
How change affects the coral reefs  
History of coal; CO<sub>2</sub> challenge  
India's floating gardens; methane from animals has a major effect on climate change  
How much is a metric ton of coal; so much is backed up by evidence  
Polar bear; arctic fox  
CO<sub>2</sub> revelation; how coal was the major pollutant  
Animation of cloud patterns; tree rings  
Effect on arctic fox; permafrost  
Impacts on a variety of climates; oceans and people, urban situations  
The growth in carbon emission from year 2000; the amount of saving that can be done  
Stuff that we already knew; visualization increases awareness  
CO<sub>2</sub> storage  
When you cut the tree CO<sub>2</sub> is released; wind power  
Coral life; exhibit about pollution  
Flooding issue, how different countries handle it; Arctic ice research, effect on bears  
3-D globe maps  
Wall of commitment we can make, w/ associated facts; changing water levels*

**Most interesting** (continued)

*The amounts of CO<sub>2</sub> emitted; things you can do to prevent it*

*Calculating how many trees one has to plant to offset the car*

*Storing energy by moving water upwards; tree rings*

*Section on coal with metric ton chunk of coal, minimal electricity produced; solar could give  
100% of electricity needs*

*Evidence, statistics, numbers; drills in the ice, ice cores*

*Ice core; coral reef*

*Coal emits more CO<sub>2</sub> than oil; higher temps and storms*

*Diseased coral; red CO<sub>2</sub> line*

*You can do more with answers on big screen; change use of autos and electricity, alternative  
energies*



## B.4. Perceptions of the main idea

OVERVIEW: When visitors were asked about the main idea of this exhibition, the top category of answer was to educate and raise people's awareness of climate change. Other common answers were: to encourage people to conserve, how humans are affecting climate, the effects will change the world, and there are solutions to the problems. These categories of answers align well with the intended themes of this exhibition.

### *What's the main idea of this Climate Change exhibit?*

[FORM A; n=203]

36%	raise awareness, educate about climate change
25%	what people can do to help, encourage people to change habits
20%	causes of climate change: human activity, CO <sub>2</sub> emissions
17%	effects of climate change, earth is already changing
13%	there are solutions (didn't mention specifics)
8%	present evidence for climate change, convince people
6%	importance of issue, a serious problem, urgency
5%	alternative energy sources
3%	conservation, protecting the earth (general answers)
2%	no easy solutions, complicated issue
3%	other answers
1%	don't know, no answer

### **Sample of answers**

*The effect will change the world as a whole*

*Awareness, education, encouragement*

*Human driven climate change*

*To get people to rethink how they use their energy*

*Climate is changing and we can do something about it*

*CO<sub>2</sub>*

*Alternative fuels and thinking about the need for nations to prepare for transitions*

*Human induced, people will have to change their habits*

*The change in climate since 1950; impact our society has on the environment*

*To impel people to make changes*

*Shows how we humans are doing most of the damage, many of us are unwilling to change*

*The world is raising its temperature and carbon emissions*

*Discussing evidence of climate change, the different components and how we can tack/solve*

*To show how humans have had an impact and some actions that can be taken to reverse*

*To create consciousness about our planet; what little things we have to better*

*The use of unclean energy, population has increased, using more energy, CO<sub>2</sub> into air*

*Sustainability, informing people about climate change and how to save the environment*

*To convince people we have problems and how we can fix it and that it is urgent*

*To educate to help form an opinion*

*The principles of what's causing climate change and solutions to the problems*

**What's the main idea?** (continued)

*Showing how energy we use over time affects our planet, ways to mitigate climate change*

*How humans are affecting climate change*

*To reduce waste*

*To inform and inspire*

*Change, conservation, what we can do*

*Saving electricity; to encourage people to conserve*

*Awareness to realize the factors going into it and data that say its changing*

*To help the world*

*To make people aware of challenges in the future*

*To raise awareness*

*To help people understand gravity of climate change and how our actions individually  
make a difference*

*Awareness*

*To provide scientific info and proof for climate change and the causes*

*To educate students about global warming; how they can make a difference*

*Pollution*

*Understanding technology behind the cause, invention of the steam engine*

*The educational value of exhibit was very good, reaches goal of awareness*

*The extent of how the climate has changed*

*It's here, no point debating ,evidence everywhere, awareness of what can/should be done*

*How to lower carbon*

*Education*

*To educate on the realities of how we are living*

*Show how carbon emissions are changing the climate*

*Our climate is changing and there are alternative methods*

*No one idea*

*Save the earth*

*Presenting info about it*

*To educate us that we better do something; why and what we might do*

*Climate is changing*

*That it's happening and we need to do something about it*

## B.5. Perceptions of interpretive emphasis

**OVERVIEW:** Before visitors saw the exhibition, they were asked which of four themes would be more interesting. Two of the four choices were clearly more interesting: ‘effects of climate change on animals and humans’ and ‘solutions to climate change problems.’ They expressed lower interest in seeing ‘the evidence’ or ‘how climate change is being measured.’ ‘Active’ and ‘sympathetic’ people had similar interests.

After seeing the exhibition, a different pattern emerged: visitors selected all four topics about equally when asked to choose the ones they *found out more about* in this exhibit. This might suggest that the interpretive techniques used for the less interesting topics (evidence, measuring) were effective at getting visitors’ attention. Again, ‘active’ and ‘sympathetic’ visitors responded similarly to all four topics indicating that this exhibition was not just “preaching to the choir” (the ‘actives’ did get something from the experience), it was also reaching the “mainstream audience” (‘sympathetics’ had similar perceptions of what they found out, compared to ‘actives’).

**ENTRANCE:** *Which of these would be more interesting to you?*

[pick a 1<sup>st</sup> and 2<sup>nd</sup> choice]

	<u>Active</u> (n=63)	<u>Sympathetic</u> (n=72)
The effects of climate change on animals and humans	<b>76%</b>	<b>76%</b>
The most likely solutions to climate change problems	<b>63%</b>	<b>74%</b>
Evidence that climate change is real	35%	31%
Several ways that climate change is being measured	23%	18%

**EXIT:** *Which of these did you find out more about in this exhibit?*

[pick a 1<sup>st</sup> and 2<sup>nd</sup> choice]

	<u>Active</u> (n=112)	<u>Sympathetic</u> (n=85)
The effects of climate change on animals and humans	55%	49%
The most likely solutions to climate change problems	49%	52%
Evidence that climate change is real	49%	40%
Several ways that climate change is being measured	47%	56%

## B.6. Take away messages, realizations

OVERVIEW: The primary message that visitors expressed when asked about their *personal realizations* was that people need to do more to change. This message was vocalized in several variations, such as: “there is more that I can do,” “much work needs to be done,” “we have to be better stewards,” and “we all have to get involved.” It’s discouraging that only 1% cited the realization that alternative energies are a solution because the primary intended message was that individual efforts are not enough and that a global switch to alternative energy is the real solution. It’s possible that museum visitors are now so familiar with the message of ‘things you need to do to help with conservation’ that this is what comes to mind first.

### *Seeing this climate change exhibit made me realize that . . . .*

[FORM A; n=203]

17%	there is more I can do
15%	more needs to be done, we have a lot of work to do
13%	we need to save the earth, need to do something
10%	our efforts can make a difference, communal efforts
8%	people need to be educated, people don’t understand
7%	bigger problem than I thought
7%	there are solutions (unspecified), it’s not hopeless
6%	governments must act, work together, global effort
6%	global warming is real, evidence
5%	hopeless, people don’t care enough, won’t change
3%	some people and governments are concerned & acting
3%	urgency, need to act NOW
2%	it’s complicated, we don’t know everything
2%	disbeliever
1%	alternative energies are a solution
4%	other

### Sample of answers

*I need to work a littler harder to do my part*

*Much work needs to be done, and can be done with discipline*

*Doing all I can*

*More needs to be done to reverse the problem*

*Didn't realize, but confirmed that its up to us to change the decisions of government*

*We're starting to be more optimistic on solutions, it's a starting point*

*Government should take action in developed and under-developed countries*

*I'm concerned about climate change*

*We are contributing to what may be a natural event*

*We should really do something! We should get on the train and walk more*

*Have to make changes in my life to make better world for my family; only one planet*

*There are more solutions than I thought*

*We have a lot of work to do to convince people that it's real and to spend resources*

**Seeing the exhibit made me realize . . . (continued)**

*We need to do something fast to stop this and change*

*We need to be more aware of the climate*

*Everyone can contribute towards reducing climate change, one said to plant a few trees*

*We as a society have to make major changes in the way we live and work*

*We need to do something about it and we are very wasteful*

*Global warming exists*

*There is more that I can do*

*There are a lot of things we have to do and our government has to do to combat this*

*Enormous ways in which climate change affects the world that I haven't taken note of*

*I have to keep changing for the better, control my own wastes*

*People should care more*

*Museum accepts premise that climate change is a result of CO<sub>2</sub> emissions, didn't explore other possibilities*

*That we are on a destructive path*

*There are concrete things that I can do and that I'm going to look into climate change more*

*More people need to be informed about it*

*To be more proactive about personal effects on climate change*

*The importance of addressing this issue*

*Even though I thought I was doing a great job conserving, I can do better, community*

*This problem is real and we really need time to address the solutions*

*I'm part of the problem and the solution*

*We all have to get involved*

*We have many types of evidence for climate change*

*We threaten our own existence; have some control over it if we decide to not damage it*

*Changes that I can personally make will be beneficial*

*How serious it is and that we can reverse the situation*

*I need to bring my students here*

*There aren't enough people here*

*We have to be better stewards of using energy available to us*

*We have a lot of work to do*

*We better hurry up*

*We have to change and do something*

*There are solutions, we can remain optimistic*

*We've got a lot of work to do*

*People are starting to take climate change seriously*

*We have a lot more work to do*

*It's a solvable problem*

*We have to change our energy use now*

*We're in a lot of trouble*

**Take away messages** (continued)

OVERVIEW: The main idea that visitors *hope other people get* from this exhibition is (again) that lifestyle changes are needed. The next most frequent answers are about the seriousness of climate change (that is already happening) and a sense of urgency.

***The idea that I hope people get from this exhibit is . . .***

[FORM B; n=101]

33%	we all need to help by making individual lifestyle changes
20%	climate change is real, already happening, serious problem
12%	urgent – we need to act NOW
8%	hopeful – we can avoid serious damage
5%	save the planet (general comments)
5%	action at the community level is needed
4%	global/large scale action is needed
4%	humans are responsible for climate change
3%	alternative energy solutions
7%	other

**Sample of answers***How they can change their lives to help with changing overall**We need to take climate change seriously**Important to reduce CO<sub>2</sub> made by humans to avoid having abrupt change of climate**Change as soon as they get out of the museum for real**We need to make changes in our daily habits and there are many things we can do**To conserve energy**That we have to do something now**Everybody needs to help, get our towns to do it**To use our resources wisely**Climate change is an immediate issue, everybody must take responsibility**That everyone needs to make a change, group effort**Conserve energy**We need to take climate change seriously and work on solutions**Understanding global situation**How the climate changes; where we can get more energy other than burning coal**Get enlightened and take action**To consume what they need and less of what they want**That they can influence climate change by choices they make**We can't go on the way we are**That we have to make change**More knowledge about climate change, that climate change is real**That people can work together to solve problems**Change needs to be made to help the earth and us**That climate change is happening and alternative sources of energy**That we all must do our part to combat climate change*

**The idea I hope people get from this exhibit . . .** (continued)

*Feeling guilty*

*That climate change is real*

*People will go back and do something in their community*

*We can do it!*

*We need to do more about garbage and recycling, composting needs to catch on in the US*

*There are alternatives that we have to start using*

*To learn and be proactive*

*We gotta start working on this issue*

*There are actions that we can and should take*

*Their actions have an impact*

*Start making that change*

*That climate change is brought on by humans and we have to do something about it*

*Consensus on how we are destroying the earth and take action*

## **C. Educational impact of seeing the exhibition**

Impacts were assessed by comparing visitors' awareness of climate change issues before vs. after seeing the exhibition. The key findings are:

- Visitors leaving the exhibition gave higher ratings of 'believability of the evidence for climate change' compared to entering visitors (71% vs. 56% 'very believable').
- Sympathetic visitors entered the exhibition with lower awareness of eight climate change issues as compared with active visitors. After seeing the exhibition, the sympathetic visitors showed increased knowledge of seven issues, bringing them up to the level of actives. Actives only indicated an increase in knowledge about one issue: coal.
- Most visitors coming into this exhibition (72%) were already aware that climate change is affecting the planet now. This awareness increased further among actives after seeing the exhibition (93%), but not so much among sympathetic/main-stream.
- Visitors came out of the exhibition with a more specific idea about the cause of climate change (CO<sub>2</sub> emissions), as compared with their thoughts before seeing the exhibition (humans causes in general).
- About half of the visitors got the message that alternative energy is the most effective solution. Many of the other suggestions focused on consumer habits and transportation changes. The message of lifestyle habits and behavior seems to have competed with the alternative energy message.
- The exhibition did not appear to have a significant impact on visitors' overall feelings of optimism (or pessimism) about climate change. When asked to cite something hopeful, the alternative energy section was mentioned most frequently.
- Although most visitors felt that much of the information was not new to them, most were able to cite tidbits that were new (e.g., tree rings, alternative energy information, ocean impacts).



## C.1. Believability of the evidence

OVERVIEW: There was a small increase (not quite statistically significant;  $p < .06$ )<sup>4</sup> in the proportion of visitors who gave high ratings for the believability of the evidence for climate change when comparing the Entrance and Exit samples. Additional analysis shows that the change was more noticeable among ‘sympathetic’ visitors (also not quite statistically significant).

*On a scale of 1 to 10, how believable do you think the arguments/evidence is for significant climate change?*

	<u>Entrance</u> (n=137)		<u>Exit</u> (n=98)
completely believable (9-10)	56%	++	71%
moderately believable (7-8)	33%		21%
not so believable (1-6)	11%		7%

Analyzed by ‘active’ vs. ‘sympathetic’

	Active		Sympathetic	
	<u>Entrance</u> (n=63)	<u>Exit</u> (n=52)	<u>Entrance</u> (n=72)	<u>Exit</u> (n=42)
completely believable (9-10)	70%	81%	45%	++ 62%
moderately believable (7-8)	27%	15%	37%	26%
not so believable (1-6)	3%	4%	18%	12%

<sup>4</sup> Statistical significance is based on probabilities; in general differences with a less-than-five percent chance of being random ( $p < .05$ ) are considered statistically significant. Standards like this are important so that findings are not arbitrarily considered noteworthy.

## C.2. Was the information familiar or new?

OVERVIEW: One concern of the exhibit team is that if this exhibition is just ‘preaching to the choir,’ then the information may not be new to visitors. The results support this concern: most visitors (76%) felt that they were already familiar with at least half of the exhibit content. However, 82% were able to cite at least one piece of information that was new, including tree rings, alternative energy (especially examples of how other countries are already using nuclear, solar, and geothermal energy), ocean impacts, animal impacts, carbon capture, facts about coal, and effects on humans. ‘Sympathetic’ visitors found more that was new than did ‘active’ visitors.

### *What percentage of what’s in this exhibition was NEW to you?*

	<u>Overall</u> (n=295)	<u>Active</u> (n=166)	<u>Sympathetic</u> (n=129)
less than 15%	22%	28%	** 14%
15-25%	27%	28%	26%
30-45%	27%	25%	29%
50% or more	24%	19%	32%

### *Give an example of something that was new for you:*

[FORM B; n=101]

- 16% tree rings
- 11% alternative energies (especially solar, geothermal)
- 10% impact on oceans, acidification, coral bleaching
- 9% impacts on polar bears, fox, animal cycles (‘sympathetics’ only)
- 8% carbon capture, role of trees, oceans (‘actives’ only)
- 8% coal – how much we use, how much CO<sub>2</sub> produced
- 8% effects on humans: severe weather, disease, etc.
- 5% sea level rise – NYC model
- 5% CO<sub>2</sub> graph, CO<sub>2</sub> challenge
- 4% ice at poles reflects sunlight
- 4% what other countries are doing already
- 4% how we can help, hopeful message
- 3% ice core technology
- 2% green buildings
- 2% solutions video
- 2% info about cars and oil
- 7% other
- 18% nothing new

***An example of something new for you:*****Sample of answers**

*Some of the effects, photography made it poignant*  
*Different types of alternative energy, changes that weren't evident*  
*Tree exhibit*  
*Coal*  
*Ocean was greater at absorbing carbon than trees*  
*Part about fox, also didn't know much about coal*  
*Solar could be 100%, spread of disease*  
*The tree rings, sea rise*  
*Thing with polar bear, Iceland uses 90% geothermal energy*  
*Corals, I didn't know much about life in oceans*  
*About cars*  
*That France is 80% nuclear*  
*No idea how much energy and pollution produced by coal*  
*Manhattan's future outlook*  
*Surprised about amount of solar energy in Kenya*  
*Solution graph, the CO<sub>2</sub> challenge, best*  
*Impact on animals*  
*Tree rings, sediment core and shellfish*  
*Seven year cycle globe*  
*The rate of the ice melting, NYC flood*  
*The plants on the wall*  
*CO<sub>2</sub>*  
*Information on coral reefs*  
*Reflection of sun on ice shelf*  
*Ocean acidification*  
*Polar bears being forced into residential areas*  
*Carbon capture*  
*Tree rings*  
*Luminescence of arctic ice sheets, patches that float as solution*  
*Hundred percent of electricity can come from solar panels*  
*Amount of light reflected by snow at poles*  
*Carbon sequestration*  
*Wind turbine and effects on polar bear*  
*Coal produces carbon into air, sewer, storms*  
*Tree rings area*  
*The coral reefs, what does healthy coral look like?*  
*The options to make building sustainable, greener*  
*Chart, timeline of rise of CO<sub>2</sub>, pollution from geothermal*  
*Solutions film, what other countries are doing; rising sea level*  
*Plankton they make skeletons*  
*Tree rings*  
*Earlier onset of spring*  
*Glaciers over land are safer than ice shelves*

*Tree rings*

*Interior of nuclear reactor*

*Polar bear, sea temperature data*

*Percentages of global energy from alternative fuels*

*1.4 percent increase only on average, there are many ways to save*

*Carbon capture, relative alternative energy percentages*

*Rise of severe rainstorms and more snow*

*Cement technology's carbon footprint*

*Polar ice core technology, reflectivity of ice*

*Red line graph in the first room*

*Ice core reading technology*

### C.3. Knowledge of climate issues: before vs. after

OVERVIEW: Visitors’ familiarity with 12 climate change issues was measured in both the Entrance and Exit surveys. Results show that most (74% or more) ‘active’ visitors were familiar with eight of these issues when they entered the exhibition. They gained knowledge on only two issues: coal and tree rings. Among ‘sympathetic’ visitors, there was more room for impacts on knowledge because they were only clearly familiar with four of the issues when they entered the exhibition. ‘Sympathetic’ visitors showed significant gains on seven of the issues: severe storms, coral reefs, consumer choices, polar bears, ice cores, coal, and tree rings. For sympathetic visitors, the level of awareness of these issues “caught up” to the ‘active’ visitors so that when they left the exhibition, there were no differences in knowledge based on environmental attitudes. This suggests that the information was accessible to less environmentally-oriented people.

*Do you **know** how these are related to climate change?* (ENT, EXIT A)

(select the ones you know about enough that you could say a sentence or two about it)

	Active		Sympathetic	
	<u>Entrance</u>	<u>Exit</u>	<u>Entrance</u>	<u>Exit</u>
arctic ice melting	97% **	80%	91%	84%
carbon dioxide emissions	87%	80%	79%	79%
greenhouse effect	84%	80%	76%	77%
severe storms	82%	76%	53%	** 71%
coral reefs	77%	69%	51%	** 68%
alternative energy sources	75%	82%	72%	++ 82%
consumer choices	74%	78%	59%	** 74%
polar bears	74%	72%	56%	** 71%
ice cores	63%	63%	25%	** 57%
wildlife reproduction cycles	61%	++ 49%	39%	38%
coal	53%	** 75%	39%	** 70%
tree rings	52%	++ 64%	18%	** 60%
bogus items, testing accuracy				
sun spots <sup>5</sup>	40%	** 16%	21%	16%
earthquake activity <sup>6</sup>	36%	** 18%	23%	** 10%

<sup>5</sup> This item is not related to the exhibition, but was added to the list as a validity check. The fact that some people said they knew how this relates to climate change suggests some “overconfidence” in these figures. However, it is reassuring that people were less likely to indicate an association with climate change when leaving the exhibition (because there was nothing in the exhibition about sun spots).

<sup>6</sup> Another false item, unrelated to the exhibition.

**Knowledge of climate issues** (continued)

OVERVIEW: Using a variation in questioning to explore what content visitors may have gotten from the exhibition, the findings show that most visitors (60%+), regardless of environmental orientation, said they found out about four topics: alternative energy, carbon dioxide, severe storms, and arctic ice melt. At least half of the visitors also found out about coal, tree rings, consumer choices, greenhouse effect, coral reefs and polar bears.

*Did you find out anything about how these topics are related to climate change?* (EXIT B)

	<u>Overall</u> (n=97)	<u>Active</u> (n=54)	<u>Sympathetic</u> (n=43)
alternative energy sources	63%	61%	65%
carbon dioxide emissions	61%	59%	63%
severe storms	61%	61%	61%
arctic ice melting	60%	56%	65%
coal	58%	61%	58%
tree rings	57%	57%	58%
consumer choices	56%	54%	63%
greenhouse effect	54%	54%	58%
coral reefs	53%	52%	54%
polar bears	51%	48%	56%
ice cores	46%	50%	44%
wildlife reproduction cycles	24%	24%	26%
sun spots	12%	7%	19%
earthquake activity	12%	13%	12%

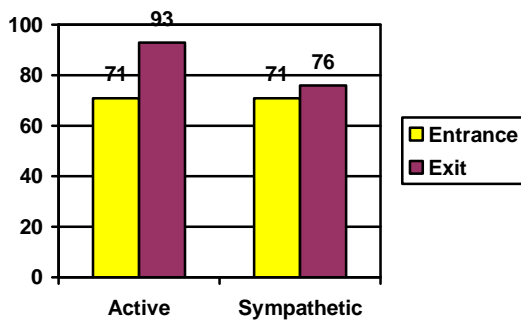
### C.4. Awareness that climate is already changing

OVERVIEW: One of the intended interpretive messages of this exhibition is that climate change is already happening, it's not just a potential future concern. Results from an open-ended question show that most visitors (72%) knew this before seeing the exhibition. Among actives there was a significant increase in the proportion who knew this after seeing the exhibition (from 71% to 93%). Among sympathetic visitors, there was no increase.

*When do you think climate change will actually affect things on the planet?* (ENT, EXIT B)

	<u>Entrance</u>	<u>Exit B</u>
already affecting planet	72%	86%
soon, within 20 years	15%	5%
in the future, over 20 years	9%	9%
unclear answers	4%	0

**Awareness that climate change is already affecting things increased among actives after seeing the exhibit**



**Awareness that climate is already changing** (continued)

OVERVIEW: Among people who indicated they knew the climate is already changing, the examples most frequently given include: ice is melting, more storms, heat waves, and erratic weather patterns.

(if already changing) ***Give an example of something that is already changing:***  
[FORMS A&B; n=304]

29%	ice melting (polar: 21% / glaciers: 8%)
23%	more storms, rain, floods
19%	temperature, warmer, heat waves
13%	weather patterns, erratic, drastic
9%	species dying, threatened (especially coral reefs)
7%	more fires, drought
6%	sea level rising
6%	just “weather”
5%	seasons, longer growing, early spring
5%	bird migratory patterns, animal ranges, habitats
4%	personal reflection about local weather changes
3%	oceans (warming, acidification)
2%	CO <sub>2</sub> levels
7%	other

<< sample of answers on the next page >>



**Sample of answers: something that is already changing**

*My home town had three feet of snow, largest amount before was seventeen inches*

*More floods*

*Storms we see all the time on the news*

*Glaciers melting*

*The intensity and strength of storms*

*CO<sub>2</sub> level, ice caps breaking up, more hurricanes, other weather related changes*

*Hurricanes in south and increased storms and distribution of Lyme disease*

*Temperature*

*Seasons*

*Oceans are changing, jelly fish on coasts*

*Sea levels are rising, seasons shorter, fire season longer, heat wave in Europe*

*There was more snow when I was a little kid*

*Seen changes in Alaska w/ Tanager melting, and Antarctica w/ penguin populations*

*Flooding*

*Ice in Greenland is melting faster than usual*

*The weather*

*Polar ice caps and storms*

*Strength of hurricanes, flooding and droughts, disappearance of glaciers*

*The capacity for us to grow food, erosion of land*

*More dangerous storms*

*Ice sheets and changes in global temperature, changes in sea level*

*Warmer summers/colder winters*

*The storms/severe weather*

*Eskimos have to move because sea level is rising*

*Temperature levels and drought*

*Change in drought and rainfall*

*Reduction of caps, glaciers shrinking*

*Ocean levels are rising*

*Heat wave in Europe, tsunamis and hurricane Katrina*

*In Argentina glaciers are melting*

*Corals are dying*

*Plankton and animals affected*

*Evidence in changing habitats*

*Rising sea levels, change in weather*

*Melting of ice caps. 1% change in temperature*

*Polar ice melting, sea level rising*

*Effects on polar ice cap, temperature, weather*

*Storms are more intense*

*Greenland ice sheets*

*Drought is becoming more prevalent around the world*

*Arctic is changing, moss that caribou feed on is disappearing*

*Melting of polar ice caps, accelerated species extinction rate*

*Species are dying out (frogs); causes chain reaction*

*Shrinking of glaciers and mountains, indigenous people who are vulnerable*

*Temperature fluctuations, extreme changes from day to day, week to week*

## C.5. Awareness of the causes of climate change

OVERVIEW: Visitors got the message that CO<sub>2</sub> emissions are a main cause of climate change. Although visitors were able to give reasonable causes of climate change before entering the exhibition (e.g., humans, emissions, pollution), the answers of exiting visitors were more specific (especially: CO<sub>2</sub>, burning fossil fuels).

*What do you think are the main cause or causes of climate change?*

<u>Entrance</u> (n=138)	<u>Exit A</u> (n=203)	
22%	<b>49%</b>	CO2 emissions
3%	<b>24%</b>	burning fossil fuels
<b>41%</b>	23%	humans
9%	9%	cars, transportation
8%	9%	energy consumption, power plants
6%	7%	industry, industrialization
7%	6%	stupid, greedy people, wasteful
3%	4%	methane, cows
1%	4%	deforestation
<b>11%</b>	4%	natural cycle, sun spots
2%	4%	coal
10%	4%	greenhouse effect (no specific gas mentioned)
<b>17%</b>	3%	pollution, trash
3%	7%	other
1%	0	don't know

## C.6. Awareness of solutions

OVERVIEW: Nearly half of the visitors got the message that alternative energy is the most effective solution. This is a fairly high figure for an open-ended question, and really supports the curatorial main message.

*What would be the most effective types of solutions to help with climate change problems?*  
[FORM A; n=203]

48%	alternative energy sources, clean energy
17%	consumer lifestyle changes
16%	energy conservation
14%	less driving, public transportation, fuel efficient cars
14%	large scale political & economic change, regulations, caps, taxes
13%	use less fossil fuels, reduce CO <sub>2</sub> emissions
6%	recycling
3%	stop cutting trees
2%	green building
8%	other

### Sample of answers

*Alternative life styles*

*Stop cutting down trees*

*Investigating alternative energy sources, consumer changes, just a small change by millions*

*Reduce consumption, awareness, a lot of people still haven't got it*

*Change in lifestyle*

*Government needs to get involved, make laws and force people*

*Using less fossil fuels*

*Large scale investments politically and financially*

*Recycling and nuclear energy*

*Conservation, changing energy sources*

*Don't know, people listen but then forget*

*Having a cap on national emissions*

*Reducing energy use in general, research alternative fuels*

*Everyday actions, regulatory changes*

*Taxes, the price of energy should be higher and to disseminate information*

*Awareness of the problem, taking steps afterward*

*Alternative sources of energy, driving less, using less electricity, recycling*

*Solar energy, wind, tidal, and reduce consumption*

*Cut down on CO<sub>2</sub> emission in day to day life and industry*

*Reduce CO<sub>2</sub> emissions, alternative energy sources*

*Drastic changes in life cycle for large portion of world population, explore different sources of energy*

*Limiting consumption*

*Government start subsidizing alternative energy*

*Reducing CO<sub>2</sub> emissions*  
*Reduction, alternative energy, change lifestyle*  
*Being prepared, reduce carbon foot prints*  
*Infrastructure/transportation*  
*Personal conservation as part of it, multi faceted plan for alternative energies*  
*More energy efficient homes and cars, alternative energy sources*  
*Alternative energy, lifestyle changes*  
*Alternative energy and using less energy*  
*Conserve, find alternative energy sources, eat more responsibly, avoid fast food*  
*Green energy*  
*Change the energy source*  
*Alternative fuels*  
*Reduce carbon dioxide; wind turbines*  
*Cutting back energy usage*  
*Alternative energy sources*  
*Changing how we get our energy*  
*Finding new ways of energy generation; consumer changes*  
*Combinations of solutions, nuclear to individual*  
*Reduce the use of fossil fuels, use alternative energy*  
*Use less fossil fuels*  
*Use less energy*  
*Reduce emissions*  
*Individually changing consumption and recycling habits, researching alternative energies*  
*Reduce amount of carbon dioxide, store it somewhere, remove it from atmosphere*  
*Energy conservation, smaller cars*  
*Affordable technology and awareness, education*  
*Recycling, limiting fossil fuel emissions*  
*Nuclear power on a local scale, hybrid and electric cars, public transportation, more  
alternatives to driving; renewable energy*  
*Clean energy, humans using reusable materials, conservation*  
*Create economics that focus on solutions*

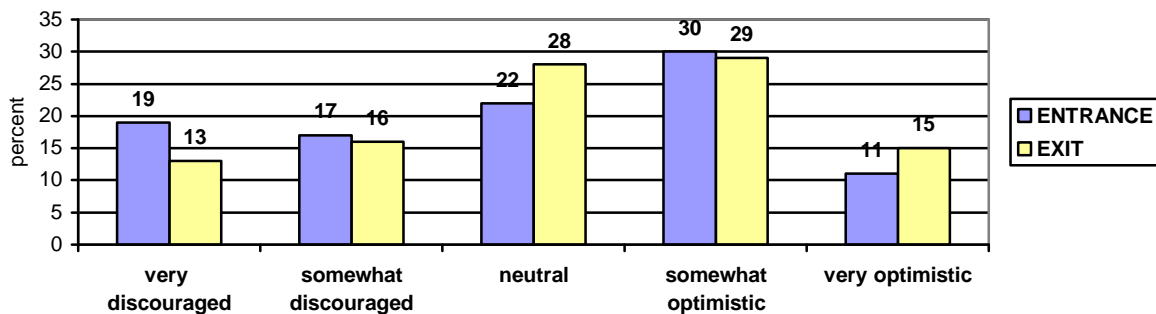
### C.7. Affective impact

OVERVIEW: Two different approaches were used to assess visitors’ feelings about climate change: one used a single 11-point scale with ‘-5’ and ‘+5’ at the ends. The other approach used two separate 10-point scales (results presented on the next page). The single-scale approach showed that most visitors were either neutral-mixed (26-32%) or somewhat optimistic (24-29%). There was no difference between entering and exiting visitors. There were also no significant differences in reactions among ‘active’ and ‘sympathetic’ people.

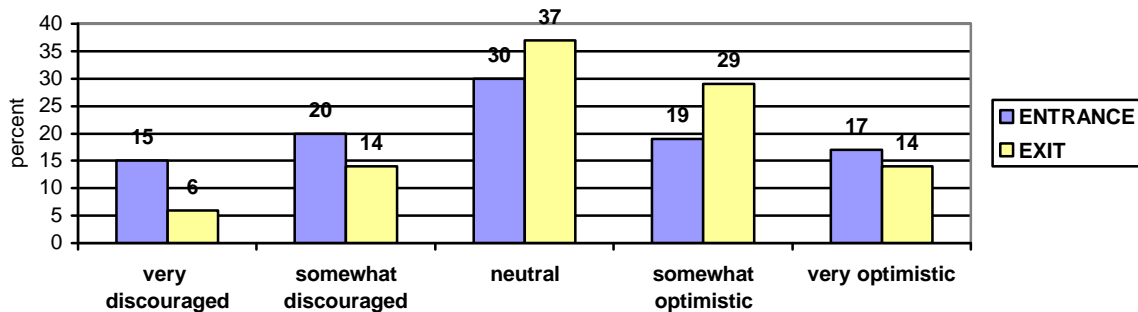
*Based on everything you know about climate change, how discouraged or optimistic do you feel? (on a scale of -5 to +5) (Entrance, Exit A)*

	<u>Entrance</u>	<u>Exit A</u>
very discouraged (-5,-4)	17%	10%
discouraged (-3,-2)	20%	15%
neither/ neutral (-1,0,+1)	26%	32%
optimistic (+2,+3)	24%	29%
very optimistic (+4,+5)	14%	15%

**Among ‘active’ people, ratings of discouragement / optimism didn’t change much**



**Among ‘sympathetic’ people, there is a mild shift in ratings, away from being discouraged (but the difference from Entrance to Exit is not statistically significant)**



**Affective impact** (continued)

OVERVIEW: A second approach to measuring discouragement and optimism – using two separate scales – shows that most people leaving the exhibition were a little-to-moderately discouraged about climate change and at the same time a little-to-moderately optimistic about what can be done. The patterns of results were not significantly different for ‘active’ and ‘sympathetic’ people. The results indicate that many people are “on the fence,” not sure how they feel about this huge, complicated issue that they as individuals do not have the power to fix.

*How discouraged do you feel about climate change, on a scale of 1 to 10?* (Exit B)

*How optimistic do you feel about what can be done about climate change?* (Exit B)

	<u>Exit B</u>	<u>Active</u>	<u>Sympathetic</u>
very discouraged (9,10)	23%	22%	22%
moderately discouraged (7-8)	<b>30%</b>	35%	22%
a little discouraged (5-6)	<b>36%</b>	29%	46%
not too discouraged (1-4)	11%	14%	10%
very optimistic (9-10)	13%	18%	7%
moderately optimistic (7-8)	<b>27%</b>	28%	21%
a little optimistic (5-6)	<b>42%</b>	41%	46%
not too optimistic (1-4)	19%	13%	26%

**Affective impacts** (continued)

OVERVIEW: The polar bear on the garbage pile was most frequently cited as the most discouraging thing people saw in the exhibition. It seems to be a powerful visual example of how climate change is already impacting our planet. Other discouraging things mentioned were that people are not doing enough to change, the increase in CO<sub>2</sub>, and hearing about severe weather events.

***What was the most discouraging thing?***

[FORMS A&B; n=304]

31%	effects on wildlife and habitats (polar bear on garbage)
11%	that people don't care, don't act, stupidity
10%	CO <sub>2</sub> emission rate rising, red line
10%	storms, disasters, heat waves, people suffering
8%	impacts on oceans, coral, plankton, acidification
7%	sea level rise, NY city model
6%	it's real and already happening
5%	melting ice caps and glaciers
4%	a huge problem, will take global action to fix
4%	exhibit – not enough info, not strong enough
4%	visuals of all the cars, future energy needs (especially Asia)
6%	other
9%	no answer, don't know

**Sample of answers**

*Red line at the beginning and industrialization of China and India*

*Reality of climate change and ignorance*

*Lots of poor people who need energy*

*Coral reef and polar bears*

*Evidence that CO<sub>2</sub> concentration increasing and amount of fossil fuel still dependent on*

*The burning of trees - rainforest*

*Rate of change over last 100 years, wish there was more about lack of government action*

*We are not doing enough, large undertaking is necessary*

*Polar bear graphic*

*Polar bear*

*The polar bear's habitat being destroyed*

*Graph at the beginning*

*The things on the ocean, coral reefs*

*More technology more problems*

*Changes in habitat*

*Polar bears*

*The species that could die out*

*The exhibit is ineffective in that it does not sell*

*The rising sea levels to life in the ocean and human life*

*The animals/wildlife cycles have or are being changed*

*City flooding, images of millions of people being moved around, agriculture*  
*Lack of data*  
*The speed at which climate change is occurring*  
*It is so overwhelming, it is a huge interconnected problem*  
*The extent of the increase in CO<sub>2</sub>*  
*Thinking about whether anyone was going to pay attention*  
*That it's already happening, all we can do is make it not as severe*  
*Lack of people in exhibit, personal solutions aren't the big thing*  
*We are not doing enough to change our habits*  
*The little pied flycatchers going extinct*  
*Easy things that people can do to help but don't*  
*Ppm graph- the trend went up 100 in 450 years*  
*Coal energy is the most used*  
*Countries have not gotten together*  
*Polar bear on trash*  
*Negative things we are doing to environment*  
*Bangladesh and polar bear*  
*The increase in global warming*  
*We continue to use fossil fuels carelessly*  
*Polar bear, so much garbage*  
*Model of Manhattan flooding*  
*The fact that positive information was presented at all*  
*Intensity of weather changes*  
*Effects of pollution*  
*Ice melting*  
*Unknowns about the ocean because you can't deal with something if it's unknown*  
*Information about flood and weather events*  
*Manhattan flooding*  
*That we've already caused damage*  
*Acidifying of the ocean*  
*Polar bear on a trash heap*



**Affective impacts** (continued)

OVERVIEW: Alternative energy sources were most frequently cited as the most hopeful thing people saw in this exhibition. Other categories of answers included: this exhibit educating people, solutions (unclear if referring to alternative energy or something else), and “people pushing the buttons for change.”

***What was the most hopeful thing?***

[FORMS A&B; n=304]

35%	alternative energy
18%	this exhibit, educating people (especially children)
14%	solutions (no specifics)
13%	little things people can do, people pushing buttons to commit
9%	people and governments are working on it
5%	message board, comments and opinions
5%	videos (especially Bloomberg one)
5%	other
5%	no answer, don't know

**Sample of answers**

*Renewable energy*

*Video of what could be done to reduce fossil fuels*

*Countries are looking for new ways to conserve energy*

*Solar panels, effective green buildings*

*Spreading information to the public*

*It gives many solutions, simple*

*Having this exhibit*

*Alternative clean energy*

*Energy alternatives*

*Alternative energy (wind or solar)*

*Tack board (message board)*

*Wind energy*

*Solar panels*

*Examples about solutions*

*Display of things people can do to help*

*We have to turn green, like it or not*

*The ways to conserve energy in everyday life*

*Alternative energy*

*Political leaders saying that we need to do something*

*Solutions that are presented and nuclear power*

*The alternative energy sources room*

*That there is an exhibit about something like this*

*Last section, alternative energy*

*That it was here*

*That some of these alternatives are being developed*

*Some of the nuclear and other things that can be used*  
*Human nature to find solutions*  
*People pushing the buttons for change*  
*Wind power*  
*Alternative energies*  
*Making people aware of the problem*  
*Plant wall*  
*Things can be changed by using alternative energy*  
*Plant trees and maintaining environment*  
*Children's flash cards*  
*People are responding on the solutions*  
*Many potential solutions*  
*100% of our energy could be met by the sun*  
*Kids suggestions*  
*People are getting new solutions*  
*Renewable energy*  
*Solving the problem facts at exit, solar, water, carbon capture*  
*Education of children*  
*Good turnout and good presentation*  
*People starting to take more action*  
*Amount of alternative fuel sources available/pending*  
*Lots of mention of things people can do right now*  
*Visual, with animals and climate*  
*Board where people could make suggestions*  
*Solar panels*  
*Solar panels, tree planting*  
*Solutions individuals can partake in*

## **D. Contributions of specific exhibits**

This section of the report explores visitors' perceptions of specific exhibit elements, including issues such as: which exhibits best conveyed the main messages? what did people think of the animated globes and videos? did people really understand the point of some of the exhibits? Some highlights of these findings are:

- Visitors thought that the NYC Flood Model and the Polar Bear exhibit did the best job of convincing people that climate change is a serious problem. These very graphic images had an impact on people.
- Visitors selected the Actions Wall most often as doing the best job of talking about big solutions, which suggests that many people didn't get the message that individual consumer choices are not enough to solve the problem. However, the second and third most frequent selections were the Last Video and the Alternative Energy Area.
- Visitors chose four exhibits as doing the best job of showing the evidence for climate change: Ice Cores, Polar Bear, Tree Rings, and the Intro Area.
- The active visual media (rotating globes, videos) were well-received. The text panels and hands-on exhibits were moderately well-received but were also perceived as needing improvement (e.g. visitors commented that there was too much text and that there could be more interactives).
- Most visitors showed a reasonable understanding of select exhibits (if they stopped there): Polar Bear, Tree Rings, Coal, Intro Area, and Alternative Energy. However, two of these exhibits were skipped by about 20% of the audience: Tree Rings and Alternative Energy.

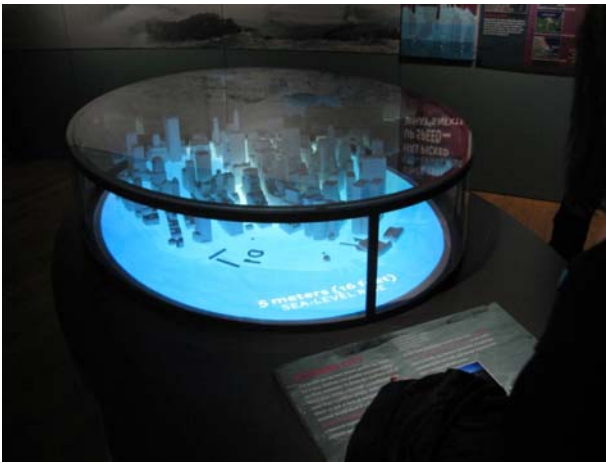
**Exhibit Photos shown to visitors for the questions in section D1**



**TREE RINGS**



**ALTERNATIVE ENERGY AREA**



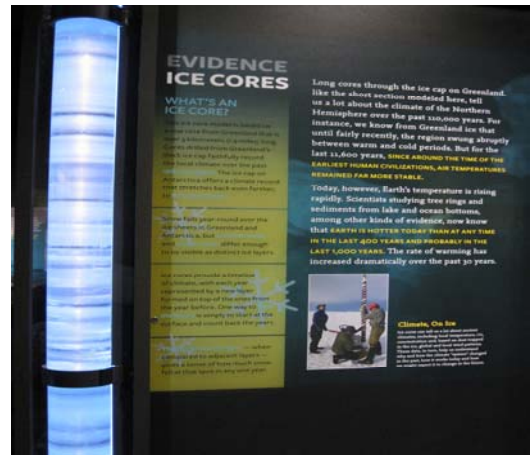
**NY CITY FLOOD MODEL**



**COMMENT CARDS**



**ACTIONS WALL**



**ICE CORES**

### Exhibit Photos (continued)



**LAST VIDEO – ENERGY FUTURE**



**BEHAVIOR CHANGE KIOSKS**



**POLAR BEAR ON GARBAGE**



**SUN ANGLE INTERACTIVE**



**INTRO TIMELINE**



**ICE CAPS INTERACTIVE**

### D.1. Which exhibits did the best job of showing main messages?

**OVERVIEW: Climate change is a serious problem.**

Based on visitors’ selections among 12 exhibit photos, the message that ‘climate change is a serious problem’ was best depicted by the NY City Flood Model and the Polar Bear (disturbing visual images). There were a few differences between active and sympathetic people: for example, actives were more likely to choose the Intro Area (red line graph of CO<sub>2</sub> increase). Nearly one-quarter of visitors chose the Actions Wall, which doesn’t really make sense for this question (perhaps they thought it was effective in a different way: for convincing people that they should change their habits).

***Which of these parts of the exhibit do you think did the best job of . . .  
convincing people that climate change is a serious problem?***

[PHOTOS; EXIT A]

	<u>Serious</u> (n=198)	<u>Active</u> (n=112)	<u>Sympathetic</u> (n=86)
NYC Flood Model	46%	47%	44%
Polar Bear	41%	43%	38%
Intro Area	27%	32%	** 20%
Actions Wall	23%	23%	22%
Ice Caps Reflect Interactive	16%	21%	** 9%
Last Video	15%	16%	13%
Ice Cores	14%	12%	16%
Tree Rings	10%	5%	** 16%
Last Area (Solutions)	10%	10%	9%
Conservation Kiosks	10%	10%	9%
Sun Angle Interactive	7%	9%	5%
Comment Cards	6%	6%	6%

(average of 2¼ selections per person)

**Which exhibits showed main messages? (continued)**

OVERVIEW: There are big solutions to climate change.

The exhibit that visitors chose most often as depicting ‘big solutions to climate change’ was the Actions Wall, followed by the Alternative Energy Video and the Alternative Energy Area. These findings again suggest that visitors are more tuned-in to messages about individual conservation actions and had a harder time getting the message that alternative energy sources are the best solution. Also, the Actions Wall was popular and well-used, and it may be that people didn’t pay quite as much attention to the last area about alternative energy.

***Which of these parts of the exhibit do you think did the best job of . . . (photos) talking about big solutions to climate change?***

	<u>Solutions</u> (n=198)	<u>Active</u> (n=112)		<u>Sympathetic</u> (n=86)
Actions Wall	44%	49%	++	37%
Alternative Energy Video	34%	36%		32%
Alternative Energy Area	28%	28%		27%
Behavior Change Kiosks	15%	14%		17%
Comment Cards	8%	4%	**	13%
Ice Caps Reflect Interactive	3%	2%		5%
Polar Bear	3%	1%		5%
Intro Area	3%	3%		2%
NYC Flood Model	2%	3%		1%
Ice Cores	2%	2%		2%
Sun Angle Interactive	2%	3%		0
Tree Rings	0	0		0

(average of 1½ selections per person)

**Which exhibits showed main messages? (continued)****OVERVIEW: Showing the evidence for climate change.**

Four exhibits were selected as doing the best job of showing ‘the evidence for climate change:’ Ice cores, Polar bear, Tree rings and Intro area. Three of these are about technical data, which is a very positive indication that some people are paying attention to the details. Again, the Polar Bear is considered to be effective, even though it doesn’t really show evidence (rather it is a strong visual/psychological reminder of the consequences of climate change and some visitors see this as ‘evidence’).

***Which of these parts of the exhibit do you think did the best job of . . . (photos) showing the evidence for climate change?***

	<u>Evidence</u> (n=198)	<u>Active</u> (n=112)	<u>Sympathetic</u> (n=86)
Ice Cores	29%	34%	23%
Polar Bear	28%	27%	29%
Tree Rings	25%	29%	20%
Intro Area	25%	27%	23%
NYC Flood Model	15%	18%	10%
Ice Caps Reflect Interactive	15%	16%	14%
Sun Angle Interactive	8%	9%	7%
Last Area (Solutions)	4%	4%	4%
Last Video	4%	7%	0
Actions Wall	3%	2%	4%
Comment Cards	1%	1%	0
Conservation Kiosks	1%	1%	1%

(average of 1½ selections per person)



## D.2. Visitor opinions of different types of exhibits

OVERVIEW: Visitors liked the rotating globes and videos – 81% said these ‘active visual images’ were perfect. However, several people (8%) thought the rotating globes were confusing or didn’t give much information (results on the next page). Visitor reaction to the text panels and interactive exhibits was somewhat less positive, although mostly favorable – about 60% said they were perfect. Most of the comments about the text panels suggested that there was too much text. A few people had difficulty with the red text. Most of the comments about the hands-on exhibits indicated that people wanted more interactives. Several people had difficulty understanding some of the hands-on exhibits.

*The designers would like some feedback on three types of exhibit elements -- in terms of the number of them and how worthwhile they were, would you say they were perfect as is or they could use some improvement? [EXIT B; n=101]*

	Perfect <u>as is</u>	Could <u>improve</u>
active visual images (e.g., rotating globes, video theaters)	81%	19%
text panels	62%	38%
hands-on exhibits	58%	42%

### *How could text panels be improved?*

14%	too much text, too long
9%	too many text panels
5%	more colorful, more graphics
4%	hard to see red text with lighting
2%	use additional languages
3%	other

### *How could hands-on exhibits be improved?*

23%	have more interactives
10%	hard to understand, need staff to explain
7%	lame, not engaging
4%	other (not working, hard to see, etc.)

### Answers about being ‘hard to understand’

*Need staff demonstrating*

*Didn’t quite understand Pangea*

*Not well explained*

*Good, but some not easy to understand*

*Ice pieces was confusing*

*Temperature guns were fixed in place*

*Weren’t clear, a little unsophisticated*

## Opinions about different types of exhibits (continued)

### *How could active visual images be improved?*

8%	globes confusing, didn't show much
5%	suggestions about the videos
3%	have more globes

#### Globes

*Not informative enough, not precise*

*Wasn't clear what it was trying to show*

*The globe with clouds was not self explanatory*

*Confusing, push button, not sure what happened, what was result?*

*Globes don't give any information*

*Globes do not do anything*

*Globes were least illuminating*

*Too similar to each other*

#### Videos

*More information, couple of minutes longer*

*Didn't think showing a face of the expert was useful in the second one*

*Theaters could be more dynamic*

*Would like a timer or some way to know where you are in the movie when playing*

### D.3. Understanding the Polar Bear

OVERVIEW: Although the Polar Bear display was popular and almost everybody saw it, the exhibit team wondered what message people were really getting from it. The findings are mixed: one-fifth of visitors clearly understood the point of this exhibit, two-fifths probably got the point but weren't as articulate, and one-fifth got the wrong message – that our trash is threatening the polar bear.

*What does this polar bear exhibit have to do with climate change?* [FORM B; n=101]

20%	ice melting, must forage for food
41%	losing habitat, encroaching (didn't say food)
19%	our trash is threatening polar bears
5%	endangered animal, shock value
12%	other / unclear
7%	don't know, didn't see



#### Sample of answers

*They're declining, rams home the trash aspect*  
*It's natural habitat is being destroyed has to seek out other food, around humans*  
*Their natural habitat is melting away*  
*Best image, not in pristine land anymore, encroaching human space*  
*Since they couldn't hunt in ice caps, foraging of dumps*  
*It's having a hard time finding food, receding of ice, losing habitat*  
*Losing his territory*  
*Waste is threatening polar bear*  
*Impact on animal life*  
*They can't do anything must adapt*  
*Cc is affecting his environment, can't hunt*  
*How it will be in future if we don't watch our behavior*  
*Foraging in junk pile*  
*Going away from natural habitat, nearer to humans*  
*Ice is disappearing, throw back from technology*  
*It has lost his space and has to forage*  
*Demonstrates how human waste negatively impacts polar bear population*  
*Ice is melting and they are losing lives*  
*People throwing garbage in wild habitat, endangering*  
*Because arctic is melting*  
*To show pollution and how it affects animals*  
*Didn't see problem with waste but hunting grounds disturbed*  
*The loss of habitat and source of food*  
*Impact on large arctic mammals, loss of habitat*  
*Habitat is being destroyed, ice melting*  
*Endangered species*  
*Dying off; meeting with other bear species (brown, grizzly)*

## D.4. Understanding the Tree rings

OVERVIEW: Slightly more than half of the visitors (55%) reasonably answered a question about the point of the tree rings exhibit. About one-quarter didn't really understand the relationship between tree rings and climate, and one-quarter didn't recall seeing this exhibit.

*Why were the tree rings in the exhibit?* [FORM B; n=101]

27%	see history: climate/ growth conditions (general answers)
25%	see history: drought, fires, wet conditions (more specific answers)
3%	see history: temperatures, warming
6%	trees are dying due to pollution
5%	measure CO <sub>2</sub>
4%	see age of trees
3%	trees are being cut down
7%	other
23%	don't know, didn't see



### Sample of answers

*Don't cut the wood, the trees*

*Climate change, moisture, temperature makes them grow faster or not*

*Time capsules hold info from past*

*Showed how droughts affected growth of trees*

*Rings show age of the tree, see cracks forming*

*Killing trees, CO<sub>2</sub>*

*How we can study past weather*

*They show CO<sub>2</sub> levels similar to ice thing*

*Shows droughts, wildfires*

*Shows history of changes in climate*

*Showed droughts over time, tool for measuring*

*Can read history of good/bad years*

*How long trees live, increase in pollution decrease length of tree life*

*Shows weather change, sunlight effects*

*Tree rings are really informative by how climate changes*

*To see changes in growing conditions*

*Shows changes in climate (in their growth)*

*Showed effects of climate change on growth of tree*

*Tell us when climate jumps occurred*

*Thinner in dry years*

*Climate change is ruining trees*

*Difference in thickness shows drought periods over the last several hundred years*

*Droughts with timeline (colored dots)*

*Anti-logging (not sure)*

*Shows climate change*

## D.5. Understanding the Coal

OVERVIEW: Most visitors (~70%) articulated a reasonable message about the point of the Coal exhibit. Only a small portion of visitors (8%) didn't see this exhibit.

*Why was there a hunk of coal in this exhibit?* [FORM B; n=101]

### reasonable answers:

- 37% burning coal emits CO<sub>2</sub>
- 13% fossil fuel, we use it for energy
- 13% how much coal is used today
- 12% how much energy coal gives off
- 5% burning coal causes pollution
- 3% large reserves of coal, inexpensive fuel

### not so good:

- 14% see what it looks like, feel it, how dirty
- 7% early fuel, not used anymore
- 3% our coal reserves are depleted
- 9% other / unclear
- 8% don't know, didn't see



### Sample of answers

- It's declining, source of pollution*
- Coal is big reason humans seeing CO<sub>2</sub> in atmosphere*
- Major problem for modern life, causes burden*
- So we could see what it looked like*
- That huge chunk of coal only produces a little bit of energy*
- Back in the days of trains, a source of CO<sub>2</sub>*
- Fossil fuel burning is main contributor*
- To see it, how much coal there is*
- People burn coal to use as fuel*
- Where our CO<sub>2</sub> has come from*
- Obvious, this is what we used for energy*
- To illustrate what a ton looks like and how much CO<sub>2</sub> is going into atmosphere*
- Show that coal is a problem*
- Show type of energy a ton of coal can produce*
- Just to show coal since it's a main topic*
- Coal source of energy, producing too much carbon*
- Advocates of man made global warming attribute reason to coal*
- Because coal causes radiation, pollution*
- One of the main contributors to climate change*
- Using coal for energy but need new source*
- Coal is leading culprit for CO<sub>2</sub> emissions*
- To show us what we use for energy*
- To give us a visual of how dirty it is*

## D.6. Understanding the Introductory Area

OVERVIEW: Almost half of the visitors (46%) clearly got the message of this area about CO<sub>2</sub> increasing; an additional 38% gave reasonable answers referring to the timeline but didn't specifically mention CO<sub>2</sub>. About one-tenth of the visitors didn't really stop in this area or didn't know what it was about.

*What was the point of these exhibits in the first room?* [FORM B; n=101]

46%	increasing energy needs, CO <sub>2</sub> rising
38%	history of energy use, timeline
6%	other / unclear
11%	don't know, didn't stop



### Sample of answers

*Unbelievable how after 1850 it was increasing problems*

*Showing the change over the decades due to fossil fuels*

*With development of technology, population and economy, CO<sub>2</sub> is growing exponentially*

*History on the economy growth, population growth, CO<sub>2</sub> growth*

*CO<sub>2</sub> emissions how its grown over time*

*Shows rapid change in energy use*

*Show growing economy, population and CO<sub>2</sub>*

*Energy use over years, we're using more now*

*Evolution of energy, industrial revolution, rapid growth of energy use*

*Development of energy*

*Changing our energy source*

*Clear, to show how much it's increased over the years*

*Red line shows increasing CO<sub>2</sub> over time (very effective)*

*Industrial revolution, fossil fuel dramatic increase*

*Timeline extremely short given whole span of time*

*To focus on amount of fossil fuel we are consuming*

*Show level of CO<sub>2</sub> has been rising rapidly recently*

*Showed concentration of CO<sub>2</sub> in atmosphere from industrialization*

*Visualize the change in activity and how much we use now*

*To show us how "progress" is detrimental*

*The progression of industrial usage*

*Shows the rise of the level of CO<sub>2</sub>*

*CO<sub>2</sub> increased recently in atmosphere*

*To explain the start of energy in the industrial revolution*

*An Inconvenient Truth showed this; exponential increase of CO<sub>2</sub> emissions with population*

*Timeline of industrial age*

*Shows emissions over time*

*How society was building (population, technology) and effects on atmospheric CO<sub>2</sub>*

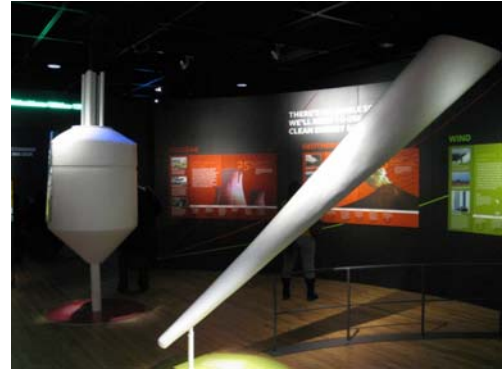
*How we lived before; and technology's effect on CO<sub>2</sub> levels*

## D.7. Understanding the Last Area (alternative energies)

OVERVIEW: About two-thirds of the visitors gave a reasonable explanation of the point of the last area. About one-fifth of the visitors said they didn't stop here (some fatigue evident at the end of the exhibition).

*What was the point of these exhibits in the last room?* [FORM B; n=101]

38%	alternative energy sources
16%	nuclear power, solar, wind
8%	solutions for the future
8%	new technologies, carbon capture
5%	what we can do to change
4%	didn't like this area, no interaction
11%	other / unclear
19%	don't know, didn't stop



### Sample of answers

*Less impressed with these exhibits*  
*To educate about alternative energy*  
*To make us aware of what we need to do to change*  
*What the alternatives are - nuclear, etc.*  
*Nuclear reactors, it's dangerous, a bomb could destroy us all*  
*Suggest alternative forms of energy production*  
*Different types of energy, good for long term or not*  
*Show how we can change, alternative fuel sources*  
*Alternative energy sources*  
*Changing our energy source*  
*New info*  
*Alternatives*  
*Left coal out, other forms, how to improve*  
*New energy*  
*Alternative solutions*  
*Alternative energy*  
*Technology has given new ways to produce energy*  
*Saw solar panels*  
*To show us new technologies*  
*To give us hope about what we can do*  
*I had trouble relating them to each other and have a solar panel*  
*Offering alternative solutions and giving hope and inspiration*  
*Alternative energy*  
*Too much information! Got burned out by the end*  
*Nuclear energy is available*  
*Things we can do to slow the trend*  
*Carbon capture*

## **E. Observational studies of selected exhibits**

This section of the report summarizes the results of four separate “mini-studies” using observational methods to address questions about usage of specific exhibit areas or components. The key findings are:

- Intro Area: are visitors rushing through this space? No, most visitors spent a reasonable amount of time here (average = 3 minutes) and most visitors stopped to look at multiple components, especially some of the vitrines and dates along the timeline (1650, 1900, 2000). The main message text panel was skipped by 80% of visitors.
- Conservation Behaviors Area: are visitors bypassing this area? No, most adults (64%) were attracted to the Actions Wall, and only 14% passed through this area without stopping anywhere. Children were less likely to stop at the Actions Wall first (42%), and somewhat more likely to pass by the area without stopping at any of the three components (26%).
- Actions Wall: are visitors engaged by this exhibit? Yes, adult visitors who stopped to look at this exhibit spent time at the wall (at least 2 minutes on average), most looked at five or more of the seven topics, and about half pushed at least one button.
- Behavior Change Computers: do people using these computers see that the big screen on the wall is part of this exhibit? No, only one-third of the computer users appeared to look at the big screen.



## E.1. Intro Area

**ISSUE:** The Intro Area was selected for an observational study because the exhibit team had concerns about whether people were spending any time here or just rushing through.

**METHOD:** The method consisted of observing 56 visitors as they went through this area and recording the length of time spent and where they stopped.

### RESULTS:

- Most people did spend a reasonable amount of time here (3 minutes on average).
- Visitors stopped to look at multiple elements (5 stops on average).
- The most frequently used elements were the greenhouse gas panel, the vitrine with coal and several spots along the timeline (1650, 1900, and 2000).
- One finding of potential concern is that only 20% of visitors stopped to look at the main message panel.



### **E.1.a. Sample characteristics of Intro Area**

OVERVIEW: A total of 56 adult visitors (alone, with other adults, with children) were observed as they went through this first room of the exhibition. The observations were conducted primarily on weekdays so most of the visitor groups consisted of adults visiting without children. The sample includes equal proportions of men and women. Most of these observations occurred when the exhibit was not busy, so that visitors' choices of what to do and see were not constrained by other visitors' use of the space.

(n=56)

#### Gender:

men	52%
women	48%

#### Group composition:

adults-only	76%
family with children	24%

#### Group size:

one	29%
two	54%
three	13%
four or more	4%

#### Day type:

weekday	91%
weekend	9%

#### Amount of other visitors:

light (0-3 users)	82%
medium (4-9 users)	13%
crowded (10+ users)	5%

**E.1.b. What did visitors do in the Intro Area?**

OVERVIEW: People spent about three minutes, on average, in the first room. The vast majority of visitors (87%) stopped at least once – the average number of stops was five. About three-quarters of the visitors stopped at one or more of the vitrines, two-thirds stopped somewhere along the timeline, and half stopped at one of the message panels (primarily the second one about greenhouse gases). Social interaction occurred among half of the visitor groups in this area.

**Time spent**

under 1 minute	29%	
1 minute to under 3 minutes	19%	(first half of exhibit: 1 min. 52 sec.)
3 to under 5 minutes	20%	Median = 3 minutes 8 seconds
5 minutes or more	32%	

**Number of stops:**

none	13%	
one, two or three	27%	
four, five or six	21%	Median = 5 stops
seven, eight or nine	20%	
ten or more	20%	

**Stops along TIMELINE**

1600	34%	70% stopped at least once Average number of stops = 2
1650	<b>50%</b>	
1700	20%	
1750	14%	
1800	36%	
1850	27%	
1900	<b>45%</b>	
1950	18%	
2000	<b>48%</b>	

**Stops at MESSAGE PANELS**

main message panel	20%	57% stopped at any panels
greenhouse gas panel	<b>52%</b>	

**Stops at VITRINES**

coal	<b>50%</b>	79% stopped at one or more Average number of stops = 2
steam	43%	
lights	41%	
computers	39%	

**Social interaction?**

talking among group (of 2+ people)	51%
no interaction (among 2+ people)	49%

## E.2. Conservation Behaviors Area

**ISSUE:** The exhibit team was concerned that if visitors were not attracted to the Actions Wall, they may bypass the whole area (Actions Wall, Behavior Change Computers, Built Environment Panel).

**METHOD:** A simple counting study was conducted where all visitors (adults and children) approaching this area were observed to see where they *stopped first* (or if they walked by without stopping at any of these three exhibits). Observations were conducted for nine 30 minute periods on different days of the week – four weekday periods (2 hours total) and five weekend periods (2½ hours total). Visitation was light during all of the weekday periods and during two-thirds of the weekend periods (so there aren't enough data to analyze how behavior might change during busy times).

### RESULTS:

- The majority of adults (64%) stopped at the Actions Wall first.
- Children were somewhat less likely to stop at the Actions Wall (46%), and slightly more likely to go to the Behavior Change Stations first (20% vs. 10%).
- Only 14% of adults walked through without stopping anywhere but children were slightly more likely to pass by this area (26%).

<u>First Stop:</u>	<u>Adults</u> (n=242)	<u>Kids</u> (n=54)
Actions Wall	64%	42%
Behavior Change Computers	10%	20%
Built Environment Panel	11%	11%
Walked by without stopping	14%	26%

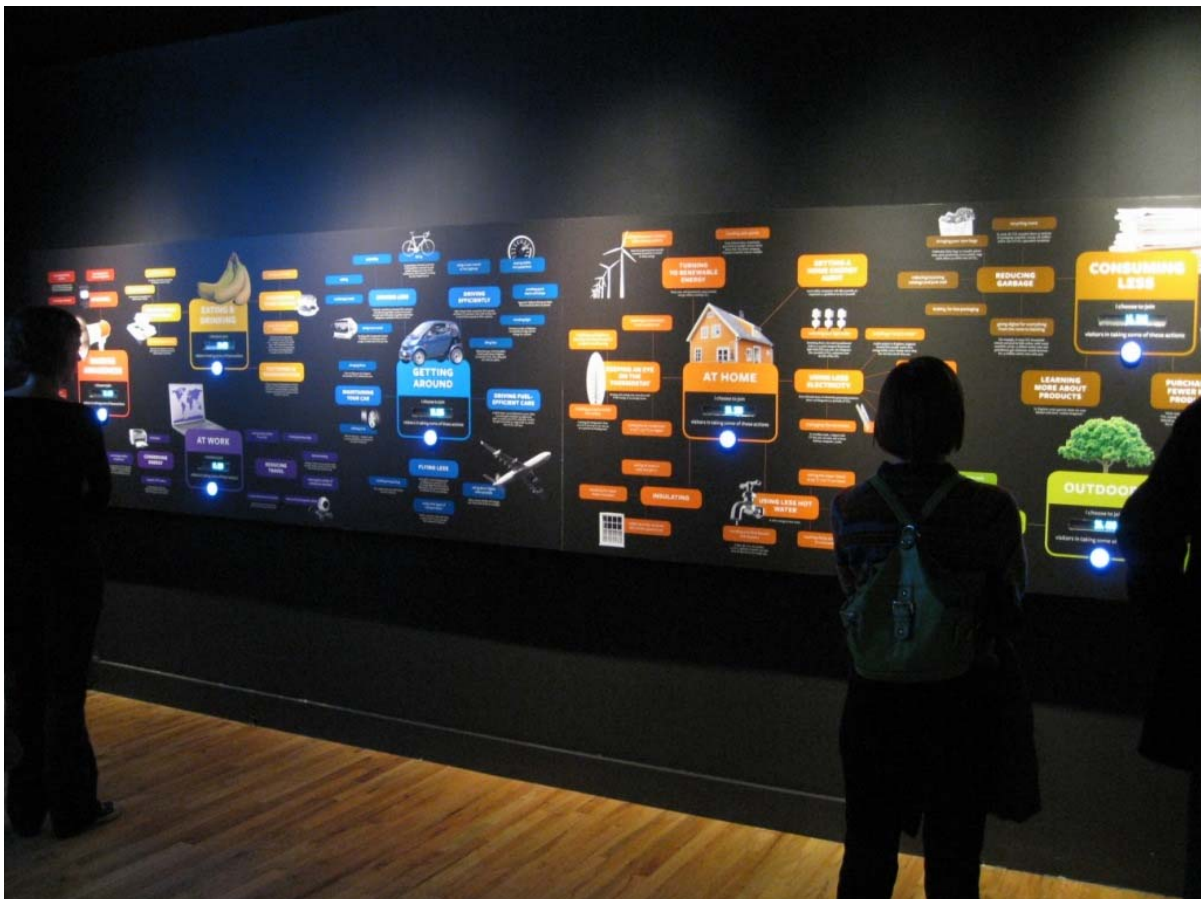
### E.3. Actions Wall (mind map)

**ISSUE:** Actions Wall was selected for an observational study because the exhibit team wondered whether visitors were engaging with the wall or perhaps finding it too overwhelming, i.e., do they look at multiple parts or just one piece? Also, the team was curious to see how visitors responded to a relatively low-tech interactive (e.g., a simple push button activity versus a full computer interactive).

**METHOD:** The method consisted of observing 54 adult visitors who stopped to look at the wall and recording how much time they spent and where they stopped.

#### RESULTS:

- Most adults spent a reasonable amount of time here (over 2 minutes, on average).
- They stopped to look at multiple parts (5 stops on average).
- Over half (54%) moved along the entire wall before leaving the exhibit.
- About half of the visitors (or someone in their group) pushed at least one of the buttons (showing commitment to change a behavior or perform an action).
- A high level of social interaction was observed among visitors in groups (79% talked while at this exhibit).



### E.3.a. Sample characteristics of Actions Wall users

OVERVIEW: A total of 54 adult visitors (alone, with other adults, with children) were observed as they stopped at this exhibit. Most of the visitor groups consisted of adults visiting without children. The sample includes adults of all ages and similar proportions of men and women. Most of these observations occurred when the exhibit was not busy, so that visitors' choices of what to do and see were not constrained by other visitors' use of the space.

		(n=54)
<u>Gender:</u>		
	men	44%
	women	56%
<u>Estimated Age:</u>		
	20's	15%
	30's	37%
	40's	22%
	50+	26%
<u>Group composition:</u>		
	adults-only	80%
	family with children	20%
<u>Group size:</u>		
	one	41%
	two	41%
	three	14%
	four or more	4%
<u>Day type:</u>		
	weekday	88%
	weekend	12%
<u>Amount of other users:</u>		
	light (0-3 users)	80%
	medium (4-9 users)	20%
	crowded (10+ users)	0

### **E.3.b. What did visitors do at the Actions Wall?**

OVERVIEW: People spent over two minutes, on average, looking at this exhibit. About half of the visitors looked at all seven topics along this wall (78% viewed at least 5 topics). About half of these visitors (or someone in the group) pushed at least one button. Most visitor groups (79%) were talking while at this exhibit.

#### **Time spent**

under 1 minute	20%	
1 minute to under 2 minutes	26%	
2 to under 3 minutes	21%	Median = 2 minutes 18 seconds
3 minutes or more	33%	

#### **Extent of use:**

looked at first set of 2 topics only	4%
left after AT HOME	4%
left after GETTING AROUND	15%
left after WORK/EATING	24%
looked at entire wall (all 7 topics)	<b>54%</b>

#### **Number of stops:**

one or two	11%	
three or four	37%	
five or six	26%	Median = 5 stops
seven or more	26%	

#### **Buttons pushed**

pushed OUTDOORS	26%	54% pushed a button
pushed CONSUMING LESS	32%	Median = 1 button
pushed AT HOME	30%	
pushed GETTING AROUND	18%	
pushed AT WORK	21%	
pushed EATING	22%	
pushed AWARENESS	24%	

#### **Who pushed buttons?**

adult	39%
child	6%
not recorded	9%

#### **Social interaction?**

talking among group (of 2+ people)	79%
no interaction (among 2+ people)	21%

## E.4. Behavior Change Computers

**ISSUE:** This mini-study examines the visitor experiences with the Behavior Change Computers. Staff questions about usage include duration and extent of use, and whether or not visitors appeared to make the association of the stations to the big screen.

**METHOD:** Forty-six visitors from separate visitor groups were observed after they approached and stopped at one of the exhibit's three touch screen stations. The observer recorded visitors' characteristics, the amount of time spent at the exhibit and various behaviors: which touch screens they touched, if they appeared to look at the big screen and whether the group talked about this exhibit.

### RESULTS:

- Visitors who stopped at this exhibit typically spent a minute or more at one (or occasionally more than one) of the stations.
- Visitors were more likely to engage the “light bulbs” and “hybrid cars” stations (those closest to the entrance to this area) than the “trees” station.
- Only about one-third of the visitors using the touch screen computers seemed to notice the big screen.
- Among groups of two or more visitors, most (69%) were observed talking about the exhibit.





#### E.4.a. Sample characteristics of Behavior Change Computer users

OVERVIEW: The visitors observed at the Behavior Change exhibit reflect some variation in characteristics. Gender was evenly represented, about one third were visiting alone and most were adult groups without children. Although about half of the observations occurred on weekend days, the exhibit was not crowded during the observations.

		(n=48)
<u>Gender:</u>		
	men	50%
	women	50%
<u>Group composition:</u>		
	adults-only	78%
	family with children	22%
<u>Group size:</u>		
	one	30%
	two	46%
	three	9%
	four or more	15%
<u>Day type:</u>		
	weekday	54%
	weekend	46%
<u>Amount of other users:</u>		
	light (0-3 users)	87%
	medium (4-9 users)	13%
	crowded (10+ users)	0%

### **E.4.b. What did visitors do at the Behavior Change Computers?**

**OVERVIEW:** Most of the visitors who stopped at this exhibit spent more than one minute there; slightly less than half of the visitors engaged more than one of the stations. Visitors were most likely to use the “light bulbs” station, slightly less likely to use the “hybrid car” station and much less likely to use the trees station. This is also the order in which visitors would typically encounter these stations in this space.

Although all of the visitors either touched one of the small screens or (in a few cases) watched while someone else touched the screen, only about one-third of the visitors were observed looking up at the big screen. Among groups of two or more visitors, most (69%) were observed in social interaction apparently regarding the exhibit.

#### **Time spent:**

under 1 minute	30%	Median = 1 minute 28 seconds
1 minute to under 3 minutes	50%	
3 or more minutes	15%	

#### **Number of touch screens used:**

one	57%	Median = 1 stop
two	26%	
three	17%	

#### **Which computers used (among those unoccupied):**

<b>light bulbs</b>	
only touched small screen	46%
also looked at big screen	19%
did not use	34%
<b>hybrid car</b>	
only touched small screen	34%
also looked at big screen	14%
did not use	45%
<b>trees</b>	
only touched small screen	27%
also looked at big screen	9%
did not use	64%

#### **Looked at the big screen at any time:**

yes	36%
no	64%

#### **Social interaction (among groups of 2+):**

talking among group	69%
no interaction	31%