



1 **Environmental Values and Behaviors: Strategies To Encourage Public**
2 **Support for Initiatives To Combat Global Warming**

3
4 Deborah L. Rhode, Professor, Stanford Law School and Director, Stanford Center on
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6

7 **REVIEW DRAFT: NOT FOR CITATION**

8 **Please send review comments to:**

9 **Leigh Johnson, Woods Institute for the Environment, leighj@stanford.edu**
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11 **I. Introduction**

12
13 This brief explores public values and behaviors on environmental issues, particularly
14 global warming. Its central concern is how to get Americans to act in ways that are
15 environmentally responsible but that are unlikely to have much direct benefit to them
16 personally. Adverse climate change reflects multiple factors that any individual can affect
17 only at the margins. The consequences of this change are to some extent uncertain and, if
18 not reversed, likely to have greatest adverse affect on future generations and on
19 populations in vulnerable regions outside of the United States. The discussion that
20 follows explores strategies for encouraging the public in general and Californians in
21 particular to make global warming a more central personal and political concern despite
22 in the absence of ordinary personal incentives for doing so.
23

24 Significant progress on climate issues will require behavioral changes on several
25 levels: voting, purchases, personal consumption, and support of environmental issues,
26 initiatives, and organizations. This, in turn, will require that the public have sufficient
27 information and sufficient motivation to act on the information it has. The following
28 analysis first surveys what the public knows about global warming, and the priority it
29 attaches to the problem. Discussion then turns to the challenge of achieving behavioral
30 changes and to the lessons available from a quarter century of relevant social science
31 research. Findings from this body of work offer crucial insights for public policy makers
32 about the most effective strategies for increasing public knowledge, concern, and action
33 on environmental issues related to global warning. Specific topics considered include:
34 perceptions of and responses to risk; personal values; cognitive and motivational biases;
35 peer influences and perceptions of social norms; and techniques to encourage
36 environmental commitment and compliance. The brief concludes with a summary of
37 strategies that are most likely to be effective in increasing public support of global
38 warming initiatives.
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REVIEW DRAFT: NOT FOR CITATION

1 **II. Public Knowledge and Values**

2
3 A. What Does the Public Know?

4
5 Most members of the public have some, but not a great deal of knowledge about
6 global warming. According to a 2004 survey by the Program on Policy Attitudes and
7 Knowledge Networks, 15% of Americans had heard a great deal and 48% had heard
8 “some” about global warming (Americans and the World 2005). In a 2003 CBS poll,
9 27% had heard or read “a lot” about global warming, 39% had heard or read “some”
10 about it, and 33% had heard or read “not much or nothing” (Americans and the World,
11 2005). West Coast residents (those in California, Oregon, and Washington) displayed
12 among the highest levels of awareness; 38 percent describe themselves as very aware of
13 global warming, compared with 32 percent of the nation generally (Greenberg, Quinlan,
14 Rosner Research, Inc., 2004).

15
16 A majority of Americans see a basis for concern. Three quarters of those in a 2002
17 Harris poll believed that unchecked emission of carbon dioxide and other gasses will
18 cause global warming (Americans and the World, 2005). When asked in September 2005
19 by an ABC and Washington Post survey “How convinced are you that global warming or
20 the greenhouse effect is actually happening?” about a quarter (23%) described themselves
21 as “completely convinced,” and another 33% were “mostly convinced.” A quarter (22%)
22 were “not so convinced”; only 17% were “not convinced at all” (Pollingreport.com,
23 2005). In a 2004 survey for the Yale Center for Environmental Law and Policy by the
24 Global Strategy Group, 70% of respondents indicated that global warming was a very
25 serious (40%) or somewhat serious (30%) problem. Californians are among those most
26 concerned. A 2005 Public Policy Institute of California survey found that 86% believed
27 global warming will affect future generations; 56% believed it was already occurring, and
28 62% believed it was primarily caused by human activity. (Public Policy Institute of
29 California, 2005).

30
31 The public’s general awareness does not, however, reflect widespread accurate
32 knowledge of particular controversies. In a 2004 Gallup Survey, 66% had heard
33 “nothing” or “not much “about criticism of Bush for ignoring scientific evidence
34 (Americans and the World, 2005). A 2004 poll by the Program on International Policy
35 Attitudes and Knowledge Networks found that less than half (48%) of Americans knew
36 that President Bush opposes participation in the Kyoto Agreement; 42% erroneously
37 believed that he favors participation. The public also underestimate the degree of
38 scientific consensus over global climate change. Half of those polled in 2004 by the
39 Program on International Policy Attitudes and Knowledge Networks believed that
40 scientists are divided on the existence of global warming and its impact; only 43 percent
41 agreed that there “is a consensus among the great majority of scientists that global
42 warming exists and could do significant damage” (Americans and the World, 2005).

43
44 Americans are also uninformed about the specific dynamics of climate change. A
45 2005 poll by researchers at MIT and Knowledge Networks found that most were
46 relatively unaware regarding sources of global warming and technologies to mitigate

1 climate change. For example, only a quarter knew that carbon dioxide capture and
2 storage could reduce global warming; a slightly larger percentage (29%) thought,
3 incorrectly, that it could reduce smog (Herzog, Curry, Reiner, & Ansolabehere, 2005).
4 Despite considerable recent media coverage of the relationship between global warming
5 and natural disasters, the public’s beliefs are not in accord with those of the scientific
6 community. Although most scientists believe that global warming heightens the intensity,
7 but not the frequency of hurricanes, almost two thirds of American surveyed in a 2005
8 Gallup Poll expressed the belief that global warming has been a major cause (36%) or at
9 least a minor cause (29%) of an increase in frequency (Pollingreport.com, 2005).

10
11 Given such findings, it is not surprising that Americans themselves recognize the
12 limits of their knowledge. In a May 2005 poll by the Yale University School of Forestry
13 and Environmental Studies, a majority (53%) agreed that “there is so much information
14 and disagreement in the media that I don’t know who to believe about what is best for the
15 environment.” Only 42% thought that “I have enough information to have a good idea
16 about what is best for the environment” (Yale University School of Forestry and
17 Environmental Studies, 2005). Similarly, in a September 2005 Harris Interactive Poll,
18 less than a third thought that the “quality of information we have about global climate
19 change” is “excellent” (4%) or “good” (29%). A third thought it was of “fair” quality,
20 and a quarter thought it was “poor” or “terrible”(Oak Ridge Center for Advanced Studies,
21 2005).

22 23 B. How Much Does the Public Care? 24

25 Efforts to assess the public’s level of concern about climate change have produced
26 mixed results that depend on how the question is framed and who is asked. In one 2004
27 survey by the Program on International Policy Attitudes and Knowledge Networks, only
28 about a third of Americans (31%) believed that global warming is a “serious and pressing
29 problem” and that “we should begin taking steps now even if this imposes significant
30 costs.” A greater percentage (45%) thought that although the problem “should be
31 addressed,” its effects will not be immediate “so we can deal with the problem gradually
32 by taking steps that are low in cost” (Americans and the World, 2005). A poll taken a
33 year later by ABC News and the Washington Post found only a slightly higher percentage
34 (38%) of individuals who felt that the problem was urgent and in need of immediate
35 action. By contrast, a majority (58%) thought it was a longer term problem requiring
36 more study before government action was taken. However, about four fifths (79%) did
37 agree that global warming would pose a “serious threat to future generations” (Roper
38 Center, Public Opinion Online, 2005). And an independent research center poll in 2004
39 found that only 13% of the public thought that “concern about global warming is greatly
40 exaggerated,” and only a quarter thought that more “research is necessary before we take
41 actions that might hurt the economy” (Greenberg, Quinlan, Rosner Research, 2004).

42
43 Data on public assessments about the relative importance of global warming is
44 similarly mixed, but most survey results suggest that it is not a consistently high priority.
45 In the MIT 2005 poll, the environment came out 13th on a list of 22 possibilities for “the
46 most important issues facing the U.S. today.” On a list of 10 specific environmental

1 problems, global warming came up sixth, well behind water pollution and toxic waste
2 (Herzog, Curry, Reiner, and Alsolabehere, 2005). Findings from 2004 surveys were
3 similar. The Yale Center for Environmental Law and Policy found that global warming
4 ranked 15th out of 22 general concerns, and Gallup found that global warming ranked 9th
5 on a list of 10 environmental concerns, lagging behind extinction of animal and plant
6 species and the loss of tropical rain forests (Yale Center for Environmental Law and
7 Policy, 2004; Pollingreport.com, 2005). In a June 2005 poll, only a third believed that
8 global warming was a significant enough problem that America should be “willing to
9 limit job growth to address it” (New Models National Brand Poll, in Roper Center Public
10 Opinion Online, 2005). The public inadequately ranks the seriousness of global
11 warming—far lower than an EPA task force’s conservative estimates. (Adler and
12 Kranowitz, 2005, 18). One scholar offers three reasons why the public has
13 underestimated the seriousness of global warming risks: “(1) the consequences are very
14 much in the future and hard for many to imagine because they extend beyond ordinary
15 experience; (2) the problem is diffuse and there are many causes (the scapegoat problem);
16 and (3) there is simply a general lack of public familiarity with the issue (Allen, 1987,
17 141).

18
19 However, almost half (47%) of those surveyed in August 2005 believed that we had
20 too little government regulation in the area of environmental protection (Harris,
21 Pollingreport.com, 2005). And it may well be that public priorities have changed in light
22 of increased coverage of the relationship between climate change and natural disasters
23 following Katrina and the cluster of other hurricanes in the fall of 2005. (Krosnick,
24 Holbrook, Lowe, and Vissen, 2005).

25
26 Californians in particular register relatively strong views on the urgency of global
27 warming and the need for further action: 39% considered it a very serious threat, and
28 36% considered it a somewhat serious threat to the economy and quality of life for
29 California’s future. About three quarters (77%) favored more stringent emission
30 requirements for new cars; 69% favored new emission targets for industry; 76% favored
31 solar incentives; and 76% favored tighter fuel efficiency standards even if they were
32 more costly (Public Policy Institute of California, 2005). Almost two-thirds (62%)
33 believed that there was “no real conflict between creating jobs and protecting the
34 environment and, in fact, investments in new technology are not only good for the
35 environment but create the jobs of the future.” Only about a quarter (26%) believed that
36 “until we get the economy back on track and create jobs, environmental regulations
37 should be a lower priority” (Greenberg, Quinlan, Rosner Research, 2004).

38
39 In short, Americans generally believe that global warming is a problem requiring
40 action, but most do not feel a sense of urgency about the problem, particularly in
41 comparison with other social concerns. This complacency may be partly due to the lack
42 of clear, consistent information, but it seems also to reflect peoples’ widespread
43 assumption that the problem is unlikely to affect them personally. In a June 2005 ABC
44 News and Washington Post poll, two-thirds of Americans did not believe that global
45 warming would pose “a serious threat” to them or their “way of life in [their] lifetime”
46 (Roper Center Public Opinion Online, 2005). A Transatlantic Trends survey around the

1 same time similarly reported that only a third of the respondents believed it “very likely”
2 that they would be personally affected by global warming. Another third felt that it was
3 “somewhat likely,” and a third felt that it was “not likely at all” (Roper Center Public
4 Opinion Online, 2005).

5
6 The public’s lack of accurate information and its perception that global warming does
7 not pose a serious immediate threat to their quality of life poses obvious policy
8 challenges.. As the following discussion suggests, the challenge involves both creating
9 new norms for individuals and governments, and convincing individuals and political
10 leaders to act in accord with norms that they already accept. Social science research can
11 affirm common sense understandings of persuasive techniques and help us to adapt them
12 to environmental contexts, as well as offer new insights about achieving behavior change
13 that may challenge conventional wisdom.

14 15 16 **III. Information, Persuasion, and Behavior Change**

17 18 **A. The Personal and Political Challenge**

19
20 To make substantial progress in controlling the emission of carbon dioxide and other
21 gases that contribute to global warming, we obviously need behavioral changes on both a
22 personal and political level. Many consumer purchases and lifestyle choices that would
23 promote energy conservation do not involve an unreasonable price in money,
24 convenience, or quality of life. They include buying energy efficient appliances and
25 motor vehicles, making home construction and renovation choices that prevent wasted
26 energy (such as weather stripping, insulation, and passive solar design), and altering daily
27 routines to minimize unnecessary energy consumption (such as turning down
28 thermostats, turning off lights, and carpooling). Many of those behavioral changes are
29 justifiable for most Americans on economic grounds alone. Others—such as the purchase
30 of hybrid vehicles or the early adoption of new, energy-saving technologies, or
31 conservation by tenants who do not directly pay the bills for energy consumption—
32 cannot be justified by any narrow calculation of economic self interest. Such choices
33 would have to be motivated by the introduction of governmental regulations and
34 incentives and/or by the same combination of personal values and social norms that
35 prompt other prosocial and civic acts, such as contributions of time or money to
36 charitable causes, refraining from littering, and participation in elections.

37
38 Progress in meeting environmental goals relevant to global warming also requires that
39 individuals make those goals a political priority. Necessary policy changes would include
40 stiffer efficiency and emission standards, additional support for mass transit, tax rebates,
41 and other financial incentives for research and development likely to yield new energy
42 sources and technologies for energy conservation.. Both environmental activism and
43 environmental citizenship are required (Stern, 2000, 409-410). Activism includes
44 participation in environmental organizations and campaigns. Citizenship requires a
45 willingness to make energy conservation a key factor at the ballot box and to offer
46 financial and political support for pro-environmentalist candidates and initiatives.

1 Ordinary citizens can also help to increase the salience of environmental issues and the
2 political stakes for office-holders through letters, petitions, community action, and
3 donations to environmental organizations that are most effective in addressing
4 conservation issues (Sheer, 2005; Stern, 2000, 409).

5
6 B. Influence Strategies and Techniques

7
8 1. *Appeals to existing personal values and priorities*

9
10 One influential framework for understanding and exerting influence on behavior of
11 the sort relevant to environmental impact is the “theory of reasoned action,” (Ajzen &
12 Fishbein, 1980, 5-7; Hwang, Kim, and Jeng, 2000; Kals, Schumacher, and Montada,
13 1999). In essence, the theory builds on the common sense assumption that behavioral
14 choices reflect individuals’ perceptions of the likely personal and social consequences of
15 their actions. Beliefs about consequences are, in turn, affected by the way that
16 information is presented, processed, and recalled. Furthermore, the evaluation of those
17 consequences will be a function of the individual’s own personal preferences and value—
18 and the importance of those values to the individual’s identity and self-esteem.

19
20 However, as many other theorists emphasize, behaviors are only partially determined
21 by underlying interests, values, and priorities. Individuals’ actions also reflect the
22 strength of their motivation, or magnitude of perceived costs versus benefits of acting in
23 particular ways, and their capacity to bring their actions in line with their interests.
24 (Clayton and Brook, 2005, 90-94). In the context of global warming, the “reasoned
25 action” theoretical frameworks suggest that the likelihood that individuals will behave in
26 environmentally responsible ways will reflect factors such as the following:

- 27
28 • The information they receive about the urgency of the problem and the strategies
29 necessary to address it;
30 • The manner in which they evaluate that information in terms of credibility and
31 how it relates to their own values and self-image;
32 • The way they perceive others behaving in response to the problem; and
33 • How costly or inconvenient they believe that energy conservation would be.

34
35 2. *Communicating risk and motivating action*

36
37 The obvious implication of the reasoned action framework is that producing
38 environmentally responsible behavior depends on providing people with relevant
39 information, and either modifying or appealing to personal values. The threshold
40 challenge therefore is to attract individuals’ attention, engage their values, and move
41 them to action. In a world of information overload, this challenge is a formidable one.
42 Individuals often adopt strategies of “rational ignorance” or rather rational conservation
43 of time and attention. In particular, they are inclined to tune out information, including
44 scientific data that appears uninteresting and irrelevant to immediate concerns (Fischhoff,
45 2004). Many environmental issues are complicated and are likely to be ignored if
46 individuals do not perceive their relevance for their own personal interests (Clayton,

1 2005, 87). Under ordinary circumstances, people would prefer to leave such matters to
2 trusted public official whose responsibility, they believe, is to know the facts and to act
3 wisely in the interests of the general welfare.
4

5 In such circumstances, where the goal is to overcome complacency, lack of perceived
6 personal interest, or ignorance about the issue at hand, the most effective communication
7 strategy is to present easily understandable material from credible sources in inviting,
8 vivid formats. Compelling visual images and personal stories are particularly useful
9 (Stern and Aronson, 1980, 68, 85, 184-85; Shanahan and McComas, 1999, 24). Where it
10 is difficult to get accurate and consistent information, or where it is difficult to judge the
11 validity of claims and arguments, individuals will rely on sources that they believe are
12 most trustworthy and likely to have expertise (Stern and Aronson, 1980, 44). For some
13 people, and in some environmental contexts, grassroots organizations, local officials, or
14 even friends and work associates may have more credibility than state officials or
15 spokespersons for utilities and other regulated agencies (Stern and Aronson, 1980, 45, 68,
16 91).
17

18 Much of the publicly available information about global warming falls short in terms
19 of the criteria outlined above. News coverage and environmental outreach efforts often
20 present relatively dry and sometimes technical analysis that highlights complexity and
21 uncertainty (Rayner, 1998, 83). And information about the urgency of the problem or
22 importance of conservation often comes from federal authorities or public utilities, who
23 offer bland political platitudes or formulaic politically careful messages that neither
24 capture attention nor persuade.
25

26 Journalistic conventions of “balance” can compound the communication challenge.
27 Even when there is a strong scientific consensus about the urgency or a problem the
28 media feel a need to give equal time to those espousing a contrary view. In global
29 warming contexts, the result is often that sources funded by self-interested groups offer
30 convenient assurances that the problem is not serious or imminent, that it is not the result
31 of human activity, or that human effort will not solve it. As a consequence, the public
32 may end up with a sense that “experts disagree,” that more study is required before
33 acting, or simply that the issues are too complicated for them to assess. Such a conclusion
34 is particularly likely when the alternative might entail costly behavioral changes.
35

36 A related problem lies in the nature of the risk itself. Both the media and their
37 audience tend to focus on dramatic, immediate dangers and to underemphasize chronic,
38 long-term problems. The news, after all, aims to be new, and journalists underreport
39 problems that are long-standing, technical, and lacking “human interest” stories (Bennett,
40 1996, 39; Shanahan and McComas, 1999, 30). Global warming has traditionally gotten
41 little coverage unless there is some unusual climate-related occurrence, like an
42 exceptionally severe heat wave, a devastating hurricane season, or a major policy event
43 like the Kyoto Conference. Even then, press reports tend to follow a rather short-lived
44 news cycle common to environmental reporting. Some dramatic event or discovery
45 sparks concern about a problem, which is followed by a burst of public interest and

1 support for efforts to combat it. Then attention declines as the costs and difficulties of
2 change become clearer (Shanahan and McComas, 1999, 149-51).

3
4 Media accounts of the potentially catastrophic consequences of global warming are
5 problematic for other reasons. Sensationalized coverage, with a focus on doomsday
6 scenarios and scare tactics, following a major natural disaster can be counterproductive
7 on several grounds. First, such coverage may evoke fear and suggest a need to sacrifice;
8 sentiments are unpleasant and threatening and apt to lead to repression, resistance, or
9 denial of the problem (Oskamp, 2000, 383-84; De Young, 2000, 512). Such coverage can
10 also generate a sense of futility, rather than a commitment to plausible incremental
11 reform (Shanahan and McComas 1999, 174; Oskamp, 2000, 384). Accounts that stress
12 the enormity and complexity of the problem can similarly lead to feelings of “global
13 helplessness,” which discourage rather than promote personal and political actions of the
14 sort necessary to being combating global warming (Pelletier, Dion, Tuson, and Green-
15 Demers, 1999; Kaplan, 2000, 498). Ambiguities in calculating the costs and benefits of
16 modest action can further discourage effective responses. As many researchers note, it is
17 hard to convince many audiences that small increases in average global temperature are
18 serious enough to demand immediate fundamental changes in global energy use—
19 especially when the benefits of those changes are also likely to lie quite far in the future
20 (Rayner, 1998, 101).

21
22 In short, media coverage is both a cause and effect of public attitudes. Most research
23 suggests that mass media coverage does little in and of itself to shape environmental
24 values or behaviors (Shanahan and McComas, 1999, 32-41; McKenzie-Mohr, 2000, 548).
25 What it does influence is the *salience* of environmental concerns. Conventional media
26 coverage can get such matters onto the public agenda, but it is less effective in producing
27 strong commitments and in prompting effective action. Such change requires that media
28 presentations be a part of a broader, coordinated, public education and social influence
29 strategy—one that emphasizes not only information, but also motivation, and the problem
30 of converting positive motives and intentions into individual and collective action.

31
32 Comprehensive strategies of the sort required to deal with the problem of global
33 warming have been lacking. Until recently, even major environmental organizations have
34 been reluctant to showcase the issue. According to Linda Lopez, head of membership
35 efforts for the Natural Resources Defense Council [NRDC], the traditional wisdom used
36 to be that global warming concerns lacked sufficient appeal for it to be worth featuring
37 prominently in major public relations efforts. Although that view may have shifted since
38 hurricane Katrina, the polls noted earlier suggest that risks of climate change still evoke
39 less concern than other environmental problems such as water pollution and toxic wastes.
40 And these problems rank lower than non-environmental problems such as those of
41 terrorism, the war in Iraq, economic challenges of globalization, and possible pandemics
42 such as Avian flu) that pose more immediate, certain, and/or easy-to-communicate
43 dangers.

44
45 3. *The special role of visual images*
46

1 The role of visual images in shaping environmental values and behaviors deserves
2 particular attention. Individuals are especially likely to respond to messages that are vivid
3 and dramatic, and therefore cognitively “available.” Visual presentations are more
4 effective than purely textual material in conveying such messages. Images create as well
5 as represent our world: “nature is not just a physical reality to which people respond but a
6 social construction whose meaning has been learned” (Clayton and Brook, 2005, 91;
7 Shanahan and McComas, 1999, 2). Visual communications shape individual values
8 directly and through replication by the media. These communications assume special
9 significance in the context of global warming because they inspire and symbolize a
10 relationship with nature that encourages conservation. (Clayton, 92). They have similar
11 impact by conveying, in uniquely powerful form, the global implications of
12 environmental degradation.

13
14 The importance of iconic images in building the American environmental movement
15 has been extensively documented. Photographs of Yosemite in the later half of the
16 nineteenth century helped inspire the creation of the world’s first wilderness area and
17 paved the way for a national park system that built environmental consciousness in
18 successive generations (DeLuca and Demo, 2000). Other twentieth- century nature and
19 wildlife photographs were similarly pivotal in encouraging Americans to experience and
20 protect nature (Carlson, 2000, 4; Shanahan and McComas, 1999, 11; Andrews, 1999). So
21 too, the 1972 picture of the earth taken from spaceship Apollo gave many people a
22 transformative understanding of the global dimensions of their environment and the need
23 for shared custodial responsibility in its preservation (Jasanoff, 2004, 31-54). That image
24 is now the most frequently reproduced photograph in history, and it continues to
25 symbolize the interdependence of ecosystems and the importance of transnational
26 conservation efforts. Because “good visuals” increase the chance of sustained media
27 attention, images of oil spills, hazardous waste sites, and toxic sludge—along with
28 natural disasters such as floods and droughts—have all helped build environmental
29 consciousness (Sachsman, 1996, 251-54). Most recently, the pictures of devastation
30 following Hurricane Katrina brought home the human consequences of global climate
31 change. And the award winning documentary, *The March of the Penguins*, has increased
32 concern for species that would be threatened by melting icecaps.

33
34 Public interest organizations and environmental activists have long recognized and
35 increasingly capitalized on the role of visual images. Major environmental organizations
36 have adopted particularly photogenic species as their symbols, and their publications are
37 liberally strewn with endearing wildlife and scenes of unspoiled wilderness. Groups like
38 Greenpeace have constructed media events around dramatic visual displays, such as those
39 of members climbing smokestacks to post signs about air pollution (Day, 2000, 79).
40 Although accounts of global warming initially did not seem to lend themselves to
41 dramatic imagery, that has begun to change. For example, the 2005 NRDC holiday gift
42 membership featured an email gift card with a photograph of two exceptionally appealing
43 polar bears stranded on a small floating ice cap. The caption read: “As the polar bear’s
44 future literally melts away, the Bush Administration refuses to act. Help NRDC force
45 their hand.” So too, Al Gore’s 2005 global warming presentation makes dramatic use of
46 images, aided by the new technology of Google Earth. By draping satellite imagery over

1 3-D topographic data, this technology creates the illusion of flying through a landscape. It
2 also provides opportunities to zoom in for close ups of particular sites. Gore’s
3 presentation conveys the consequences of escalating climate changes through the
4 vulnerable beauty of coral reefs and the Arctic Wildlife Refuge Area, as well as the
5 famine experienced in drought-torn Darfur. The pace of change becomes apparent
6 through footage of snowless peaks on Mt. Kilimanjaro and abandoned Austrian ski
7 chalets.

8
9 Corporations, for their part, also capitalize on the dramatic potential of visual
10 representation. Some attempt to “green” their image by illustrating claims about social
11 responsibility with appealing wildlife or wilderness portraits (Stauber and Rampton,
12 1995, 125-27). Emperor penguins are now a common embellishment of oil company
13 advertisements. Other businesses use similar images in attempting to develop niche
14 markets for environmentally committed consumers (Dietz and Stern, 2002; Heffner,
15 Kurani, and Turrentine, 2005). Industry-funded nonprofit organizations with
16 environmentally friendly names similarly employ environmental images. The result is
17 often to confuse policy debate. Psychological research suggests that the most effective
18 way of countering misleading claims by such organizations may be to give target
19 audiences readily available counterarguments. One possibility is the “poison parasite
20 defense”: a strategy that combines strong rebuttals, which include features present in the
21 original message, sometimes combined with ridicule (Cialdini, Demaine, Barrett,
22 Sagarin, and Rhodes, 2005). In the context of global warming, for example, that might
23 argue for resituating the oil companies’ chosen images in ironic settings. Penguins
24 floating on oil spills, or stranded on melting caps, could underscore messages suggesting
25 that oil companies may profit by drilling in refuge areas, but others will pay the price.

26
27 *4. Cognitive and motivational biases*

28
29 Well-studied cognitive and motivational biases may similarly compromise
30 perceptions of risk and decisions about how to act in the face of risk (Fischhoff, 2004).
31 Research suggests that people generally overestimate the likelihood and seriousness of
32 threat posed by vivid, readily visible or imaginable, catastrophic threats that are low in
33 probability while at the same time underestimating the likelihood and seriousness of less
34 visible, cumulative, long-term risks (Adler and Kranowitz, 2005, 16; Allen, 1987). It is
35 this “cognitive availability” bias that makes media images so important. Disproportionate
36 concern is also given to problems that evoke personal outrage—problems that are caused
37 by identifiable individuals or organizations that seek to harm us, or that act in
38 irresponsible ways to further their own interests at the expense of public safety (Shanahan
39 and McComas, 1999, 33; Kals, Schumacher, and Montada, 1999). By contrast, problems
40 like global warming that lack incontrovertible villains and that are partly attributable to
41 policy and life style choices of the public itself provoke more resignation than
42 indignation.

43
44 The tendency of people to reason in ways that are self-serving and that reduce
45 dissonance can also work against concern with environmental risks and commitment to
46 personal behavioral change (Kunda, 1990; Festinger, 1957; Harmon-Jones and Mills,

1 1999). Individuals who have come to share the norms, values, and behaviors of a society
2 with high-energy use have a motivational stake in discounting information that makes
3 their own consumption patterns seem ethically irresponsible and that would argue for
4 painful or difficult behavioral responses. In the face of such a threat, people are apt to
5 reduce their dissonance by seeking and uncritically accepting claims that minimize the
6 urgency of the problem and the need for inconvenient lifestyle or consumption changes.
7 They are also apt to feel that changing their own behavior, if others do not change, will
8 be fruitless and quixotic. The problem of combating global warming is a classic
9 “commons dilemma,” in which “cooperators” (those who forego individual gain or
10 convenience for the common good) pay the price, and “defectors” continue to reap the
11 benefits (Hardin, 1968, 162).

12
13 Other cognitive biases may similarly distort individuals’ choices about behavior that
14 would conserve energy and reduce CO₂ emissions but impose potential costs. Influential
15 work in “prospect theory” (work that won the 2002 Nobel Prize in Economics)
16 documents the fact that individuals are more willing to act to prevent losses than to obtain
17 gains; that they are prisoners of sunk costs and inertia; and that they are relatively
18 insensitive to the “opportunity costs” associated with maintaining the status quo (Tversky
19 and Kahneman, 1981; Stern and Aronson, 1984, 95). This work suggests that
20 conservation programs that offer the prospect of long-term savings at the cost of
21 immediate expense or inconvenience are apt to stir little interest—even if they would be
22 cost-effective in the long run.

23
24 The same work, however, suggests ways in which alternative “framing” of the
25 choices in question may be effective. Individuals are more likely to be persuaded by
26 presentation of the choices in a manner that emphasizes unnecessary costs and savings
27 and other opportunities that will be lost if they fail to adopt suggested conservation
28 measures or buy energy-inefficient appliances, vehicles, or building materials. A study of
29 California homeowners illustrates the point. They were asked to evaluate cost-benefit
30 information concerning solar water heaters and insulation for heaters and to indicate their
31 intent to purchase these improvements. Presentations that stressed the losses that could be
32 averted were more persuasive than those suggesting the gains to be realized from the
33 improvements (Yates, 1982; Stern and Aronson, 1984, 95).

34
35 Research suggests other strategies that similarly may help to mitigate the fear, futility,
36 and resentment of sacrifice that appeals to combat global warming sometimes evoke.
37 Giving people concrete, convenient strategies to reduce risks is the best way to reduce
38 feelings of anxiety and helplessness (Oskamp, 2000, 383). Also, conservation campaigns
39 can be framed in ways that avoid the implication of sacrifice, or that buttress the belief
40 that the cause is important enough to justify the effort. Individuals often rise to the
41 occasion when they feel that vital societal interests are at stake, and it is certainly possible
42 to present global warming in those terms (Oskamp, 2000, 384).

43
44 Again, social psychologists remind us that the vividness and personal salience of
45 conservation campaigns matter. Information that is more cognitively “available” to the
46 individual’s perceptive and memory processes is apt to exert more influence on judgment

1 and decision-making than appeals that are abstract and removed from the individual’s
2 personal experiences (Nisbett and Ross, 1980; Plous, 1993). For example, in the context
3 of energy conservation, appeals based on general savings in kilowatt-hours will be less
4 likely to motivate behavioral change than those expressed as reductions in the average
5 family’s utility bill per year or those based on home demonstrations of dials that move at
6 different speeds or other devices that make sources of heat loss visible to the naked eye
7 (Stern and Aronson, 1984, 91). Public service announcements also need to be concrete,
8 vivid, emotionally arousing, and personally relevant (Bator and Cialdini, 2000, 534).
9 Their messages should convey strong social approval for conservation from a credible
10 source and, where possible, should stress the personal convenience and benefits of
11 compliance (Bator and Cialdini, 2000, 536).

12
13 Given the diversity in consumer circumstances and motivations, multiple appeals
14 from multiple sources are necessary. In the context of residential home improvements, for
15 example, different households have different levels of concern about energy bills,
16 uncomfortable drafts, environmental preservation, and related factors. Knowledge about
17 specific customer interests is critical in shaping effective conservation campaigns.

18
19 In summary, getting people to care deeply about adverse climate change is a task that
20 faces major obstacles. The most serious consequences of carrying on as usual lie far in
21 the future. So too, the causes of those consequences are diffuse, the magnitude of those
22 consequences (and of the benefits that will result from changing behavior) is hard to
23 predict. Familiar problems of collective action are also present; many individuals may
24 feel that any costs they bear from environmentally responsible behavior will not be fairly
25 shared by others and that their actions alone will not really make any difference. Various
26 cognitive biases further distort individuals’ understanding of the problem and willingness
27 to change patterns of behavior that are familiar, comfortable, and culturally accepted.

28
29 Yet despite these obstacles, popular understanding and concern about global warming
30 has increased substantially over the last decade. Most importantly, the vast majority of
31 the American public recognizes that a problem exists. Although energy conservation
32 practices are far from universal, they are generally seen as socially desirable.
33 Researchers’ understanding of the obstacle to effective communication and of approaches
34 that are most likely to be effective have also evolved. And as discussion below indicates,
35 we have also learned about strategies for translating good intentions into action.

36
37 *5. Values, norms, and behavior*

38
39 Basic and applied research makes clear that the problem of achieving changes in
40 behavior can be separated from the problem of convincing people to adopt particular
41 attitudes or values. In part, getting people to act in accord with positive attitudes and
42 values is a matter of “framing” or strengthening the connection between beliefs and
43 actions consistent with those beliefs. Available research evidence suggests that the best
44 strategy is generally to achieve explicit commitments and make it easy for people to
45 begin acting on their good intentions while those intentions are strong and salient. Often,
46 behavior change depends less on direct appeals to change behavior than on demonstrating

1 that others believe that the behavior is appropriate and are acting accordingly. In short,
2 people need to be persuaded that the actions in question are both descriptively and
3 proscriptively “normative.” This body of research challenges conventional wisdom, not
4 because it reveals sources of influence that are unfamiliar to social scientists or the
5 general public, but because it indicates surprising differences in the relative power of
6 those sources.

7
8 Although values alone do not determine environmentally responsible behavior, they
9 are undeniably an important factor. Environmentalist values involve two dimensions. One
10 is an ethical commitment to environmental preservation, often founded on emotional or
11 aesthetic responses to nature itself that come to be central to individuals’ identity and
12 self-esteem (Schultz, 2000, 393; Kals, Schumacher, and Montada, 1999; Newhouse,
13 1990; Hines, Hungerford, and Tomera, 1986). A second dimension involves a sense of
14 altruism or social obligation to respect the needs of other inhabitants of the earth—both
15 the needs of one’s contemporaries and those of future generations (Corraliza and
16 Berenguer, 2000; Stern, 2000, 41). For some individuals, that sense of moral
17 responsibility is linked with a desire not only to preserve natural resources and
18 opportunities for their children, but also to insure the survival of their own culture and
19 civilization (Kempton, Darley, and Stern, 1992, 1219-1220).

20
21 More detailed analysis reveals that environmental values fall into three clusters that
22 psychologists label egoistic, social altruistic, and biospheric (Schultz, 2000, 392; Stern
23 and Diezt, 1994, 70). Egoistic concerns reflect people’s preoccupation with their own
24 self-interest and lead to support for environmental policies such as wilderness
25 preservation and clean air that they perceive to affect them personally (Schultz, 200, 393;
26 Kaplan, 2000, 429). Social-altruistic values lead to concern for environmental policies
27 and practices that affect others; the concern may run largely to local groups or national
28 populations, or may extend more broadly to include global communities. Biospheric
29 values involve a sense of responsibility for all living inhabitants of the earth.

30
31 Empirical research confirms what common sense predicts. Values play an important
32 role in encouraging conservation behaviors. Some research even suggests that ethical
33 commitments are more likely to promote sustained environmentally responsible behavior
34 than short term financial incentives. Although conduct induced by financial incentives
35 tends to revert to baseline norms once those incentives are discontinued (De Young,
36 2000, 511), deeply held values can encourage and sustain long term conservation actions.
37 In one four-year study, utilities randomly assigned Wisconsin customers to different rate
38 structures that had different charges for peak residential use. The best predictor of
39 reduced usage was not cost but people’s sense of moral obligation—namely, whether
40 they believed that it was good to reduce the need for polluting power plants. That ethical
41 conviction was most important even when rate differentials were as high as eight to one
42 for peak and off-peak use (Heberlein and Warriner, 1982; Stern and Aronson, 1984, 72).
43 Research further makes it clear that certain conservation measures, such as solar panels
44 on roofs, are sometimes adopted out of commitment to environmental preservation and
45 the sense of personal environmentalist identity, even when they yield little or no financial
46 savings (Stern and Aronson, 1984, 64).

1 Recent research on California owners of hybrid vehicles further underscores the
2 importance of principles over price. A majority of owners had a symbolic image of their
3 vehicle that was linked to broader values, including social awareness, responsibility, and
4 concern for others. Interestingly some connected their choice to messages of frugality and
5 intelligent consumerism, although none even managed to break even in financial terms
6 because of the steep purchase price that offset any fuel savings. Hybrid owners believed
7 that their vehicles conveyed an image of their owners as people who cared about
8 conserving scarce resources and preserving the natural ecosystem (Heffner, Karani, and
9 Turrentine, 2005, 1, 5). Another study similarly found that hybrid purchasers were
10 motivated more by their commitment to be “pioneers” and to make the choice that is
11 “right . . . for society” than by economic benefits such as fuel cost savings (Karani and
12 Turrentine, 2004).

13
14 Beliefs about the need for environmentally responsible behavior, and personal values
15 consistent with those beliefs, are important; however, field research suggests that
16 perceptions about the behavior of one’s peer group may be the most critical factor in
17 determining whether those beliefs and values get translated into action. In one study, for
18 instance, researchers showed that the most effective message in getting hotel guests to re-
19 use their towels was one that told the guest that most other guests were complying with
20 the relevant energy saving request. Messages about cost savings, environmental impact,
21 or obligations to future generations all proved less influential (Goldstein, Cialdini, and
22 Griskevicius, 2005). Similar evidence about the power of perceived behavioral norms
23 emerges from a study of visitors to the Petrified National Forest. The message that
24 succeeded most in discouraging the visitors from removing wood was not one about the
25 adverse environmental effects of that practice; rather, it was information that others were
26 leaving the wood in place (Cialdini et. al., 2005).

27
28 Perhaps most relevant is a recent study of utility customers indicating that they
29 reduced household energy consumption the most when they learned that the vast majority
30 of their neighbors were conserving, rather than when they were told about environmental
31 benefits or about personal cost savings (Cialdini et al., 2005). What is particularly
32 striking about this study is that the participants generally thought information about the
33 behavior of their peers would be *less* likely to influence them personally than
34 considerations of environmental impact or financial savings.

35
36 Social norms can also be conveyed through the media. Celebrities who serve as
37 spokespersons on environmental issues can, at the very least, attract popular attention,
38 donor support, and access to policy circles (Hirschopf, 2005). A 2005 television
39 extravaganza on global warming, *Earth to America*, featured stars such as Tom Hanks,
40 Larry David, and Ray Romano and illustrated the potential value of this approach.
41 Research has not yet established whether a desire to associate oneself with prominent role
42 models motivates large numbers of people to change their own environmental behavior,
43 but the general power of media stars to influence people’s purchases and lifestyle choices
44 seems beyond doubt.

45

1 The most important role models for most people, however, may lie closer to home.
2 When it comes to residential improvements, people are most persuaded by seeing what
3 friends and neighbors have done, finding out exactly what was involved in doing it, and
4 hearing them recount the benefits and sources of satisfaction they derived from the
5 experience. Such personalized accounts are apt to prove more effective than information
6 available from more official sources (Stern and Aronson, 1984, 35, 68-69; Darley and
7 Beniger, 1981, 15). The most influential sources are individuals who occupy central
8 positions in social networks or who appear to friends and neighbors as role models and
9 reliable advisors about finance, management of home repairs, or the “right” way to live
10 can play a particularly important role in this regard (Gladwell, 2000)

11
12 *5. Face-to-face contact, commitment, channel factors, and feedback*

13
14 Getting people to act on positive environmental values and intentions can be achieved
15 by face-to-face encounters that reinforce those values, show the concrete actions
16 required, and win some initial commitment to begin undertaking those actions. In one
17 study where utility companies offered to subsidize 93% of the cost of energy efficiency
18 improvements, consumer responses varied between 1% and 20% annually, depending on
19 how the subsidy was communicated (Stern, 2000, 419). A Canadian study of strategies to
20 reduce summer use of water on residential lawns found that simply providing information
21 on efficient use actually *increased* consumption by 15 percent. However, when residents
22 in the study received a home visit and were asked to commit to reduced usage the results
23 were dramatic. Three quarters of those visited made the commitment in question, and
24 overall water consumption was reduced by more than 50% (McKenzie-Mohr, 2000, 550-
25 551).

26
27 Another case study in effective consumer outreach is the Hood River Project,
28 undertaken by the NRDC and the Pacific Northwest’s largest electricity suppliers. After
29 less than 10% of customers signed up for a voluntary weatherizing program, the sponsors
30 developed an experimental project to market the program more extensively. The project
31 relied heavily on local residents, including Citizen Advisory Councils, door-to-door
32 visitors, and speakers at school, church, and community events. Within two years, 85% of
33 households had enrolled, and by the end 95% were participating (Cavanagh and Hirst,
34 1987; Engels, Kaplan and Peach, 1987).

35
36 Outreach programs are most likely to succeed when they ask for responses that are
37 modest, inexpensive, and easy to achieve. Once individuals have agreed to small
38 behavioral changes, and taken those steps, they tend to identify with the relevant goals
39 and become more likely to undertake more substantial changes in behavior (Staw 1976).
40 In one study, homeowners who signed a written commitment to try and reduce energy
41 use in fact achieved significantly more reductions than those who did not, including
42 homeowners who were offered money for conservation (Bator and Cialdini, 2000, 537).
43 Public information campaigns can build on commitment biases by attempting to enlist
44 audiences in small gestures of support. Possible strategies include encouraging
45 individuals to contact the sponsoring organization for a bumper sticker, refrigerator
46 magnet, or t-shirt endorsing the targeted conservation measure. Not only can such

1 gestures increase participants’ personal commitment, they also serve to signal support for
2 the relevant social norms to others, and the salience of those norms, as noted previously,
3 is a key factor in promoting widespread behavior change (Bator and Cialdini, 2000, 537).
4

5 Building personal commitment to specific energy-saving or emission-reducing
6 actions, and creating a sense of personal identity that includes environment responsibility,
7 is apt to be a step-by-step procedure. Cost and convenience are obviously important.
8 More specifically, creating an easy path or channel for the behavior one seeks to
9 encourage may be more important than the persuasiveness of one’s message or even the
10 degree to which the recipients agree with the message. Thus, it is desirable to make home
11 improvements as easy to install as possible, and also to provide a list of names and
12 telephone numbers of reputable service providers (Stern, 2000, 429; Darley and Beniger,
13 1981, 153).
14

15 A study of Northeast utility customers demonstrates the importance of initial
16 convenience and ease of compliance. The program offered free energy audits, assistance
17 with financing, referral to a certified contractor, and inspection of improvements.
18 Because the program was financed by a surcharge on the work performed by certified
19 companies, it did not offer customers any cost savings over work done by other
20 contractors. Nonetheless, 2000 households, about a quarter of those who requested audits,
21 made the improvements. Although the participants ended up recouping four times their
22 initial investment through reduced energy bills, the most frequent reasons for
23 participating in the program were non-financial. The key factors were that the program
24 relieved consumers of the effort and worry they might otherwise have had to expend in
25 finding a reliable company, in determining what work really needed to be done, and
26 making sure that the work was done properly (Stern, Black, and Elliot, 1982; Stern and
27 Aronson, 1984, 58).
28

29 Participation by citizen groups and focused research can often be helpful in
30 determining what factors actually are important to potential participants and what
31 reservations or barriers to participation must be overcome. By seeking such information,
32 Boulder, Colorado, succeeded in designing a shuttle service that provided an alternative
33 to single-occupancy vehicle trips—one featuring friendly drivers, comfortable seats, and
34 an attractive interior—that made the program desirable from both a consumer and
35 environmental perspective (Kaplan, 2000, 500).
36

37 An ideal intervention strategy, most social psychologists would agree, involves
38 creating a particular moment of decision in which it is easy (and, if possible, inexpensive)
39 for the individual to say yes, and merely saying yes sets in motion or even fully produces
40 the desirable consequences. For example, a consumer might agree to replace an old
41 inefficient refrigerator with a more efficient one, join a carpool, or schedule an energy-
42 auditor’s visit. While strategies to overcome inertia and passivity toward consumption
43 decisions are an important part of successful environmental intervention efforts, inertia
44 toward policy change can sometimes work to the advantage of program designers. If pro-
45 environmental policies are adopted by officials who enjoy a reasonable degree of public
46 legitimacy, opponents to those programs will find it difficult to build active political

1 opposition on the part of citizens who might not have supported those policies in the first
2 instance.

3
4 Results of “opt-in” vs. “opt-out” programs suggest just how powerful inertia can be.
5 An example is the organ-donation option (in case of death) for automobile drivers. Some
6 countries ask motorists to check a box if they are *willing* to participate in the program
7 (with the default option being *non*-participation); some ask them to check a box if they
8 are *unwilling* to participate in the program (with the default option being participation).
9 The result of this slight change in the wording or “framing” of the relevant option proves
10 to be dramatic. In opt-in programs (where non-participation is the default option), donor
11 participation rates are typically about 20 percent. In opt-out programs (where
12 participation is the default option), participation rates are typically in the 80% to 90%
13 range (Johnson and Goldstein, 2003). Similar results are found in comparisons of opt-in
14 versus opt-out savings plans, and one can expect that the same would be true in any
15 comparison of opt-in versus opt-out energy conservation plans. Opt-out plans do more
16 than simply make it easier to say yes than to say no. They also reflect and reinforce social
17 norms and expectations. They convey the sense that ordinary citizens ought to participate
18 unless they have some compelling, personal justification for not doing so.

19
20 Individuals also tend to be more responsive to concrete information than to general
21 warnings or appeals. Changes in monthly energy bills or in the cost of filling one’s gas
22 tank provide such information. In fact, sudden spikes in those costs heighten motivation
23 (in a way that more gradual increases do not) and provide timely occasions to step up
24 campaigns for energy conservation and fuel efficiency standards (Darley and Beniger,
25 1981, 158). Specific, and where possible immediate, feedback about energy *savings* can
26 play an important role in promoting desired changes in behavior (Seligman, Becker, and
27 Darley, 1981, 100). For example, most people pay attention to their total monthly energy
28 bill, but they are not well informed about the costs of particular uses of energy. Nor are
29 individuals usually aware how much they could save through modest measures, such as
30 turning down the thermostat at night or investing in low-cost home improvements (Stern
31 and Aronson, 1984, 35). Family members or renters who do not personally pay utility
32 bills may be particularly ignorant about such costs and potential savings. Researchers
33 have found that households provided with frequent (ideally daily) reports of usage
34 showed savings of up to 20% in consumers’ total bills when compared to households
35 paying the same rates but receiving less frequent feedback (Winkler and Winnet, 1982;
36 Stern and Aronson, 1984, 39).

37 38 39 **IV. Conclusions and Recommendations**

40 The need for greater commitment by governments and individual citizens on the issue
41 of global climate change is clear. That is true of all societies, but the United States bears
42 special responsibility to address its inefficient use of energy resources. Americans
43 account for 5% of the world’s population but a quarter of its energy consumption.
44 California is in a key position both to alter those patterns and to serve as an example for
45 other state, national, and international efforts.

1
2 To reach a sustainable environmental future, individuals will need to make
3 conservation a higher priority in both their personal and political behavior. For that to
4 occur, policy makers and environmental groups will need a coordinated strategy,
5 informed by the kind of behavioral research summarized above. All too often,
6 conservation campaigns have proceeded without adequate knowledge of, or attention to,
7 the lessons that have been learned from laboratory and field research. Limitations of time
8 and resources have worked against systematic research in the design, pretesting, and
9 evaluation of public outreach efforts (Oskamp, 2000; McKenzie-Mohr, 2000). In the long
10 run, however, the price for short-changing research and evaluation is too high. More
11 careful planning, with involvement from researchers and target audiences, is necessary to
12 achieve the fundamental behavioral and policy changes that reduction of global warming
13 requires.

14
15 The preceding overview has identified the major challenges in increasing public
16 commitment to energy conservation and the strategic considerations that should shape
17 attempts to achieve widespread behavioral changes. As a threshold matter, decision
18 makers need to identify what behaviors most need to change. They also need to consider
19 when individual energy consumers, opinion-leaders and experts, or local, state, or federal
20 government officials are the most relevant targets for influence. A careful analysis of
21 obstacles to change, and of resources available to overcome those obstacles, should be
22 part of any energy conservation campaign.

23
24 Setting realistic objectives and focusing on proven tactics for achieving and
25 sustaining behavioral change should be part of the process. Too often, environmental
26 campaigns are undertaken without proper planning or attention to how good intentions
27 can be translated into daily practices (McKenzie-Mohr, 2000; Bator and Cialdini, 2000).
28 Involving local organizations, or creating citizen advisory groups at the design phase, and
29 pretesting a pilot version of any public outreach effort are critical. Attention must also be
30 paid to the opportunities and difficulties that arise when small programs are “scaled up”
31 to the level required for real environmental impact. Consultation at all stages of any new
32 program with marketing experts, social and cognitive psychologists, and other
33 knowledgeable social scientists (especially those with experience in producing behavior
34 change relevant to the environment) will help officials to achieve success and to avoid
35 costly mistakes. Website resources, particularly those that archive successful local
36 campaigns, can also be useful (McKenzie-Mohr, 2000; Renew America Environmental
37 Success Index, 2005; Kaplan, 2000).

38
39 The research findings summarized here suggest a number of general considerations
40 that should guide information campaigns concerning global warming:

- 41
42
- 43 • Information should be available in multiple forms from multiple sources and
44 should be targeted to particular audiences’ circumstances and concerns.
 - 45 • Sources should be credible and include celebrities, local officials, community
organizations, and social networks of friends, neighbors, and colleagues.

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- 1 • Messages should be concrete, vivid, and dramatic; they should also be
2 personalized and responsive to the core audience’s values and experiences.
- 3 • Visual images should be used to enlist media and public attention and evoke
4 concerns about environmental preservation and stewardship for future
5 generations.
- 6 • The risks of global climate change should be conveyed in ways that underscore
7 urgency but that do not evoke doomsday scenarios that may result in denial and
8 perceptions of futility.
- 9 • Messages that convey social norms and highlight environmentally responsible
10 behavior by relevant peer groups are especially important.
- 11 • Messages that emphasize opportunities to avoid losses or negative changes are
12 particularly important, as people are more willing to act to prevent losses than to
13 achieve gains.
- 14 • The focus of any campaign should be on behavior change rather than information,
15 attitudes, or values alone. Specific behaviors should be targeted, and, where
16 possible, specific opportunities should be created for individuals to commit
17 themselves to those behaviors.
- 18 • The behavior change initially sought should be made as easy, convenient, and
19 inexpensive as possible. More significant behavior change can more readily be
20 achieved after individuals have internalized pro-environmentalist values and made
21 them a source of personal identity and self-esteem.

22
23 The preceding overview also suggests some specific directions for campaigns targeting
24 particular conservation behaviors:

- 25
26 • Energy-saving home improvements can be encouraged by linking home owners
27 with trustworthy companies that can assess needs and do the necessary work.
- 28 • Rebates can be used to encourage the purchase of more energy-efficient
29 appliances and help consumers take an initial step toward environmental
30 responsibility
- 31 • Demonstration projects and home visits can be employed to increase participation
32 in conservation programs and provide specific opportunities to enlist in such
33 programs.
- 34 • Consumers can be asked to demonstrate their commitment to energy conservation
35 to their neighbors through bumper stickers, letter-writing campaigns, and other
36 visible symbols of compliance with pro-environment norms.
- 37 • Where possible, individuals should receive frequent, specific feedback on their
38 energy uses (and savings) in order to encourage cost-effective reductions.
- 39 • Individuals should be encouraged to support pro-environment organizations.

40
41 This is not a modest agenda. But efforts along these lines are crucial in moving
42 California, the nation, and the global community towards a sustainable environmental
43 future.

44

1 **References**

2
3 GreenCom, The Environmental Education and Communication Project of the U.S.
4 Agency for International Development for USAID, Environmental Education and
5 Communication for a Sustainable World: Handbook for International Practitioners
6 (Washington, D.C. Academy for Educational Development, 2000).

7
8 Adler, Peter S. and Jeremy L. Kranowitz. A Primer on Perceptions of Risk, Risk
9 Communications, and Building Trust (Keystone, Colorado: The Keystone Center,
10 February, 2005).

11
12 Ajzen, Icek and Martin Fishbein. Understanding Attitude and Predicting Social Behavior
13 (Englewood Cliffs, N.J., 1980).

14
15 Allen, Frederick W. Towards a Holistic Appreciation of Risk: The Challenge for
16 Communicators and Policymakers, Science, Technology and Human Values 12 (1987):
17 138-143.

18
19 Americans and the World, The Reality and Urgency of Global Warming, New Poll
20 Results, available at Program on International Policy Attitudes, [http://www.americans-](http://www.americans-world.org/digest/global_issues/global_warming/gwl.cfm)
21 [world.org/digest/global_issues/global_warming/gwl.cfm](http://www.americans-world.org/digest/global_issues/global_warming/gwl.cfm), last accessed November 21,
22 2005.

23
24 Andrews, R.N.J. Managing the Environment, Managing Ourselves: A History of
25 American Environmental Policy (New Haven: Yale University Press, 1999).

26
27 Baum, Andrew and Jerome E. Singer, eds. Advances in Environmental Psychology
28 Volume 3 (Hillsdale, N.J.: Lawrence Erlbaum, 1981).

29
30 Bator, Renee J. and Robert B. Cialdini. The Application of Persuasion Theory to the
31 Development of Effective Pro-Environmental Public Service Announcements. Journal
32 Social Issues 56 (2000):527-541.

33
34 Bennet, W. Lance. News: The Politics of Illusion (New York: Longman, 3d ed. 1996).

35
36 Clayton, Susan and Amara Brook. Can Psychology Help Save the World? A Model for
37 Conservation Psychology, Analysis of Social Issues and Public Policy 5 (2005): 87-102.

38
39 Cantrill, James G. and Christine L. Oravec, eds. The Symbolic Earth, Discourse and Our
40 Creation of the Environment (Lexington: The University Press of Kentucky, 1996).

41
42 Carlson, Allen. Aesthetics and the Environment (New York: Routledge, 2000).

43
44 Cavanagh, Ralph, and Eric Hirst. The Conservation World=s Capital, The Amicus
45 Journal (Summer 1987):87.

REVIEW DRAFT – Not for Citation

- 1 Cialdini, Robert., et. al., Descriptive Normative Beliefs, Normative Feedback, and
2 Behavior (unpublished paper, Arizona State University, 2005).
3
- 4 Cialdini, Robert, Linda J. Demaine, Daniel W. Barrett, Brad J. Sagarin, and Kelton L.
5 Rhoads. The Poison Parasite Defense: A Strategy for Sapping a Stronger Opponent’s
6 Persuasive Strength. (unpublished paper, Arizona State University, 2005).
7
- 8 Corraliza, J.A., and J. Berenguer. Environmental Values, Beliefs and Actions: A
9 Situational Approach. *Environment and Behavior* 32 (2000): 832-848.
10
- 11 Darley, John M. and James R. Beniger. Diffusion of Energy-Conserving Innovations.
12 *Journal of Social Issues* 37 (1981):150-169.
13
- 14 Day, Brian A. Media Campaigns, in GreenCom, The Environmental Education and
15 Communication Project of the U.S. Agency for International Development for USAID,
16 Environmental Education and Communication for a Sustainable World, 79-85.
17
- 18 DeLuca, Kevin Michael and Ann Teresa Demo. Imaging Nature: Watkins, Yosemite, and
19 the Birth of Environmentalism. *Critical Studies in Media Communication*.17 (2000): 241-
20 260.
21
- 22 Dietz, Thomas and Paul C. Stern, Exploring New Tools for Environmental Protection, in
23 Dietz and Stern, Exploring New Tools For Environmental Protection.
24
- 25 Dietz, Thomas, and Paul C. Stern, eds. Exploring New Tools For Environmental
26 Protection: Education, Information, and Voluntary Measures (Washington, D.C.:
27 National Academy Press, 2002).
28
- 29 Engels, Danielle, Shelly Kaplan, and H. Gil Peach. Marketing and Promotion Plan
30 Prepared by Pacific Power and Light, Oregon, for U.S. Department of Energy (Portland,
31 Oregon: Bonneville Power Administration, 1987).
32
- 33 Festinger, Leon. Theory of Cognitive Dissonance (Stanford, CA: Stanford University
34 Press, 1957).
35
- 36 Fischhoff, Barush. What=s Worth Knowing- and Saying (Carnegie Mellon, Workshop on
37 Global Warming: The Psychology of Long- Term Risk, November 12, 2004).
38
- 39 Goldstein, Noah J., Robert B. Cialdini, and Vladas Griskevicius. A Room with a
40 Viewpoint: Using Normative Appeals to Motivate Energy Conservation in a Hotel
41 Setting (Arizona State University, 2005).
42
- 43 Greenberg, Quinlan, Rosner Research, Inc. Perceptions of Global Warming in West
44 Coast States (San Francisco: Greenberg, Quinlan, Rosner Research, Inc. June, 2004)
45

REVIEW DRAFT – Not for Citation

1 Harmon- Jones, Eddie, and Judson Mills, ed. Cognitive Dissonance: Progress on a Pivotal
2 Theory in Social Psychology (American Psychological Association, 1999).

3
4 Heffner, Reid R., Kenneth S. Kurani, and Thomas S. Turrentine. Effects of Vehicle
5 Image in Gasoline Hybrid Electric Vehicles. (Paper Presented at the 21st Worldwide
6 Battery, Hybrid, and Fuel Cell Electric Vehicle Symposium and Exhibition, Monaco,
7 April 2-6, 2005).

8
9 Herberlein, T.A. and G. K. Warriner. The Influence of Price and Attitude on Shifting
10 Residential Electricity Consumption from On to Off Peak Periods. (Paper Presented at
11 the International Conference on Consumer Behavior and Energy Policy, Netherlands,
12 September, 1982).

13
14 Herzog, Howard J., Thomas E. Curry, David M. Reiner, Stephen Ansolabehere.
15 unpublished survey, discussed in Climate Change Poorly Understood by US public, MIT
16 Survey Finds, available at EurekAlert, [http://www.eurekalert.org/pub_releases/2006-
17 03/miot-ccp032305.php](http://www.eurekalert.org/pub_releases/2006-03/miot-ccp032305.php), last accessed November 21, 2005.

18
19 Hines, J. M., H.R. Hungerford, and A.N. Tomera, Analysis and Synthesis of Research on
20 Responsible Environmental Behavior: A Meta-Analysis. Journal of Environmental
21 Education 18 (1986): 1-18.

22
23 Hirschopf, Alan. Natural Resources Defense Council, Telephone Interview, December
24 22, 2005.

25
26 Hwang, Y., S. Kim, and J. Jeng. Examining the Relationships Among Selected
27 Antecedents of Responsible Environmental Behavior. Journal of Environmental
28 Education 31 (2000); 19-25.

29
30 Jasanoff, Sheila. Heaven and Earth: The Politics of Environmental Images, in Jasanoff
31 and Marello, Local and Global in Environmental Governance, 31-54.

32
33 Jasanoff, Sheila, and MaryBeth Long Martello, Local and Global in Environmental
34 Governance (Cambridge, MA: MIT Press 2004).

35
36 Kals, E. D. Schumacher, and L. Montada. Emotional Affinity Toward Nature as a
37 Motivational Basis to Protect Nature. Environment, and Behavior 31 (1999): 178-202.

38
39 Kaplan, Stephen. Human Nature and Environmentally Responsible Behavior. Journal of
40 Social Issues 56 (2000): 491-508.

41
42 Kempner, Willett, John M. Darley, and Paul C. Stern, Psychological Research for the
43 New Energy Problems. American Psychologist 47 (1992):1213-1223.

REVIEW DRAFT – Not for Citation

- 1 Krosnick, Jon A., Allyson L. Holbrook, Laura Lowe, and Penny S. Vissen. The Origins
2 and Consequences of Democratic Citizens= Policy Agendas: A Study of Popular
3 Concern about Global Warming (In Press, November 2005).
4
- 5 Kunda, Ziva. The Case for Motivated Reasoning. *Psychological Bulletin* 108 (1990):
6 480.
7
- 8 Kurani, Kenneth S., and Thomas S. Turrentine. Automobile Buyer Decisions about Fuel
9 Economy and Fuel Efficiency. ITS-R-04-31 (September, 2004).
10
- 11 McKenzie-Mohr, Doug. Promoting Sustainable Behavior: An Introduction to
12 Community-Based Social Marketing. *Journal of Social Issues* 56 (2000):543-554.
13
- 14 Miller, Joanne, Jon A Krosnick, Leandre R. Fabrigar. The Origins of Policy Issue
15 Salience: Personal and National Importance Impact on Behavioral, Cognitive, and
16 Emotional Issue Engagement (In Press, September 2005).
17
- 18 Nisbett, Richard E., and Lee Ross. *Human Inference: Strategies and Shortcomings of*
19 *Social Judgment* (Englewood Cliffs, N.J.: Prentice-Hall, Inc. 1980).
20
- 21 Newhouse, N.H. Implications of Attitude and Behavior Research for Environmental
22 Conservation. *Journal of Environmental Education* 22 (1990):26-32.
23
- 24 Oak Ridge Center for Advanced Studies. Harris Interactive Survey of Public Perceptions
25 (September, 2005).
26
- 27 Oskamp, Stuart. Psychological Contributions to Achieving an Ecologically Sustainable
28 Future for Humanity, *Journal of Social Issues* 56 (2000): 373.
29
- 30 Pelletier, Luc G., Stephanie Dion, Kim Tuson, and Isabelle Green-Demers. Why Do
31 People Fail to Adopt Environmental Protective Behaviors? Toward a Taxonomy of
32 Environmental Amotivation. *Journal of Applied Social Psychology* 29 (1999): 2481-
33 2504.
34
- 35 Plous, Scott, *The Psychology of Judgment and Decision Making*. (New York: McGraw
36 Hill, 1993).
37
- 38 PollingReport.com, Environment, available at <http://www.pollingreport.com/enviro>, last
39 accessed, November, 2005.
40
- 41 Public Policy Institute of California, in Collaboration with the William and Flora Hewlett
42 Foundation. PPIC Statewide Survey, Special Survey on the Environment (San Francisco,
43 Public Policy Institute of California, July, 2005).
44
- 45 Rayner, Steve, and Elizabeth L. Malone. *Human Choice and Climate Change*. Volume 4:
46 *What Have We Learned* (Columbus, Ohio: Battelle Press, 1998).

REVIEW DRAFT – Not for Citation

- 1
2 Renew America, Environmental Success Index, available on line at
3 http://www.crest.org/renew_america.
4
5 Sachsman, David B. The Mass Media “Discover” the Environment: Influences on
6 Environmental Reporting in the First Twenty Years, in Cantrill and Oravic, *The*
7 *Symbolic Earth*, 241-256.
8
9 Seligman, Clive, Lawrence J. Becker, and John M. Darley, Encouraging Residential
10 Energy Conservation Through Feedback, in Baum and Singer, *Advances in*
11 *Environmental Psychology*, 93-113.
12
13 Schultz, P. Wesley, Empathizing With Nature: The Effects of Perspective Taking on
14 Concern for Environmental Issues. *Journal of Social Issues* 56 (2000):391-406.
15
16 Shanahan, James, and Katherine McComas. *Nature Stories: Depictions of the*
17 *Environment and Their Effect* (Creskill, N. J.; Hampton Press, 1999).
18
19 Stauber, John C. and Sheldon Rampton, *Toxic Sludge is Good for You: Lies, Damn Lies*
20 *and the Public Relations Industry* (Monroe, Maine: Common Courage Press, 1995).
21
22 Staw, Barry M. Knee Deep in the Big Muddy: A Study of Escalating Commitment to a
23 Chosen Course of Action, *Organizational Behavior and Human Performance* 16
24 (1976):27.
25
26 Stern, Paul C. Toward a Coherent Theory of Environmentally Significant Behavior.
27 *Journal of Social Issues* 56 (2000): 407-424.
28
29 Stern, Paul C. and T. Dietz. The Value Basis of Environmental Concern. *Journal of*
30 *Social Issues* 50 (1994): 65-84.
31
32 Stern, Paul C., and Elliot Aronson. *Energy Use: The Human Dimension* (New York: W.
33 W. Freeman, and the National Research Council, 1984).
34
35 Stern, Paul C., J.S. Black, and J.T. Ellsworth. Influences on Household Energy
36 Adaptation, Paper Presented to the American Association for the Advancement of
37 Science (1982).
38
39 Tversky, Amos, and Daniel Kahneman. The Framing of Decisions and the Psychology of
40 Choice. *Science*, 211 (1984):453-458.
41
42 Winkler, R. C. and R.A. Winett. Behavioral Interventions in Resource Management A
43 Systems Approach Based on Behavioral Economics. *American Psychologist* 37 (1982):
44 421-435.
45

REVIEW DRAFT – Not for Citation

1 Yale University School of Forestry and Environmental Studies. Survey on American
2 Attitudes on the Environment-Key Findings (New Haven, CT: Yale University School of
3 Forestry and Environmental Studies, May, 2005).
4
5 Yale University Center for Environmental Law and Policy Yale University School of
6 Forestry and Environmental Studies. The Environmental Deficit: Survey on American
7 Attitudes on the Environment, Issue Focus: Global Warming (New York: Global Strategy
8 Group, May, 2004).
9
10 Yates, S. Using Prospect Theory to Create Persuasive Communications About Solar
11 Water Heaters and Insulation. (Doctoral Dissertation ,Santa Cruz: University of
12 California, 1982).
13
14