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Climate-Friendly Default Rules

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Abstract

Careful attention to choice architecture promises to open up new possibilities for reducing greenhouse gas emissions – possibilities that go well beyond, and that may supplement or complement, the standard tools of economic incentives, mandates, and bans. How, for example, do consumers choose between climate-friendly products or services and alternatives that are potentially damaging to the climate but less expensive? The answer may well depend on the default rule. Indeed, climate-friendly default rules may well be a more effective tool for altering outcomes than large economic incentives. The underlying reasons include the power of suggestion; inertia and procrastination; and loss aversion. If well-chosen, climate-friendly defaults are likely to have large effects in reducing the economic and environmental harms associated with various products and activities. In deciding whether to establish climate-friendly defaults, choice architects (subject to legal constraints) should consider both consumer welfare and a wide range of other costs and benefits. Sometimes that assessment will argue strongly in favor of climate-friendly defaults, particularly when both economic and environmental considerations point in their direction. Notably, surveys in the United States and Europe show that majorities in many nations are in favor of climate-friendly defaults.

Keywords (5): choice architecture; nudges; defaults; energy transition, climate change

I. Beyond Mandates and Incentives

It is reasonable to think that the problem of climate change is best handled through two familiar tools: mandates and incentives. If the world needs to reduce greenhouse gas emissions, perhaps regulatory mandates should be imposed on coal-fired power plants, (combustion engine) automobiles, and other emissions sources, ensuring significant cuts in a short time. Or perhaps it is best to proceed with some kind of carbon tax, or with a

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national (or international?) cap-and-trade program.[1] We agree that both regulatory mandates and incentives, both positive and negative, should play a significant role in the world's efforts to come to reduce the risks of climate change. But it is increasingly clear that such efforts must also come to terms with something that is potentially both a problem and an opportunity: human behavior (Ross, Arrow, Cialdini, Diamond-Smith, Diamond, Dunne, Feldmen, Horn, Kennedy, Murphey, Smith, York, & Ehrlich, 2016).

Greenhouse gas emissions are driven, in large part, by voluntary behavior, produced by some mixture of perceived benefits, perceived costs, and perceived social norms. Changes in such behavior, produced by new norms and different kinds of choice architecture, could produce substantial emissions reductions. To be sure, those changes are most unlikely to do everything that must be done. But if a ton of carbon emissions is valued at an appropriate level – say, around $35, as the United States now believes – then even seemingly modest steps could easily produce monetized benefits in the hundreds of millions, or even billions, of dollars (or euros). And if any nation is adopting some kind of "Clean Power Plan," designed to reduce greenhouse gas emissions, a serious question remains: How will such a plan achieve its goals? At least part of the answer lies in uses of behavioral science, including behavioral economics – our main topic here.

For orientation, suppose that in a relevant community, there are two sources of energy, denominated "green" and "gray." Suppose that consistent with its name, "green" is better than "gray" on climate change grounds. Those who use green energy emit lower levels of greenhouse gases and also of conventional pollutants. Suppose that those who use gray energy save money. Which will consumers choose?

The obvious response is that the answer will depend on the magnitude of the relevant differences. Suppose that green energy is far better than gray in terms of climate change and that gray energy costs only very slightly less. If so, consumers will be more likely to choose green energy than if it is only slightly better on environmental grounds and if it costs far more. Individual preferences certainly matter. Across a reasonable range of imaginable differences in magnitudes, we would expect to see a great deal of heterogeneity across people, nations, and cultures. Some people do not much care about greenhouse gas emissions, and the monetary figures will drive their choices. For other people, reducing such emission is important, and such people may be willing to pay a great deal to make the environmentally preferred choice. On standard assumptions, people's decisions will depend on the relationship between economic incentives and underlying preferences.

The standard assumptions are not exactly wrong, but as behavioral economists have shown, they disregard important variables that do not involve strictly economic incentives (Shafi, 2013). Some kind of choice architecture lies behind people's decisions, and that architecture may have large effects on what people choose (Thaler & Sunstein, 2008). One question involves prevailing *social norms* (Allcott, 2011; Allcott & Rogers, 2014). What choices are other people making, and why? If choosers know that most other

[1] For a superb discussion, see Nordhaus (2013).

choosers are selecting green energy, there will be an increase in the likelihood that they will themselves choose green energy (Allcott, 2011, p. 1082). If, by contrast, environmentalists lament the fact that few people are choosing green energy, the result might well be to aggravate the very problem that environmentalists are seeking to solve, by drawing attention to, and thus reinforcing, a social norm that they hope to change (Cialdini, Demaine, Sagarin, Barrett, Rhoads, & Winter, 2006, p. 10-12). And if there is a widespread belief that reasonable and good people select climate-friendly products, that norm will exert pressure in favor of green energy (Cialdini et al., 2006, p. 12).[2] Social norms may well lead behavior in a green or gray direction even in the face of significant economic incentives.[3]

Another question involves *expressive considerations*. Some consumers select green energy not because of a careful calculation that the environmental benefits justify the private costs, but because of a desire to express certain values (Posner, 2004) or to act in accordance with their idealized self-perception (Reisch, 2003). Many of those who purchase climate-friendly vehicles seem to be responding largely to expressive considerations. They want to "make a statement." They may want to do so because of their conception of their identity[4] or because they want their statement to be seen in public (Griskevicius, Tybur, & Van den Bergh, 2010). Expressive considerations can of course point in different directions in accordance with prevailing norms. In some communities, purchase of green energy (and green products in general) is strongly favored on expressive grounds; in other communities, it is not favored or is even disfavored.[5]

While expressive considerations may involve people's self-understandings, they may also involve *signaling* (Griskevicius et al., 2010; Sexton & Sexton, 2011). Consumers may wish to signal their preferences to others and that desire may influence their choices, as in cases of *conspicuous conservation* (Sexton & Sexton, 2011). Socially visible products, such as electric sports cars, are naturally more useful for status display than switching to green electricity, installing a high-efficiency heat pump in the basement, or opting for car sharing. "Buying green" is often done for status reasons, while "behaving

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[2] Note in particular the finding that drawing public attention to the existence or pervasiveness of undesirable behavior can actually increase such behavior:

It is worthy of note that our most ineffective persuasive message simulated the sort of negatively worded, descriptive norm message that . . . is regularly sent by public health and community service officials regarding a wide variety of social problems. Our results indicate that appeals of this type should be avoided by communicators in their persuasive undertakings. Unfortunately, this is not always the case. . . . For instance, after we reported the outcomes of the present study [showing the ineffectiveness of park signs containing negatively worded, descriptive normative messages] to park administrators, they decided not to change the relevant aspects of their signage. . . . We were disappointed—but, truth be told, not surprised—that park officials weighted visitors' subjective responses more than our empirical evidence in their signage decision (Cialdini et al., 2006, p. 12)

[3] It is possible, of course, that an emphasis on social norms will trigger adverse reactions and potentially resistance, perhaps especially among younger people. See the discussion of "deviant subcommunities" in Kagan and Skolnick (1993).

[4] For relevant discussion, but not focused on environmental protection in particular, see Akerlof and Kranton (2010).

[5] On the diversity of social meanings, and their changes over time, see Lessig (1995).

green" is usually less visible and status-laden (Starr, 2009). As we shall see, expressive considerations may also interact with law and policy. In particular, the law may affect the nature and even the sign of the signal.

People may also make a *rapid, automatic judgment* in favor of or against green energy, and that automatic judgment may motivate their behavior whatever the nature of a careful calculation of its own consequences (Kahnemann, 2011). Denominating a product a climate-friendly choice may be sufficient to create a kind of brand that sparks a "warm glow" for brand aficionados (Hartmann & Apaolaza Ibáñe, 2006). That form of green branding and the associated emotional benefits may well have a large effect on intuitive judgments. In fact the power of green branding is such that it has been found to lead to a significant increase in the purchase of candy bars with green labels, especially among health-conscious purchases, even when those candy bars are not more healthy in any way (Schuldt, 2013). Of course social norms are likely to play a large part in producing such judgments.

Our principal topic here is the role of *climate-friendly default rules*. Defaults are settings that apply, or outcomes that stick, when individuals do not take active steps to change them (Brown & Krishna, 2004; Johnson & Goldstein, 2013). Default rules establish what happens if people do nothing at all. In the example with which we began, people are asked to make an active choice between green and gray energy. But it is easy to imagine a different approach, one that in which choice architects set a default rule in one direction or another, while allowing people to depart from it. In short, social outcomes might be automatically green.

Apart from creating a default rule, choice architects may or may not seek to influence people's choices. In fact there is a continuum of possible approaches, whose poles are active choosing (with neutral presentation) and firm mandates (with no ability to opt out), and whose multiple intermediate points include the following:

- active choosing accompanied by self-conscious framing or related influences (meant to encourage either climate-friendly or gray choices),
- a climate-friendly default with costly opt-out,
- a climate-friendly default with costless opt-out,
- a gray default with costless opt-out,
- a gray default with costly opt-out.

Our goal is to explore the uses of climate-friendly default rules. A great deal remains to be learned; on the empirical side, new studies continue to be highly informative. But on the basis of existing evidence, it is reasonable to think that climate-friendly defaults may well have major effects on environmental outcomes -- in some contexts comparable to the effects of mandates and bans, and potentially far larger than the effects of information, education, moral exhortation, and even significant economic incentives (Chetty & Friedman, 2014).[6] If the goal is to reduce greenhouse gas emissions, and to

[6] For electricity products in Germany, see Kaenzig, Heinzle, and Wüstenhagen (2013).

save money in the process, default rules are an important tool in the regulatory repertoire, and they may be able to achieve a great deal more than other tools, including those that would cost taxpayers a great deal of money.

Especially in a period in which the standard tools – mandates, bans, and economic incentives – sometimes face serious economic and political obstacles, climate-friendly default rules deserve careful attention. Such default rules might play a supplementary role in any nation's effort to reduce greenhouse gas emissions, or indeed by any such effort by private institutions or even households. It is true, of course, that any public officials must have the legal authority to promote (or require) climate-friendly default rules, and any such officials may lack that authority. Without engaging the legal issues, which vary across states and nations, we urge that private providers should give serious consideration to climate-friendly defaults, and that officials should do so as well to the extent that they are authorized to do so. It is relevant in this connection that about as of this writing, about every sixth provider in Germany *automatically enrolls people in certified green energy sources* (renewables).

One of the primary advantages of climate-friendly defaults is that they can have beneficial effects while maintaining freedom of choice and hence respect for heterogeneity. Suppose, for example, that a relevant population contains a number of people who are facing serious economic difficulty. If so, and if green energy is more expensive than the alternative, it may well be important to allow consumers to opt out (at least if energy subsidies are unavailable). But a series of complexities arises by virtue of the fact that default rules are typically selected because they benefit choosers, not third parties; in the environmental context, externalities are frequently involved. This point suggests that the choice of default rules should turn on an assessment not only of consumer welfare but also of a set of other costs and benefits. If, for example, a green default would have modest costs for consumers, but produce significant social benefits from emissions reductions, it would (by hypothesis) be justified on cost-benefit grounds.[7]

It follows that our own criteria are *welfarist*: We suggest that default rules should be evaluated by asking about their consequences, that social welfare is what matters, and that cost-benefit analysis is a useful (because administrable) method for testing whether one or another approach would increase social welfare. We acknowledge that this approach can be contested and also that it leaves gaps; we also acknowledge the existence of questions about public acceptability (Reisch and Sunstein, 2016).

The largest point is that default rules with environmental consequences are pervasive, and they might be green, gray, or somewhere between. When existing defaults are relatively gray, it is not because nature so decreed, but because of emphatically human choices, and these might be otherwise. If public and private institutions seek to make progress on the climate change problem, they might well be able to do so by becoming far more self-conscious about selection of the appropriate defaults. One of our principal points is that default rules of multiple kinds are already in place, alongside other

[7] For an illuminating challenge to cost-benefit analysis, calling for attention to the interests of the least well-off, see Adler and Treich (2015).

forms of choice architecture, and they have large effects on outcomes, both economic and environmental, even if they have not been subject to careful scrutiny.[8]

The remainder of this chapter is organized as follows. In Part II, we offer a few examples of climate-friendly defaults, designed to establish their generality, their potential, and their impact. We also offer evidence about (positive) attitudes toward such defaults in a wide range of nations. Part III explores why default rules matter, with an emphasis on the power of suggestion, the role of inertia, and loss aversion. Part IV examines non-sticky defaults, showing that in some cases, people will reject climate-friendly defaults. Part V explores whether choice architects should select a climate-friendly default, first on the admittedly artificial assumption that consumers' interests are the only issue at stake, and second by introducing externalities. Part VI examines active choosing and various ways of influencing (while preserving) choice without the use of default rules. Building on the foregoing discussion, Part VII offers a general framework, welfarist in character, for choice architects to consider in selecting among the various options. Part VIII concludes.

II. Climate-Friendly Defaults: Examples

Daily life is increasingly accompanied by the equivalent of climate-friendly defaults. Consider motion detectors that turn out the lights when people do not appear to be in the relevant room. In this way, motion detectors create the equivalent of an "off" default. Or consider appliance and computer settings that turn the relevant equipment off when it is not in use. If the default setting on office thermometers is turned down in winter, and up in summer, we should expect significant economic and environmental savings, at least if the default setting is not so uncomfortable that people will take steps to change it (Brown, Johnstone, Haščič, Vong, & Barascrud , 2013). Both policy and technology are making climate-friendly defaults of this kind readily available.[9]

A. Green Energy

We began with a choice between utility suppliers. It is far too simple, of course, to suggest that the available possibilities fall in two dichotomous categories of "green" and "gray." There are multiple options, and the environmental and economic consequences of diverse sources of energy require careful investigation; disputes are easy to find (see, e.g., Boyle, 2012; Everett, Boyle, Peake, & Ramage, 2012; Morriss, Bogart, Meiners, & Dorchak, 2011; Zehner, 2012). As noted above, the very label "green" can affect consumers, even for candy bars, whether or not the underlying good or service is healthy or protective of the environment (Schuldt, 2013). For present purposes, it is sufficient to stipulate that from the standpoint of reducing greenhouse gas emissions, some sources are far preferable to others, and consumers might want to consider that point when choosing energy, especially if they can save (or do not lose) money at the same time.

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[8] Note that choice architecture may result from deliberate design or instead from invisible-hand mechanisms; there may be no architect (Ullmann-Margalit, 1978).

[9] For the available palette of default policies, see Johnson, Shu, Dellaert, Fox, Goldstein, Häubl, Larrick, Payne, Peter, Schkade, Wansink, & Weber (2012).

Many jurisdictions do offer some kind of choice. In some nations (including the United States), people are generally defaulted into a particular source, with the option to opt out. Typically, the default is relatively gray (perhaps because some of the green options continue to be expensive, or perhaps because most national energy authorities have promoted and subsidized grey energy for decades). To use green energy, people have to seek out relevant information and choose it affirmatively.[10] The deterrent effects of that requirement are large, even in circumstances in which people would give serious consideration to climate friendlier options if presented with the choice unaccompanied by a default. What would be the effects of switching to a green default? The question has been examined through two natural experiments, involving actual behavior, and also a series of laboratory experiments (Pichert & Katsikopoulos, 2008).[11]

1. *Actual behavior, 1*. In Germany, many people say that they would use green energy if presented with a choice, but very few consumers actually opt for green; in almost all communities, the green usage rate was for a long period under one percent (though it has significantly increased in recent years) (Pichert & Katsikopoulos, 2008). Even when the green usage rate was generally close to zero, two communities showed usage rates well above 90 percent. The reason is simple: They used green defaults.

The first such community is Schönau in the Black Forest, consisting of about 2500 people and (in the period of the relevant study) dominated by conservatives, with a weak Green Party (receiving, in that period, only about five percent of votes; the number has significantly increased in more recent years) (Pichert & Katsikopoulos, 2008, p. 66). In the aftermath of the Chernobyl disaster in the 1980s, a citizen referendum established an environmentally-friendly energy supply, in which the Schönau Power Company became the incumbent utility and many of the Schönau citizens became owners of the cooperative. That company promotes solar energy and places a great deal of reliance on renewables. Customers are allowed to opt out and to use other energy sources, but they have to find relevant information in order to identify alternatives. Almost no one opts out: In many years, the opt-out rate was only slightly above zero percent.

The second natural experiment involves the former EnergieDienst GmbH[12], which supplies energy to an area in southern Germany. In 1999, the company established three separate tariffs. The default was green, and it turned out to be eight percent cheaper than the previous tariff. The second option was less green but cheaper (by an additional eight percent) and the third was greener but more expensive (by an additional 23 percent). If customers did not respond, they would remain with the default. About 94 percent of

[10] For one example, see http://www.massenergy.org/renewable-energy/FAQ (last visited June 26, 2016.

[11] A more recent experimental study in Germany is reported in Kaenzig et al. (2013). Equally, Momsen and Stoerk (2014) found in a lab experiments that green default nudges increased the share of individuals who choose renewable energy by 44.6%. Most recently, Vetter and Kutzner (2016) found a strong effect of the default manipulation on choices; they did, however, find no moderating effect of general proenvironmental attitudes on these choices.

[12] Today Energiedienst Holding AG, see https://www.energiedienst.de (last visited June 26, 2016).

customers so remained, with 4.3 percent switching to the cheaper tariff, and the rest switching either to the greener alternative or to a different supplier.

These results testify to the extraordinary power of defaults. Recall that elsewhere in Germany, the use of green energy was at the time of the study less than one percent, even though consumers said that they would be willing to pay a premium for it. But outside of the two areas just described, people were required affirmatively to select green energy, and overwhelmingly they did not. It is fair to speculate that at least within a large range, the default rule determines the kind of energy that people use.

2. *Actual behavior, 2*. More recently, a randomized controlled trial was conducted in Germany, attempting to test the effect of a default rule on use of green energy (Ebeling & Lotz, 2015). The study involved 41,952 households, participating in the 4.5-week-long RCT and randomly assigned into one of two treatments. In the first, people were asked whether they wanted to opt into green energy (renewables); in the second, they were automatically enrolled into green energy, and asked whether they wanted to opt out. In both treatments, green energy was slightly more expensive.

The default rule had a highly significant effect. Conditional on the purchase of an energy contract, only 7.2% of purchased contracts in the opt-in treatment were green – but in the opt-out treatment, a remarkable majority of 69.1% of purchased contracts were green. Notably, this effect was robust after controlling for service quality of the chosen contract, base prices of electricity, and unit prices.

Not surprisingly, approval of the Green Party was associated with green energy choices in opt-in condition. In the lowest quintile of approval, just 4.63% of people signing a contract opted into green energy, while in the highest quintile, 9.87% of people opted into it. But in the opt-out condition, approval of the Green Party had no significant effect. The authors' follow-up study strongly suggests that in both opt-in and opt-out conditions, consumers were not tricked or fooled; they were consciously aware of what they were doing.

3. *Experiments*. Experimental results should be taken with many grains of salt, because they may not predict actual behavior (Loewenstein, Sunstein, & Goldman, 2015), but they can be informative, and they also find a large effect from climate-friendly defaults (Pichert & Katsikopoulos, 2008, p. 67-68). A study on Amazon Mechanical Turk found that in an opt-out condition, over 90 percent of people would end up with green energy – but in opt-in, just 34 percent would do so (Ebeling & Lotz, 2015). A more recent study also found a significant effect, from a green default, in increasing use of green energy, though less dramatic than in the previous study (79 percent with opt-out, 69 percent with opt-in) (Hedlin & Sunstein, 2015).[13]

In another laboratory study, focusing specifically on climate, people were presented with a choice between two suppliers. The first, called EcoEnergy, was described in this

[13] The stronger effect of opt-out compared to opt-in schemes has also been found in other green default applications. such as carbon offsetting programs (Araña & León 2013).

way: "*EcoEnergy sells clean energy, generated from renewable electricity sources. Contribute to climate protection and environmental protection!*" The second, called Acon, was described in this way: "*We offer low-priced electricity tariff—you cannot beat our prices. Save money with Acon!*" The default turned out to matter a great deal. When Acon was the default, 57 percent of participants stuck with it, but when it was the alternative, only 32 percent of people chose it (Pichert & Katsikopoulos, 2008, p. 68-69). Interestingly, about the same percentage of people chose Acon in a case of active choice.

A similar experiment found a significant disparity in economic valuations (Pichert & Katsikopoulos, 2008, p. 70). Asked how much they would be willing to pay to switch to green energy, people gave a mean value of 6.59 euros. Asked how much they would be willing to accept to switch from green energy, they gave a median value of 13 euros. Interestingly, this difference precisely tracks the standard difference between willingness to pay and willingness to accept; the latter is usually double the former (Thaler, 1991).

A study based on 2009 household data found a remarkable gap between customer preferences and the products being offered as the average electricity mix in Germany (Kaenzig et al., 2013). With regard to five alternative electricity production mixes offered, the then-current default ranked second to last in terms of consumer preferences – which were strongly in favor of renewable energy products.[14] The finding attests to the real possibility that existing defaults may persist even if they do not reflect the preferences of the consumers whose choices are effectively determined by them.[15]

4. *A note on public opinion*. Green defaults can be highly effective; but do citizens favor or oppose them? Democratic nations would hesitate to promote climate-friendly defaults if it turned out that most citizens thought that they were a bad idea.

We have attempted to make progress on this question by asking for citizens' view in the United States, Denmark, France, Hungary, Italy, Germany, and the United Kingdom (Reisch & Sunstein, forthcoming). Our questions were admittedly stylized; we did not probe how citizens would react if green energy cost significantly more. Nonetheless, the responses do suggest a high degree of receptivity to automatic enrollment – irrespective of whether these defaults are encouraged or required by the government:

Table 1

Approval of green energy defaults in six surveyed countries[16]

[14] Note, however, that two years after the Fukushima disaster and the initiation of the German "Energiewende," most energy providers offer attractive "green energy" mixes and have greatly changed their supply policy (see Reisch, 2013).

[15] *See* below for discussion of inertia.

[16] Data for the two items were collected along with information on 13 other nudges. Surveys in all countries where carried out as part of CAWI (Computer Assisted Web Interview) Omnibus survey, except in the case of Hungary, where no omnibus survey was available and hence a CAWI ad hoc survey was employed.

	IT	UK	FR	GER	HU	DK
Encouraging defaulting customers into green energy providers	76	65	61	69	72	63
Requiring energy providers to default customers into green energy	74	65	57	67	65	55

Note: total support in percentages; unweighted results.
Source: Own data (see Reisch & Sunstein, forthcoming)

These results suggest that movements in the direction of climate-friendly defaults (by private or public institutions) are likely to attract substantial public support, though we acknowledge that cost matters, and that the word "climate" (as opposed to the word "green") would likely increase support in some quarters and decrease it in others. We note as well that in our research, majority support for green defaults (somewhat surprisingly) cuts across partisan lines, at least in general. In terms of public opinion, then, there is a significant opportunity here.

B. Energy Efficiency

Many consumers use products that are significantly less energy-efficient than available alternatives (Sorrell, O'Malley, Schleich, & Scott, 2004). For purposes of reducing greenhouse gas emissions, a central question is whether and when they will to switch to products that are more efficient and less expensive (at least in the long-run). And in some cases, people do have energy-efficient products, and it is possible that they will switch less energy-efficient products that are less expensive (at least in the short-run). Independent of the expense of the switch itself, does the default matter?

A series of experiments attempted to answer this question (Dinner, Johnson, Goldstein, & Liu, 2011). People were asked to choose between two kinds of light bulbs. One is the efficient but costly Compact Fluorescent Light Bulb (CFLB); the other is the inefficient but inexpensive Incandescent Light Bulb (ILB). The choice between the two greatly matters. If every home in the United States changed merely one ILB to a CFLB, the result would be to save over $600 million in annual energy costs, to eliminate greenhouse gas emissions equal to those of more than 800,000 cars, and to save energy that would light over three million homes annually.

In the relevant studies, subjects were told that they were undergoing a significant amount of remodeling of their home and that the contractor had outfitted the light fixtures with either the ILB or the CFLB. Subjects were asked whether they wanted to switch, at no cost, to the alternative. They were also given a great deal of information about the costs and benefits of the two options. For example, the CFB would cost $11 in electricity per 10,000 hours, whereas the ILB would cost $49 per 10,000 hours. The CFB would cost $3 per bulb whereas the ICB would cost $0.50 per bulb (Dinner et al., 2011).

Samples for Italy and Germany are representative for the population of private internet users ("online representative") while the samples for the UK, France, Hungary and Denmark are representative for the resident population ("face to face representative").

The central finding is that the default greatly mattered. When energy-inefficient ICBs were the default, they were chosen nearly 44 percent of the time. When the CFLB was the default, the ICB was chosen only 20.2 percent of the time (Dinner et al., 2011). The disparity is especially noteworthy in view of the fact that in the relevant experiments, people were not in the standard real-world situation of having to overcome inertia and to make a change. They were asked, more simply, whether they would do so, and in the sense they were forced to choose. If they had the option of postponing the decision and simply sticking with the status quo, the disparity would undoubtedly be larger.

D. Smart Grids

Smart grid technology is of considerable interest in many nations (Fox-Penner, 2014), in particular as a means of reducing greenhouse gas emissions, and in Germany in particular, it is a prerequisite for the radical expansion of the share of renewable energy that is needed to realize the German "Energiewende" (a transition in the uses and sources of energy). Such technology has the potential to provide a better balance of the supply and demand of electricity and to make the grid more flexible, efficient, and reliable. In particular, smart meters have increasingly been seen, by the public and private sectors alike, to be useful tools to develop smart energy use patterns through the provision of immediate feedback (Fox-Penner, 2014). The explicit binding goal of the European Union's "Third European Energy Liberalization Package" is that by 2020, smart meter systems are installed in 80 percent of households.[17] But there are obstacles to achievement of this goal, including data privacy concerns and perceived risks of reduced home comfort (part of the electricity consumption is remote controlled by the energy provider). As a result, consumers are reluctant to accept this new technology in their homes, and the 80 percent target currently seems to be a distant prospect (Austrian Energy Agency, 2011).

If the goal is to get close to the target, what might be done? A recent experimental study based on a nationwide panel in Denmark shows that the implied default greatly affects consumer behavior. More specifically, the acceptance rate to install a smart meter is significantly higher if offered as an "opt-out" frame ("No, I would not like to have a smart meter with remote control installed in my home") than as an opt-in frame (Ölander & Thøgersen, 2014).The study confirms that the framing of the question, and the implied default, have a substantial impact on the share of a population that accepts Smart Grid installation; with this finding in mind, the authors urge "that campaigners therefore should choose a framing only after careful consideration" (Ölander & Thøgersen, 2014, p. 151).

III. Why Default Rules Matter

[17] Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC (Text with EEA relevance), Official Journal of the European Union, 14.8.2009. L 211/ p. 91; *see also* Institute for Energy & Transport Joint Research Centre, http://ses.jrc.ec.europa.eu/ (last visited June 26, 2016).

Why do climate-friendly defaults have such a large effect on outcomes (see, e.g., Gale, Iwry, & Walters, 2009; Dinner et al., 2011)? There appear to be three principal contributing factors; each of them has distinctive characteristics in the context of greenhouse gas emissions (e.g., Brown, Farrell, & Weisbenner, 2011; Johnson & Goldstein, 2013).

1. *Suggestion and endorsement*. The first factor involves an *implicit suggestion or endorsement* on the part of those who have devised the default rule (McKenzie, Liersche, & Finklestein, 2006; Madrian & Shea, 2001).[18] Suppose that choice architects, whether private or public, have explicitly chosen a climate-friendly default. If so, choosers may believe that they have been given an implicit recommendation (perhaps from a private institution, perhaps from public officials), and that they should not reject it unless they have reliable private information that would justify a change. If the default choice is green energy, it is tempting to think that experts, or sensible people, believe that this is the right course of action. Those who are deciding whether to opt out might trust the choice architects well enough to follow their lead.

Many people appear to think that the default was chosen by someone sensible and for a good reason. Especially if they lack experience or expertise and/or if the product is highly complex and rarely purchased, they might simply defer to what has been chosen for them.[19] The point suggests that default rules are less likely to have an effect when people consider themselves to be experienced or expert, and indeed there are findings to this effect among environmental economists, who reject selected defaults (Lofgren, Martinsson, Hennlock, & Sterner, 2012).

Outside of the climate change context, there is strong evidence that a lack of information on the part of choosers, including a lack of information about alternatives, helps to account for the power of defaults (Brown, Farrell, & Weisbrenner, 2011). In one study (involving savings behavior), over half of those who stuck with the default specifically mentioned an absence of private information as one of their reasons for doing so (Brown, Farrell, & Weisbrenner, 2011). An implication of this explanation is that if choosers do not trust the choice architect, in general or in the particular instance, they will be far more likely to opt out. And indeed, there is evidence for this proposition as well (Tannenbaum & Ditto, 2012). If choice architects select a climate-friendly default for reasons that are perceived as self-serving, elitist, preachy, or foolish, we would expect to see an increase in the rate of opt-out. Climate-friendly defaults are more likely to stick if choosers trust those who have selected them, or at least perceive no reason to distrust them.

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[18] Of course it is not true that all defaults are chosen because they produce the best outcomes for people.

[19] People might also have experienced for themselves the positive outcomes of controversial regulatory decisions that they might not have endorsed *ex ante*. Examples include smoking bans for bars and restaurants that have been imposed in the US and in Europe in the 2000s – in the face of industry opposition. Yet polls today show a high *ex post* agreement with these bans. Citing such examples, Elke Weber (2013, p. 380; 393) concludes that "query theory and such examples suggest that policy makers may sometimes be well advised to shape and lead public opinion rather than follow it."

2. *Inertia*. The second explanation involves inertia and procrastination (sometimes described as "effort" or an "effort tax"; see Johnson & Goldstein, 2013). To change the default rule to either green or gray, people must make an active choice to reject that rule. They have to focus on the relevant question, which is whether how they should trade off environmental, economic, and perhaps other goods. Especially but not only if the question is difficult or technical, and if the tradeoff is complex or morally charged, it may be tempting to defer the decision or not to make it at all. In view of the power of inertia and the tendency to procrastinate, people may simply continue with the status quo and avoid to choose (Iyenga, Huberman, & Jiang, 2005).

A striking example can be found in Germany. While increasing energy prices are headlines news in German media, and are causing considerable concern to consumers, many households remain in the basic tariff of the energy provider. This is so even though the basic tariff is usually more expensive than one fitting the household's actual use patterns and may also be more expensive than green energy.[20] However, recent consumer information and switching campaigns have had some success, and the number of households switching both provider and basic tariff is steadily increasing, leaving 76% percent in the basic tariff (Bundesnetzagentur & Bundeskartellamt, 2015, p. 25-26). Recall as well that in Germany, many citizens appear to be defaulted into a form of energy use that the vast majority of Germans reject. Recall finally that in Germany, one-quarter of energy providers do automatically enroll users into green energy.

In many cases involving climate change, the decision whether to select green energy involves some thinking, some risk, and a potentially complex (and morally charged) assessment of economic and environmental considerations. The choice of an electricity provider is not exactly intuitive; it may well be cognitively demanding. The default rule might stick simply because people do not want to engage in that thinking, take that risk, or make that tradeoff. Studies of brain activity find that when decisions are complex and difficult, people are more likely to stick with the default (Fleming, Thomas, & Dolan, 2010). Even if people in some sense want to investigate the issue and possibly to make a change, they might decide that they will do so tomorrow – and tomorrow never comes.

Consider in this regard the finding that a default thermostat setting has a significant effect on OECD employees (Brown, Johnstone, Haščič, Vong, & Barascund, 2013). A 1 C degree decrease in the default caused a significant reduction in the average chosen setting, apparently because most employees did not much care about the new default, and hence did not take the time to change it. Small as it was, the cost of that effort did not justify the bother. This interpretation is supported by the remarkable finding that when the default setting was reduced by 2 C degrees, the reduction in the average chosen setting was actually smaller, apparently because sufficient numbers of employees thought

[20] See regular product tests and price comparisons of energy providers offers conducted by the "Stiftung Warentest," available at www.test.de (last visited June 26, 2016); *see, e.g.*, *Strompreise: Mit in paar Klicks mehrere Hundert Euro sparen*, Stiftung Warentest (June 26, 2016), https://www.test.de/Strompreise-Mit-ein-paar-Klicks-mehrere-Hundert-Euro-sparen-4993315-0/; and *Strom und Gas: Anbieterwechsel leicht und lohnend* (June 26, 2016), https://www.test.de/Strom-und-Gas-Anbieterwechsel-leicht-und-lohnend-4464395-4464400/.

that it was too cold, and returned the setting to the one that they preferred (Brown, Haščič, Vong, & Barascund 2013).

In this case, the reason for the effect was probably inertia, not suggestion. The 1 C degree decrease was a bit colder that the preferences of OECD employees, but not enough to justify a change. But with a 2 C degree decrease, the underlying preference manifested itself in restoration of the original status quo. The general lesson, to which we will return, is that in the face of strong preferences, the default is less likely to stick, which gives choice architects greater room to maneuver when they make small changes rather than large ones.

3. *Reference point and loss aversion*. A third and especially interesting explanation stresses the fact that the default rule establishes the *reference point* for people's decisions. Recall in this regard the behavioral finding of loss aversion. People dislike losses far more than they like corresponding gains (McGraw, Larsen, Kahneman, & Schkade, 2010; Thaler, Kahneman, & Knetsche, 1994, p. 167, 169)[21] and whether a loss or a gain is involved does not come from nature or from the sky. The default rule determines what counts as a loss and what counts as a gain.

To appreciate the power of loss aversion and its relationship to default rules, consider an illuminating study of teacher incentives (Fryer, Levitt, List, & Sadoff, 2012). Many people have been interested in encouraging teachers to do better to improve their students' achievements. The results of providing economic incentives are decidedly mixed; many of these efforts have failed (Fryer et al., 2012). But the relevant study enlists loss aversion by resetting the default. The authors gave teachers money in advance and told them that if students did not show real improvements, *the teachers would have to give the money back*. The result was a significant increase in math scores – indeed, an increase equivalent to a substantial improvement in teacher quality. The underlying idea here is that losses from the status quo are especially unwelcome, and people will work hard to avoid those losses.[22]

Return in this light to default rules and the question of energy efficiency. Suppose that as compared to the gray (energy-inefficient) choice, the green option costs $200 more upfront but saves $210 over a period of five years. If the gray option is the default, people are likely to focus on the immediate loss of $200, and they will be highly reluctant to incur that loss. Perhaps the $210 savings will overcome their reluctance -- but the immediate $200 loss will likely loom large. If, by contrast, the green option is the default, people are more likely to focus on the eventual loss of $210, and they will be highly reluctant to incur that loss. In the environmental context, loss aversion may have an especially significant effect, certainly in the case of climate-friendly defaults: People may

[21] Vivid evidence of loss aversion can be found in Card and Dahl (2011), finding an increase in domestic violence after a favored team suffers from an upset loss in football.

[22] For a valuable discussion of loss aversion and its importance, see Homonoff (2013), showing that small, five-cent tax on the grocery bags, in the District of Columbia, has had a significant effect in reducing grocery bag use – but that a small, five-cent bonus for using reusable bags had essentially no effect.

well feel a pang of conscience, or anticipatory regret, if they are contemplating rejection of a green default (Hedlin & Sunstein, 2015).

In this respect, the default may well interact with, and help to establish or reinforce, prevailing social norms. Recall that some people make climate-friendly choices because they want to "make a statement." If opting out produces environmental as well as economic harm, it may entail a statement that consumers do not want to make – and this is so even if they would not have opted in.

IV. When Default Rules Do Not Stick

In some cases, people are willing to switch the default at the expense of the climate-friendly outcome. Recall that in the face of a 2 C degree decrease in the default setting, many OECD employees took action to turn up the temperature (Brown, Haščič, Vong, & Barascund, 2013). Note as well that when experienced people – environmental economists attending a conference – were presented with a default number for carbon dioxide offsets for flying, they were unaffected by that number (Löfgren et al., 2012). And in the study of energy-efficient light bulbs, the default rule was sticky, but not remarkably so. Even when it was the default, the energy-inefficient light bulb was rejected by about 56 percent of choosers.[23] We could easily imagine populations that would likely reject the energy-efficient choice in equal or higher numbers, especially if the less efficient option cost a great deal less, and if in that population, environmental considerations did not loom large.

When default rules do not stick, the usual reason is usually straightforward: People have clear preferences that run counter to them. If preferences are clear, people are less likely to be influenced by the endorsement in the default rule. Inertia may well be overcome. Loss aversion will be far less relevant, in part because the clear preference helps define the reference point from which losses are measured.

Suppose that consumers are defaulted into a climate-friendly energy source that costs 50 percent more than the alternative. Unless social norms or inertia are particularly strong, some consumers will reject that default. For supportive evidence, consider both the evidence presented above and also a study in the United Kingdom, which found that most people opted out of a savings plan with an unusually high (and therefore unattractive) default contribution rate (12 percent of before-tax income) Only about 25 percent of employees remained at that rate after a year, whereas about 60 percent of employees shifted to a lower default contribution rate. Notably, people with lower incomes were more likely to stay at the unusually high contribution rate (Beshears, Choi, Laibson, & Madrian, 2012). Similar findings have been made elsewhere, with growing evidence that those who are less educated, and less sophisticated, are more likely to stick

[23] Recall, however, that the study was a laboratory experiment, not a randomized trial. If people actually had to take steps to change the default – rather than merely answering questions about whether they would do so – the switch rate would likely have been smaller.

with the default (Brown, Farrell, & Weisbenner, 2011). Note as well the finding that while school children could well be nudged (through the functional equivalent of default rules) into healthier choices, researchers were not able to counteract the children's strong preference for (unhealthy) French fries (Just & Wansink, 2009).

The clear implication is that extreme or highly unwelcome defaults are less likely to stick. It follows that climate-friendly defaults that are perceived as foolish, wrong, harmful, expensive, or the imposition of some high-minded environmentalist elite, may well be rejected by many consumers. A more puzzling and somewhat troubling implication, based on the lower incomes of those who stayed with the default in the savings study described above, is that default rules may be more sticky for low-income workers than for their higher-earning counterparts. One reason may be that low-income workers have a great deal to worry about (Banerjee & Duflo, 2012; Shah, Mullainathan, & Shafir, 2012), and so are less likely to take the trouble to think through and to alter the default rule. An "effort tax" may seem especially high, and have an especially large adverse effect on, people who are already facing a large number of decisions and costs. Supportive evidence can be found in Germany, where low socio-economics status (SES) households tend to stay with their energy provider while higher SES households tend to switch.[24]

This point suggests that a costly climate-friendly default may have a regressive impact, both because poor people have less money and because they may well be especially likely to stick with it. And indeed, there is general evidence that when people are highly informed and experienced, and hence know what they want, they are far less likely to be affected by the default rule (Löfgren et al., 2012). One reason is that the effort tax is worth incurring. Another reason is that highly involved and competent "market mavens" actually enjoy searching extensively and making their choice independently of defaults. Since "*the* consumer" does not exist in the abstract, there have been calls for a more group-specific policy design that takes the relative level of consumer competence into consideration, and in particular that distinguishes among confident, vulnerable, and responsible consumers (Micklitz, 2013). Such distinctions may bear on the selection of personalized default rules, taken up below.

V. Should Private or Public Institutions Choose Climate-Friendly Defaults?

We now turn to the normative question. Which default rule should choice architects select? Are climate-friendly defaults a good idea? As we had suggested, our criteria are insistently and unabashedly welfarist. The question is whether one or another approach would improve people's lives, which requires a focus on the actual consequences. We acknowledge the existence of questions about public acceptability (Reish and Sunstein, 2016); we note also that welfarist considerations can be understood in diverse ways

[69] Infas Energiemontor 2012, available at https://www.infas.de/fileadmin/user_upload/PDF/infas_Abb_Energiemarktmonitor.pdf (last visited June 26, 2016)

(Adler, 2012). Our hope is that in this context, considerable progress can be made without requiring resolution of the most difficult normative questions.

A. Consumers (Without Externalities)

For purposes of simplification, begin with the case in which the only concern is the welfare of the chooser and there are no (or only modest) externalities. Under this admittedly unrealistic assumption, the preferred approach is *to select the default rule that reflects what most people would choose if they were adequately informed* (Smith, Goldstein, & Johnston, 2009). If we know that a particular default rule would place people in the situation that informed people would select, we have good reason to select that default rule (with the understanding that those who differ from the majority may opt out).

In the easiest cases, the answer is entirely clear once we specify the likely effects of the options in question. If climate-friendly energy would both cost less and reduce environmental harm, it is safe to say that most informed people would choose it.[25] It should certainly be the default. Under the specified circumstances, those who want consumers to make different choices will not find it easy to explain their views. Indeed, some options should be ruled out of bounds because they are obviously in no one's interest.

Now suppose that the tradeoff is not so self-evident, but that we have reason to believe that 80 percent of people, given a great deal of information, would choose green energy. This might be the case if either (1) climate-friendly energy is far better on environmental grounds but only very slightly more expensive or (2) the relevant population is known to have strong environmental commitments. In either case, there is a strong reason to favor automatic enrollment in climate-friendly energy. But if gray energy would cost significantly less, and if it would be only slightly worse on environmental grounds, a gray energy default would seem best.

To be sure, it might well be necessary to do a great deal of empirical work in order to identify the approach that informed people would choose. (As we shall see, this is a point in favor of active choosing.) The idea of "informed" choice might also raise hard conceptual questions. For reasons that behavioral economists have emphasized (Sunstein, 2013), people may err even if they have a great deal of information. They may, for example, display unrealistic optimism or discount the long-term (Sunstein, 2013); the latter point bears especially on choices in the areas of energy and environmental protection. If informed choosers show systematic biases, it may not make a great deal of sense to base default rules on what appear to be informed choices. On the other hand, any effort to build correction of such biases into the very idea of the informed chooser creates

[25] There are strong indications that this is the case in Germany, and demand for green energy has in fact risen dramatically in recent years. See: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of Germany (2016), available at: http://www.erneuerbare-energien.de/EE/Redaktion/DE/Downloads/erneuerbare-energien-in-zahlen-2015.pdf?__blob=publicationFile&v=3 (last visited June 26, 2016)

a risk, which is that the enterprise will involve identification of what the choice architect believes to be the right choice on the merits – in which case the chooser, as an agent, tends to drop out of the analytic picture. The best solution is probably to rely on what informed choosers actually do, while also allowing correction if their choices can clearly be shown to be against their interest, perhaps because of some kind of behavioral bias.

On this count, actual evidence -- about what informed choosers do -- is extremely important. It would be useful to assemble information about the level of opt-out under various alternatives (Thaler & Sunstein, 2008). Perhaps experiments or pilot programs would provide such information.[26] If only two percent of people opt out if climate-friendly energy is the default, and 50 percent opt out if gray energy is the default, we have reason to believe that climate-friendly energy is better.

Of course it is possible that majority rule is too crude. Suppose that there are two default rules, green and gray. Suppose that 55 percent of informed people would be relatively indifferent between green and gray, but would slightly prefer green. Suppose too that because of their unusual situation (perhaps they are poor), 45 percent of people would strongly prefer gray. It is probably best to select gray, because almost half of the population would much like it, and the (narrow) majority only cares a little bit. The example shows that it is important to ask not only about which approach would be preferred by informed people, but also about the intensity of their preferences.

B. Consumers and Third Parties

In the climate change context, externalities are pervasive; they are the principal motivation for a climate-friendly default rule. Choosers may also face a collective action problem. Asked individually, they might rationally select gray energy, but they might prefer climate-friendly energy if everyone else were doing so as well (a possibility that argues for a firm mandate rather than a mere default rule). If choice architects are deciding among defaults in the presence of externalities and collective action problems, they must investigate the full set of costs and benefits, not only the welfare of choosers (see, e.g., Johnson & Goldstein, 2013). If a default rule turned out to stick, what would be the costs and what would be the benefits?

Even if most choosers would select gray because it is less expensive, green might be the better default if it would avoid significant costs. Suppose that we focus specifically on greenhouse gas emissions. In recent years, a great deal of work has been done to attempt to specify the social cost of carbon (SCC) (Interagency Working Group on Social Cost of Carbon (IAWG), 2010a).[27] In 2010, a technical working group in the United States settled on an SCC of about $23 (2013 dollars); in 2013, the number was updated to about $35 (IAWG, 2010a; IAWG, 2010b). We could easily imagine cases in which the

[26] The Behavioral Insights Team in the United Kingdom is actively engaged in such projects, including in the domain of energy. *See* BIT (2011). *available at* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/60536/behaviour-change-and-energy-use.pdf (last visited June 26, 2016).

[27] For an illuminating critique, see Nordhaus (2011).

avoidance of greenhouse gases would produce significant gains, so that a green default would be simple to justify even if it turned out to be more expensive for users. Ideally, choice architects would monetize all of the relevant costs associated with relevant energy users and set a default rule accordingly.[28] Of course it is true that the assessment could create serious empirical challenges both in monetizing the relevant benefits and in projecting the level of opt-out.

As we have suggested, distributional issues may be relevant and important as well (Adler & Treich, 2015). Suppose, for example, that the cost-benefit analysis argues in favor of a climate-friendly default, but that the selection of that default imposes net costs on consumers, including poor people. Suppose too that poor people are unlikely to opt out, perhaps because they are busy and occupied with other matters, perhaps because they are not confident that opting out makes best sense or because they fear – unnecessarily – that they will lose supply. If poor people would in fact be net losers, but would not opt out, the argument for a climate-friendly default may remain plausible, but it is weakened. If it is chosen, it may be important to explore the possible of financial subsidies for those who pay for it or to make the possibility of opt-out both salient and clear, at least if the latter can be achieved without endangering the goals that led to the default rule in the first instance.

VI. Active Choosing, Influenced Choice, and Personalized Defaults

As we have suggested, choice architects have a large number of options, and they might dispense with a default rule entirely. For example, they might require people to make an active choice between green and gray options. Markets provide an array of active choices, and while the relevant architecture affects what consumers ultimately select, no default rule need be involved. Consider a "menu approach" or "grocery store approach" to the question of energy efficiency and fuel economy, in which people have a wide range of options, and they may select what best fits their preferences and situations (perhaps with legal restrictions on the most energy-inefficient possibilities). The menu or grocery store approach captures a great deal of the current situation. For example, there is active competition in the markets for motor vehicles and appliances, and energy efficiency is one dimension along with producers compete. No default rule is generally in place for private households.[29]

A. Neutrality and Active Choice

With active choices, people are required to make an actual decision among the various options; they are not defaulted into any particular alternative. In the

[28] As we have noted, externalities might justify a mandate rather than a default rule.

[29] One of the few exceptions is the duplex printing and copying requirement, for printers. This requirement is defined in the EU Commissions Decision of 17 December 2013 on establishing the ecological criteria for the award of the EU Ecolabel for imaging requirement, 56 (2013), available at: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0806&from=DE (last visited June 26, 2016). However, the default rules targets printer producers rather than private households.

environmental domain, active choosing has a number of significant advantages, certainly over opt-in (requiring consumers to reject the default to arrive at the environmentally preferred result), and sometimes over opt-out as well.

1. *Green by choice?* The first point is that because an actual decision is required, active choosing overcomes inertia. Suppose that people are using gray energy not because they have affirmatively decided to do so, but because gray is the default, and they have not focused on the options. If inertia (and procrastination) are playing a significant role, active choosing may be far better than opt-in. Here is another way to put the point: With active choosing, people are required to incur effort costs that might otherwise lead them to focus on other matters. As a result, active choosing promotes learning, which might be especially valuable in this context.

Active choosing is also a safeguard against uninformed or self-interested choice architects. When choice architects lack relevant information, so that the chosen rule might be harmful to some or many, there are significant advantages to active choosing. If public officials are biased or inadequately informed, and if the default rule is no better than a guess, that rule might lead people in the wrong direction. We have seen that the choice between green and gray defaults may well create serious empirical challenges. In the face of those challenges, the best route might be to ask consumers what they would like (again, in the absence of significant externalities).

In addition, and less intuitively, active choosing might, under imaginable circumstances, prove as effective as climate-friendly default rules in reducing greenhouse gas emissions. Indeed, it could prove even more effective. Suppose that a significant number of people object to climate-friendly defaults on the ground that they are an imposition by an environmentalist elite. If so, they might opt out. "Reactance" could reduce the effect of the default. Suppose that at the same time, active choosers would choose to go green, on the ground that they would feel guilty if they failed to do so. If so, guilt could overcome the ordinary effects of purely economic incentives. In an experimental setting, there is evidence to precisely this effect (Hedlin & Sunstein, 2015).

In terms of the real world, we should take this evidence with many grains of salt. In an experiment, a default rule will be weaker than it usually is in reality (because in a survey setting, people have no choice but to confront the question whether to change it), and the effects of conscience might well be stronger (because in a survey setting, the costs are not real). Nonetheless, active choosing, as a form of choice architecture, might have surprisingly strong effects in producing climate-friendly behavior, at least in the face of climate-friendly social norms.

It is also important to see that a default rule is most feasible to implement when consumer choice already occurs, or can easily be made to occur, on some kind of *interface* (e.g., on paper or electronically). In such cases, choice architects should be able to establish a default rule by placing it on the existing interface, or by adopting an interface on which the default rule is established. But in other cases, that task may be far more challenging. Suppose, for example, that choice architects, focused on environmental

protection and public health, are considering the creation of default rules for consumer choices at appliance stores, grocery stores, and concession stands at movie theaters. In such settings, is it even possible to enlist default rules? How? To be sure, choice architecture might be devised to make particular choices more accessible or salient, and the relevant design might well have significant effects on what people select (Wansink, 2016). "Green design," exploiting accessibility and salience, can be seen as a close cousin of default rules, but it is not the same thing.

Quite apart from this point, sensible default rules are hard to establish for some routine decisions, simply because of the many considerations that diverse people take into account in making those decisions. For example, the decision whether to rent a car or take a train, bus, or airplane for travel raises hard questions. Potentially relevant factors include consumer cost, consumer safety, near-term externalities (e.g., traffic congestion), long-term externalities (including greenhouse gas emissions), speed of travel, flexibility of departure and arrival time, consumer abilities (e.g., ability to drive), and consumer tastes. It might well be costly to organize any interface to establish workable default rules that reliably balance those interests for the relevant population. For this reason, active choosing seems much better. To be sure, technological innovations may eventually reduce that problem, not least through the use of personalization.

There is also a strong argument against a climate-friendly default rule, and in favor of active choosing, when self-interested private groups are calling for government to select it even though it would not produce net benefits. In the environmental context, it is often easy to imagine a high degree of interest-group jockeying, in which self-interested producers argue vigorously on behalf of a default rule that would benefit them; the choice of energy sources may well invite this kind of jockeying. Active choosing would reduce the risks on this count, because it would not allow public officials to default consumers into any particular source. Finally, and in some cases most important, active choosing appropriately handles diversity. As compared with either opt-in or opt-out, active choosing can have major advantages when the relevant group is heterogeneous, so that a single approach is unlikely to fit diverse circumstances. (We return to the issue of personalization below.)

2. *No panacea*. Notwithstanding its advantages and the frequent appeal of the menu approach, active choosing will sometimes run into legitimate objections, especially in the climate change context. The initial objection is not obscure: In the face of significant externalities, it may seem odd to ask consumers to choose for themselves. Of course some consumers may attend to those externalities and make their selections accordingly. Social norms, self-perception, and signaling may well incline them in that direction. But if a central goal is to reduce air pollution and emissions of greenhouse gases, active choosing may well be inadequate.

An independent problem is that active choosing can impose large burdens on choosers. That burden may be costly or unwelcome. Suppose that an environmental question is unfamiliar and complicated. Suppose that consumers lack information or experience. In the context of energy choices, many consumers may welcome a default,

which will relieve them of the duty of having to focus on an issue that they would like to ignore. At the same time, active choosing can impose large burdens on providers. Defaults can be desirable and even important for those who provide goods or services. Without default rules, significant resources might have to be devoted to patient, tedious explanations and to going through the various options with consumers or users, who might not welcome the exercise.

A final point is that active choosing can increase errors. The goal of active choosing is to make people better off. But if the area is unfamiliar, highly technical, and confusing, active choosing might have the opposite effect. If consumers are required to answer a set of technical questions about energy options, and if the choice architects know what they are doing, then people will probably enjoy better outcomes with defaults. Perhaps it would be best to rely on experiments or pilot studies that elicit choices from informed people, and then to use those choices to build defaults. But if choice architects have technical expertise and are trustworthy, there is a question whether this exercise would be worthwhile.

3. *A very simple conclusion*. The conclusion is that if choice architects have reason to be confident about the preferred default, they should select it, at least if it is feasible to do so. If the assessment is difficult, and if their judgment is highly tentative, they should rely on active choosing, at least if the externalities are not large (again, a generally artificial assumption in the context of climate change).

B. Influenced Active Choosing

It is possible to imagine a variety of variations on active choosing. For example, active choosing might be "enhanced," or influenced, in the sense that one of the choices might be highlighted or favored, perhaps through the use of behaviorally informed strategies (Keller, Harlam, Loewenstein, & Volpp, 2011). If choice architects intend to avoid a default rule but nonetheless want to promote selection of a climate-friendly option, they might list it first, or use bold or a large font, or adopt verbal descriptions that make it especially salient or appealing.

Consider a relevant study in which choice was enhanced, in the sense of being influenced, by enlisting loss aversion to discourage selection of the option disfavored by the experimenters (Keller et al., 2011). The experimenters introduced several different messages in the following way:

> *We would like you to imagine that you are interested in protecting your health. The Center for Disease Control indicates that a flu shot significantly reduces the risk of getting or passing on the flu virus. Your employer tells you about a hypothetical program that recommends you get a flu shot this Fall and possibly save $50 off your bi-weekly or monthly health insurance contribution cost.*

In the *opt-in condition*, people were asked to "Place a check in the box if you will get a Flu shot this Fall." In a *neutral active choice condition*, people were asked to

"Place a check in one box: I will get a flu shot this Fall or, I will not get a flu shot this Fall." With *enhanced or influenced choice*, people were asked to choose between two alternatives: "I will get a Flu Shot this Fall to reduce my risk of getting the flu and I want to save $50 or, I will not get a Flu Shot this Fall even if it means I may increase my risk of getting the flu and I don't want to save $50." Compared to opt-in, the active choice condition led to a significant increase in the percentage of people who would get a flu shot -- and the percentage was highest when active choice was influenced.

We could easily imagine analogues in the climate change context, for instance when a green default is not obviously right, is not feasible, or is ethically questionable. If a climate change default is rejected, but if there is nonetheless good reason to promote the green option, loss aversion and framing might be enlisted to encourage people to select it. The result would almost certainly be to increase the number of people who choose that option. The general point is that active choosing can be more or less neutral with respect to green and gray options. As the choice architect becomes decreasingly neutral, active choosing starts to look closer to a default rule.

C. Climate Change Personalization?

Thus far we have been speaking as if default rules apply to all of a relevant population ("mass defaults"), but some default rules are highly personalized. Personalized defaults draw on available information about which approach is sought by, or best suits, different groups of people, and potentially each individual person, in the relevant population. In the context of travel preferences, personalized defaults are increasingly familiar. A website might know where you like to sit, which airline you prefer, and how you like to pay. A bit like a close friend, a sibling, a partner, or a spouse, it defaults you into your preferred choices while allowing you to opt out.[30]

In the fullness of time, the same will be possible for a wide range of consumer products. Personalization might also be possible for choices that affect the level of greenhouse gas emissions. Choice architects might know, for example, that certain people are highly likely to be drawn to green or gray energy. The best evidence would be their past choices. If consumers have made green choices in the past, we might expect that they will do so in the future, and set defaults accordingly (while of course allowing opt-out). Lacking that evidence, choice architects might know relevant demographic or other factors, suggesting that certain people or certain communities would or would not prefer green energy. If the goal is to reflect the likely choices of consumers, personalized default rules have significant advantages. But a potential problem remains: If there are significant externalities, the interests of choosers are not the only consideration, and the default rule should be chosen only after consideration of the full set of social effects.[31]

VII. A Framework for Choice Architects

[30] See the discussion of "sensory defaults" and "predictive defaults" in Johnson et al. (2012, p. 491).

[31] Recall that a mandate, and not mere default rule, might be justified in the face of significant externalities.

We have now identified a large number of options that choice architects might consider, and it will be useful to offer a brief sketch of a general framework, based on the discussion thus far, that might be used to select among the various options. The framework is designed for situations in which environmental factors are particularly relevant, but it might well be adapted more generally.

Choice architects might be in a position to choose among a continuum of nine stylized possibilities, marked from most green to most gray: (1) climate-friendly mandate or ban; (2) climate-friendly default with costly opt-out; (3) climate-friendly default with costless opt-out; (4) active choosing with a presentation of some kind, favoring climate-friendly energy; (5) active choosing with neutral presentation; (6) active choosing with pro-gray presentation of some kind; (7) gray default with costless opt-out; (8) gray default with costly opt-out; (9) gray mandate or ban. (Of course the ideas of "climate-friendly" and "gray" are not unitary, and include possibilities that can themselves be arrayed along a continuum; the same is true of "costless" and "costly" opt-out.) As we have seen, an appealing general framework is rooted in some kind of cost-benefit analysis (bracketing some of the debates over that contested idea[32]). Enforcement costs are of course part of that analysis, and choice architects should also consider the independent value of freedom of choice and the costs associated with overriding it ("autonomy costs") (Bartling, Fehr, & Herz, 2014).

An implication of the discussion thus far is that without a market failure of some sort (typical in the climate change context), the argument for any kind of mandate or ban is weak.[33] If the interests of choosers are all that is at stake, their own freedom should generally be preserved, so long as their choices are properly informed. On the choice architecture continuum, this conclusion rules out the more aggressively regulatory poles (1) and (9). The choice among the remaining options depends on an analysis of which approach is in the interest of choosers and the confidence that choice architects have about their conclusion on that count. If they have reason for real confidence that a climate-friendly or gray default is best (from the standpoint of all or most informed choosers), they should choose that default (perhaps with some degree of personalization, if feasible). In such cases, the effort costs and error costs associated with active choosing may well be too high to justify that approach (subject to the qualifications, noted above, about the limited domain of defaults).

If choice architects lack such confidence, the set of reasonable options narrows to points (2) through (6) (the middle of the continuum). Active choosing with neutral presentation is appealing if choice architects do not know which approach is best, perhaps because they lack information, perhaps because the relevant population is heterogeneous. If choice architects know enough to favor one or another approach, but not enough to set a default, they might use active choosing with some kind of non-neutral presentation, meant to incline choosers in a particular direction.

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[32] For helpful discussion, see Adler (2011) as well as Adler and Posner (2006).

[33] A behavioral market failure might justify a mandate or ban, but even in the face of such a failure, freedom-preserving responses are usually best. See Sunstein (2012)

Of course the analysis must be different in the face of externalities – for climate, the standard case. If the decisions of choosers would impose significant costs on others, the argument for a mandate or a ban (or some kind of economic incentive) is significantly strengthened and may well be convincing – with an acknowledgement that mandates, bans, and incentives come in different forms, and some approaches are less costly and more choice-preserving than others (Ellerman, Schmalensee, Bailey, Joskow, & Montero, 2000; Nordhaus, 2013).

Sometimes, however, mandates or bans are not feasible, and sometimes there is a reasonable dispute about whether they are justified. In such cases, there is a serious argument for a climate-friendly default, even if it is not necessarily in the interest of choosers themselves. The strength of that argument depends on whether the externalities are large and whether choosers would be significantly helped, or instead hurt, by a climate-friendly default. A form of cost-benefit analysis is indispensable here. In the face of externalities, the "less green" points on the continuum lack much appeal, and the only potential argument in their favor is that the externalities are modest and that choosers would be far better off with a grayer approach.

Distributional questions must also be considered. If a mandate would have serious harmful effects on those at the bottom of the economic ladder, those effects should be taken into account. As we have suggested, a personalized approach, exempting those who cannot easily bear the relevant costs, might make sense. Or in the face of a well-justified mandate or ban, perhaps steps could be taken to give economic help to those who need it.

VIII. Conclusion

With respect to climate change, consumer choices are greatly affected by a wide range of influences, including choice architecture in the form of social norms and applicable default rules. In fact the climate change problem is created, in large part, by choice architecture that promotes extraordinarily high levels of greenhouse gas emissions. Mandates, bans, and incentives have legitimate roles, but climate-friendly defaults should be an important part of the mix. They are easiest to justify when they will simultaneously save money and reduce greenhouse gas emissions; consider motion detectors, automatic "off" defaults, and (in important cases) green energy.

In some cases, of course, climate-friendly defaults will be costly to consumers. For example, green energy may turn out to be more expensive. Smart grids and smart meters have potentially large benefits, but they may also impose costs as a result of traceability and reduced data privacy. No one should favor a situation in which choice architects select defaults that cost consumers a great deal (perhaps in terms of money, perhaps in terms of privacy) and deliver only modest environmental benefits. Some of the hardest cases arise when the climate-friendly default would cost consumers a nontrivial amount but also appear to produce significant environmental benefits.

In such cases, choice architects have two reasonable options. The first is to call for active choosing (and to inform consumers in the process). The second is to assess costs

and benefits and to select the default rule on the basis of the assessment. The choice between the reasonable options depends on whether choice architects have justified confidence in their assessment of costs and benefits. If they do, and if the assessment demonstrates that the climate-friendly default is unambiguously superior, they should choose it.

Much of the time, the best approach is automatically green. Climate-friendly default rules, attentive to the full set of costs and benefits, are likely to emerge as a significant contributor to efforts to reduce greenhouse gas emissions – complementary to and on imaginable assumptions better than education, economic incentives, and mandates or bans.

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