Cognitive Psychology of Climate Change

PSYC481: Psychology of Advertising

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» Learning Objectives

1. The Human Brain Privileges Experience Over Analysis
   - Policy insight: climate change information should be grounded in concrete relatable experiences
2. People Are Social Beings Who Respond To Group Norms
   - Policy insight: leverage social group norms
3. Psychological Distance: Out of Sight, Out of Mind
   - Policy insight: highlight climate change impacts already happening
4. Framing the Big Picture: Nobody Likes Losing (but Everyone Likes Gaining)
   - Policy insight: frame in terms of the positive benefits (gains) of immediate action
5. Playing The Long Game: Tapping The Potential of Human Motivation
   - Policy insight: extrinsic incentives should be provided in conjunction with intrinsic appeals

Psychology and Climate Change

» Psychology and Climate Change

- Climate change is one of the most serious challenges facing our planet and its inhabitants
- Limiting climate change requires action at multiple levels (government, industry, civic organisations, individual households)
- Yet, a lack of public engagement with the issue poses serious challenges to accomplishing these actions
- Many people continue to view climate change as a non-urgent issue
- This has delayed public decision making about implementing effective adaptation and mitigation policies

» Psychology and Climate Change

- Climate change policymaking has largely focused on technological solutions and economic incentives
- However, policymakers have made little attempt to understand human behaviour
- Surprising because psychological science has important insights to offer policymakers in managing climate change
- Human behaviour and decision making are at the core of the climate change problem
- Psychology is in a unique position to offer a theoretically and empirically based understanding of human behaviour

» Psychology and Climate Change

* Five psychological insights for improving public policy and decision making about climate change:

1. The Human Brain Privileges Experience Over Analysis
2. People Are Social Beings Who Respond To Group Norms
3. Psychological Distance: Out of Sight, Out of Mind
4. Framing the Big Picture: Nobody Likes Losing (but Everyone Likes Gaining)
5. Playing The Long Game: Tapping The Potential of Human Motivation

Experience Trumps Analysis

» The Human Brain Privileges Experience Over Analysis

- Climate change is typically communicated in analytical formats (e.g., statements about the likelihood of different risk scenarios)
  - e.g., *There is a 80% chance that global warming of 2° C will cause abrupt and severe changes to regional weather patterns*
- But people are notoriously poor at understanding probabilities, especially when they incorporate uncertainty
  - e.g., *There is a 65% to 95% chance that global warming of 2° C will cause abrupt and severe changes to regional weather patterns*
- Although uncertainty should encourage people to be more cautious and concerned, people often see uncertainty as a reason to be less cautious and concerned (e.g., Hine & Gifford, 1996)

» The Human Brain Privileges Experience Over Analysis

* The human brain relies on two qualitatively different processing systems (e.g., Kahneman, 2012):
  1. System 1:
     * *intuitive, experiential, automatic, affective (emotional),* and *fast*
  2. System 2:
     * *deliberate, analytical, effortful, rational,* and *slow*
* Both systems interact continuously to guide judgement and decision making
* However, System 1 often exerts a greater influence than System 2

> * People's experience of—and emotional responses toward—climate change may be more powerful motivators of behaviour change

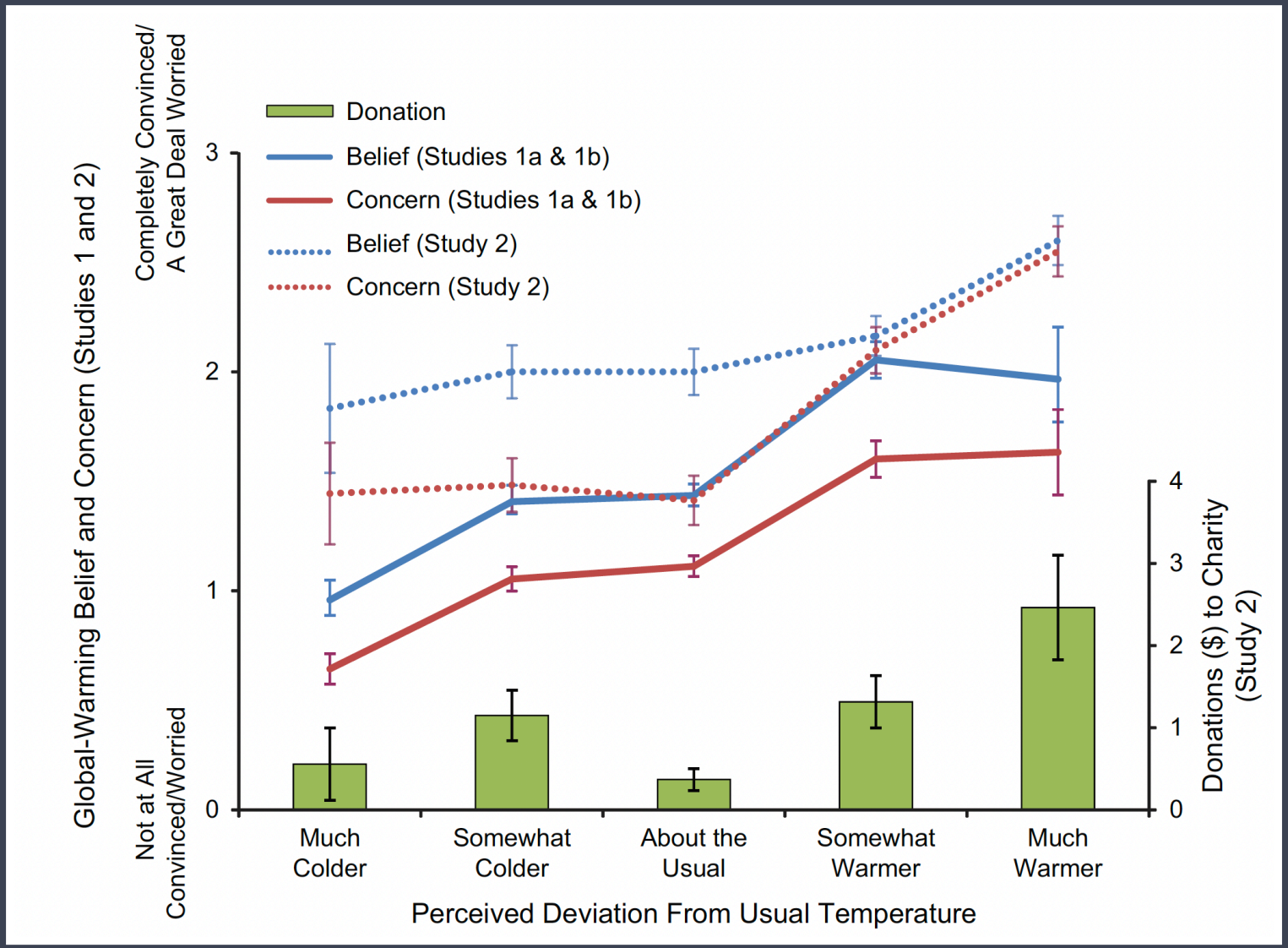
» People Can Perceive Experienced Changes in Local Temperature

* Howe et al. (2012) examined perceptions of recent local temperature change among residents of 89 countries in Africa, the Americas, and Europe between 2007–2008 (N = 91,073)
* Q: Do perceptions of local climate change correspond with historical high-resolution climate data?
* *Over the past five years, would you say that the average annual temperatures in your local area have gotten warmer, colder, or stayed about the same?*
* Public perceptions corresponded with patterns of observed temperature from climate records
* Individuals living in places with rising average temperatures more likely to perceive local warming

» People Can Perceive Experienced Changes in Local Temperature

- Other research shows that perceptions of increasing local temperature influence both belief and concern about climate change (Li et al., 2011)
- Participants asked:
  - *how convinced are you that global warming is happening?* (belief)
  - *how personally worried are you about global warming?* (concern)
- Participants also asked:
  - *is the local temperature today colder or warmer than usual for the time of year? (perceived deviation)*
  - *how much of your participation fee are you willing to donate to Clean-Air Cool planet? (charitable donation)*

» People Can Perceive Experienced Changes in Local Temperature



» Personal Experience of Extreme Weather Events Influences Behaviour

- Spence et al. (2011) studied UK national survey data collected in 2010 (N = 1,822 individuals)
- Looked at links between:
  - direct flooding experience
  - perceptions of climate change, and
  - preparedness to reduce energy use
- Those who report experience of flooding:
  - express more concern over climate change
  - see it as less uncertain, and
  - feel more confident their actions will have an effect on climate change
- These perceptual differences translate into a greater willingness to save energy to mitigate climate change

» The Role of Negative Affect

- van der Linden (2014) examined relationship between risk perceptions, negative affect, and personal experience of extreme weather events in a UK sample ($N = 808$)
  - risk perceptions: questions about *likelihood, seriousness*, and *concern* about climate change
  - affect: "I feel climate change is" (very unpleasant–pleasant, unfavourable–favourable, negative–positive)
  - personal experience: experience of flooding or other extreme weather events (e.g., heatwaves, freak storms)
- Experience of extreme weather events triggers negative affect, which strongly drives climate-risk perceptions
- Negative affect also a strong predictor of climate policy support (Leiserowitz, 2006)

» Policy Insights

- Policy makers should appeal to both the experiential (System 1) and analytical (System 2) processing systems
- Climate change information needs to be translated into relatable and concrete personal experiences
- Climate communicators and policy makers should highlight local climate trends in communications
- Highlighting relevant personal experiences using narratives and metaphors is another powerful strategy

Use Group Norms

» People Are Social Beings Who Respond to Group Norms

* As climate change is a global problem, people's sense of personal efficacy is often low
* Personal appeals may therefore leave people feeling powerless
* It is better to appeal to what others are thinking and doing to promote collective efficacy
* We evolved in social groups, and it is through social comparison with similar others we validate our thoughts and actions
* Following the social norm is a common heuristic/mental shortcut that reduces the cost of individual learning

» People Are Social Beings Who Respond to Group Norms

* There are two types of social norms (Cialdini, 2003)
    1. Descriptive norms: perceptions of which behaviours are typically performed
        * *If most other people are doing it, then it must be the right thing to do*
    2. Injunctive norms: perceptions of which behaviours are typically approved or disapproved
        * *If we do what others approve of, they must approve of us too*
* Communicating descriptive and injunctive norms can be a powerful means of shifting beliefs and behaviour
* The more people hear others talk about climate risks and the need for action, the more this amplifies their own risk perceptions and intentions to act

» 97-98% of Climate Scientists Agree Humans are Causing Global Warming

* Anderegg, W. R. L., Prall, J. W., Harold, J., & Schneider, S. H. (2010). Expert credibility in climate change. *Proceedings of the National Academy of Science, 107,* 12107–12109.
* Cook, J., Nuccitelli, D., & Green, S. A. et al. (2013). Quantifying the consensus on anthropogenic global warming in the scientific literature. *Environmental Research Letters, 8(2),* 1–7.
* Doran, P. T., & Zimmerman, M. K. (2009). Examining the scientific consensus on climate change. *Eos, 90 (3),* 21–22.
* Oreskes, N. (2004). Beyond the ivory tower: the scientific consensus on climate change. *Science, 306,* 1686.

» Consensus Messaging (Lewandowsky et al., 2012)

* Does belief that human actions are causing climate change increase when consensus information is highlighted
* Participants ($N = 100$) allocated to one of two conditions:
  1. Consensus: textual description + graphic highlighting 97% consensus (descriptive norm)
  2. Control: no consensus message
* Participants respond to various measures
  1. Belief that human CO_2 emissions cause global warming
  2. Perception of climate consensus
  3. Attribution of global climate trends to human CO_2 emissions
  4. Attribution of specific extreme weather events to human CO_2 emissions

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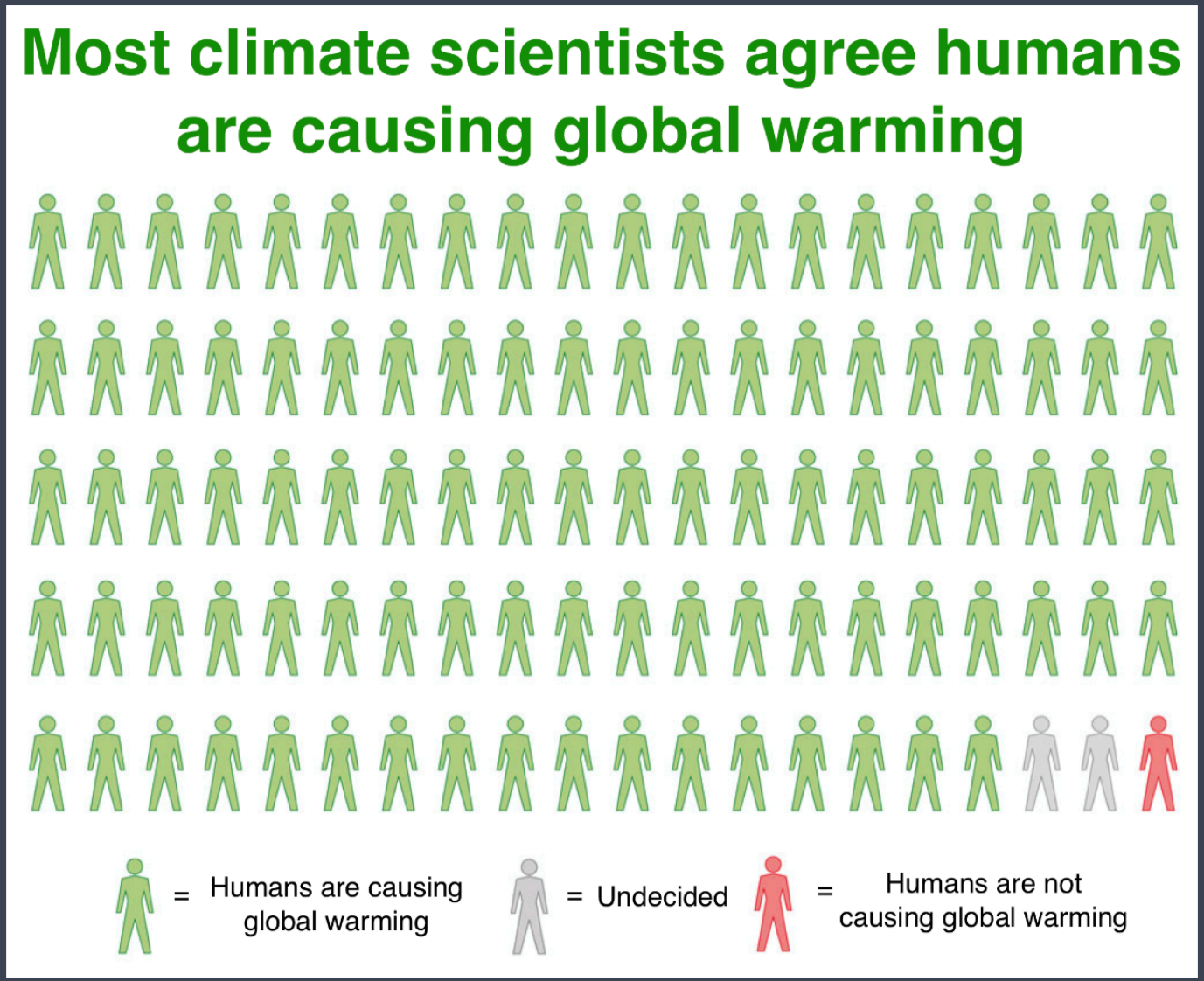

» Consensus Messaging (Lewandowsky et al., 2012)

Table 3 | Mean responses (standard errors) across conditions in Study 2.

Item	Condition	
	Control	Consensus
(a) Acceptance of scientific propositions*		
CO_2 emissions cause climate change	3.96 (0.081)	4.35 (0.146)
Smoking causes lung cancer	4.63 (0.069)	4.72 (0.109)
HIV virus causes AIDS	4.24 (0.106)	4.61 (0.146)
(b) Perceived consensus among scientists		
Emissions and climate change	67.28 (3.11)	88.47 (3.66)
Smoking and lung cancer	91.81 (1.90)	92.79 (2.62)
HIV and AIDS	84.83 (2.79)	91.21 (3.16)
(c) General climate trends†		
Increase in atmospheric temperature	60.53 (2.42)	71.86 (3.05)
Increase of global sea level	61.52 (2.94)	66.28 (3.15)
Doubling of weather-related natural disasters	53.26 (3.38)	57.56 (3.52)
(d) Specific extreme-weather events†		
The floods in Queensland	42.17 (3.48)	47.14 (4.57)
The floods in Pakistan	43.80 (3.41)	48.21 (4.59)
The Russian wild fires	45.00 (4.15)	47.98 (4.45)
The European heat wave	53.26 (3.61)	57.44 (4.27)

*5-point scale ranging from 'Absolutely False' (1) to 'Absolutely True' (5), with 3 representing 'Unsure'. †For these items participants placed a tick mark along a horizontal line with endpoints 0% and 100% to express the 'contribution from human CO_2 emissions to cause each event'.

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» Household Energy Consumption (Schultz et al., 2007)

* Schultz et al. (2007) provided 287 California households with different types of normative messages over a two-week period
* Households were randomly allocated to one of two conditions
  1. descriptive-norm-only condition
  2. descriptive-plus-injunctive-information condition
* After baseline energy measurements were taken, both sets of households received a message

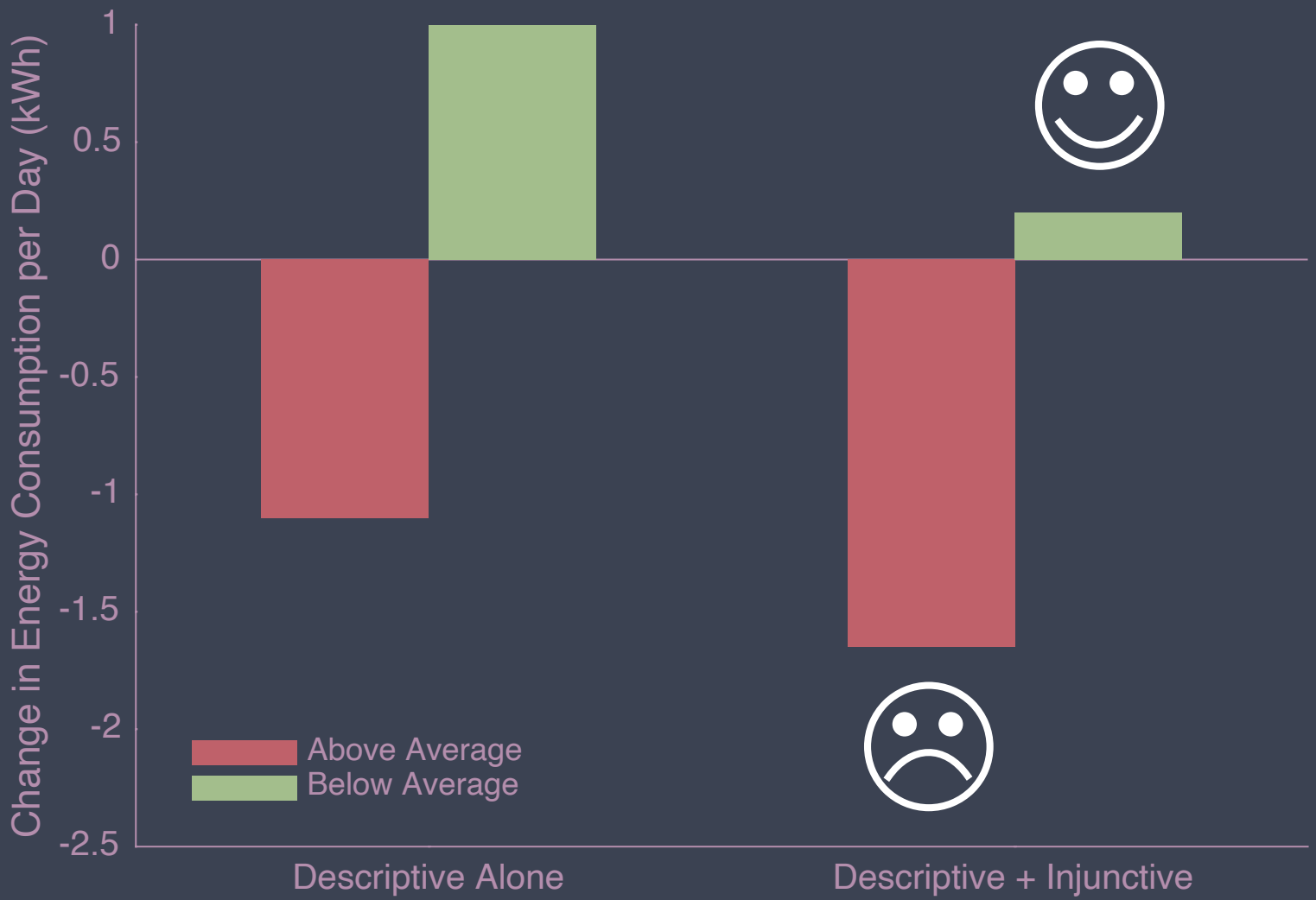
» Household Energy Consumption (Schultz et al., 2007)

* In the descriptive-norm-only condition the message contained:
  a. handwritten information about how much energy (in kilowatt-hours per day) they had used in the previous week
  b. descriptive normative information about the actual energy consumption of the average household in their neighborhood during that same period (in kilowatt-hours per day)
  c. preprinted suggestions for how to conserve energy (e.g., use fans instead of air conditioning)

» Household Energy Consumption (Schultz et al., 2007)

- The descriptive-plus-injunctive-information condition received the same information as the descriptive-norm only condition
- However, there was one key addition:
  - If the household had consumed less than the average for the neighbourhood, a happy face was drawn ☺
  - If the household had consumed more than the average for the neighbourhood, a sad face was drawn ☹
- The valence of the emoticon communicated an injunctive message of approval or disapproval about the amount of energy being consumed

» Household Energy Consumption (Schultz et al., 2007)



» Policy Insights

- Policy makers should avoid personal appeals as these may leave people feeling powerless
- Instead, they should highlight social norms to promote collective efficacy
- Government environment/climate science agencies could highlight descriptive norms (e.g., the scientific consensus on human-caused climate change)
- Energy utility companies could use social comparison information to promote energy conservation

Reduce Psychological Distance

» Psychological Distance: Out of Sight, Out of Mind

- Do the general public perceive climate change as an immediate or distant risk?
- Psychological distance refers to the subjective perception of distance between the self and some object or event (e.g., climate change)
- Discussion of climate change (e.g., by scientists, the media) often emphasises that it will affect other people, in other places, in the distant future
- Such discourse may encourage the public to perceive climate change as a psychologically distant threat

» Construal-Level Theory (Trope & Leiberman, 2010)

* According to construal-level theory (CLT), there are four dimensions of psychological distance:
    1. temporal: perceptions of *when* an event will occur
    2. spatial: perceptions of *where* it occurs
    3. social: perceptions of to *whom* it occurs
    4. hypothetical: perceptions of *whether* it occurs

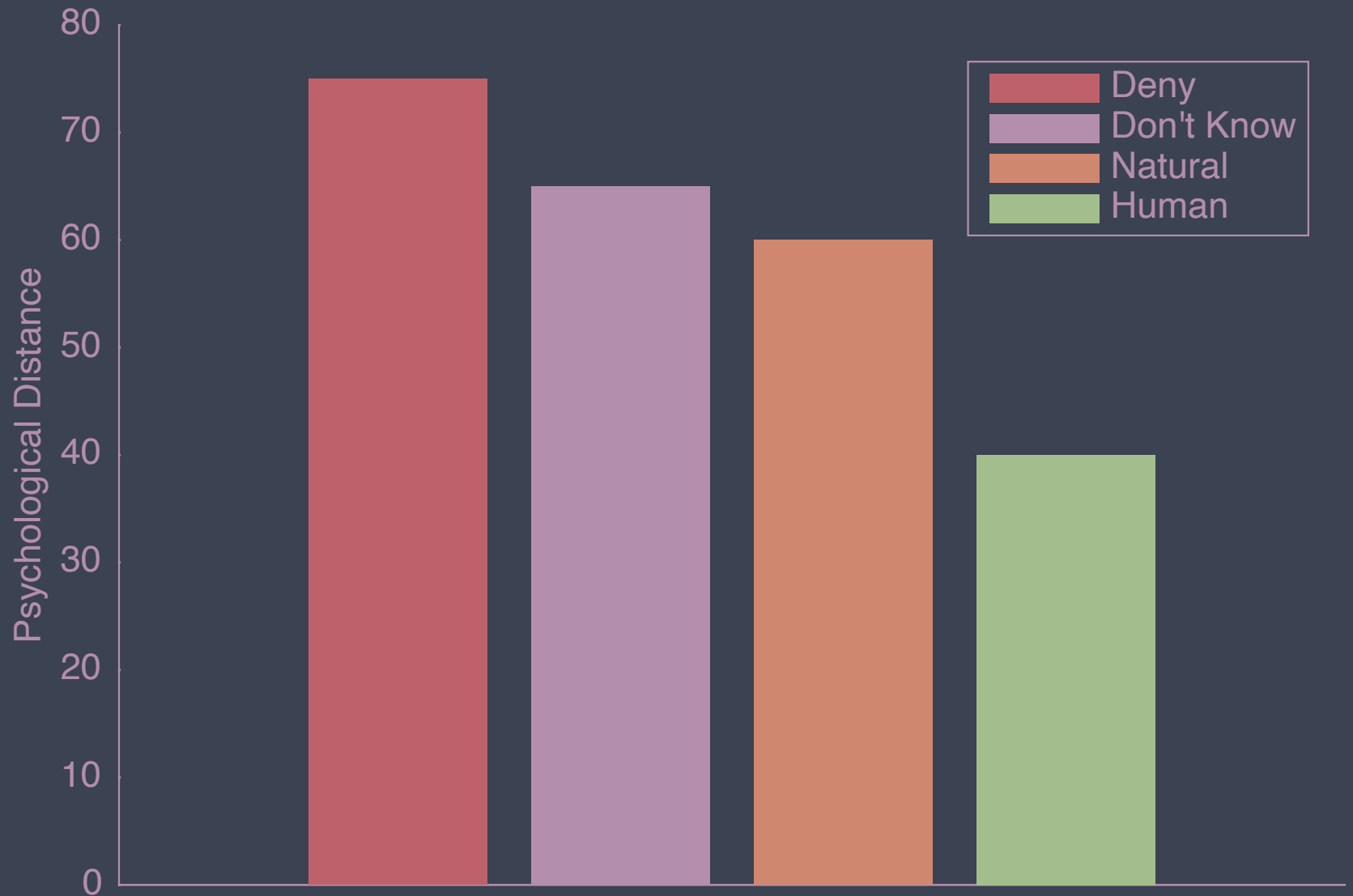
» Psychological Distance and Climate Change (Wang et al., 2019)

- Examined links between psychological distance, beliefs about climate change, and pro-environmental behaviour in an Australian sample
- Psychological distance examined using 18-items, such as:
  - *It will be several decades before Australia will start feeling the effects of climate change* (temporal)
  - *Climate change will mostly affect areas that are far away from here* (spatial)
  - *Climate change is unlikely to have a big impact on people like me* (social)
  - *I am uncertain that climate change is really happening* (hypothetical)
- Participants responded on a scale ranging from 1 (strongly disagree) to 5 (strongly agree)

» Psychological Distance and Climate Change (Wang et al., 2019)

* Beliefs about climate change measured via four declarative statements:
  1. *I don't think climate change is happening* (deny)
  2. *I have no idea whether climate change is happening or not* (don't know)
  3. *I think that climate change is happening, but it's just a natural fluctuation in Earth's temperatures* (natural)
  4. *I think that climate change is happening, and I think that humans are largely causing it* (human)
* Support for pro-environmental actions assessed by two measures:
  1. Frequency of individual pro-environmental behaviour (e.g., taking part in a conservation activity)
  2. Support for carbon policy ranging in cost ($0, $700, $900, $1,000, and $1,200) and effectiveness (0%, 5%, 10%, 15%, and 25% reduction in emissions)

» Psychological Distance and Climate Change (Wang et al., 2019)



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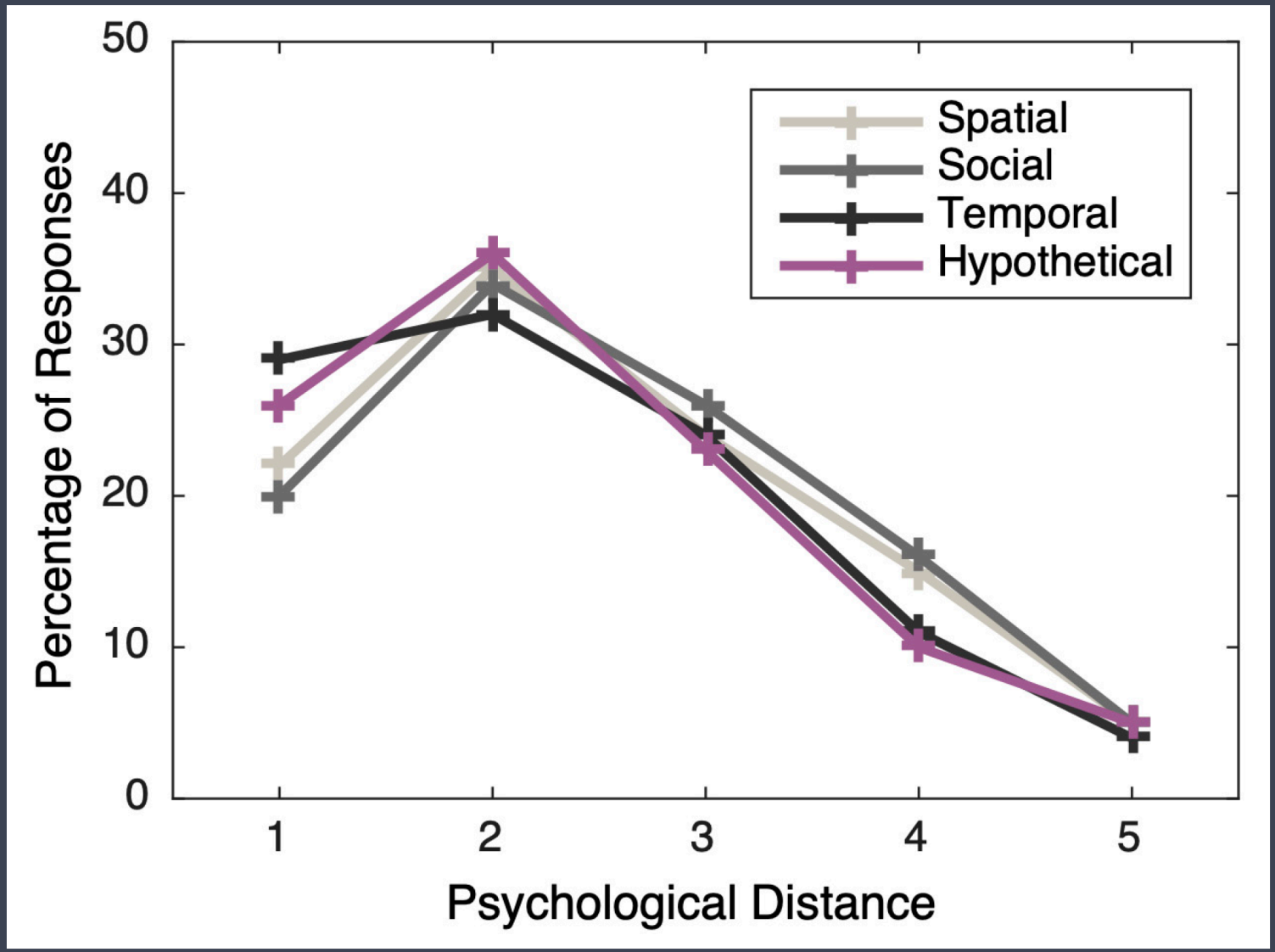


» Psychological Distance and Climate Change (Wang et al., 2019)

- Psychological distance negatively associated with both measures of pro-environmental behaviour
- As psychological distance increases:
  - people are less likely to engage in individual pro-environmental behaviours
  - people are less likely to support carbon policy
- Other work shows psychological distance is negatively associated with concern about climate change and willingness to reduce energy (Spence et al., 2012)
- As psychological distance increases:
  - people are less concerned about climate change
  - people are less willing to reduce their energy use

» Policy Insights

- Reduce psychological distance by emphasising that climate change impacts are already happening
- Don't just emphasise global impacts (e.g., average rising temperatures), also emphasise local regional impacts (e.g., increased flooding)
- Emphasise that these global and local climate risks will worsen with time

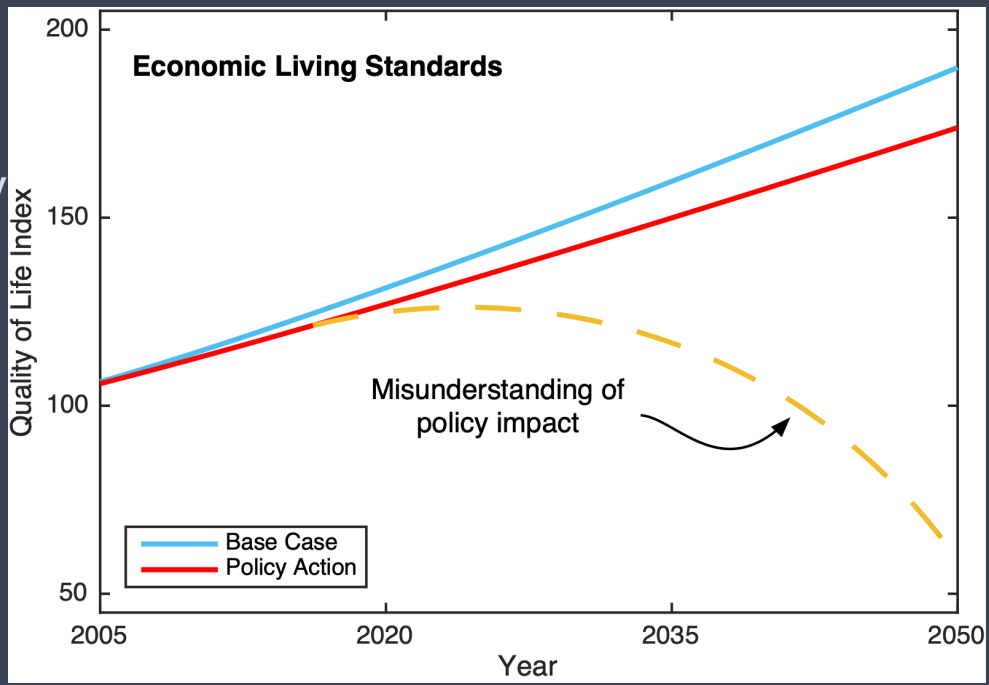
Nobody Likes Losing

» Framing the Big Picture: Nobody Likes Losing (but Everyone Likes Gaining

- Tackling climate change requires economic sacrifices
- Problematic because people are loss averse
- Loss aversion (Kahneman & Tversky, 1979) refers to the finding that losses loom larger than equivalent sized gains:
  - by a ratio of about 2:1
- For example, if you lose $50, you would need to find at least $100 to offset the psychological pain associated with this loss
- Vested interests capitalise on this by framing climate policies in ways that generate misplaced loss aversion (e.g., framing a "carbon price" as a "carbon tax")

» Misplaced Loss Aversion (Hatfield-Dodds & Morrison, 2011)

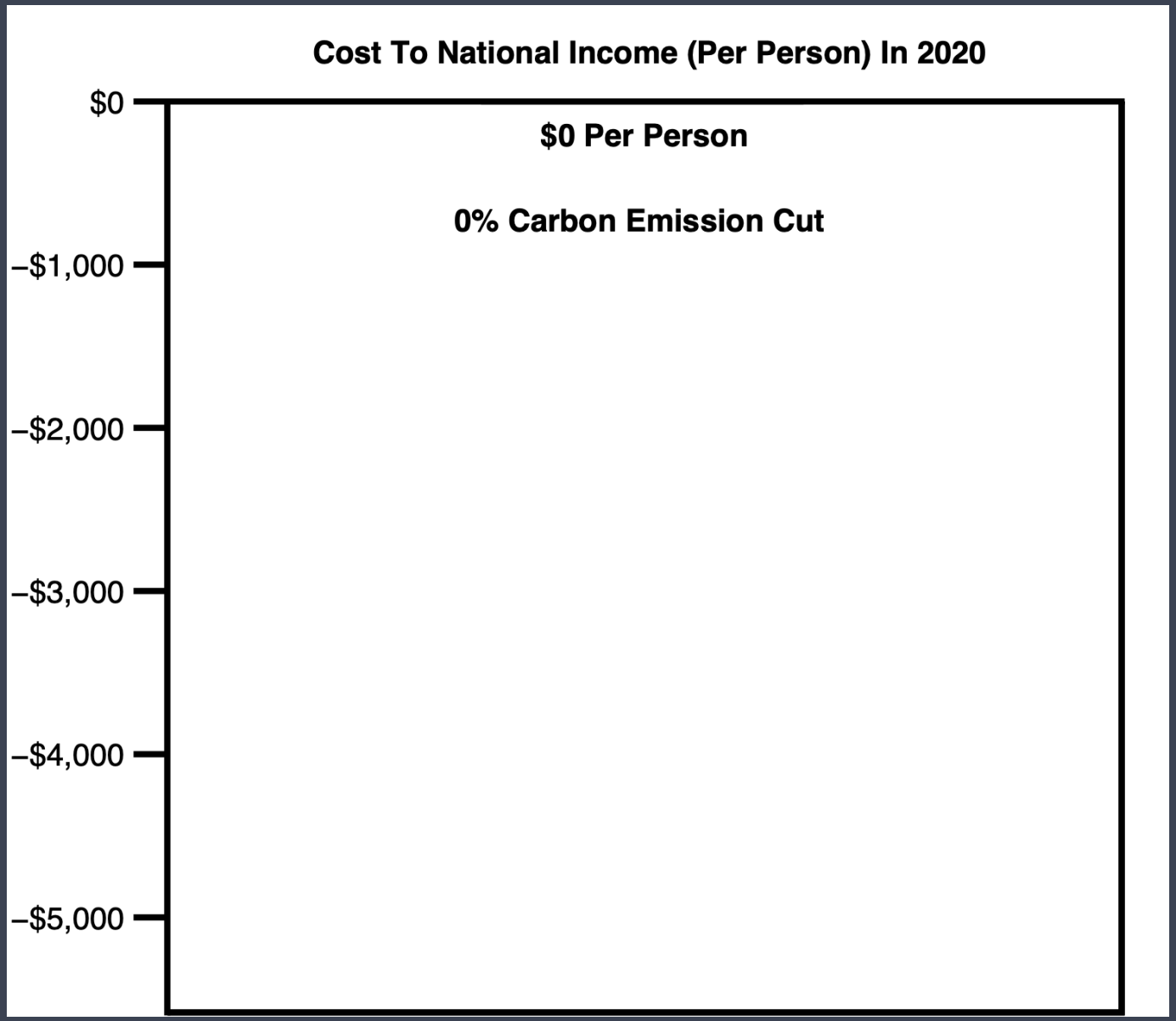
* Nearly **1 in 3** people incorrectly think reducing emissions will cause future incomes to decrease below current levels, rather than increase more slowly
* No economic modelling indicates emissions reductions would result in real incomes falling relative to current levels
* Does correcting this misperception increase policy support?



» Effect of Framing on Carbon Policy Support (Hurlstone et al., 2014)

* Examined support for carbon policies in an Australian sample (N = 120)
* Used Australian Treasury Modelling of costs to average national income per person in 2020 based on different CO_2 emissions reduction scenarios (ranging from 0% to 50% in steps of 5%)
* Examined policy support under two *objectively equivalent* framing scenarios:
    1. loss: national income decreases relative to baseline levels expected for 2020
    2. foregone-gain: average national income rises from current levels, but not by as much as in absence of emission cuts
* Policies communicated via a graphical user interface
* Participants select their preferred emission reduction policy (min = 0%, max = 50%)

» Loss Framing (Hurlstone et al., 2014)



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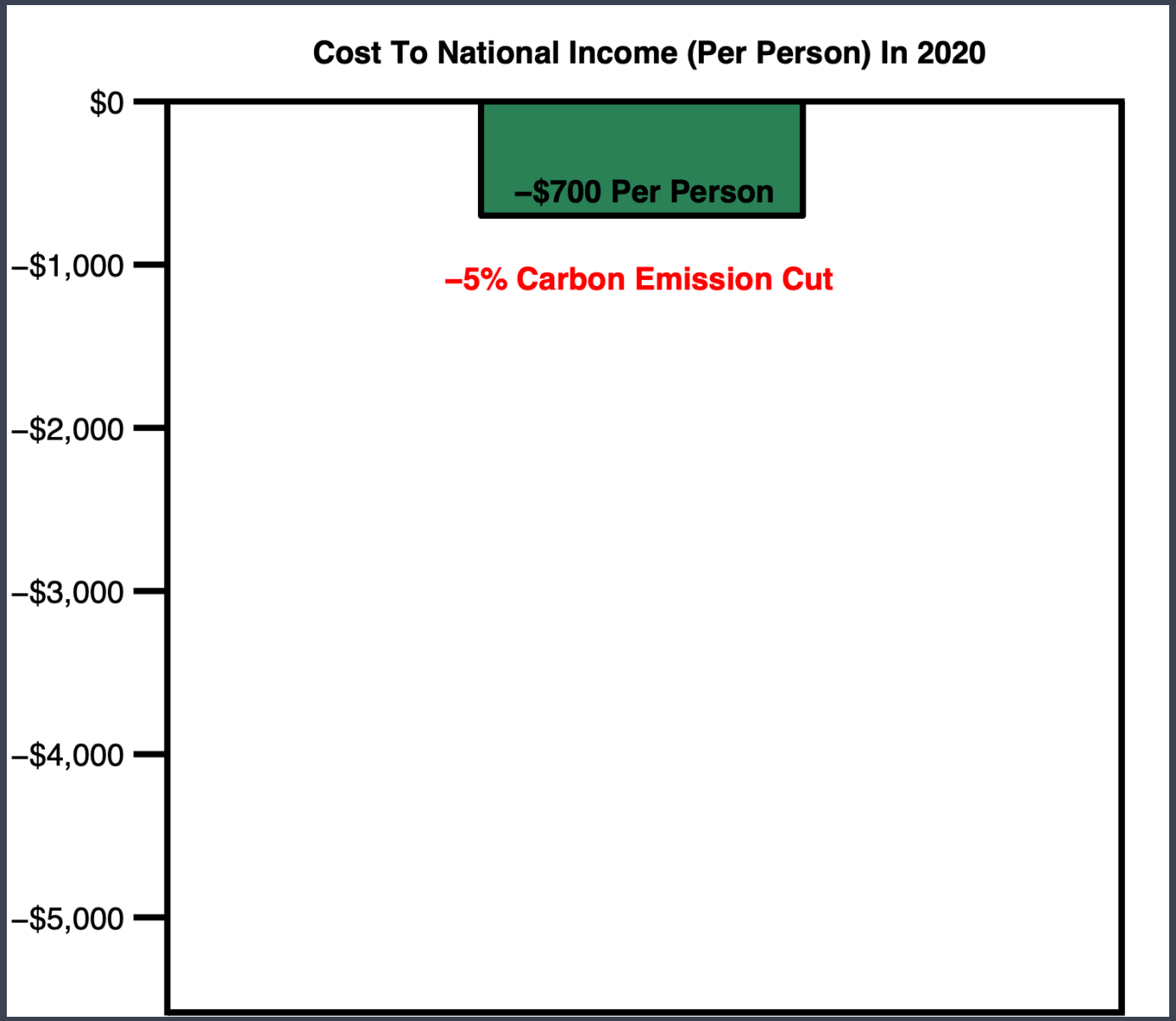

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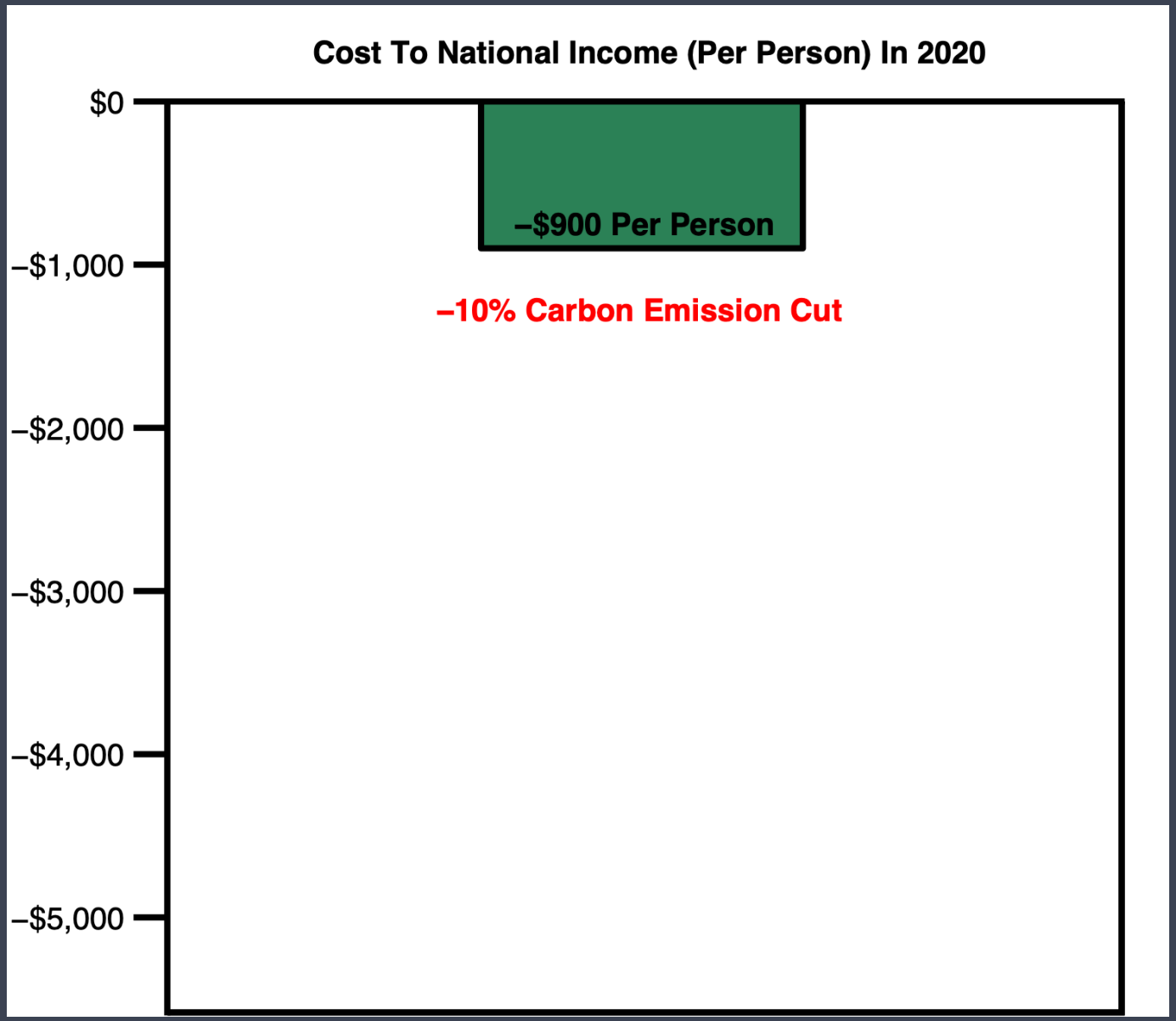

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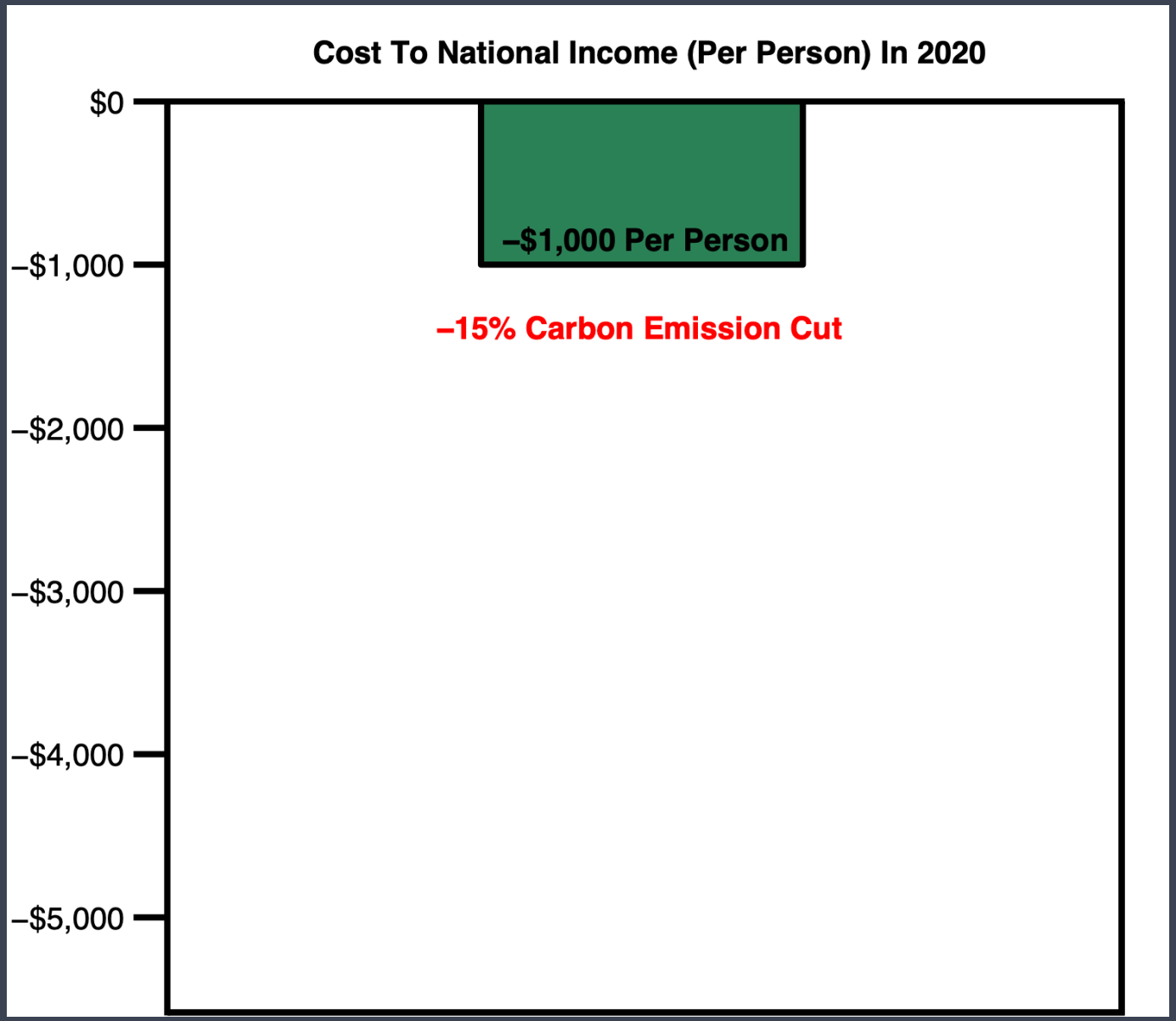

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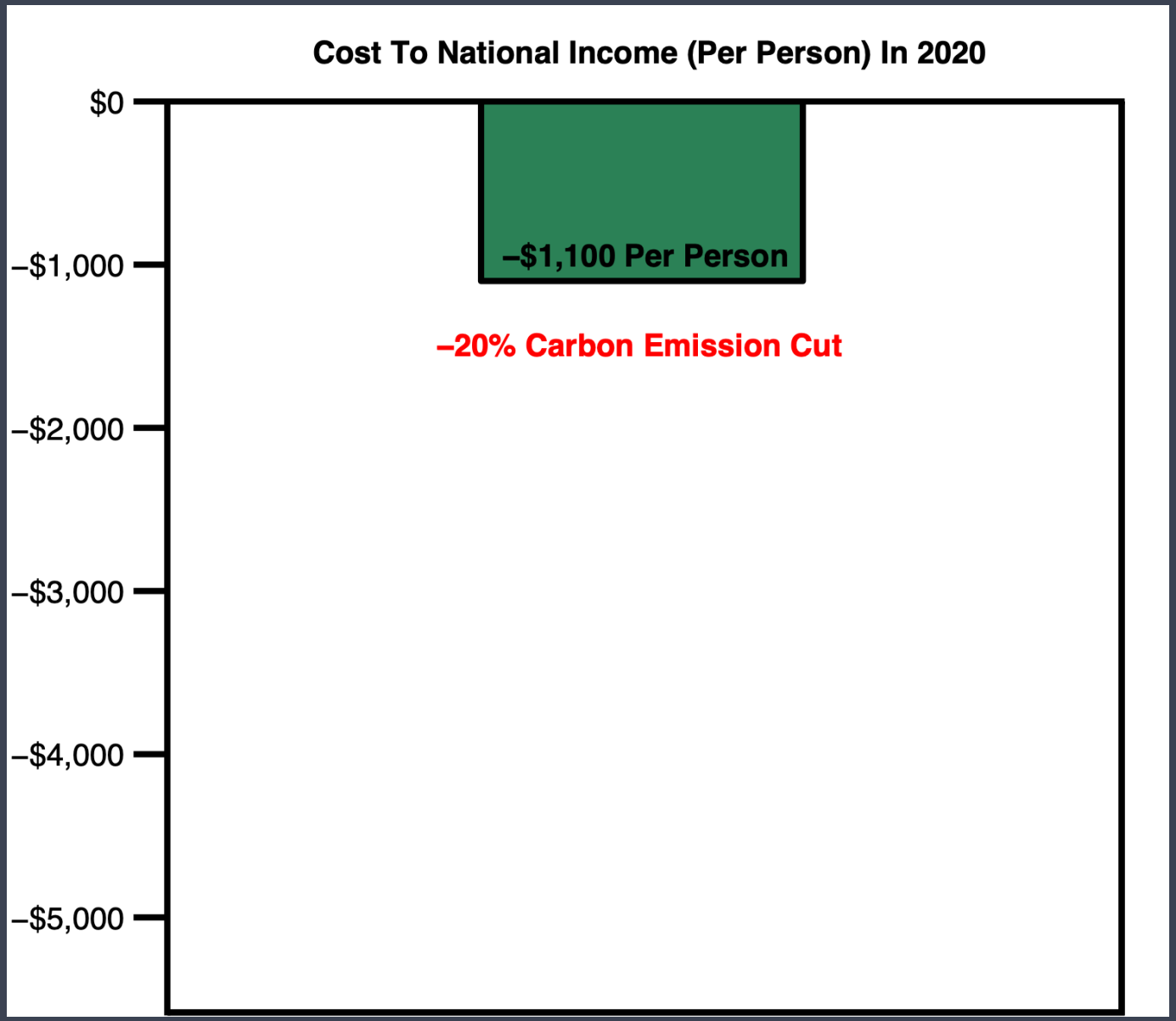

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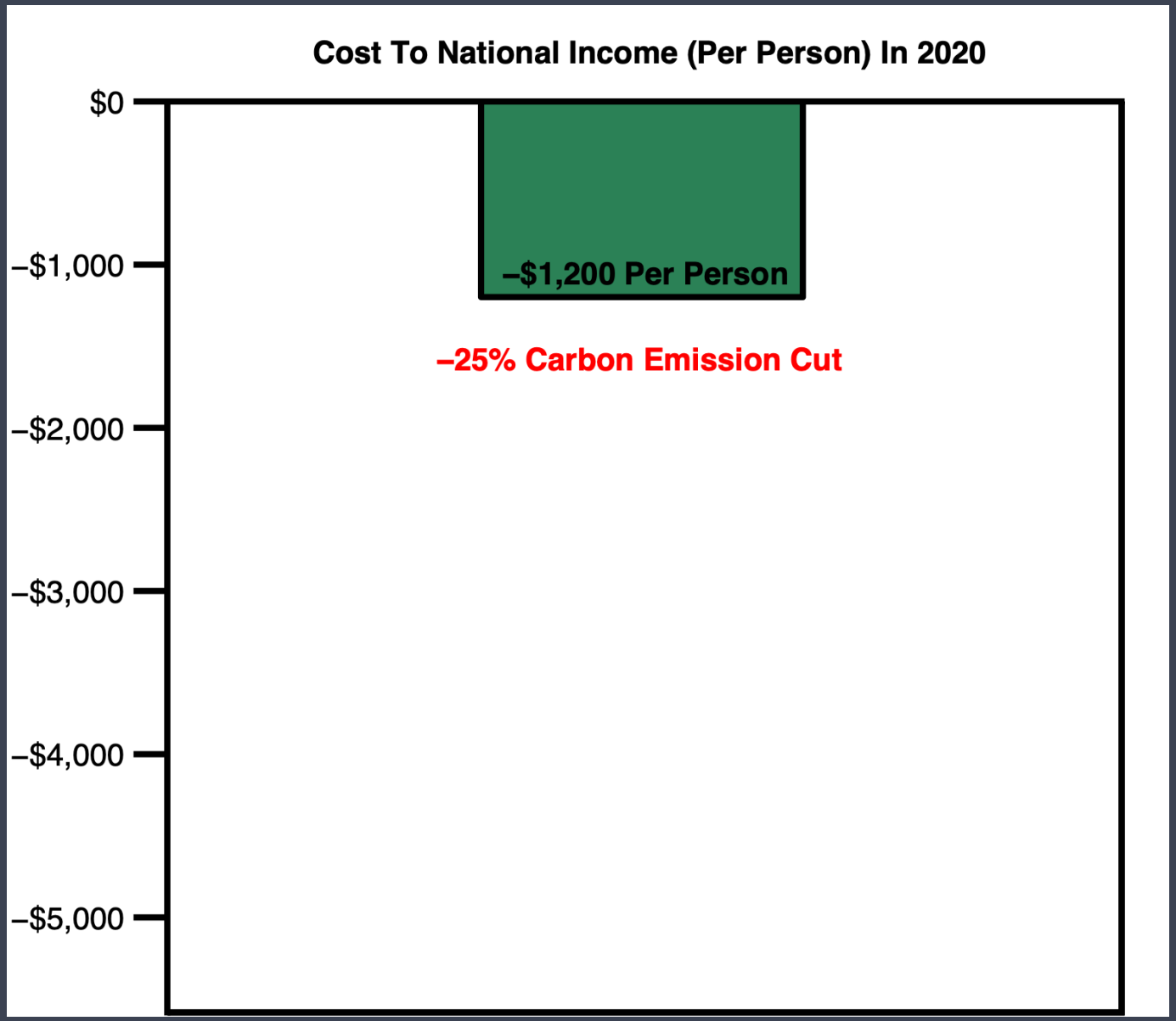

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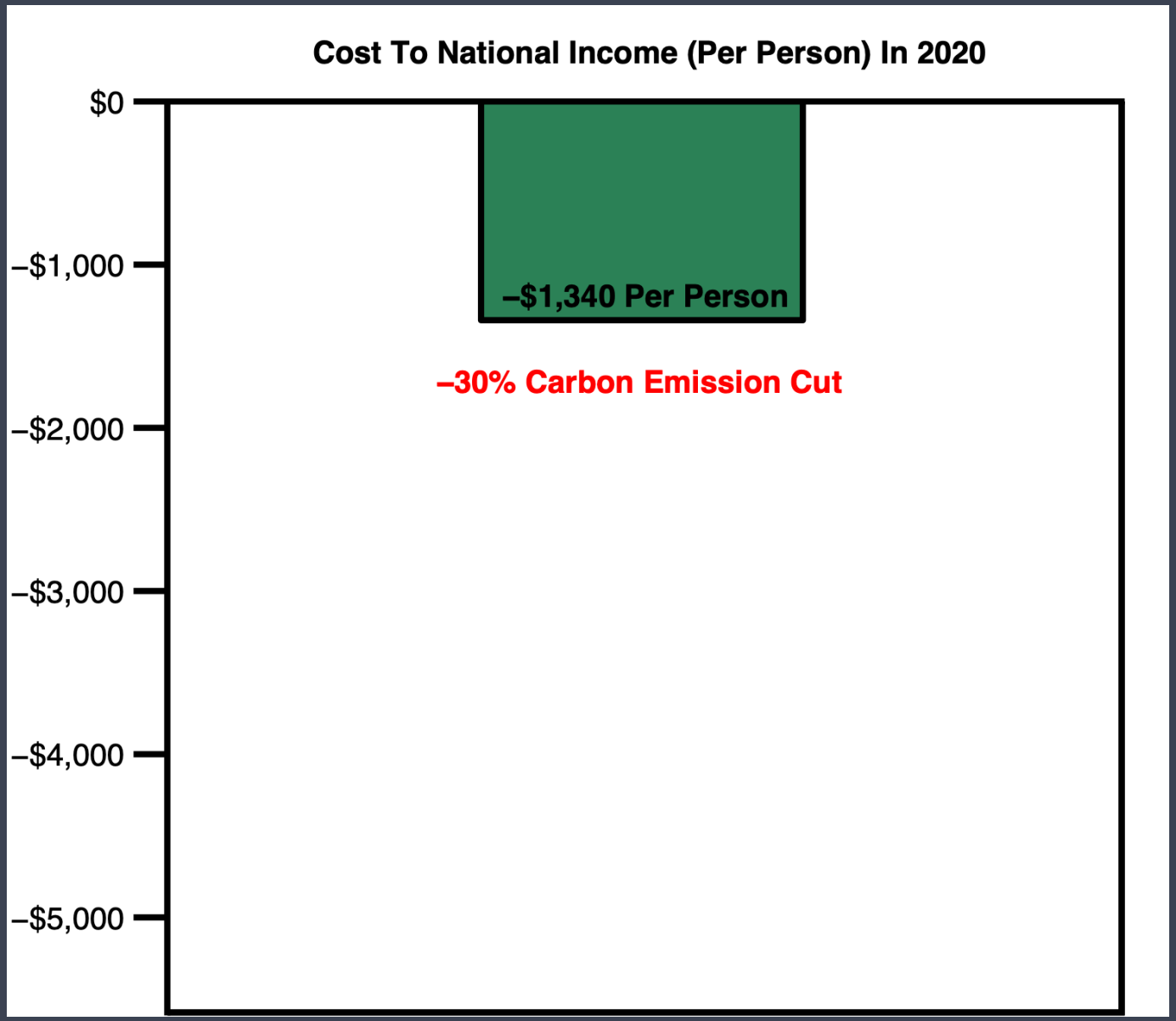

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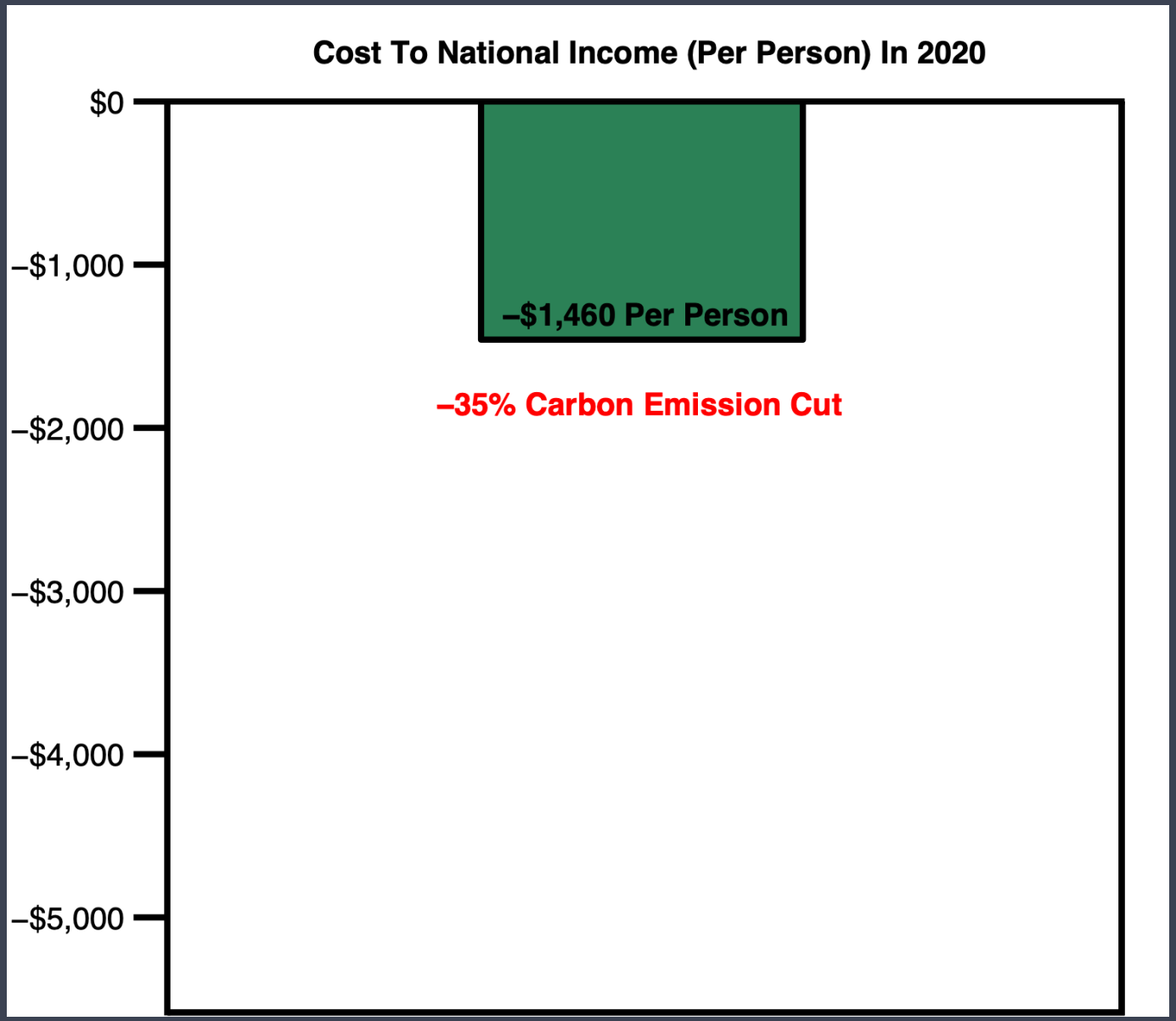

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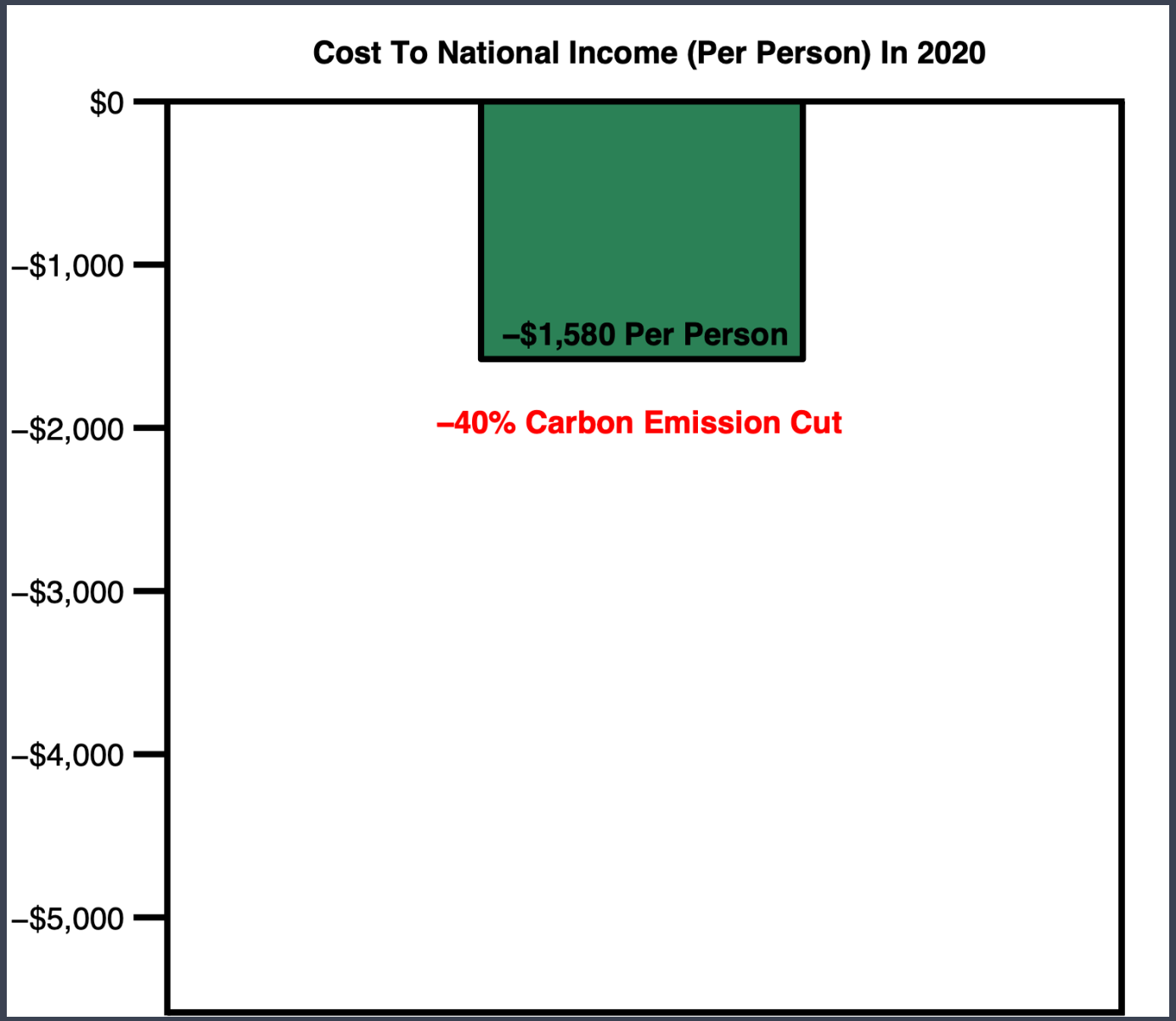

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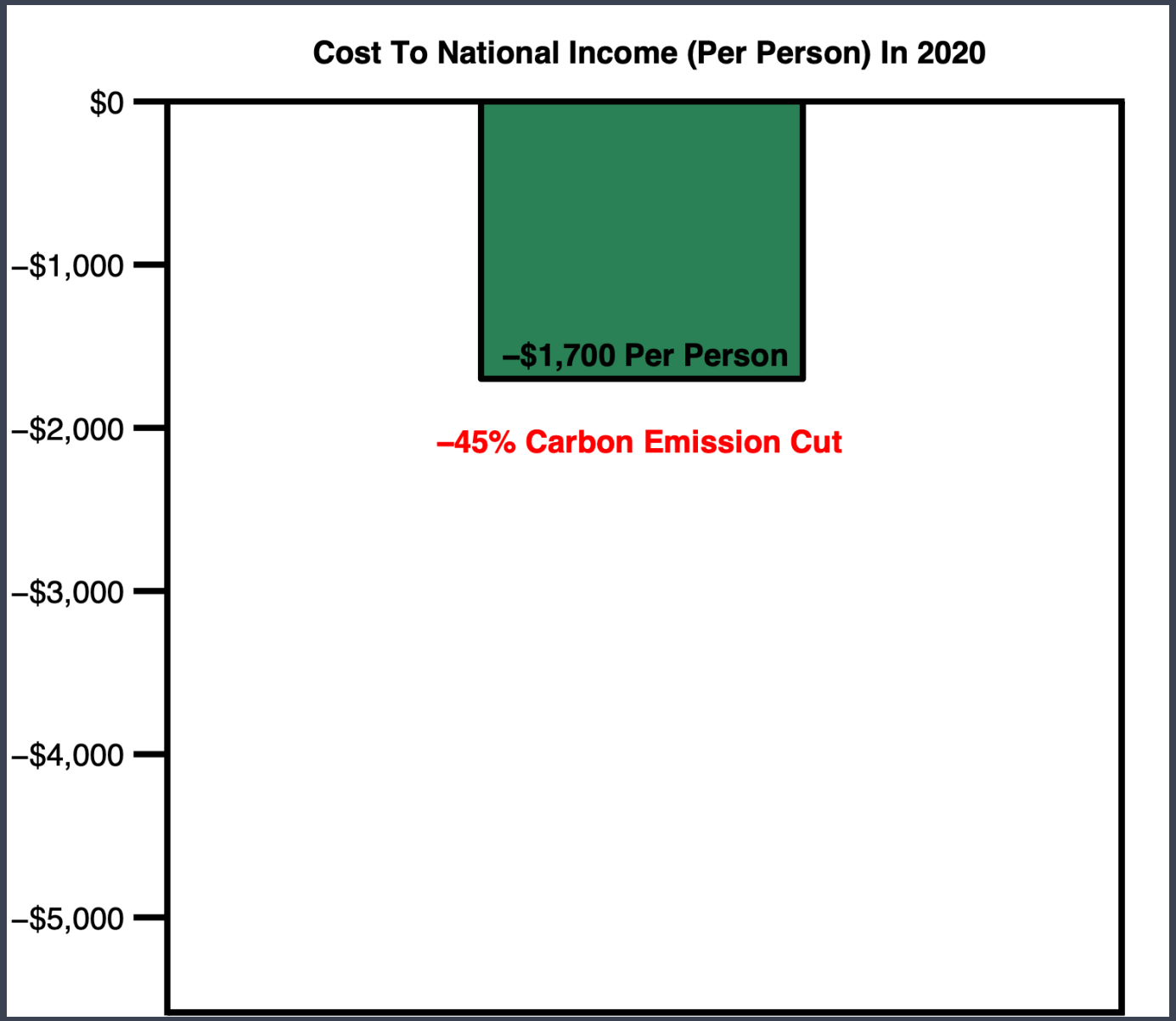

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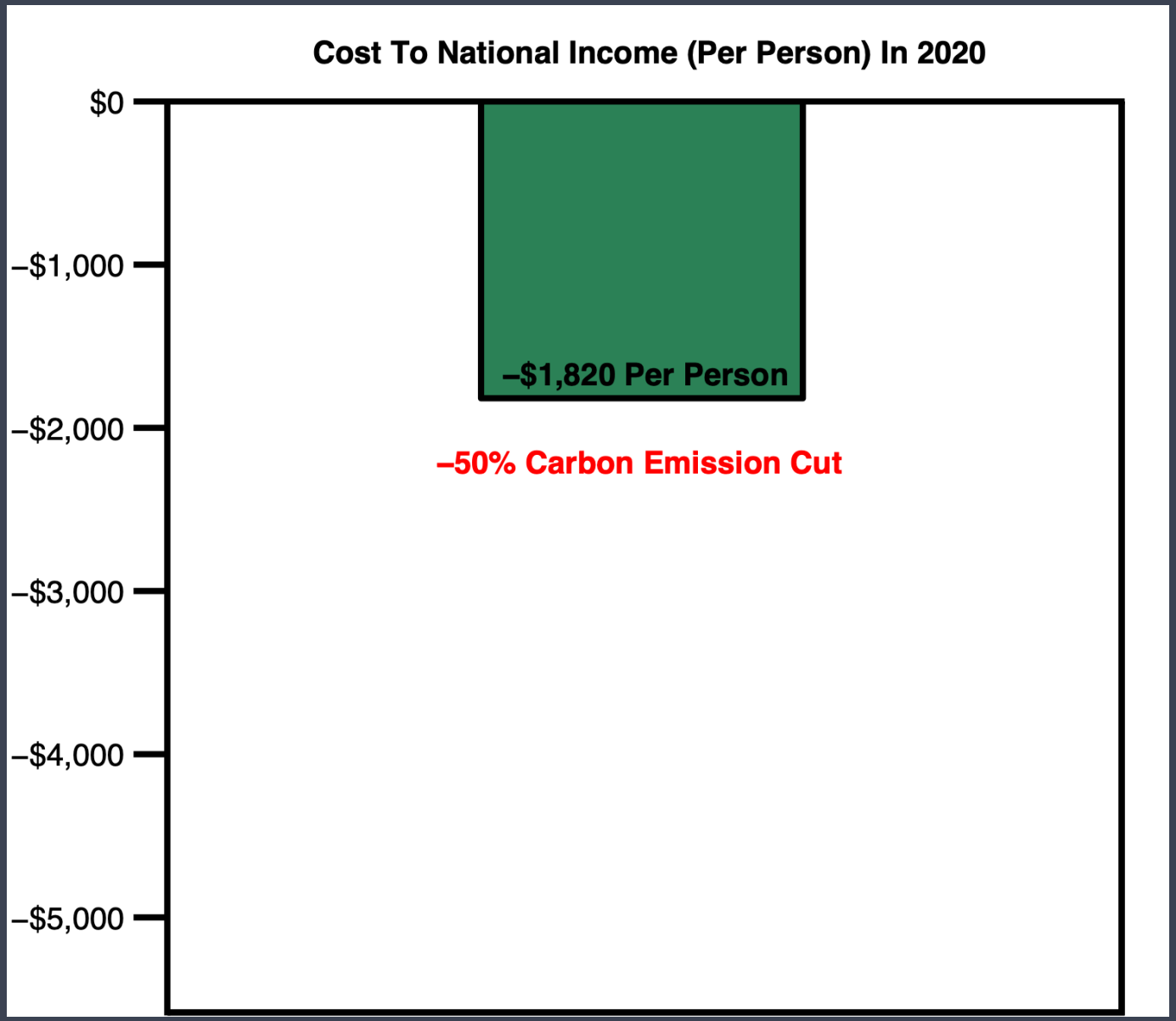

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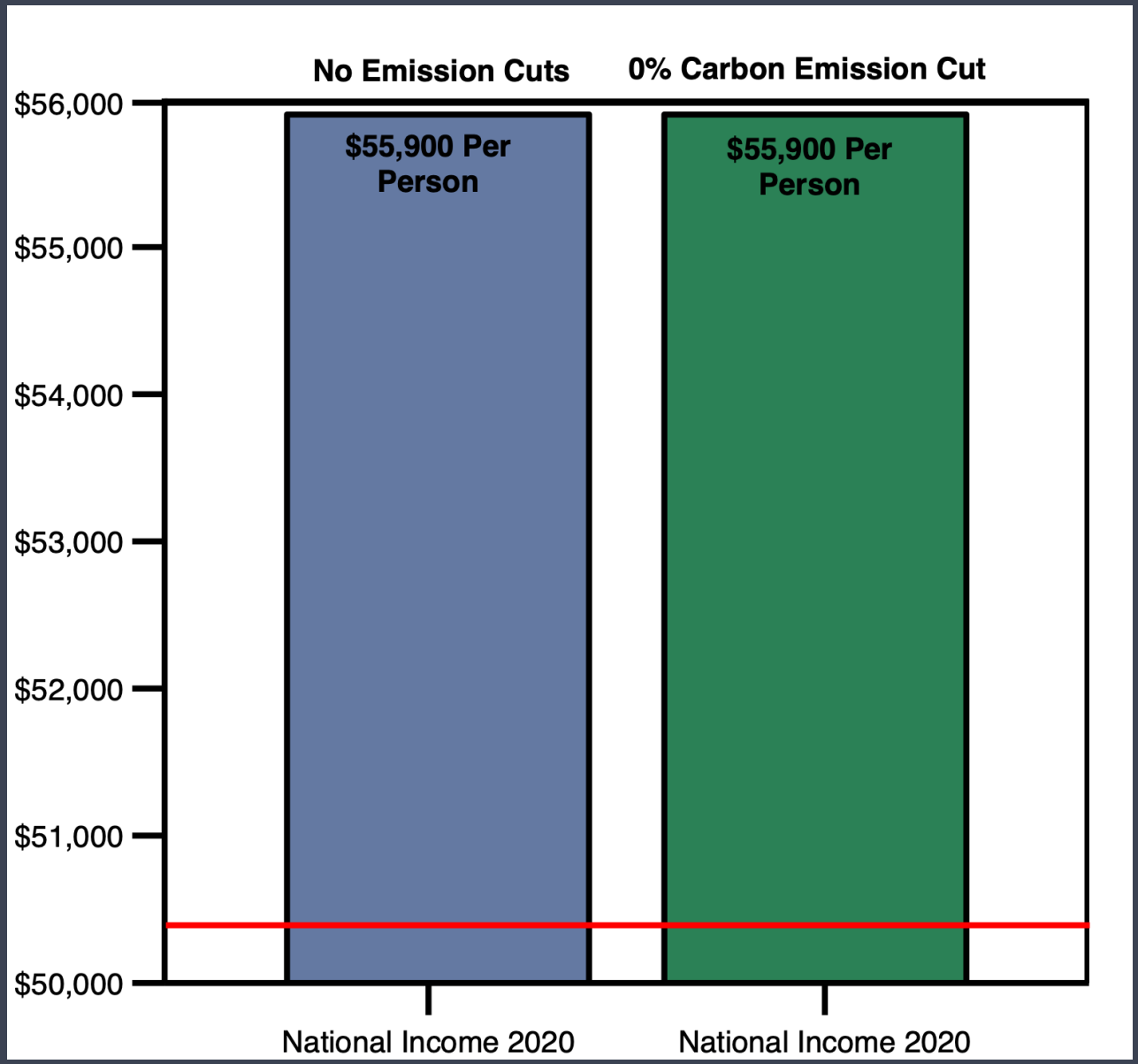

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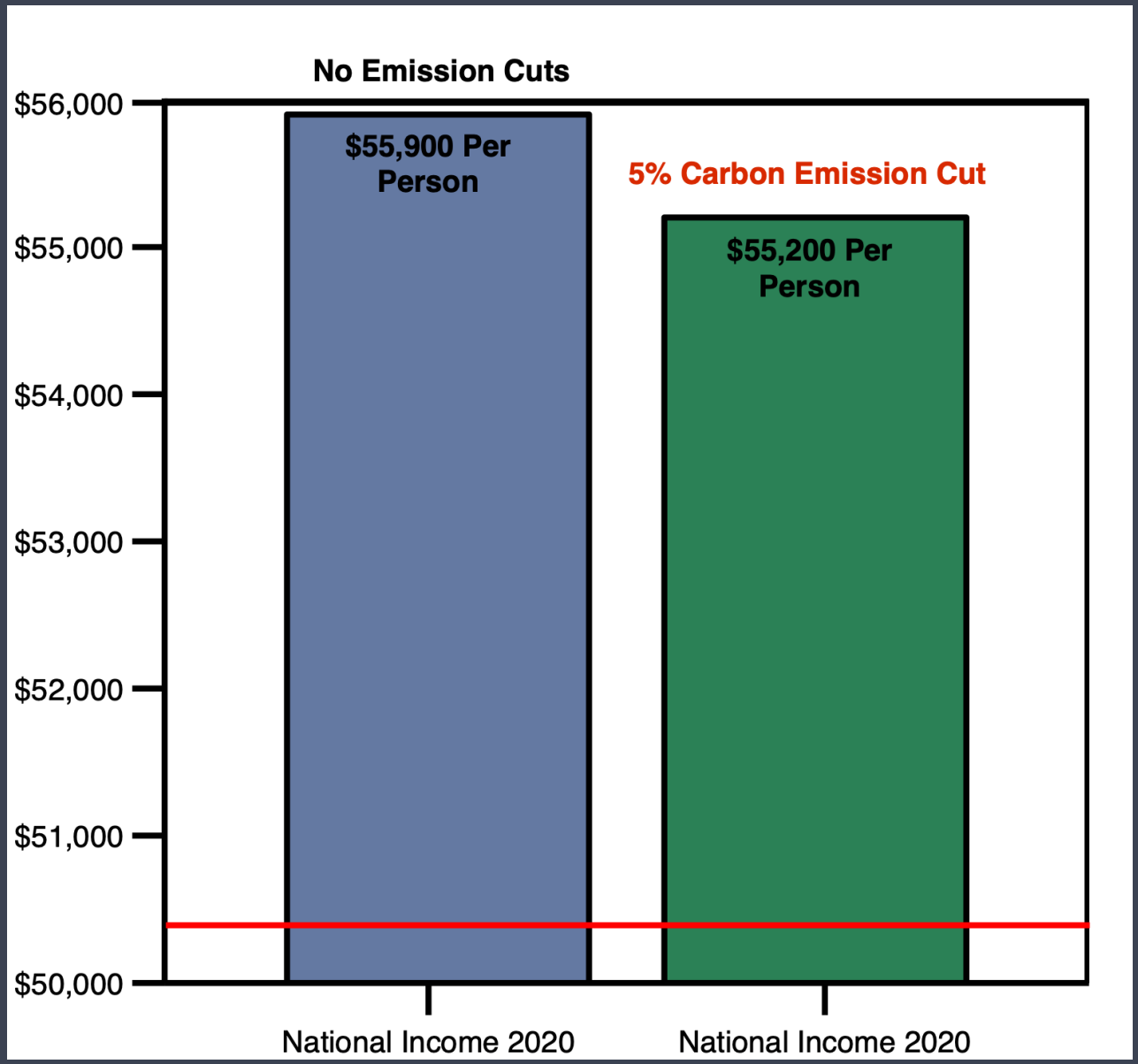

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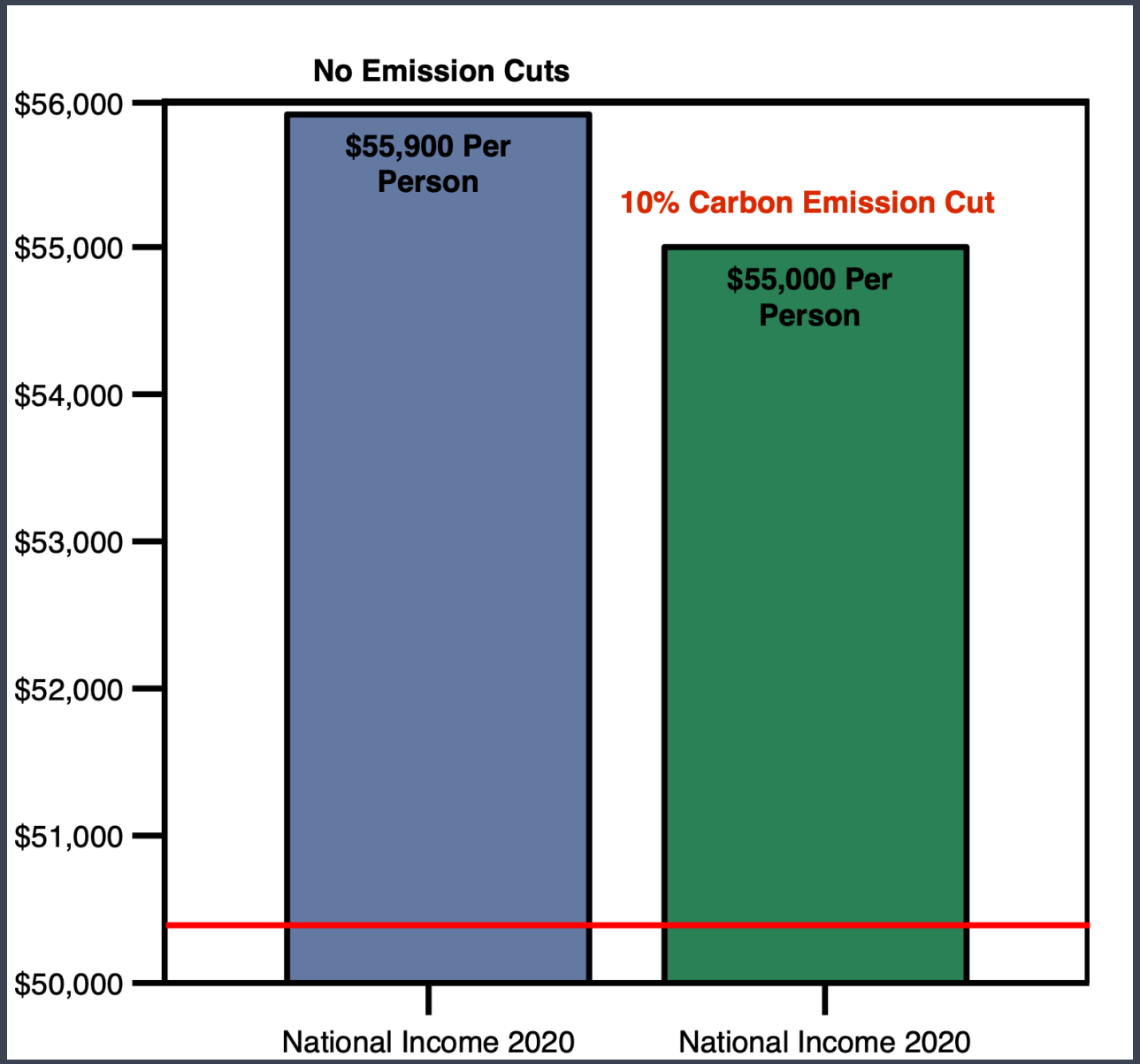

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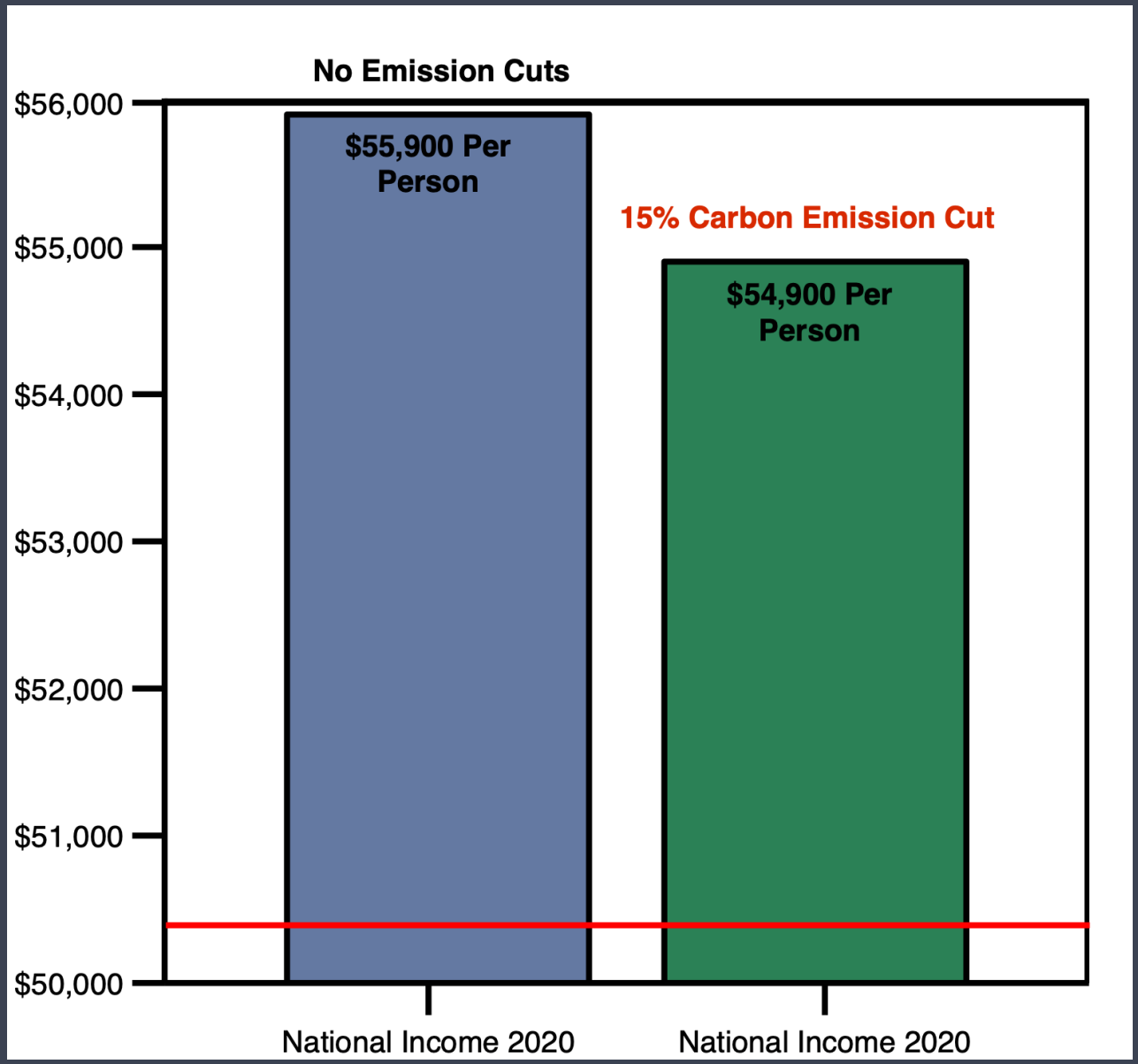

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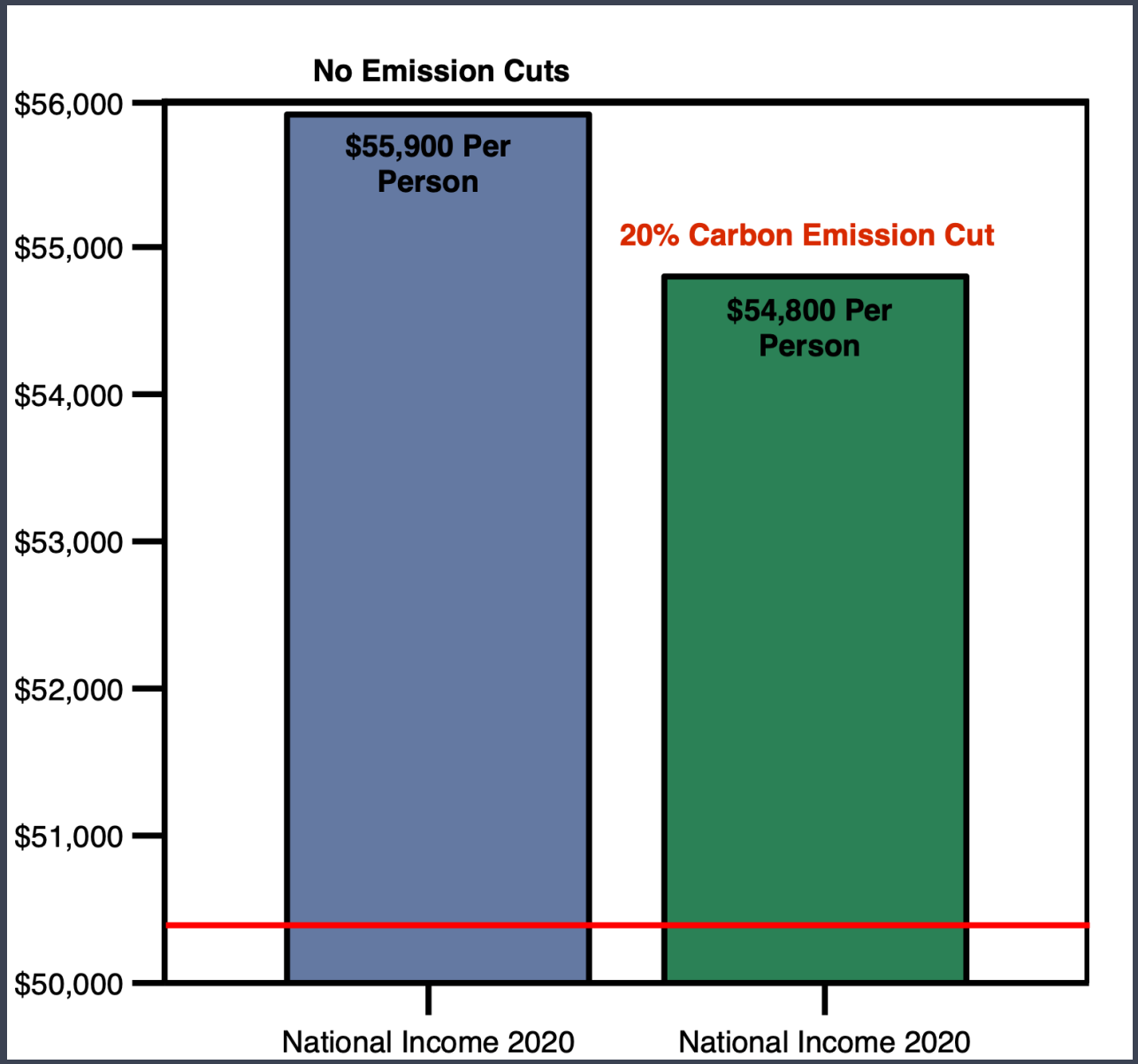

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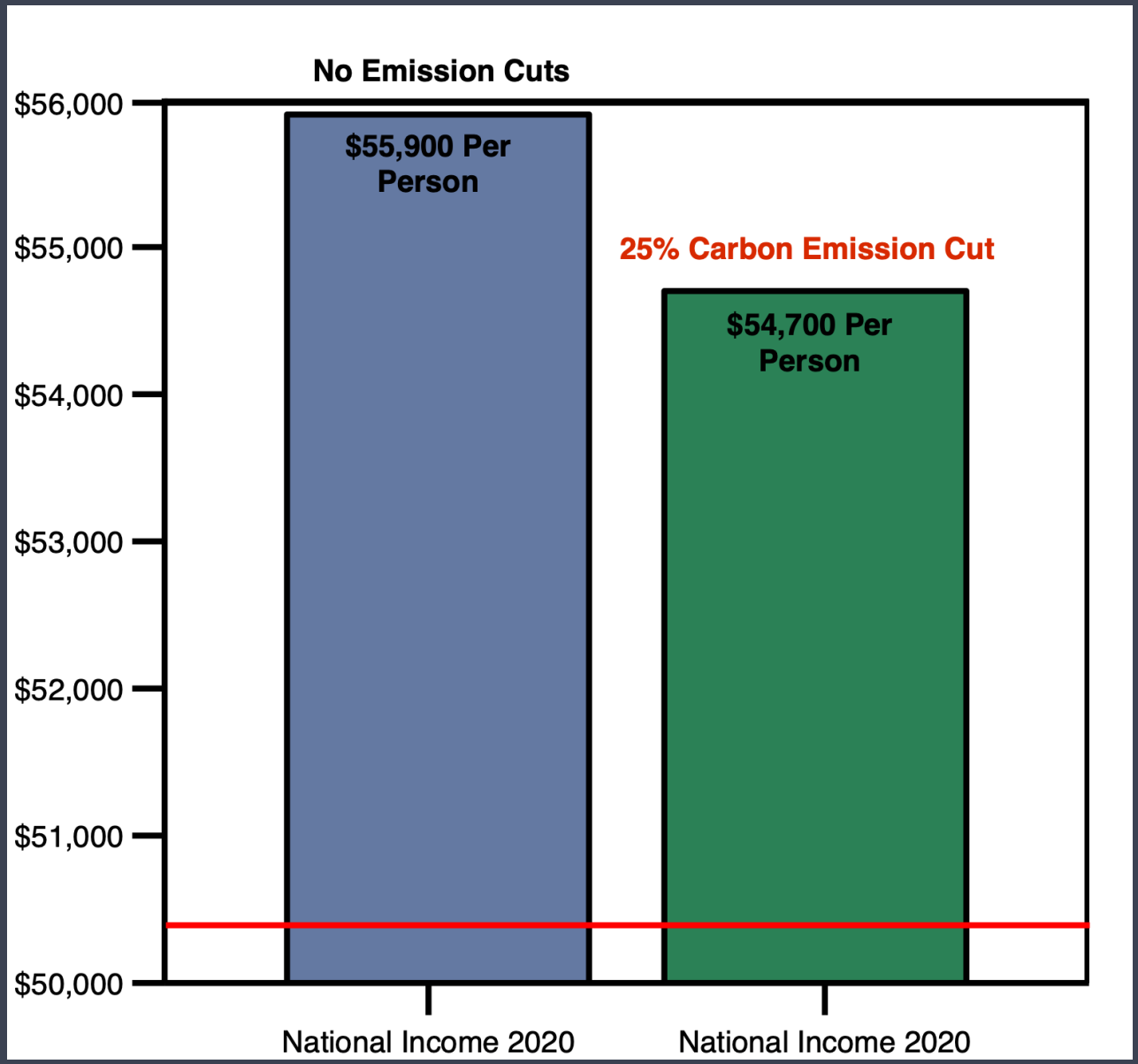

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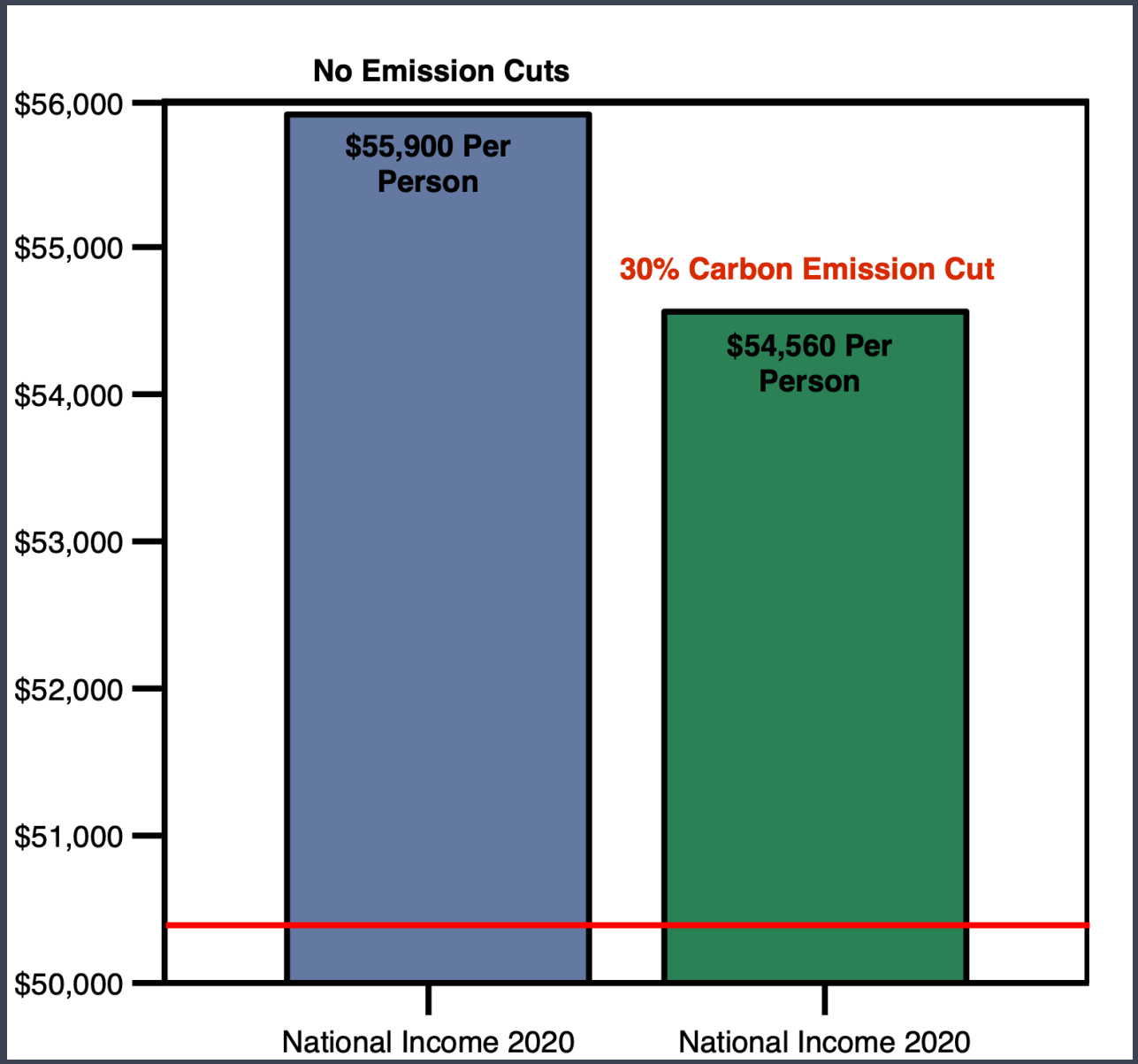

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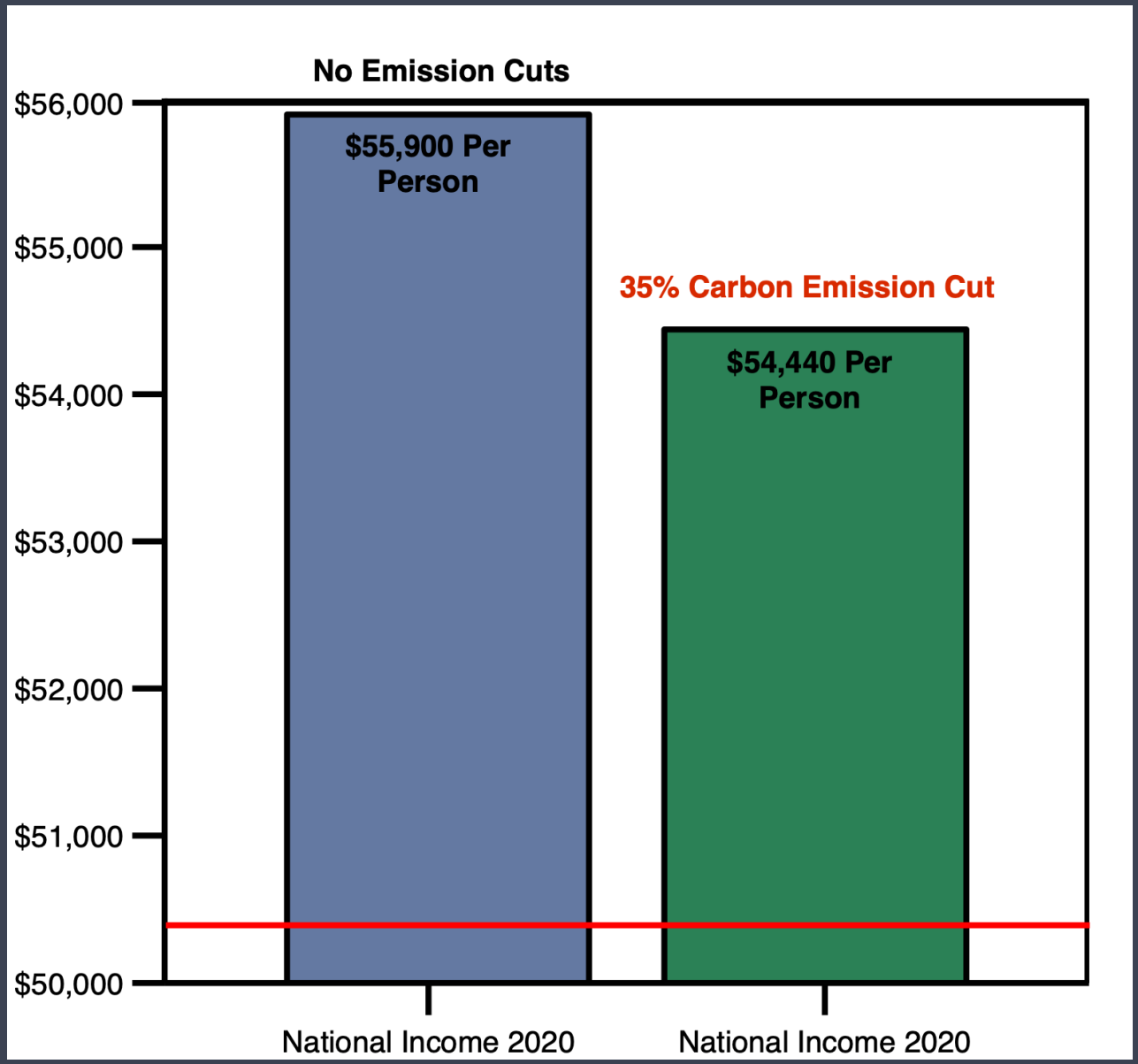

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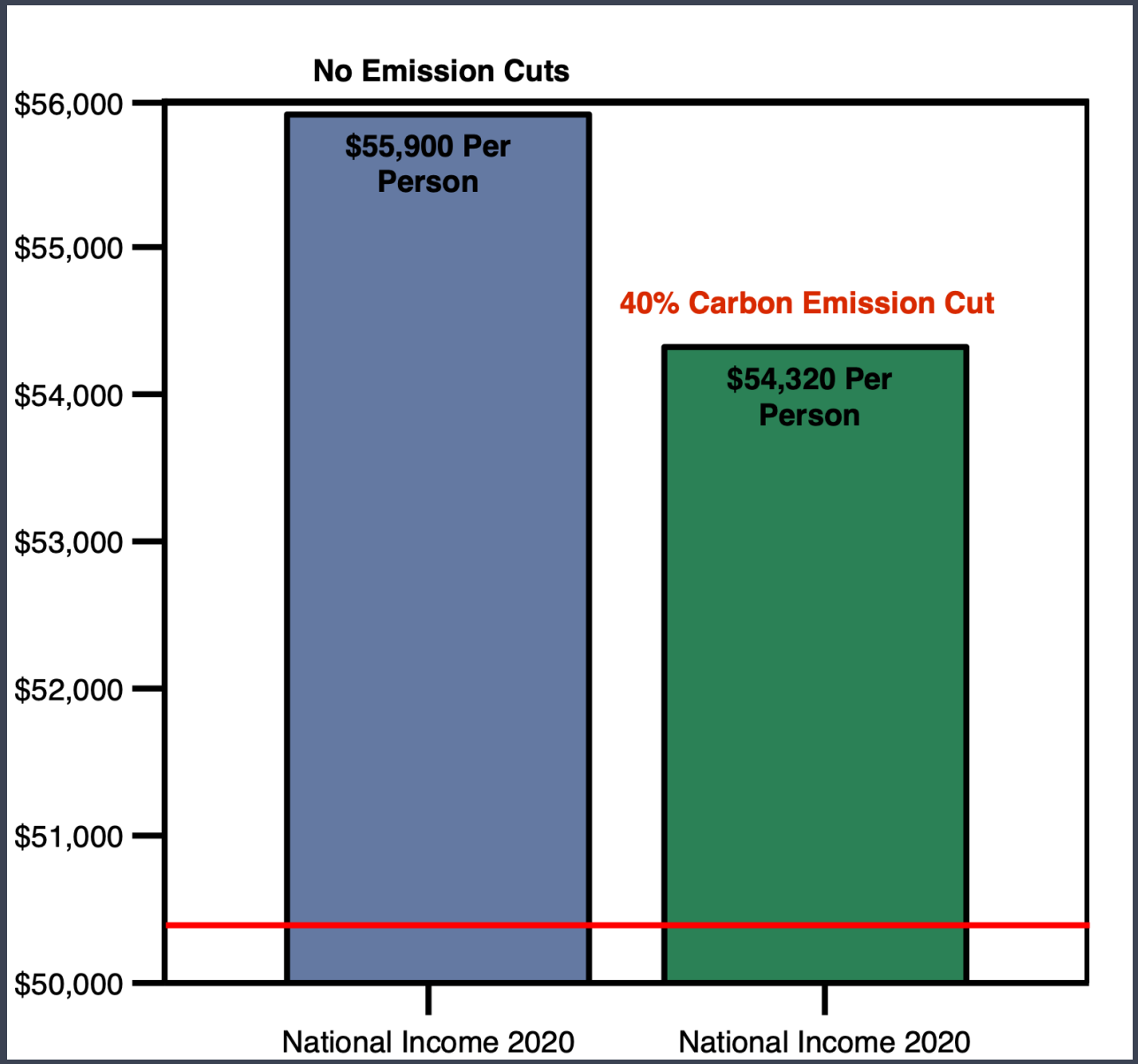

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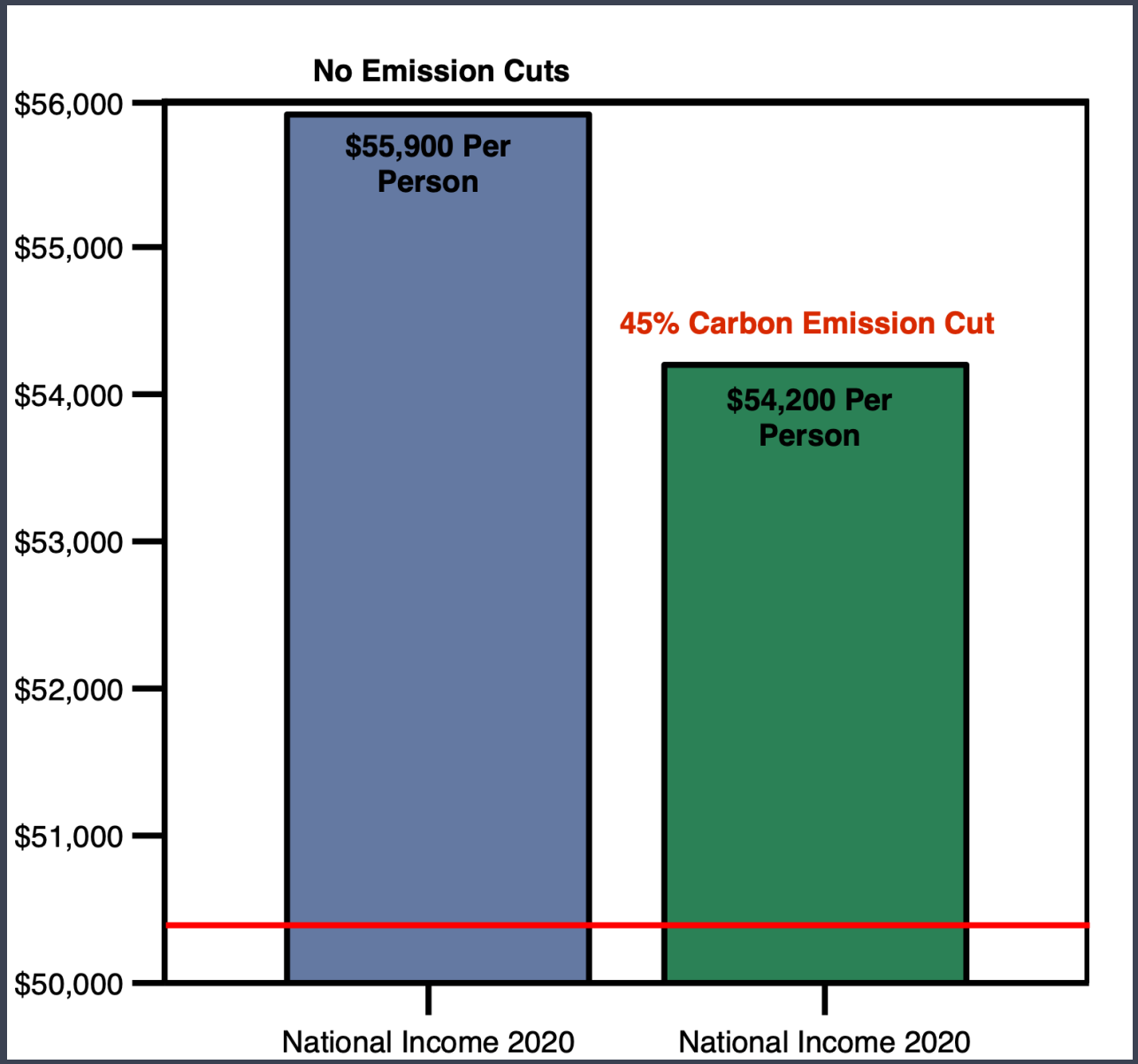

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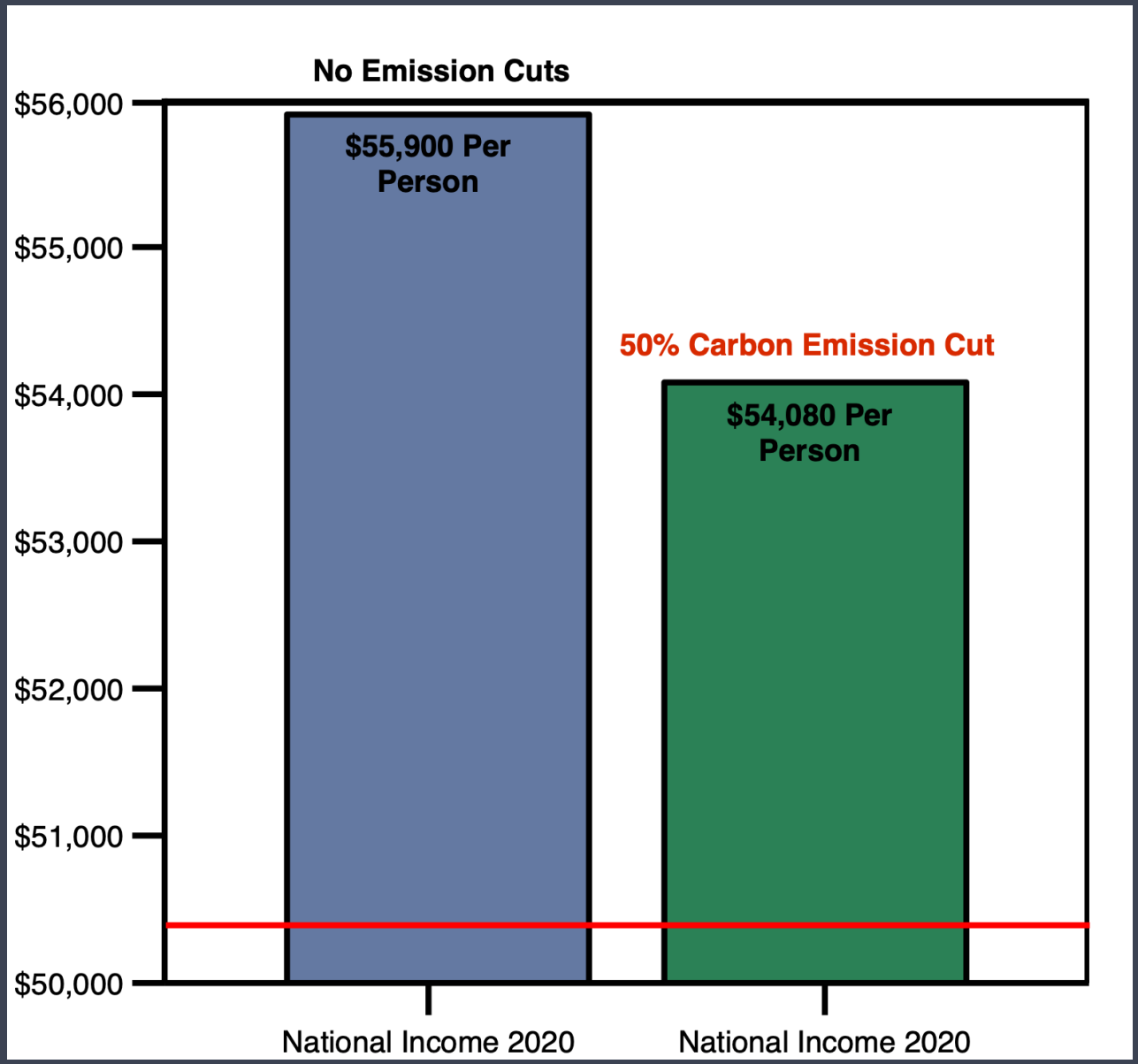
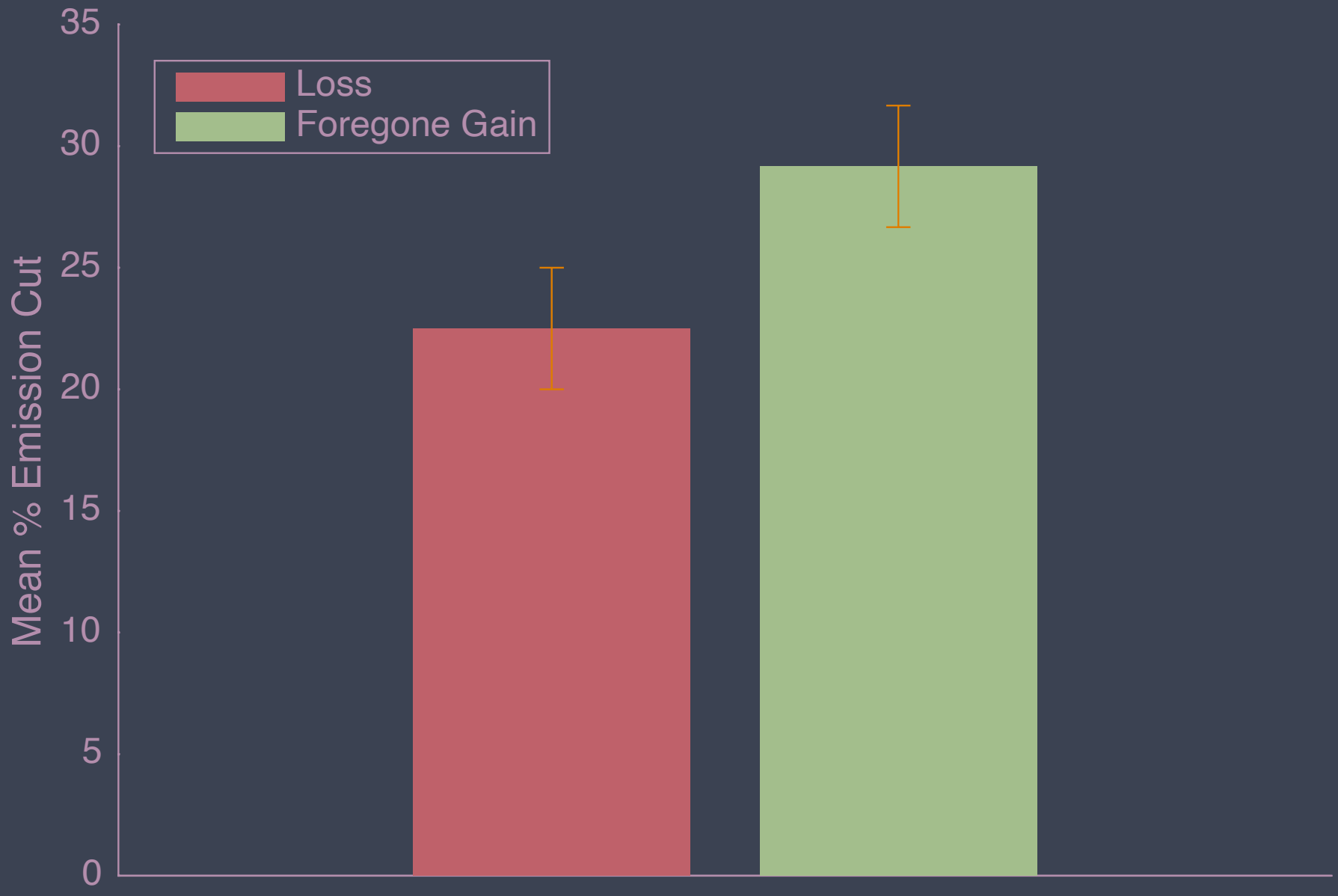


» Carbon Policy Framing (Hurlstone et al., 2014)



» Policy Insights

- The general public overestimate the costs of climate policies
- Correcting this misperception increases policy support
- Policymakers should highlight that quality of life and incomes will increase with emissions reductions (*a gain*), just not by as much as without emissions cuts
- More generally, positive gain frames should be used to highlight the positive benefits of immediate climate action

Leverage Intrinsic Motivation

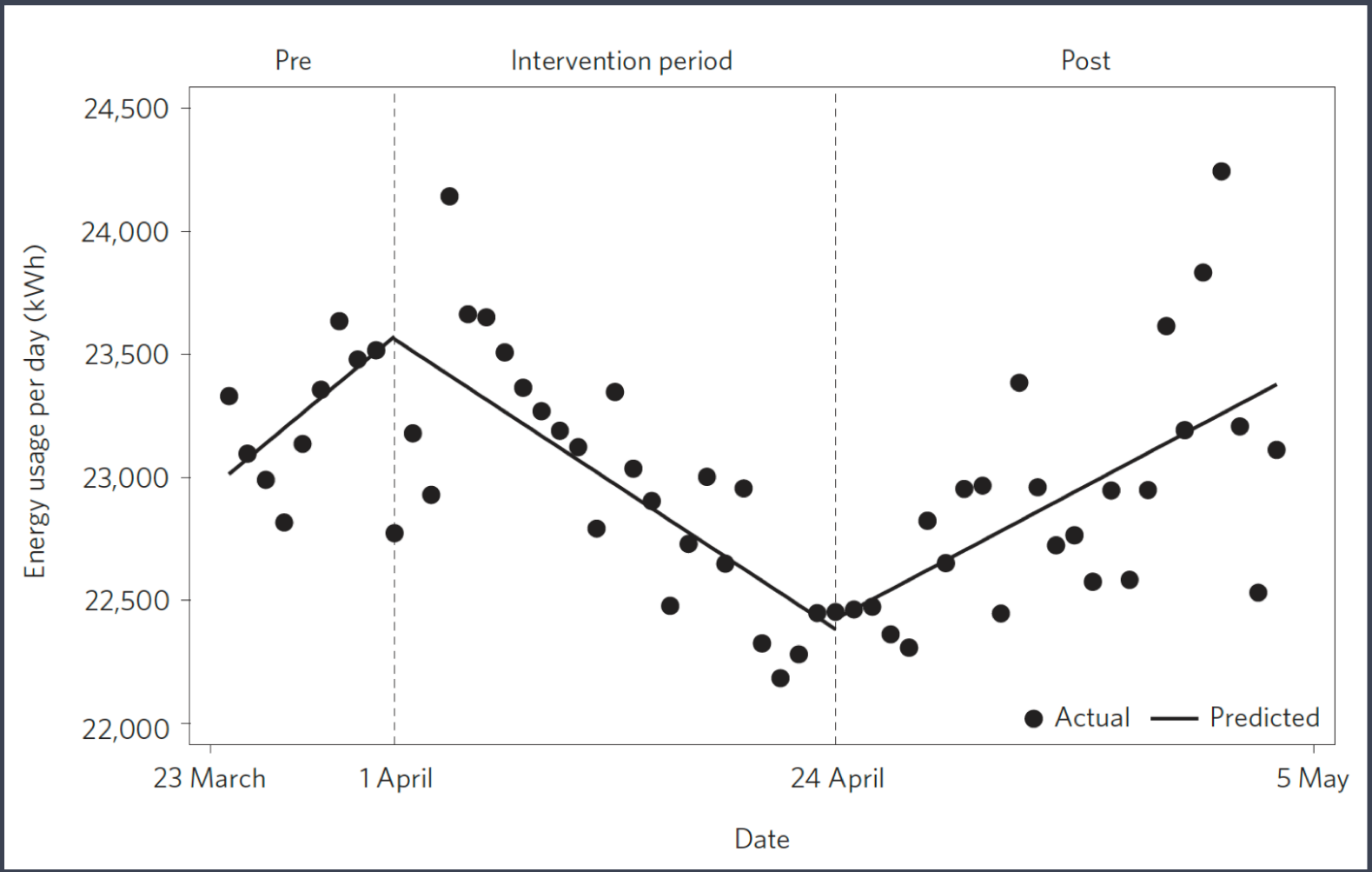
» Playing The Long Game: Tapping The Potential of Human Motivation

- To engage in any behaviour, we need to be motivated
- Psychologists distinguish between two different types of motivation
  1. Extrinsic motivation:
     - driven by a desire for external rewards such as financial incentives
  2. Intrinsic motivation:
     - driven by a desire to fulfil one's personal values, such as a desire to protect the environment
- Pro-environmental behaviour change campaigns typically use extrinsic incentives
- However, research shows intrinsic incentives may be more effective and longer lasting (Bolderdijk et al., 2013; Schwartz et al., 2015; van der Linden, 2015)

» Limitations of Extrinsic Incentives (van der Linden, 2015)

* Princeton "Do-It-in-the-Dark" energy saving campaign (2014)
* Nationwide energy competition involving students
* Students encouraged to reduce their residential energy consumption over the course of a month (the competition period)
* Several prizes (extrinsic incentives) are handed out to the winners of the competition

» Limitations of Extrinsic Incentives (van der Linden, 2015)



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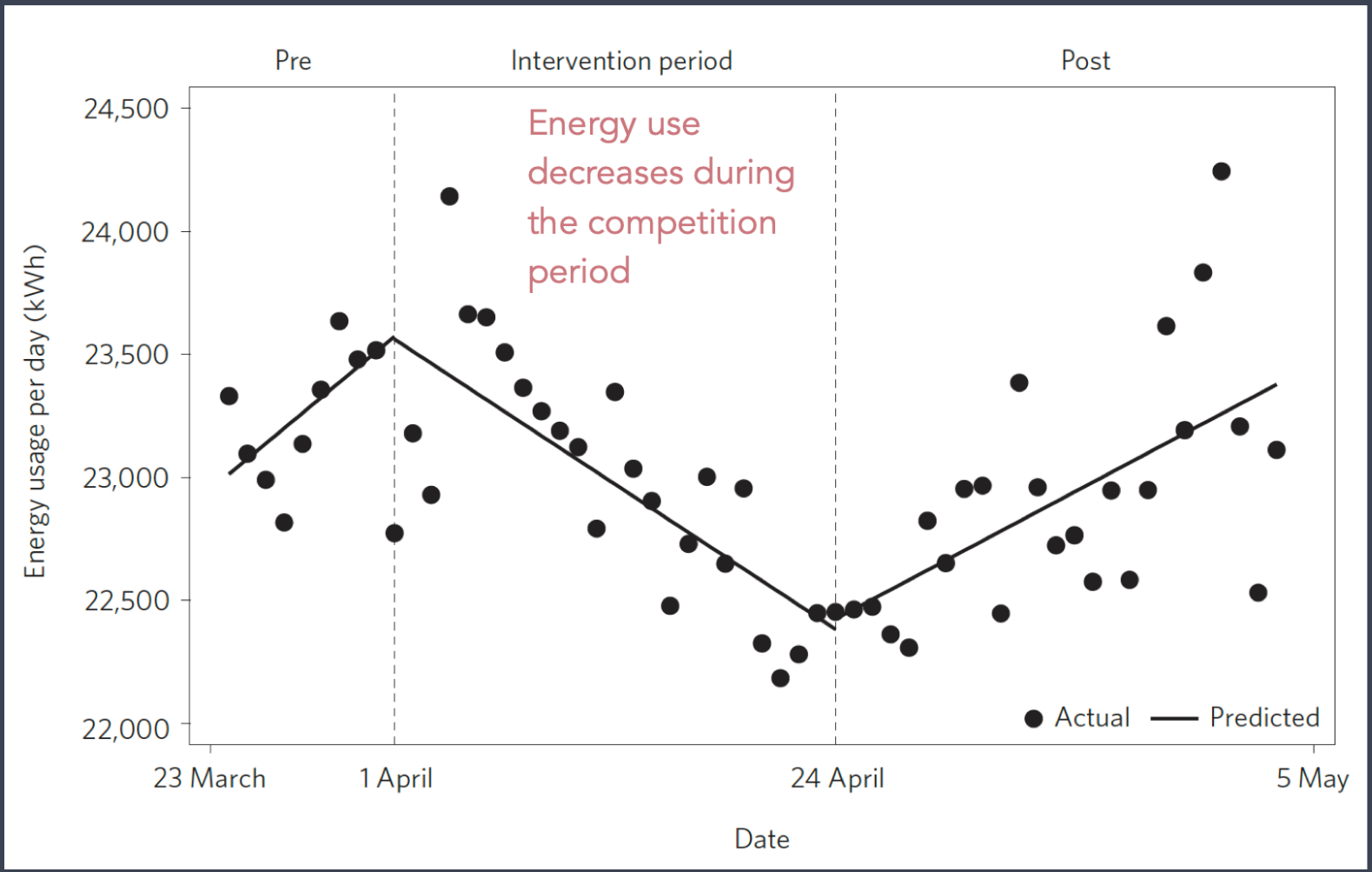

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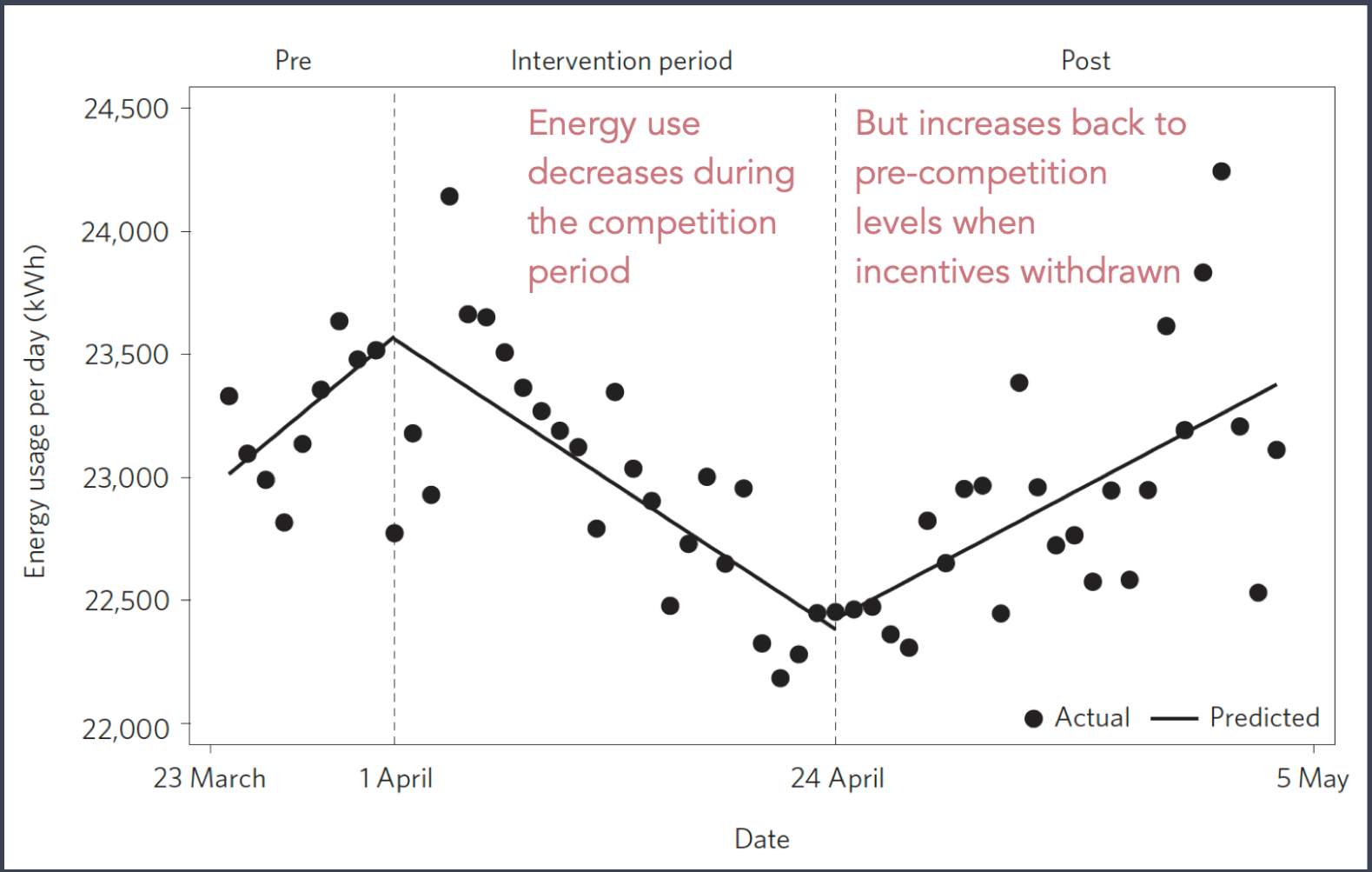
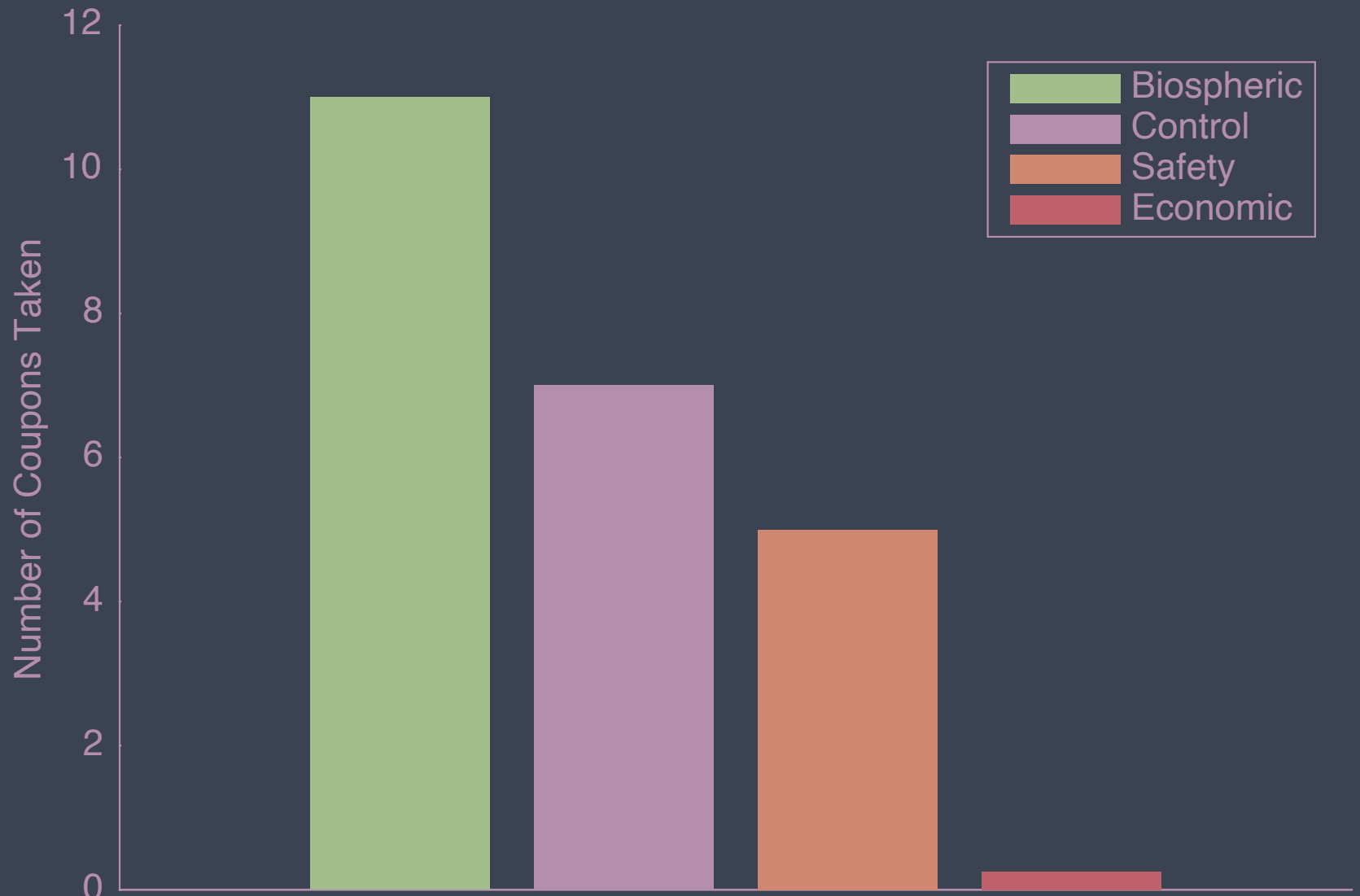


» Intrinsic Benefits Trump Extrinsic Incentives (Bolderdijk et al., 2013)

* Patrons of a US petrol station saw a sandwich board with one of four different types of appeals:
  1. biospheric: *Do you care about the environment? Take a coupon for a free professional tire check*
  2. control: *Take a coupon for a free professional tire check*
  3. safety: *Do you care about your safety? Take a coupon for a free professional tire check*
  4. economic: *Do you care about your finances? Take a coupon for a free professional tire check*
* Coupons for a free tire check were attached to the sandwich boards
* Dependent measure of interest: number of coupons taken

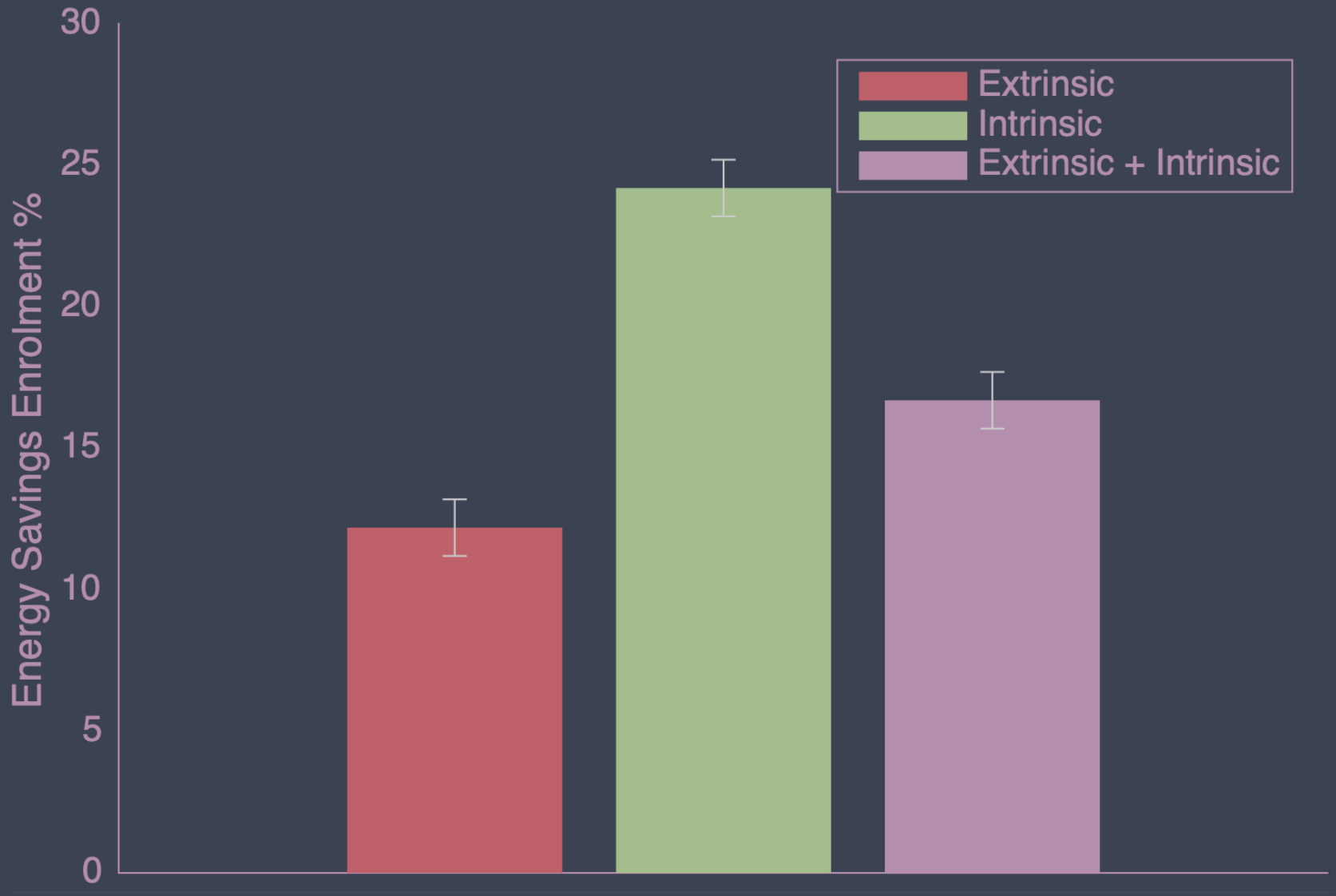
» Intrinsic Benefits Trump Extrinsic Incentives (Bolderdijk et al., 2013)



» Extrinsic Benefits Undermine Intrinsic Motivation (Schwartz et al., 2015)

* Participants (N = 1,406), recruited online, presented with hypothetical energy-saving programs
* Three conditions emphasising different incentives:
  1. extrinsic: saving money on energy bills
  2. intrinsic: reducing one's environmental footprint
  3. extrinsic + intrinsic: both incentives highlighted
* Dependent measure of interest: enrolments (%) in energy saving programs

» Extrinsic Benefits Undermine Intrinsic Motivation (Schwartz et al., 2015)



» The Benefits of Intrinsic Motivation

* The term warm glow is used to explain why people behave altruistically (Andreonni, 1990)
* Not just a metaphor, people's body temperature actually increases following good deeds (Taufik et al., 2015)
* Performing good deeds generates a helper's high: doing good actually makes people feel good (van der Linden, 2011)
* Doing good also generates physiological and psychological benefits: greater well-being, health, and longevity (Post, 2005)

> * People are clearly motivated by more than just monetary and extrinsic incentives

» Policy Insights

- As climate change is a long-term problem, stable long-term drivers of pro-environmental behaviour are needed
- Extrinsic incentives are less likely to be successful—they only work for as long as they are maintained
- Intrinsic incentives are more likely to bring about long-lasting behaviour change

End

» Summary

* Five lessons from psychological science:
  1. The Human Brain Privileges Experience Over Analysis
  2. People Are Social Beings Who Respond To Group Norms
  3. Psychological Distance: Out of Sight, Out of Mind
  4. Framing the Big Picture: Nobody Likes Losing (but Everyone Likes Gaining)
  5. Playing The Long Game: Tapping The Potential of Human Motivation

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