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Policy Brief - ALMONDO Project

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Purpose and audience

This brief is written for policymakers, regulators, and public institutions designing climate governance rules on lobbying transparency, corporate climate-claim substantiation, and safeguards around high-leverage decision points. It draws on the results of the project “Analyzing climate Lobbying with a simulation Model based ON Dynamic Opinions (ALMONDO)”, funded by the European Union - Next-GenerationEU - National Recovery and Resilience Plan (NRRP) – MISSION 4 COMPONENT 2, INVESTMENT N. 1.1, CALL PRIN 2022 PNRR D.D. 1409 14-09-2022, CUP N. J53D23015400001. The project is aimed to formalize and study how climate lobbying can shift beliefs through communication networks when people update beliefs under cognitive biases.

Executive summary

Belief-based influence strategies (delivered through policy briefs, commissioned reports, op-eds, intermediary messaging, and direct briefings) can delay or dilute climate policy by shifting perceptions of climate risk, urgency, and feasibility. Drawing on an opinion-dynamics model with underreaction and motivated reasoning, the ALMONDO project results show a credibility–reach trade-off: lobbying influence is highest at a moderate-to-high credibility investment share (i.e. the highest value of our influence measure is reached for the share parameter gw between 0.55 and 0.6), after which additional “credibility building” (e.g., CSR positioning, third-party validators, front groups)



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reduces impact because it crowds out outreach volume. The model also predicts strategic retargeting under polarization: repeatedly targeting aligned “friends” underperforms (ceiling effects), targeting opponents only helps when polarization is limited, and influence increasingly concentrates on uncommitted/swing actors as motivated reasoning strengthens. In scale-free policy ecosystems, “hub capture” is advantageous only when within-network diffusion matters enough relative to direct lobbying reach (low ρ). Otherwise, centrality targeting saturates quickly and broad outreach performs better. Complementary evidence from a nationally representative Italy survey experiment (N=1,633 respondents) finds advocacy content raises belief that climate change is real by ~2 percentage points, while skeptical content produces larger “true” belief declines once survey biases are removed (−2.9 percentage points on reality and −4.7 percentage points on human causation) and pulls mixed-signal beliefs toward skepticism on human causation. Together, these findings support an integrated governance response: extend substantiation and disclosure rules from consumer advertising to policy-facing communications and their funding/validator infrastructure; apply rapid transparency and conflict-of-interest safeguards around pivotal swing committees and expert venues; strengthen integrity requirements for high-reach intermediaries where diffusion risk is high; and introduce late-stage transparency (“sunlight”) windows to deter decisive last-minute influence campaigns.

Problem definition

Climate policy delay and dilution can be sustained not only through formal bargaining and institutional access, but also through belief-based influence strategies that shape perceptions of climate risk, urgency, and feasibility. We operationalize these influence dynamics by modeling how messages, repeated interactions, and network structure can move average beliefs over time. We emphasize that real-world climate lobbying often involves more than factual dispute. Indeed, it may rely on the strategic construction of trust and legitimacy that reduces audience skepticism towards certain (climate denial) positions without changing the factual content of messages.

What our analysis is about

The baseline setting features a population communicating on a directed network over multiple rounds about an uncertain damaging event. Individuals rely on two competing probabilistic models of the event, one “optimistic” and one “pessimistic,” and form subjective probabilities as a weighted combination of these models. Their weights



evolve based on received signals, but updating is frictional because individuals underreact and may apply motivated reasoning.

Within this environment, a lobbyist sends binary signals favoring its supported narrative under a budget constraint and per-signal costs. These “signals” can be broadly interpreted as communications such as policy briefs, commissioned reports, op-eds, PR talking points delivered through intermediaries, and direct meetings with the public, decision-makers, and staff.

A central feature is endogenous credibility. The lobbyist can allocate a share of its budget to reputational investment, which increases the persuasive impact of later messages via a sigmoid credibility function. Empirically, this corresponds to spending and organizational efforts that raise perceived trustworthiness, including CSR positioning, alliances with reputable third parties, front-group creation, and strategic use of expert authority.

Key findings for decision-makers

Credibility-building is a *strategic* lever with an interior optimum, not a linear “more is better” effect. In the simulations with endogenous credibility, lobbying influence peaks when a *moderate-to-high* share of budget is devoted to reputational/credibility investment (around $gw \approx 0.55-0.60$ in the baseline calibration) because credibility boosts per-message impact but reduces how many messages can be sent. This creates predictable incentives to fund CSR-style reputation, third-party validation, and front-group structures up to the point where they start crowding out outreach.

Targeting “friends” is ineffective for persuasion; “foes” only works when polarization is limited; “the persuadable middle” becomes the high-leverage target as motivated reasoning rises. Targeting aligned actors (“friends”) underperforms broad outreach due to ceiling effects, while targeting opponents (“foes”) can outperform broad outreach only at low-to-mid polarization and loses its edge as confirmation bias strengthens. Targeting uncommitted/median actors performs comparably to the best alternatives and becomes clearly advantageous at higher polarization.

“Hub capture” is not automatically efficient; it depends on whether influence spreads mainly through *network diffusion* or *direct contact*. In scale-free networks, naïve targeting of the most central nodes can underperform when the lobbyist can directly contact many actors each period (a high relative-intensity condition, $\rho \gg 1$), because of saturation: hubs are “converted” quickly but diffusion to the periphery is limited.



Centrality strategies become more valuable when peer diffusion matters more (lower budget per period, longer horizon, or richer within-network communication).

Sustained competing lobbying can keep public beliefs unstable; timing is itself a strategic dimension. The opinion-dynamics lobbying model identifies two regimes (lobbyist-dominant vs peer-effect/polarization). With two symmetric opposing lobbyists, the system can exhibit prolonged opinion oscillations and only converges after lobbying stops. This suggests that continuous influence can prevent stabilization. Timing matters: frontloading is advantageous when peer cascades are strong; backloading is advantageous when underreaction is high and late signals shape the final state.

Empirical belief-updating is asymmetric, with meaningful “skepticism drift” on human causation even when overall belief levels are high. In the representative Italy survey experiment we conducted (N=1,633), average priors are already high (an average confidence around 84% for the statement “climate change is real” being true and around 75% for “climate change is human-caused”). After controlling for possible distortions, climate advocacy content raises belief in climate-change reality by roughly 2.6 percentage points, but not human causation. Climate skeptical content reduces beliefs by 2.9 percentage points (reality) and 4.7 percentage points (human causation). Under equal exposure to advocacy and skepticism signals, intermediate beliefs tend to fluctuate around ~0.75 (reality) but ~0.40 (human causation). This shows a “pull” toward skepticism on causation.

Beliefs predict opinions and actions strongly, but some effects bypass beliefs. Posterior beliefs are strongly associated with a range of policy and behavior outcomes, yet two belief-independent channels stand out: (i) a backfire where skepticism increases fossil-fuel tax support by 6.8 percentage points (when controlling for posteriors), and (ii) advocacy increases signing a climate petition (+6.02 percentage points, even accounting for beliefs).

Policy options

Option 1: Reduce the payoff to manufactured credibility by regulating *claim integrity* and *credibility infrastructure*

In the version of the ALMONDO model augmented with credibility building, lobbying influence is maximized at an interior level of reputational/credibility investment (roughly when the share share gw of resources to credibility is ~0.55 in the baseline), because



credibility raises per-message impact but competes with outreach volume. That creates a predictable incentive to spend heavily on CSR positioning, third-party validators, and front-group structures to make messages more persuasive.

Separately, the Italy survey experiment finds that skeptical signals move beliefs more than advocacy signals, including a -4.7 percentage points shift on human causation when distortions are accounted for. This supports the idea that credibility and “who says it” can matter materially even when average belief levels are high.

Possible measures are:

- Require climate-related claims to be backed by evidence not only in consumer advertising, but also in policy-oriented communications (reports, briefs, sponsored commentary, coalition messaging) that are intended to shape public policy.
- Mandate “credibility infrastructure disclosure” for climate-related influence efforts. Require a standardized disclosure for any climate-related communication that identifies:
 - *ultimate funder(s)* (including pass-through entities),
 - *material sponsorships* (events, research, campaigns),
 - *organizational role* (e.g., coalition member, secretariat, fiscal sponsor),
 - *paid validators* (consultants, experts, think tanks, PR).
- Create an auditable record for “sponsored evidence.” When evidence is submitted into policy processes (consultations, hearings, advisory panels), require: funding statement + methods/data availability statement + conflict-of-interest declaration for listed authors.
- Enforcement hook: risk-based audits triggered by (i) high spending on reputation-building campaigns, (ii) repeated use of third-party validators, or (iii) repeated submissions of sponsored evidence across files/consultations. (This aligns monitoring with the credibility-investment channel.)

Option 2: Put the strongest transparency and conflict-of-interest safeguards around *high-leverage swing targets*

In the simulated targeting experiments, repeatedly targeting “friends” underperforms because of ceiling effects, and targeting “foes” loses effectiveness as motivated reasoning/polarization increases. By contrast, targeting uncommitted/median actors becomes comparatively better at higher polarization, implying persuasion efforts concentrate where decision-makers are *not yet anchored*.



The survey evidence also reinforces the importance of protecting “the middle”: beliefs are linked strongly to policy opinions and actions, and small shifts can translate into meaningful differences in expressed support/behavior.

Possible measures are:

- Define “high-leverage venues” procedurally (to avoid politicization). Examples of objective criteria: imminent votes, delegated acts under development, rule finalization windows, advisory opinions pending, or committees/panels with agenda-setting power.
- Enhanced disclosure for contacts and materials in these venues. Require near-real-time disclosure (short statutory window) of:
 - meetings/briefings with members and staff,
 - materials shared (slides, memos, draft language),
 - sponsored travel/events,
 - third-party “evidence packages” routed through intermediaries.
- Conflict-of-interest safeguards for swing institutions. Require conflict of interest declarations and funding transparency for:
 - expert panel members,
 - commissioned reviewers,
 - organizations submitting technical evidence,
 - think tanks/associations offering “neutral” briefings.
- Monitoring hook: track whether lobbying/engagement becomes more concentrated around median venues when polarization rises (the model’s predicted strategic shift).

Option 3: Build intermediary and gatekeeper resilience where network diffusion makes “hub capture” consequential

On scale-free networks, targeting highly connected “hubs” can *underperform* due to saturation when the lobbyist’s direct reach is large relative to peer diffusion. We summarize this using a relative intensity ratio (ρ): when diffusion is weak relative to direct reach, hub targeting adds little. When diffusion is quantitatively important, hub targeting becomes more valuable.

This provides a governance rationale to focus integrity measures on intermediaries *when* they plausibly shape wide downstream diffusion.

Possible measures are:



- Intermediary transparency rules (funding and amplification pathways). For high-reach intermediaries involved in climate policy discourse (major media, prominent think tanks, umbrella associations, high-centrality expert networks), require disclosure of:
 - climate-related funders and project sponsors,
 - paid partnerships and repeated briefings,
 - commissioned outputs that feed policy processes.
- Target deployment using the diffusion logic. Prioritize sectors/arenas where diffusion is plausibly high (dense expert ecosystems, heavy reliance on intermediated evidence) rather than assuming hubs always dominate.

Cross-cutting add-on: Timing-aware safeguards for late-stage influence

Our analysis shows that frontloading vs backloading can flip which side “wins” depending on underreaction and motivated reasoning; late-stage interventions can be especially impactful on the *final* distribution when underreaction is high.

As a practical safeguard, we suggest introducing “late-stage sunlight” rules for major decisions, that is mandatory publication windows for submissions and sponsored evidence near finalization, plus rapid disclosure of late contacts/materials.

Recommended course of action

1) Regulate and disclose “credibility infrastructure” as a core channel of influence (not just message content).

Update climate-governance and lobbying rules so that reputational campaigning (CSR branding tied to climate positions, third-party validators, coalitions, front groups, commissioned “expert” outputs) triggers disclosure and substantiation duties comparable to direct lobbying. This is because influence is maximized at substantial credibility spend (*gw* around 0.55) under budget constraints. Prioritize standardized attribution, funding traceability for validators/front groups, and auditable substantiation for climate claims.

2) Put the strongest transparency and conflict-of-interest safeguards around “swing” decision points and uncommitted actors.

Since persuasion becomes relatively more effective on median/uncommitted targets as polarization rises (and conversion of committed opponents becomes less feasible),



require faster and more granular disclosure of contacts, materials, and sponsorship around pivotal committees, regulators, advisory panels, and consultation gateways. Pair disclosure with conflict of interest controls (recusals, revolving-door constraints, and clear labeling of sponsored evidence).

3) Build resilience at intermediaries and high-centrality brokers, but deploy it where diffusion risk is real.

Apply tailored integrity rules to gatekeepers that can amplify narratives (major media, prominent think tanks, umbrella associations, high-reach experts), focusing on sponsorship disclosure, repeated briefings, and “exclusive information” channels. Use the diffusion logic from the scale-free experiments: hub-focused interventions matter most when indirect diffusion is important (lower ρ), and are less effective when direct lobbying reach dominates.

4) Add “timing-aware” safeguards: treat late-stage influence as a distinct risk.

Because timing can flip effectiveness (frontloading vs backloading depending on underreaction/polarization), require heightened disclosure/archiving of inputs near end-stage decisions (e.g., final drafting, delegated acts, rule finalization), and consider quiet-period style restrictions or mandatory publication windows for late submissions and sponsored evidence.

5) Target belief resilience where the empirical drift is most concerning: human causation.

The survey evidence suggests a systematic pull toward skepticism on human causation under mixed signals and underreaction; prioritize interventions that increase exposure to accurate, high-credibility information on anthropogenic causes (platform design, labeling, rapid correction pathways, and targeted inoculation for “middle” audiences).

Implementation considerations

Implementation should recognize that we model persuasion only and intentionally abstracts from other channels such as direct institutional bargaining, material inducements, endogenous media-platform amplification, and multidimensional framing beyond a binary narrative. As a result, the recommended measures should be understood as strengthening the information environment and transparency layer of



climate governance rather than replacing broader anti-capture and anti-corruption frameworks.

Monitoring and evaluation

Monitoring and evaluation should track indicators aligned with the brief's influence channels and the added diffusion/timing safeguards: (i) the scale, composition, and transparency of reputational/credibility spending tied to climate messaging (including funding links to third-party validators, coalitions, and front groups); (ii) the concentration and timing of lobbying contacts and sponsored submissions around swing committees, agencies, and advisory bodies, including whether “rapid disclosure” obligations are met; (iii) patterns of engagement with high-centrality intermediaries and their amplification pathways, alongside simple proxies for whether network diffusion is likely to matter relative to direct reach (the condition under which “hub capture” becomes most consequential); and (iv) late-stage sunlight compliance, i.e., how much evidence and how many contacts occur close to finalization, how quickly they are published, and whether mandatory publication windows are respected. These process indicators should be complemented with periodic outcome tracking of public beliefs (especially human causation, where the survey experiment suggests skepticism can exert larger and more persistent drift under mixed signals) so regulators can spot shifts from broad outreach toward credibility construction, gatekeeper leverage, or last-minute interventions in polarized contexts.

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