HEINRICH BÖLL STIFTUNG
ECOLOGY

VOLUME 44.1

A Managed Decline of Fossil Fuel Production

The Paris Goals Require No New Expansion and a Managed Decline of Fossil Fuel Production

By Oil Change International

A MANAGED DECLINE OF FOSSIL FUEL PRODUCTION

HEINRICH BÖLL STIFTUNG
PUBLICATION SERIES ECOLOGY
VOLUME 44.1

A Managed Decline of Fossil Fuel Production

The Paris Goals Require No New Expansion and a Managed Decline of Fossil Fuel Production

By Oil Change International, compiled by Adam Scott

Edited by the Heinrich Böll Foundation

Note

This contribution draws from works by Oil Change International on the subject of managed decline. Contributing authors include: Greg Muttitt, Hannah McKinnon, Kelly Trout, Adam Scott, David Turnbull, Janet Redman of Oil Change International and Sivan Kartha of Stockholm Environment Institute.

Oil Change International is a research, communication, and advocacy organization focused on exposing the true costs of fossil fuels and facilitating the coming transition towards clean energy.

A Managed Decline of Fossil Fuel Production
The Paris Goals Require No New Expansion and a Managed Decline of Fossil Fuel Production
By Oil Change International, compiled by Adam Scott
Volume 44.1 of the Publication Series Ecology
Edited by the Heinrich Böll Foundation 2018

Editorial design: feinkost Designnetzwerk, S. Langer (based on the origin layout by State Design)
Copy-Editing: Christopher Hay
Printing: ARNOLD group, Großbeeren
ISBN 978-3-86928-176-6
ISBN 978-3-86928-184-1 (anthology)

This publication can be ordered from: Heinrich-Böll-Stiftung, Schumannstr. 8, 10117 Berlin, Germany
T +49 (0)30 28534-0 **F** +49 (0)30 28534-109 **E** buchversand@boell.de **W** www.boell.de

CONTENTS

INTRODUCTION

The Paris Agreement, now officially in force and ratified by more than 160 nations, sets a global temperature goal of staying well below 2 degrees Celsius above pre-industrial levels while striving to limit the increase to 1.5 degrees Celsius.[1] Signatory nations chose these goals to create a reasonable chance of avoiding the most dangerous impacts of climate change.[2]

Basic climate science shows that – all else equal – total cumulative carbon dioxide emissions (CO2) over time determine how much global warming will occur. There is a set level of total cumulative emissions that can occur for a given temperature limit. This is our «carbon budget.»[3]

In Oil Change International's September 2016 report, The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production,[4] we analyzed what a Paris-aligned carbon budget would mean for fossil fuel production globally. We used the carbon budgets, calculated by the Intergovernmental Panel on Climate Change (IPCC),[5] that would give a likely (66 percent) chance of limiting temperature increases below 2 degrees Celsius and a medium (50 percent) chance of limiting temperature increases to below 1.5 degrees Celsius – equivalent to the range of the Paris goals. We compared these budgets to the cumulative CO2 that will be released over time from all coal, gas, and oil projects currently operating or under construction around the world (Figure 1).

The results show that the carbon embedded in already developed fields and mines would fully exhaust and exceed the carbon budgets the world must stay within to achieve the Paris Agreement goals.

1 UNFCCC, «Paris Agreement,» December 2015. http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

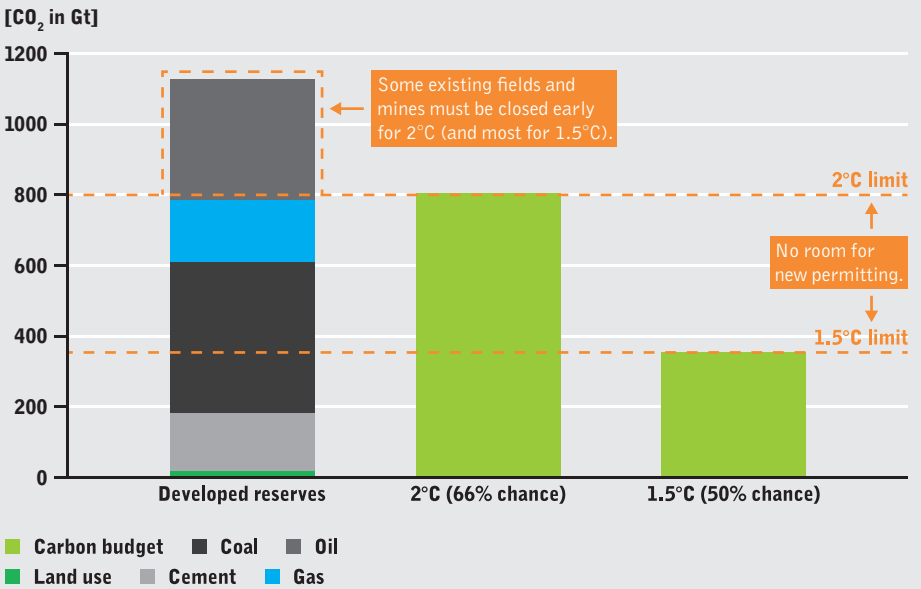
2 UNFCCC, Adoption of the Paris Agreement, p. 2. https://unfccc.int/resource/docs/2015/cop21/eng/L09r01.pdf

3 The carbon budgets approach does not apply to short-lived greenhouse gases such as methane, whose effects are factored into the calculation of carbon budgets in the form of assumptions about their future emissions.

4 Greg Muttitt, «The Sky's Limit: Why the Paris Climate Goals Require A Managed Decline of Fossil Fuel Production,» Oil Change International, September 22, 2016. http://priceofoil.org/2016/09/22/the-skys-limitreport

5 We use IPCC numbers as our principal reference because they represent a broad agreement among the scientific community, informed by and reconciling numerous individual papers.

Figure 1: Carbon Emissions from Developed Fossil Fuel Reserves, Compared to Carbon Budgets



Sources: Rystad Energy, IEA, World Energy Council, IPCC[6]; own chart

Logically, these findings tell us there are three possible futures when it comes to our current climate crisis:

1.) **Managed decline:** We succeed in restricting new fossil fuel supply projects and carefully managing the decline of the fossil industry over time, while planning for a just transition for workers and communities. This path gives us a likely chance of achieving the goals of the Paris Agreement and avoiding the worst impacts of climate change.

2.) **Unmanaged decline:** We allow further fossil fuel development to continue, but eventually manage to limit emissions to within carbon budgets. Meeting the Paris goals would become much harder and would lead to a sudden and dramatic shutdown of fossil fuel production, stranding assets, damaging economies, and harming workers and communities reliant on the energy sector.

3.) **Climate catastrophe:** We fail to restrict emissions. New long-lived fossil fuel infrastructure locks us into a high-carbon future that puts the Paris targets out of reach. Climate change reaches dangerous levels, causing compounding, irreparable harm for people and ecosystems around the world.

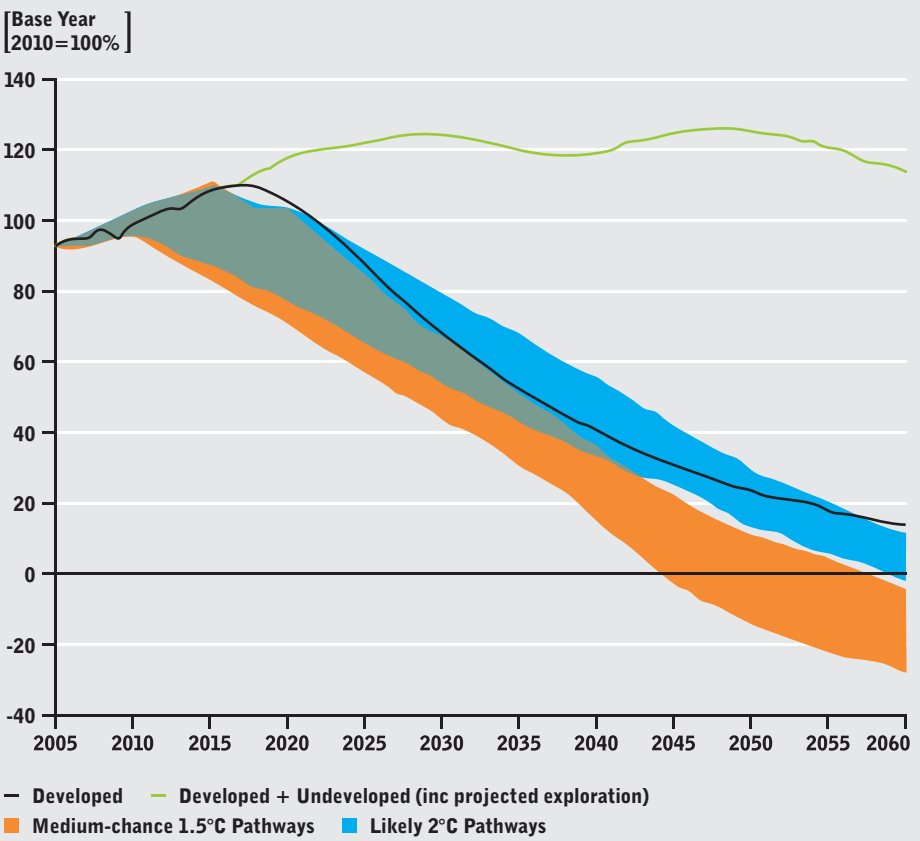
6 For detailed methodology see Muttitt, Sky's Limit, op. cit., Section 2.

Figure 2: Logic Tree of Fossil Fuel Supply vs. Emissions Restrictions

Clearly, the first option is the safest and most efficient path. By stopping new fossil fuel developments and beginning a carefully managed decline of the fossil fuel industry towards an economy powered by clean energy, we have the brightest future.

Managed decline must begin now

Figure 3: Rates of Change* of Global Emissions in a Range of 1.5°C and 2°C Scenarios, and of Emissions from Developed and Undeveloped Global Oil and Gas Fields
*Rates of change are based on 2010 emissions and production levels.



Sources: Rogelj et al.,[7] Rystad Energy UCube,[8] Oil Change International analysis; own chart

7 Joeri Rogelj et al, «Energy system transformations for limiting end-of-century warming to below 1.5°C,» *Nature Climate Change*, Vol. 5, June 2015, p. 520; communication with author

8 Staying within an emissions trajectory consistent with the Paris Agreement goals requires an end to new fossil fuel exploration and development, along with efforts to end some projects faster than natural decline rates would allow.

Meeting climate goals will require a managed phase-out of the entire fossil fuel sector towards global decarbonization in the coming decades.

A study by Joeri Rogelj and colleagues, published in Nature Climate Change, found that to keep warming below 2 degrees Celsius, current global emissions need to be reduced by half by the late 2030s, and reach zero some time around 2065. To aim for 1.5 degrees Celsius, emissions need to be halved by the early 2030s – in fifteen years' time – and reach zero by 2050 (Figure 3). And these estimates rely on unproven negative emissions technology working out – if it does not, those cuts need to be achieved earlier.

But the world is dangerously off course in planning for this imperative. Figure 3 compares the rates of change in global emissions needed for 1.5- and 2-degrees Celsius scenarios (if negative emissions technologies work out) to the projected rates of change in global emissions from future oil and gas production, according to Rystad Energy's projection. As shown by the green line in the graph, current policies and levels of investment would allow the oil and gas industry to expand at a rate that is wholly incompatible with achieving the Paris goals.

Climate leadership requires limiting fossil fuel supply

According to climate policy orthodoxy, emissions are addressed only where they come out of the chimney or tailpipe. This view is no longer supportable.

Until now, efforts to mitigate climate change have been overwhelmingly focused on measures to reduce end-use demand for fossil fuels. Current policies to improve energy efficiency, transition to renewable energy, electrify transportation, and put a price on carbon are among the most commonly used tools applied. These demand-side measures, along with efforts to address non-combustion emissions from sectors such as land use, agriculture, forestry, and industrial sources, form the established doctrine for global climate mitigation. However, increasing evidence shows that without simultaneous action to manage the phase-out of fossil fuel supply, the goals set in the Paris Agreement could be out of reach. If the fossil fuel industry is permitted to continue exploring for and developing new oil, gas and coal infrastructure projects, economic and political forces will lock-in growing emissions for decades to come. Success on climate requires using all available tools at our disposal, requiring action from governments to restrict the supply of fossil fuels as well as their demand.

It is widely recognized that no country is yet doing enough to respond to the global climate crisis. According to Climate Action Tracker, an independent scientific analysis of global climate action, the initial Nationally Determined Contributions (NDCs) currently pledged by countries under the Paris Agreement would add up to an estimated 3.2 degrees Celsius of warming.[9]

While communities on the front lines of the pollution fueled by oil production have long called for more aggressive action to curb extraction, policymakers have only recently begun to consider supply-side measures as part of their policy toolkit. The quantity of oil, gas, and coal used in the world is going to have to decline to near zero over the coming few decades if we are to stay within the Paris climate limits. This will require a comprehensive policy approach. Addressing the production of fossil fuels (i.e. supply) is a critical complement to addressing the end-combustion of fossil fuels (i.e. demand) for the reasons laid out below.

Driven by social movements calling for the managed decline of fossil fuel supply, a small but quickly growing number of jurisdictions have announcing policies to restrict new fossil fuel exploration and/or development on climate grounds. The list

9 http://climateactiontracker.org

of first movers currently includes New Zealand[10], France[11], Costa Rica[12], Belize[13] and Ireland.[14]

Avoid financial lock-in

Given the long-lived nature of fossil fuel projects, approvals and investments made now are locking in decades worth of fossil fuel production and emissions we cannot afford.

As described by Denniss and Green in the journal Climatic Change:

> When production processes require a large, upfront investment in fixed costs, such as the construction of a port, pipeline or coalmine, future production will take place even when the market price of the resultant product is lower than the long-run opportunity cost of production. This is because rational producers will ignore «sunk costs» and continue to produce as long as the market price is sufficient to cover the marginal cost (but not the average cost) of production. This is known as «lock-in.»[15]

Even if initial construction costs are written off, if ongoing revenue generated from a project exceeds the cost of operating it, the project will continue producing. Fossil fuel companies might go bankrupt and investor capital be destroyed, but projects live on. This is a critical reason why new supply-side investments must be stopped. It is significantly easier to stop projects before they start.

Minimize emissions leakage

Leakage refers to the economic phenomenon that, in a global market, the price signals sent by reducing supply or demand in one place will cause some respective increase in production or consumption elsewhere. This happens to a degree on both sides of the supply and demand equation. In neither case is leakage 100 percent. For every

10 Jamie Smyth, «New Zealand to ban future offshore oil and gas exploration,» Financial Times, April 12, 2018. https://www.ft.com/content/d91e9864-3ded-11e8-b7e0-52972418fec4

11 «France bans fracking and oil extraction in all of its territories,» The Guardian, December 20, 2017. https://www.theguardian.com/environment/2017/dec/20/france-bans-fracking-and-oil-extraction-in-all-of-its-territories

12 Corey Kane, «Costa Rica extends ban on petroleum extraction,» The Tico Times, July 28, 2014. http://www.ticotimes.net/2014/07/28/costa-rica-extends-ban-on-petroleum-extraction

13 «Belize Bans Offshore Oil and Gas Exploration,» Maritime Executive, January 9, 2018. https://www.maritime-executive.com/article/belize-bans-offshore-oil-and-gas-exploration#gs.Mux9rfs

14 Kevin O'Sullivan, «Move to ban issuing of fossil fuel exploration licences in Ireland,» Irish Times, February 6, 2018. https://www.irishtimes.com/news/politics/move-to-ban-issuing-of-fossil-fuel-exploration-licences-in-ireland-1.3382681

15 Fergus Green and Richard Denniss, «Cutting with both arms of the scissors: the economic and political case for restrictive supply-side climate policies,» Climatic Change, March 12, 2018. https://doi.org/10.1007/s10584-018-2162-x

barrel of oil not produced, and every barrel of oil not consumed, there are emissions reductions.[16]

Pulling at demand and supply levers simultaneously reduces the emissions «leakage» effect on both ends. For instance, if policies aimed at accelerating the global transition to electric vehicles are adopted, the subsequent reduction in oil demand would have some effect in lowering global oil prices, which would in turn induce some increased oil consumption. But, if policies are simultaneously enacted to reduce oil production, that reduced production would in turn raise oil prices slightly, helping to offset the price impact of lowering demand.

The fossil fuel industry continues to wield significant influence over politics around the world. In order to successfully address the global climate crisis, politicians are going to have to begin saying «no» to the sector.

Governments tend to act more strongly to protect existing industries than to stimulate future ones because of the political clout of real jobs held by identifiable people (as opposed to abstract numbers), and because of the lobbying power of dominant industries.

For example, when fossil fuel prices are low, governments often feel political pressure to reduce taxes on fossil fuel production or provide other subsidies to keep companies producing. In the United States, oil, gas, and coal companies spent over $350 million in campaign contributions and lobbying from 2015 to 2016, and received nearly $30 billion in federal subsidies over those same years – which equates to a 8,200 percent return on investment.[17] The Stockholm Environment Institute recently estimated that nearly half of new, yet-to-be developed U.S. oil production through 2050 could depend on subsidies to be economical.[18]

Industry influence and lobbying often has the effect of reducing the ambition of demand-side policies and undercutting industry regulation as well.

A portfolio approach to climate action is urgently needed

A portfolio approach to climate policy is critical: this must include complementary policies to restrict supply and demand for fossil fuels, combined with policies to rapidly incentivize the proliferation of clean energy alternatives.

16 While limiting oil and gas production as a policy tool is still relatively new, there is a growing body of academic literature that supports the conclusion that limiting production leads to decreased global emissions. See: Michael Lazarus, Peter Erickson, and Kevin Tempest, «Supply-side climate policy: the road less taken,» SEI Working Paper No. 2015-13, October 2015. https://www.sei.org/publications/supply-side-climate-policy-the-road-less-taken/; and Green and Denniss, «Cutting with both arms of the scissors,» op. cit., https://doi.org/10.1007/s10584-018-2162-x

17 Janet Redman, «Dirty Energy Dominance: Dependent on Denial – How the U.S. Fossil Fuel Industry Depends on Subsidies and Climate Denial,» Oil Change International, October 2017. http://priceofoil.org/2017/10/03/dirty-energy-dominance-us-subsidies

18 Peter Erickson et. al., «Effect of subsidies to fossil fuel companies on United States crude oil production,» Nature Energy, October 2017, pp. 891–898. https://www.nature.com/articles/s41560-017-0009-8

A recent academic study from the London School of Economics and the Australia Institute lays out four quadrants of climate policy (Table 1), noting that the quadrant of restrictive supply-side policies has been the most underutilized.[19] The study adds to a growing body of academic research that confirms that a portfolio approach – one that includes policies in all quadrants – is not only necessary for climate goals, but also economically efficient. The study suggests that the reason restrictive supply-side policies have been avoided is the political and financial power of the fossil fuel sector.

Table 1: The four quadrants of climate policy

	Supply-side	Demand-side
Restrictive	Restrictive supply-side climate policies (e.g. FF subsidy reduction; FF supply tax; FF production quotas; FF supply ban/moratorium)	Restrictive demand-side climate policies (e.g. carbon tax; carbon cap-and trade; mandatory CO2 emissions standards)
Supportive (of substitutes)	Supportive supply-side climate policies (e.g. direct government provision of low-carbon infrastructure; R&D subsidies; renewable energy feed-in-tariffs)	Supportive demand-side climate policies (e.g. government procurement policies; consumer subsidies for energy-efficient or low-emitting substitutes)
Notes: FF=fossil fuels. Shaded area represents the focus of this article; unshaded areas are those typically analysed in the comparative literature on climate policy instruments.		

Source: Green and Denniss[20]; own chart

The study makes four distinct economic arguments in favor of supply-side restrictions:

1.) **Supply-side policies are easier to administer and enforce:** Rather than accounting for and monitoring countless facilities along the supply chain, policy can be focused on relatively few production points and a small number of companies for which data is already collected for other reporting.
2.) **Supply-side policies backstop weaknesses in demand-side policies:** In the absence of a perfect global carbon market, supply-side policies are necessary to protect from demand-side leakage.
3.) **Supply-side policies avoid carbon lock-in (as discussed above).**
4.) **Supply-side policies address the challenge of the «green paradox»:** In theory, companies respond to the threat of future demand-side restrictions by accelerating growth in production now to maximize profit in the near-term.

19 Green and Denniss, «Cutting with both arms of the scissors,» op. cit.
20 Ibid.

As David Roberts of Vox helpfully summarizes:

> [N]o one is arguing that RSS [restrictive supply-side] policies are better than demand-side policies, or a substitute for them. The exact economic and political effects of any set of policies will always depend on context-dependent factors; different portfolios will be appropriate for different times and places. But RSS policies are an excellent complement to demand-side policies, with economic and political strengths that help fill in the gaps. They are simple, transparent, easy for the public to grasp, and unmistakable signs of good faith in international climate negotiations.[21]

21 David Roberts, «It's time to think seriously about cutting off the supply of fossil fuels,» Vox, April 2018. https://www.vox.com/energy-and-environment/2018/4/3/17187606/fossil-fuel-supply.

Who should move first?

Our *Sky's Limit* report shows that to achieve the goals enshrined in the Paris Agreement, no new fossil fuel development can be allowed and some resources must be retired early. This raises important questions about which countries and regions should act first and fastest, and what obligations exist for supporting regions with fewer resources to manage the transition.

In a forthcoming paper on supply-side equity from Oil Change International and the Stockholm Environmental Institute, the authors enumerate five key ethical principles by which we might aim to manage these concerns fairly, and that might inform civil society demands for an equitable phase-out of fossil fuel extraction.[22]

Briefly, these five principles are:

- **Curb extraction at a pace consistent with climate protection:** The overall global pace of the managed decline must be consistent with a precautionary interpretation of the Paris objectives of keeping warming well below 2°C, and aiming to keep warming below 1.5°C; this implies sharply curbing future extraction, and developing no new oil and gas fields or coal mines.
- **Ensure a just transition:** This decline must afford fossil-dependent workers and their communities a viable, positive future.
- **Respect human rights and safeguard local environment:** Prioritize for closure any extraction activities that violate human rights, especially of poor, marginalized, ethnic minority and indigenous communities, and local environmental protections.
- **Transition fastest where it is least disruptive:** Phase out extraction fastest in the countries where it is least socially and economically disruptive, particularly in wealthier, less extraction-dependent countries, including the early closure of oil and gas fields and especially of coal mines.
- **Share transition costs fairly:** Ensure that poorer countries whose economies depend on extraction receive support for an effective and just transition.

From this lens, wealthy, diversified jurisdictions with significant fossil fuel industries should move first and fastest in sharply reducing fossil fuel extraction. While all countries will need to undergo a managed decline of their fossil fuel sectors, the poorest

22 Sivan Kartha of the Stockholm Environment Institute and Greg Muttitt of Oil Change International are developing a forthcoming paper on equity considerations in the managed decline of fossil fuel extraction. The paper is expected to be published by Fall of 2018.

nations will need significant support, including their fair share of the global carbon budget to aid in the transition.

A just transition

The need for a just transition, especially in relation to climate change, has been adopted by numerous unions and union confederations worldwide, as well as the International Labour Organization (2015), and in the preamble of the Paris Agreement. It is now widely recognized as a key element of addressing climate change.

The labor movement has developed a set of principles to promote and guide a transition that minimizes the disruption of a rapid shift away from unsustainable practices and that paves a path for decent work going forward, i.e., a just transition.[23]

Key elements of a just transition include:

- Sound investments in low-emission and job-rich sectors and technologies
- Social dialogue and democratic consultation of social partners (trade unions and employers) and other stakeholders (such as communities)
- Research and early assessment of the social and employment impacts of climate policies
- Training and skills development to support the deployment of new technologies and foster industrial change
- Social protection alongside active labor market policies
- Local economic diversification plans that support decent work and provide community stability in the transition.

A key lesson from past transitions is that early planning is a determinant of success.[24] Delay leaves the problem more entrenched and forces a faster and more disruptive rate of change on workers.

Undergoing a transition is not easy for any region, nor for any worker. At the very least, it means disruption, and worse, risks undermining the economic basis of the region, or offering little to workers whose skills, developed over a lifetime, are no longer required. Therefore, successful action to manage the decline of fossil fuel production is indivisible from action to achieve a just transition for fossil-fuel dependent

23 International Labour Office, Governing Body, Outcome of the Tripartite Meeting of Experts on Sustainable Development, Decent Work and Green Jobs, 325th Session, Geneva, October 5–9, 2015. http://www.ilo. org/wcmsp5/groups/public/---ed_norm/---relconf/ documents/meetingdocument/wcms_420286.pdf

24 Oliver Sartor and Andrzej Błachowicz, «End of coal: Failure to see it coming will hurt miners most,» Climate Home, June 25, 2017. http://www.climatechangenews. com/2017/06/25/just-transition-coal-possible-startsnow; Ben Caldecott, Oliver Sartor & Thomas Spencer, «Lessons from previous Coal Transitions,» High-Level Summary for Policy Makers, Climate Strategies / IDDRI, 2017, pp. 8-10. http://www.iddri.org/ Publications/Lessons-from-previous-coal-tr

workers and communities. While the necessary pace of transition is determined by science, the goals of the transition, the vision for the future economy, the strategy for getting there, and the support needed must all be actively developed by and with residents of affected regions and those who work in fossil fuel extractive industries.[25]

25 Ben Caldecott, Oliver Sartor & Thomas Spencer, «Lessons from previous Coal Transitions,» High-Level Summary for Policy Makers, Climate Strategies / IDDRI, 2017, pp. 8-10. http://www.iddri.org/Publications/Lessons-from-previous-coal-transitionsHigh-level-summary-for-decision-makers

CONCLUSION

The global carbon budget is finite and dwindling. As the world moves to curb its addiction to fossil fuels, both consumption and supply are going to decline. Producing countries face an inflection point: do they embrace the inevitable and proactively manage the decline of the sector, or continue on a status quo trajectory? The former offers opportunities for leadership and innovation in defining the course for a post-carbon economy, while the latter threatens workers, communities, and finance that have become dependent on the fossil fuel-based economy.

ECOLOGY
VOLUME 44.1

A Managed Decline of Fossil Fuel Production

The Paris Goals Require No New Expansion and a Managed Decline of Fossil Fuel Production

The boxed set *Radical Realism for Climate Justice – A Civil Society Response to the Challenge of Limiting Global Warming to 1.5°C* includes the following soft-cover volumes:

VOLUME 44.1
A Managed Decline of Fossil Fuel Production

VOLUME 44.2
Another Energy is Possible

VOLUME 44.3
Zero Waste Circular Economy
A Systemic Game-Changer to Climate Change

VOLUME 44.4
Degrowth – A Sober Vision of Limiting Warming to 1.5° C

VOLUME 44.5
System Change on a Deadline
Organizing Lessons from Canada's Leap Manifesto

VOLUME 44.6
La Via Campesina in Action for Climate Justice

VOLUME 44.7
Re-Greening the Earth: Protecting the Climate through Ecosystem Restoration

VOLUME 44.8
Modelling 1.5°C-Compliant Mitigation Scenarios Without Carbon Dioxide Removal

ISBN 978-3-86928-176-6

Heinrich-Böll-Stiftung
The Green Political Foundation
Schumannstraße 8, 10177 Berlin, Germany
+49 (0)30 285340 info@boell.de www.boell.de