GLOBAL PROBLEMS, CITY SOLUTIONS

A mixed-methods analysis of local climate adaptation plans

Hillary Angelo, UCSC
David Wachsmuth, McGill

Cities saving the planet

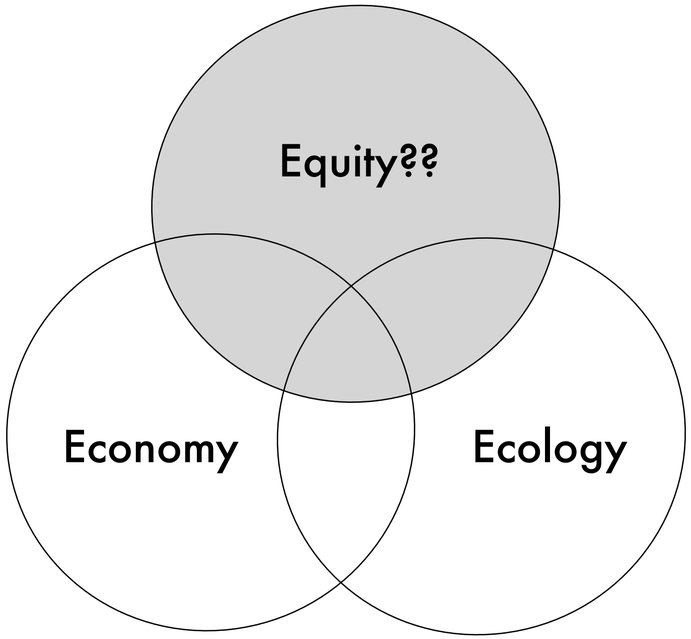
1. The city has changed from a sustainability problem to a sustainability solution.

2. Green and gray urban nature are the dominant representational forms of urban sustainability.

3. Urban sustainability policy is too narrow, spatially and socially.

4. Global best practices v. everyday cities?

What does local sustainability planning look like outside of best practice cities?



Journal of Planning Education and Research
2015, Vol. 35(3) 282–295
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DOI: 10.1177/0739456X15580022
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Pursuing Equity and Justice in a Changing Climate: Assessing Equity in Local Climate and Sustainability Plans in U.S. Cities

Greg Schrock[1], Ellen M. Bassett[2], and Jamaal Green[1]

Abstract

Despite interest in the importance of social equity to sustainability, there is concern that equity is often left behind in practice relative to environmental and economic imperatives. We analyze recent climate and sustainability action plans from a sample of twenty-eight medium and large U.S. cities, finding that few made social equity a prominent goal of their plans, although there is a discernible trend in this direction. We present case studies of three cities that incorporated social equity goals, concluding that sustainability planning efforts provide strategic opportunities to pursue equity goals, especially where capacity exists among community-based actors to intervene and participate.

Keywords

sustainability, equity planning, climate action planning, participatory planning

Introduction

For planners, the sustainable development paradigm has offered the tantalizing hope that the competing imperatives for economic development, environmental protection, and social equity can be reconciled in a meaningful way (Campbell 1996; Portney 2003). But in practice, most observers have found that social equity goals usually get lost relative to environmental and economic priorities (Agyeman 2005; Saha and Paterson 2008); even where sustainability efforts have been taken seriously, they have tended to reflect the priorities of white, upper-middle-class constituencies that dominate the environmental movement, and arguably, planning more broadly. This has engendered skepticism among planning scholars about the limits of sustainability as a vehicle for social equity (Gunder 2006).

In the past decade, local planning for climate change has represented a central front in the sustainability movement (Bulkeley and Betsill 2003; Bassett and Shandas 2010; Greve, Boswell, and Seale 2011). Faced with federal and often state inaction, mayors and other city leaders have taken the initiative to adopt strategies to promote reductions in local greenhouse gas (GHG) emissions and prepare their communities for anticipated impacts of climate change. Climate action plans (CAPs), while varying across places, generally focus on enhancing energy efficiency, adopting renewable energy sources, alternative transportation and reductions in vehicle miles traveled, and expanding "green infrastructure" such as trees. Some cities have moved beyond climate plans toward more broad-based sustainability action plans (SAPs), which emulate comprehensive plans in pursuit of a more holistic approach to sustainable urban development. Local officials have eagerly trumpeted the "co-benefits" of local climate action, especially in terms of livability and quality of life, household and public-sector energy savings, as well as job creation and opportunities for "green" economic development (Fitzgerald 2010).

From an equity standpoint, local CAPs have the potential to address both fundamental challenges and opportunities. On one hand, there is considerable evidence suggesting that the poorest and most vulnerable members of society will disproportionately bear the negative impacts of global climate change as it accelerates in this century (Morello-Frosch et al. 2009; Park 2009). But at the same time, local investments to mitigate and adapt to climate change, if targeted correctly, have the potential to serve as tools of social and racial justice by tackling longstanding disparities and inequities within

Initial submission, January 2014; revised submissions, July and October 2014; final acceptance, November 2014

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PlaNYC

A GREENER, GREATER NEW YORK

The City of New York
Mayor Michael R. Bloomberg

One New York

The Plan for a Strong and Just City

The City of New York
Mayor Bill de Blasio

Anthony Shorris
First Deputy Mayor

NYC

Introduction

Land

16 Housing

28 Open Space

40 Brownfields

Water

52 Water Quality

62 Water Network

Transportation

72 Congestion

State of Good Repair

Energy

100 Energy

Air

118 Air Quality

Climate Change

132 Climate Change

Appendices

PlaNYC

A GREENER, GREATER NEW YORK

Table of Contents

Letter from the Mayor 2

Executive Summary 4

Introduction and Evolution 8

New York City: Today and Tomorrow 22

Vision 1: Our Growing, Thriving City 44

50 Industry Expansion & Cultivation

58 Workforce Development

66 Housing

74 Thriving Neighborhoods

78 Culture

84 Transportation

100 Infrastructure Planning & Management

108 Broadband

Vision 2: Our Just and Equitable City 112

120 Early Childhood

126 Integrated Government & Social Services

132 Healthy Neighborhoods, Active Living

142 Healthcare Access

150 Criminal Justice Reform

156 Vision Zero

Vision 3: Our Sustainable City 160

166 80 x 50

176 Zero Waste

188 Air Quality

194 Brownfields

200 Water Management

206 Parks & Natural Resources

Vision 4: Our Resilient City 214

222 Neighborhoods

230 Buildings

236 Infrastructure

244 Coastal Defense

Diverse and Inclusive Government 252

Appendix 262

266 Summary of Initiatives

280 2011 Sustainability Initiatives

316 2013 Resiliency Initiatives

344 References

347 Glossary

349 Acknowledgments

SUSTAINABLE LONG BEACH

Sustainable City Action Plan

HISTORIC PAST INNOVATIVE PRESENT SUSTAINABLE FUTURE

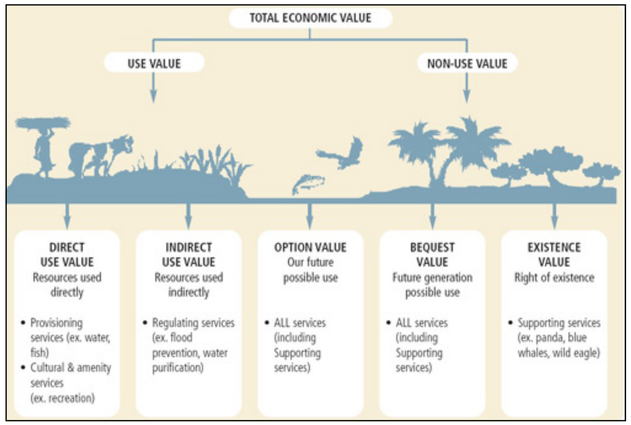
URBAN NATURE INITIATIVE 3:

Increase awareness and promote the natural environment as a place to play, learn and be active

SUSTAINABILITY GOALS

Train 500 Habitat Stewards by 2016

Annual increase of youth who are trained as Long Beach Bioneers



STATISTICS

- Long Beach has 5 miles of ocean-facing beach and 15 miles of river paths
- The El Dorado Nature Center is the 69th most visited park nationwide with 500,000 visitors per year
- The Aquarium of the Pacific is the fifth largest in the nation and the third largest cultural attraction in the Los Angeles area, with 1.4 million annual visitors, including 200,000 school children
- The Aquarium of the Pacific offers a multitude of on-site and off-site educational activities and programs for schools, including Aquarium on Wheels and Oceanographer for a Day

ACTIONS

1. Offer environmental habitat educational programs for schools & partner with LBUSD, LBCC & CSULB to incorporate educational courses/lessons about nature & our impact on the environment
2. Support the Wetland & Marine Science Center at Colorado Lagoon, El Dorado Nature Center and other experiential learning opportunities in our outdoor classroom
3. Encourage and promote local entertainment, leisure and community events at the beaches and in parks
4. Aggressively promote tree planting in city parks & open space & promote the tree dedication program
5. Promote the Ranchos as locations for history & nature, including native, drought-tolerant landscapes
6. Promote volunteer opportunities with Adopt-a-beach, Adopt-a-wetland, Coastal Cleanup days and the Aquarium of the Pacific
7. Participate & encourage community participation in Green Port Fest & other community festivals geared toward environmental education & stewardship
8. Incorporate community participation in planning parks, open space, gardens & demonstration projects to increase community ownership

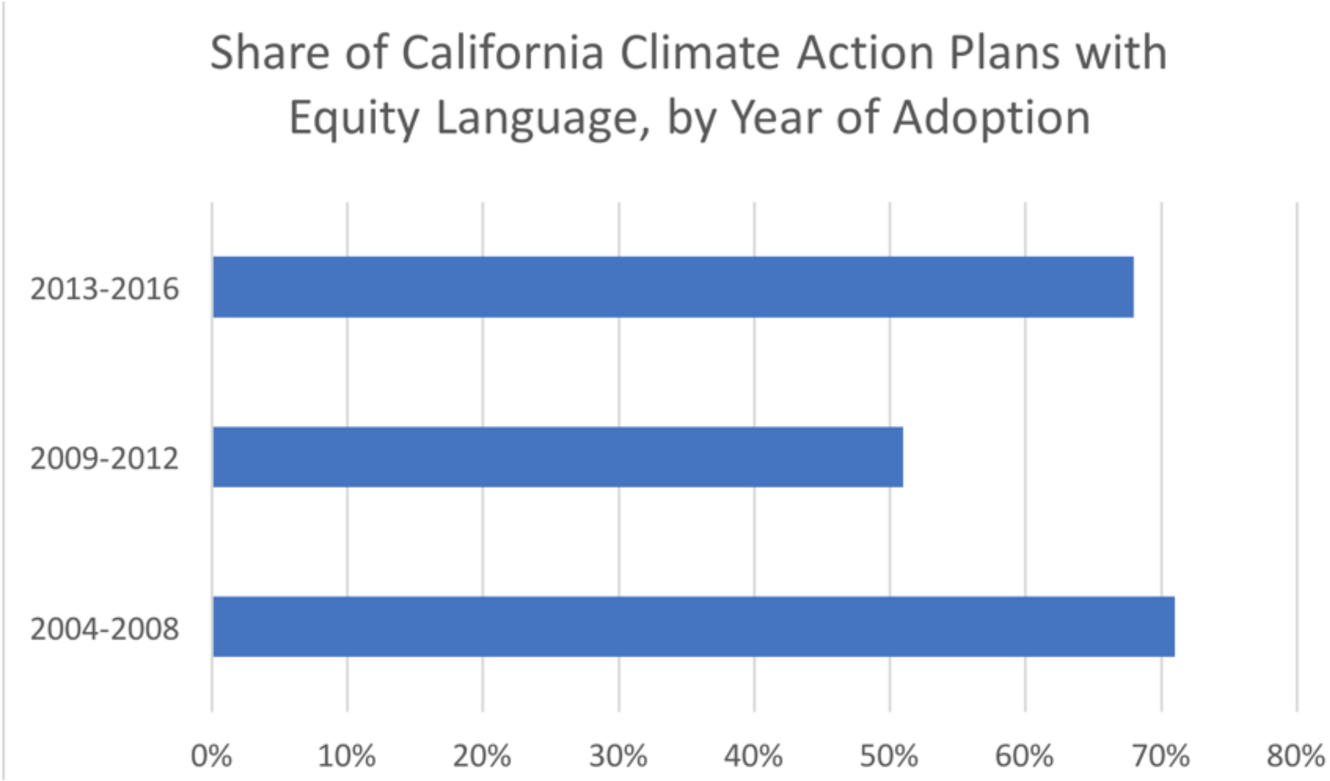
Analysis

Frequency of equity inclusion

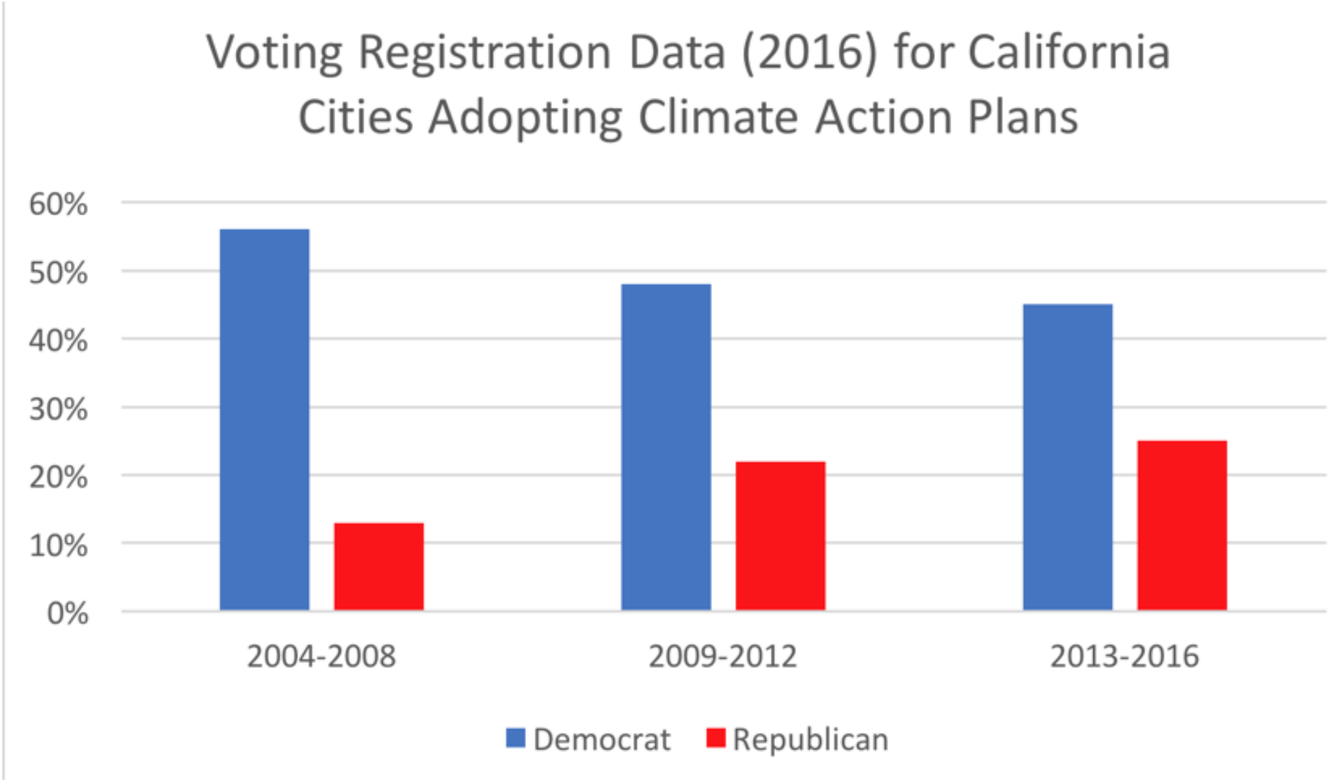
Types of solutions

Patterns of inclusion

Frequency of equity inclusion



Frequency of equity inclusion



Types of solutions

Types of solutions

Social solution	Number of plans	Percentage of plans
Recycling/waste management	170	100%
Participatory processes and public information	150	88%
Open/recreational space and street trees	148	87%
Pollution and public health	105	62%
High-density housing	90	53%
Public transit	89	52%
Affordable housing	82	48%
Food production/access	64	38%
Jobs, job training, education	61	36%

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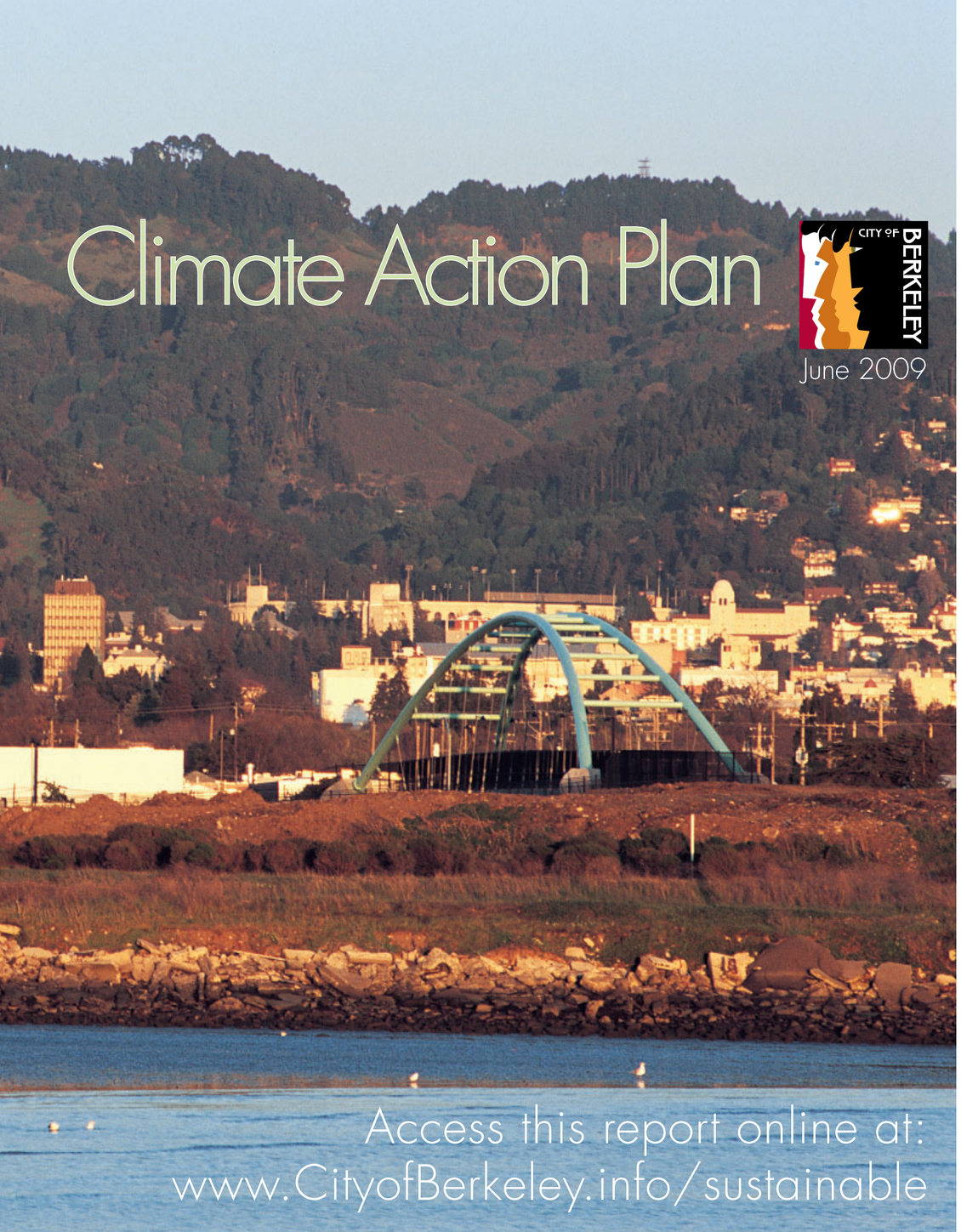
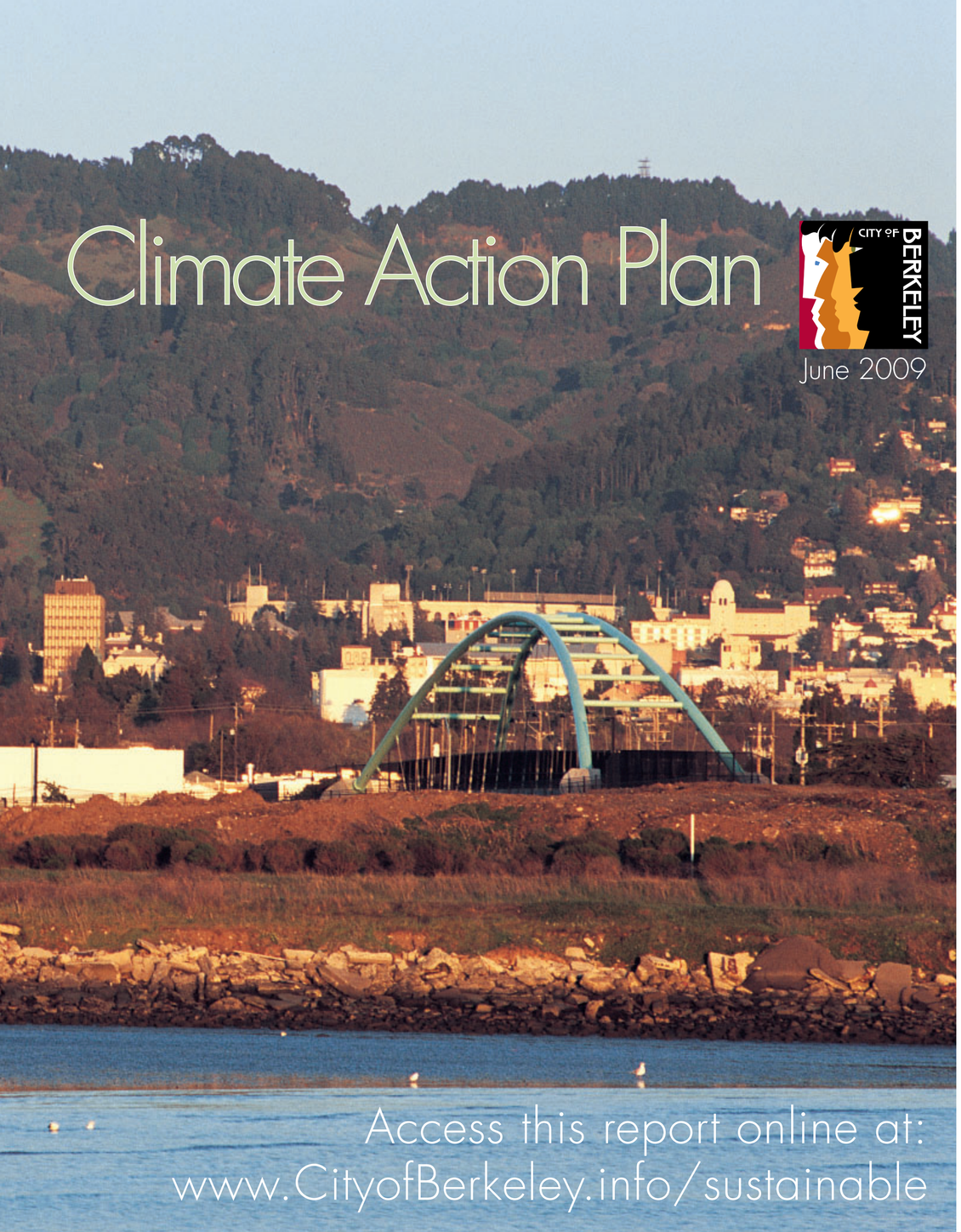
Patterns of inclusion



Patterns of inclusion

Berkeley model

high equity, high trees/waste, high housing



Patterns of inclusion

Tree-based equity

(high trees/waste, high or low equity)

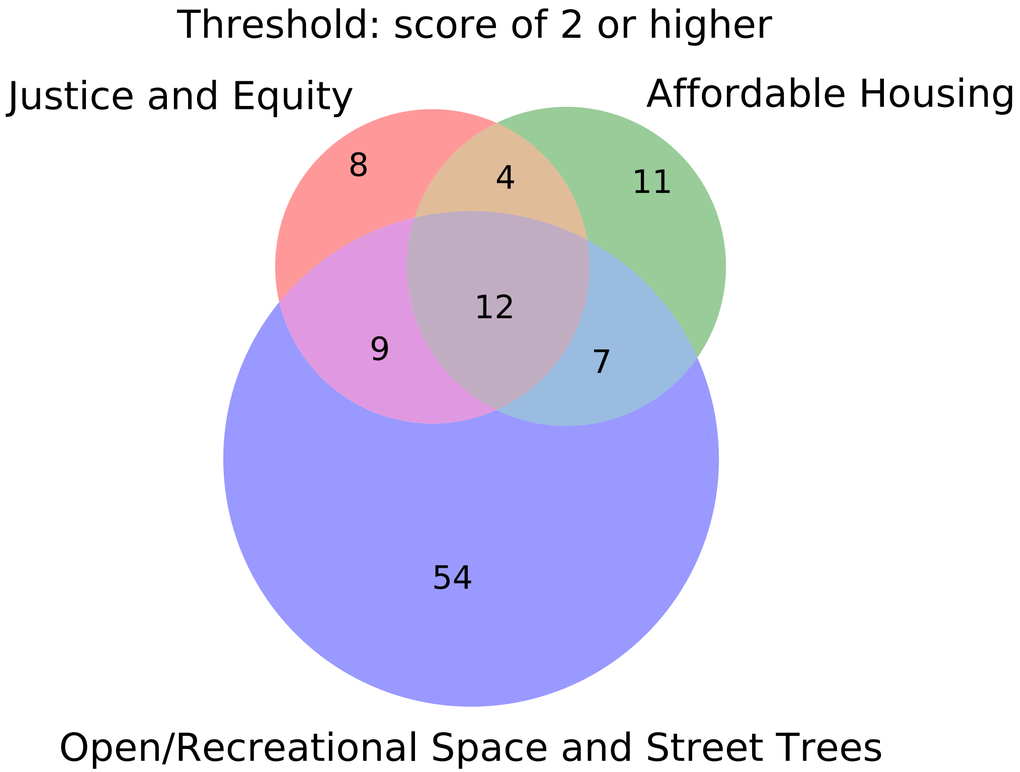
Housing-based equity

(high housing, high equity; local programs and public funding)

Middling plans

(trees/waste, medium equity and housing; market and non-market oriented forms.)

Patterns of inclusion



Current status

Equity inclusion corresponds with more systemic solutions in CAPs, but relationships to outcomes unclear

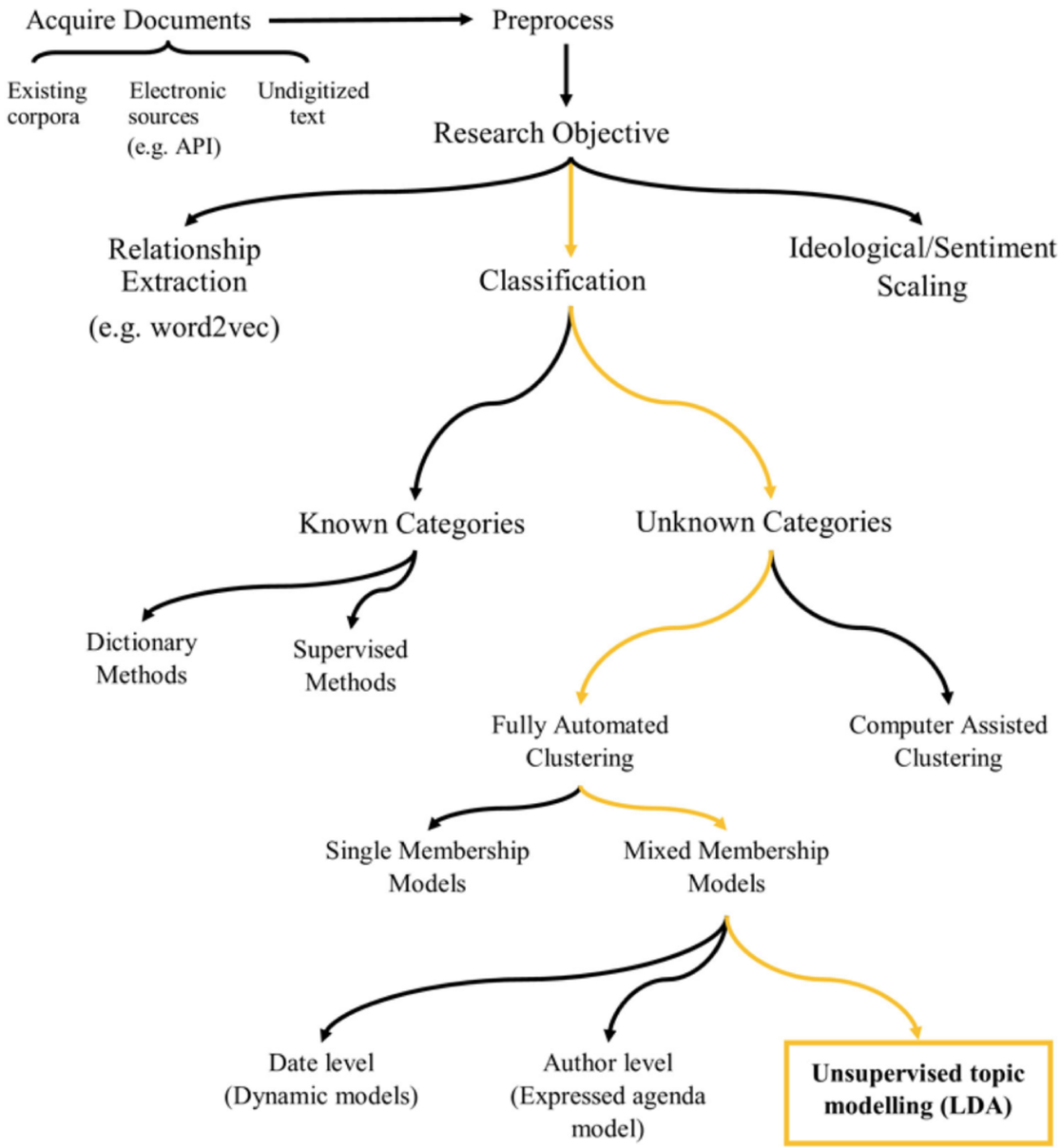
Planners: “don’t miss the housing for the trees;” do focus more on local needs

Methodological limitations: manual coding (scale and assumptions); what’s beyond the plans?

Motivations for natural language processing

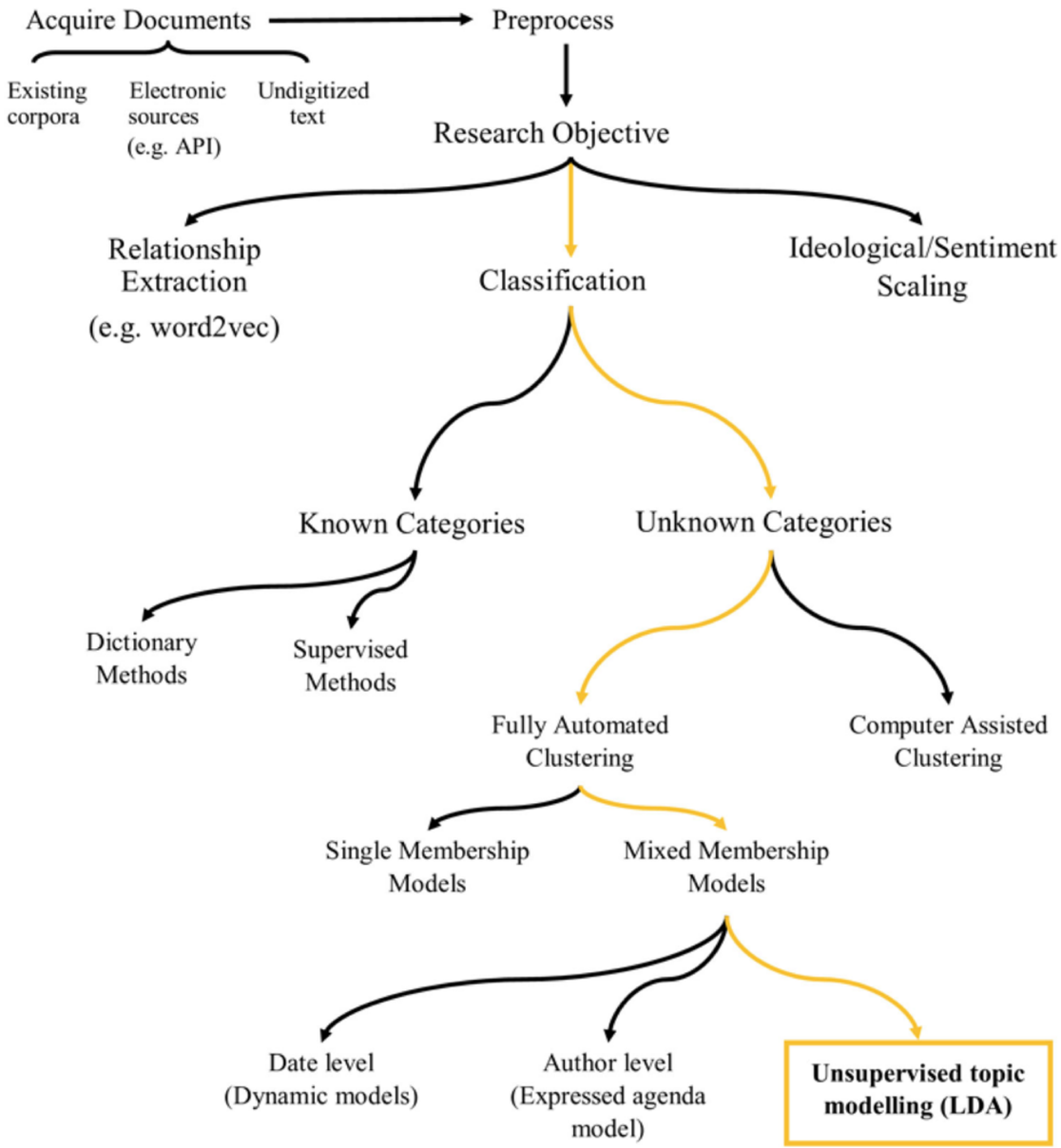
Are our categories of analysis good?

Can we scale our research methods?



Latent Dirichlet allocation (LDA)

Lesnikowski 2019



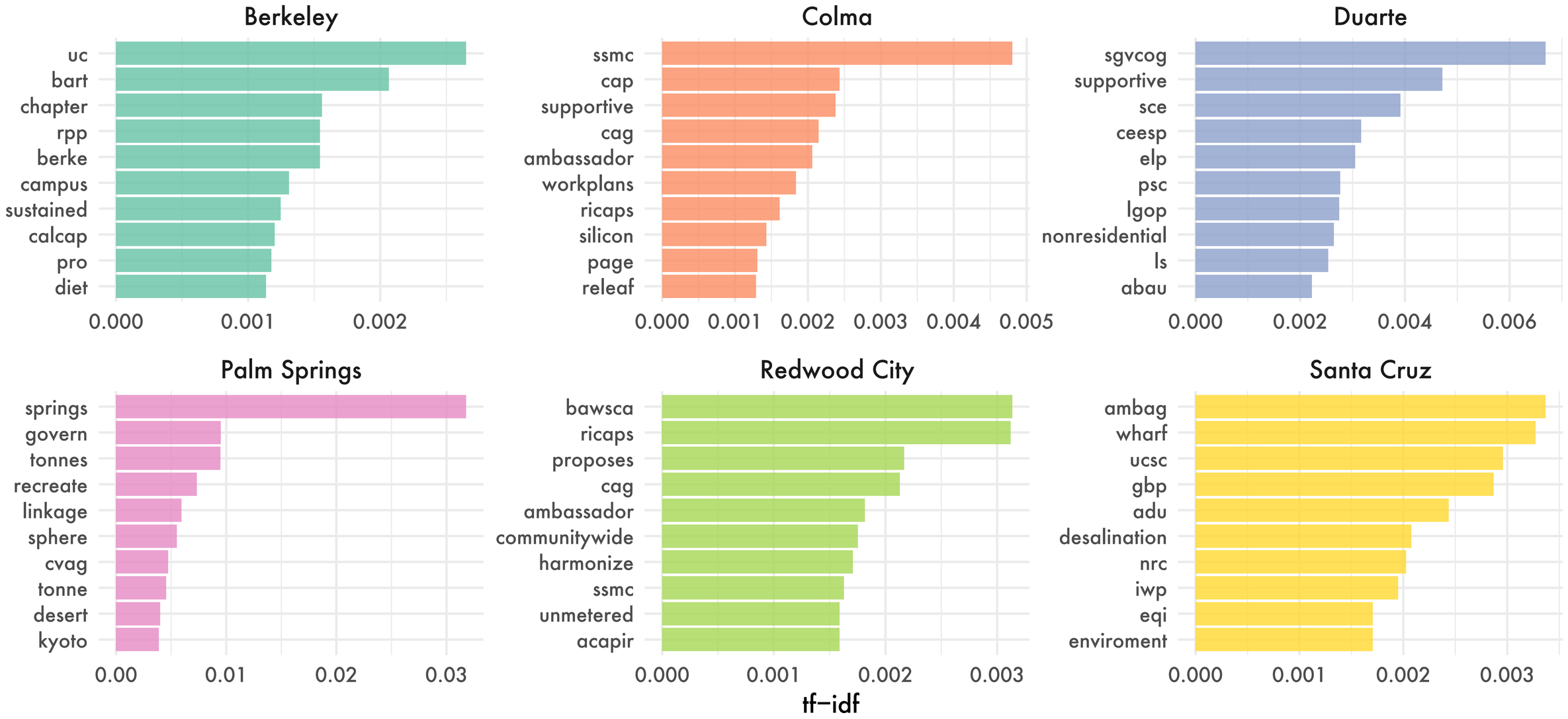
Latent Dirichlet allocation (LDA)

Unsupervised machine-learning model for textual analysis

Lesnikowski 2019

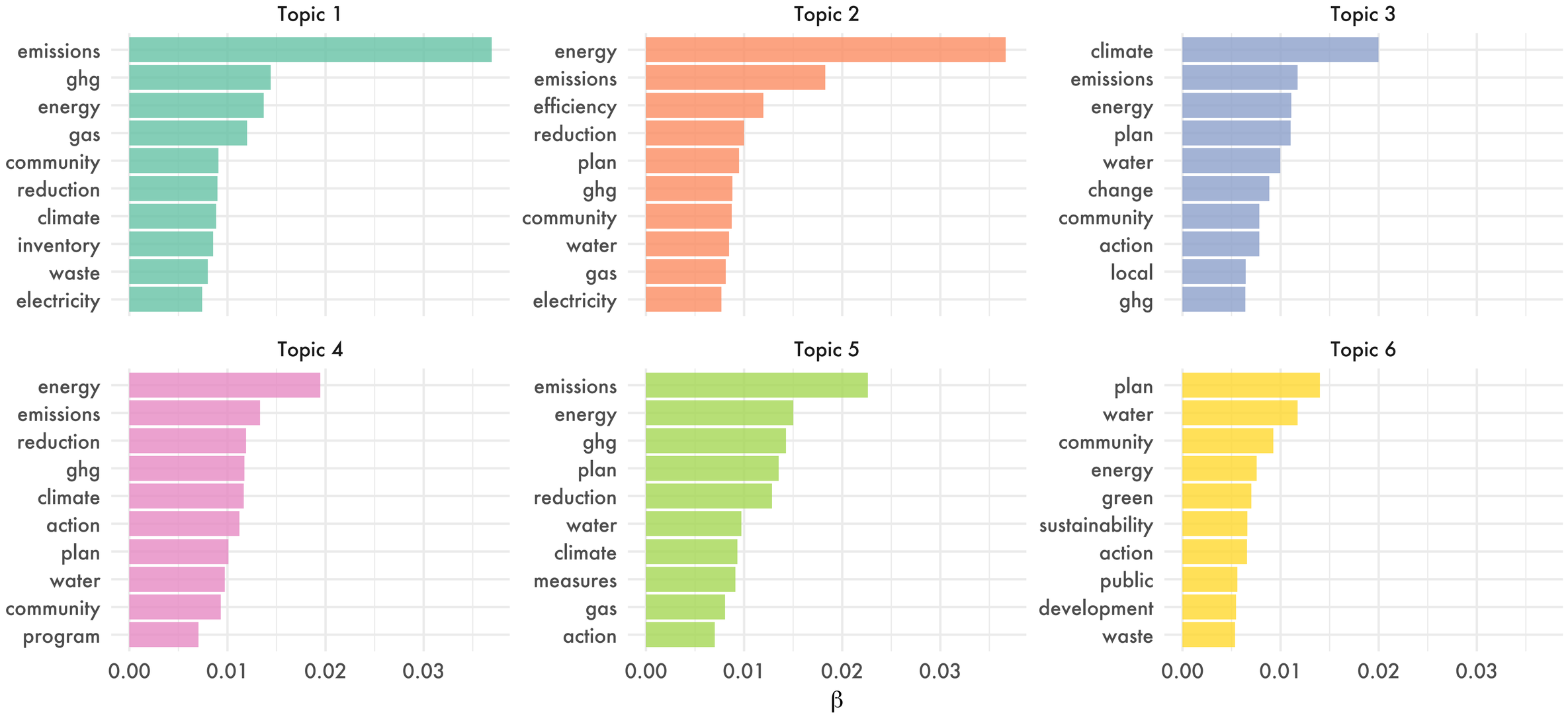
Returning to the local sustainability plans....

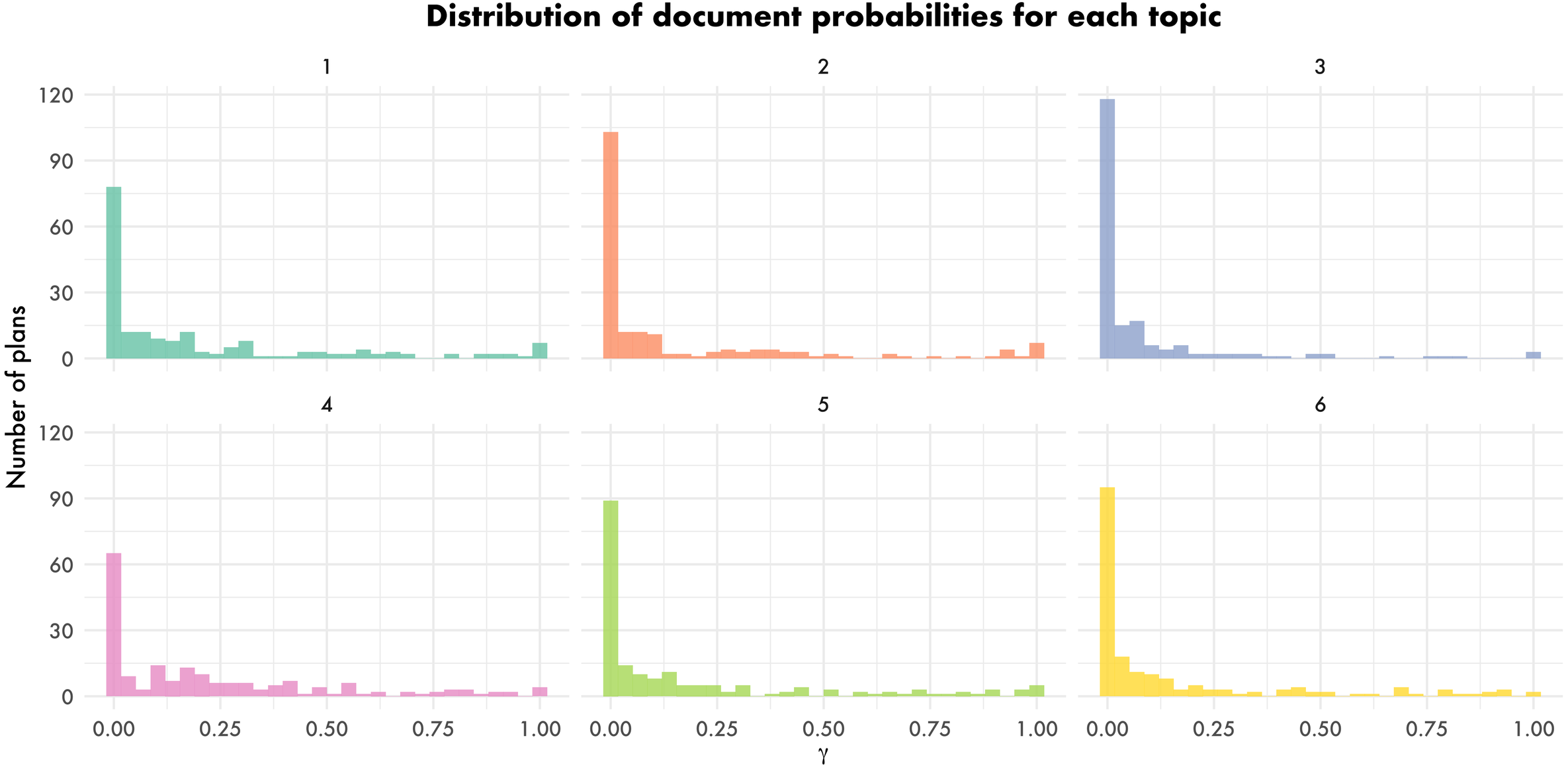
Highest tf−idf words in climate action plans

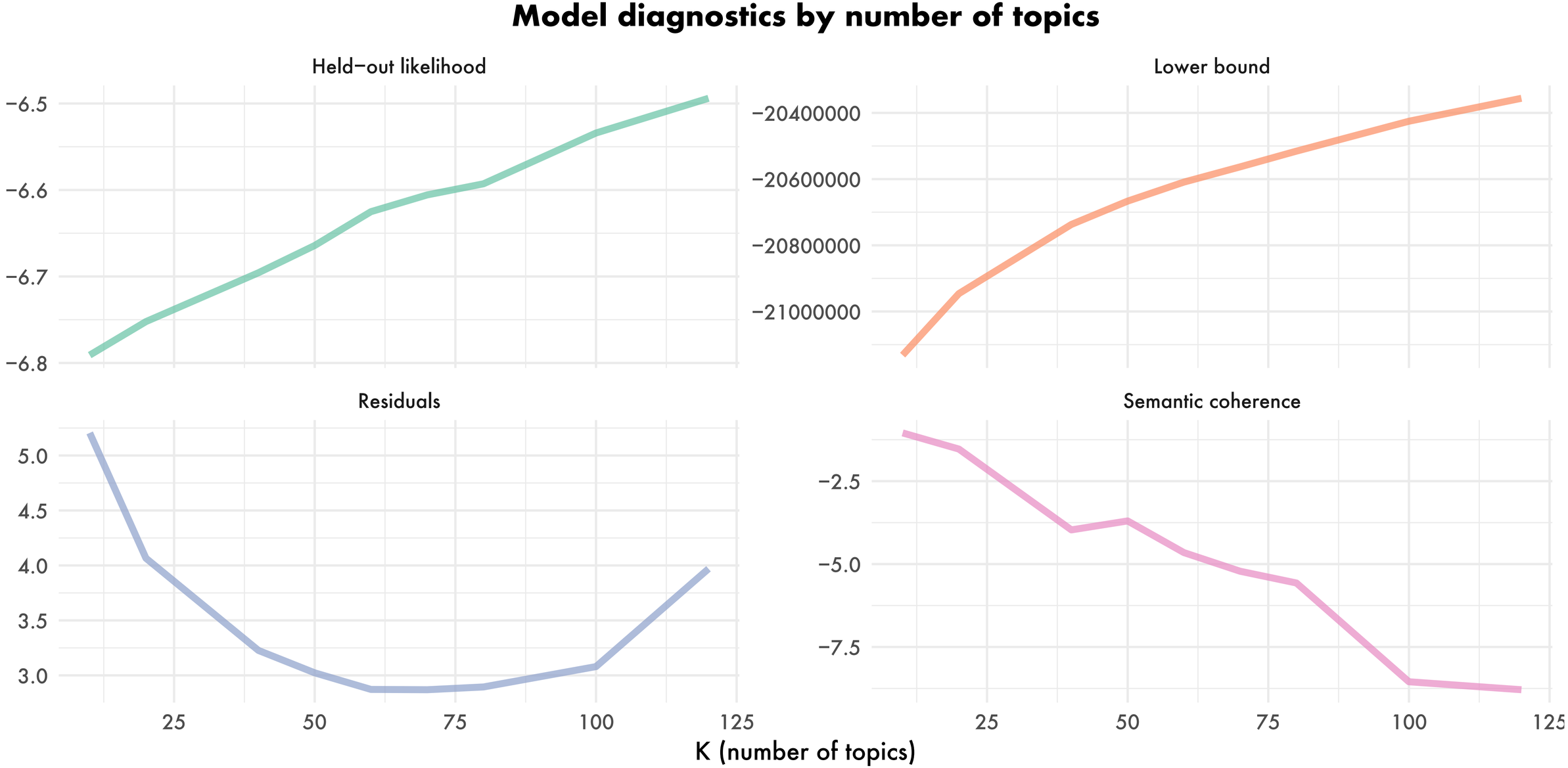


Let's train a simple topic model...

Highest word probabilities for each topic




Distribution of document probabilities for each topic
1
2
3
4
5
6
Number of plans
120
90
60
30
0
0.00
0.25
0.50
0.75
1.00
γ


Model diagnostics by number of topics
Held−out likelihood
−6.5
−6.6
−6.7
−6.8
Lower bound
−20400000
−20600000
−20800000
−21000000
Residuals
5.0
4.5
4.0
3.5
3.0
Semantic coherence
−2.5
−5.0
−7.5
25
50
75
100
125
K (number of topics)

A topic model with 70 topics,
189 documents and a 3125-word
dictionary.

Topic 1 energy, emissions, efficiency, ghg, water, measure, reduction

Topic 2 climate, plan, water, change, local, community, energy

Topic 3 emissions, gas, inventory, greenhouse, government, operations, local

Topic 4 energy, community, action, water, term, green, actions

Topic 5 annual, equipment, energy, emissions, sf, construction, ghg

Topic 6 lamp, energy, gas, watt, passenger, cost, action

Topic 7 department, plan, community, water, avenue, public, residential

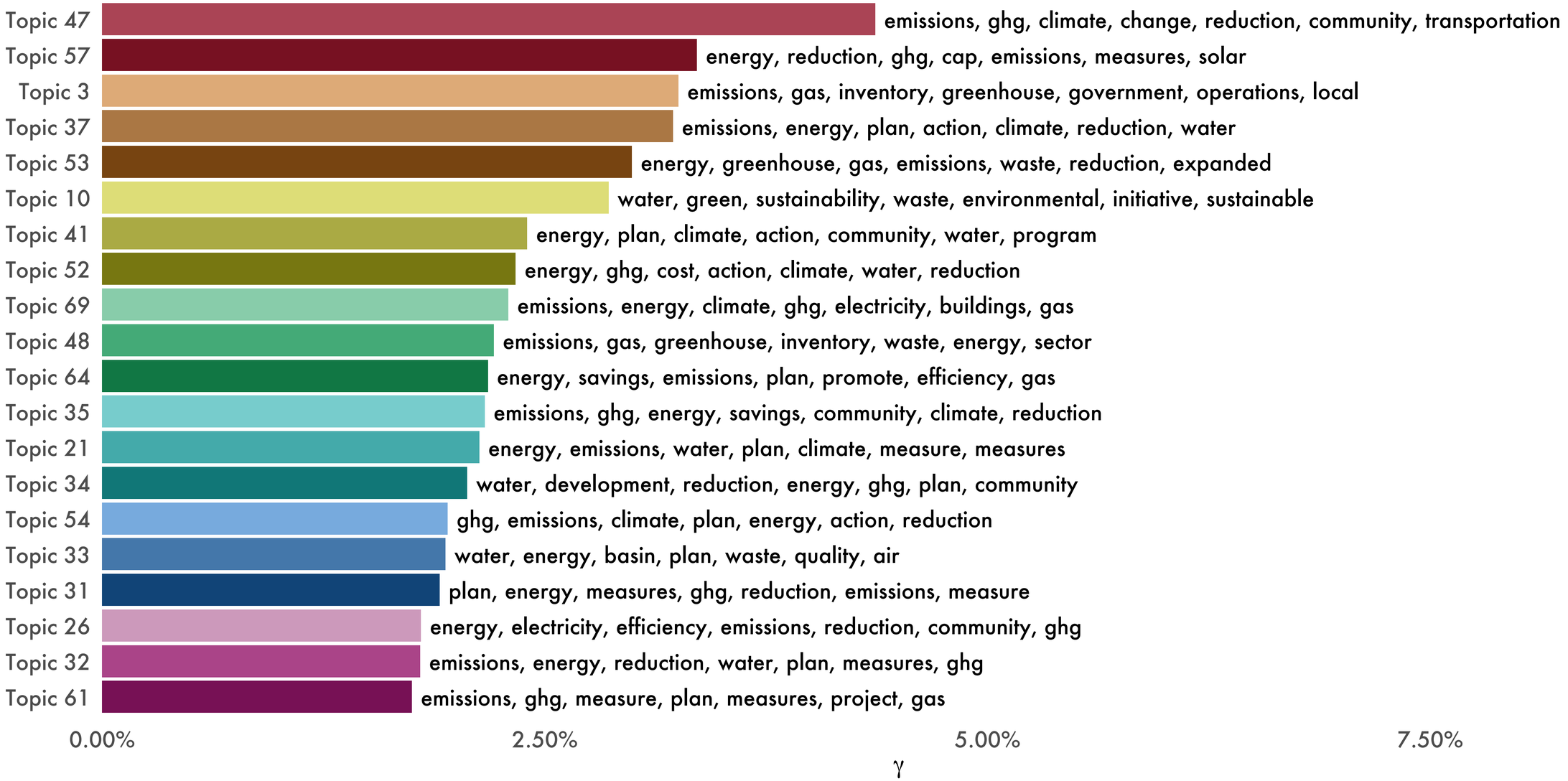
Topic 8 plan, sustainability, water, energy, action, development, sustainable

Topic 9 emissions, chapter, climate, transportation, plan, energy, green

Topic 10 water, green, sustainability, waste, environmental, initiative, sustainable

...

Top 20 topics in the California sustainability plan corpus



Next steps

Technical

Analyze documents or analyze pages? Demographic, political and geographical correlates?

Empirical

Incorporate new “texts” (e.g. democratic discourse) and qualitative case studies, to gain a fuller picture of local sustainability politics. Iterate between ML and theory-driven research.

Theoretical

Articulation between global best practices and ordinary cities?

Thank you!