

An instrument to map and strategize participation in energy projects

Analysis of the Georgetown University Energy Prize

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Arizona State University

July 25, 2019

Objectives of this presentation

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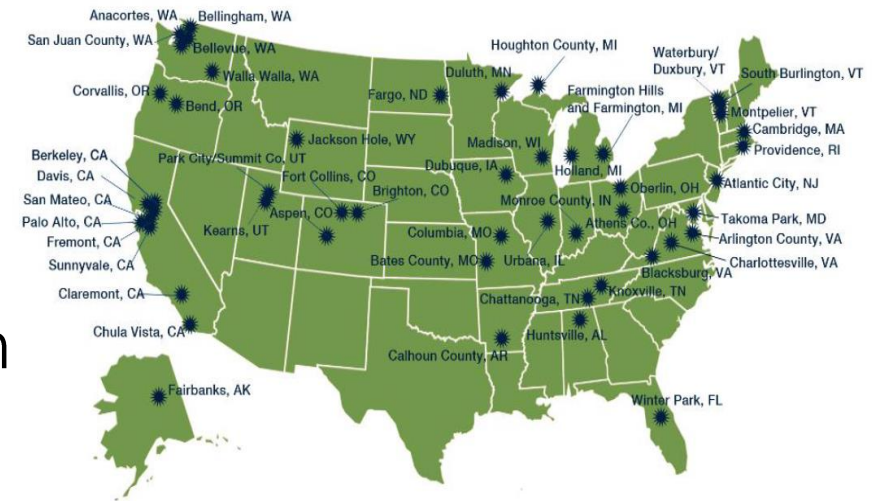
- ✈ Explain the framework we used to conceptualize participation
- ✈ Show how we conduct the empirical analysis of GUEP data
- ✈ Present the results we obtained to test our hypothesis
- ✈ Share the benefits and recommendations for a future application of the instrument that we created through this exercise

Georgetown University Energy Prize (2014-2017) rE

✈ Offered \$5 million prize to encourage US communities—small cities or towns with populations between 5,000 and 250,000—to implement energy efficiency programs, educational campaigns, and to organize towards one goal:

Reduce the consumption of gas and electricity

- ✈ (1) Standardized reports that described the activities and programs performed
- ✈ (2) Collaboration, at least three stakeholder groups worked toward the same goal
- ✈ (3) provided energy consumption reports from 2013-2017 to generate an **Overall Energy Score (OES)**.



Why mapping participation?

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🚀 Buzzword

- 🕒 Participation has been defined as a “catch-all” concept that has unclear meanings

🚀 Participation needs a strong theoretical framework

- 🕒 We believe that participatory approaches have the potential to transform our society. However, an uncritical use of the term might reproduce the oppression we want to overcome

🚀 To provide tools that add transparency to the decision making processes

- 🕒 A map of participation could disclose how the input of diverse stakeholders are shaping energy and development projects.

🚀 Inspiration

- 🕒 We want to inspire other agencies and institutions to provide clarity on how the engagement of stakeholders is conducted across the process of their projects

Guiding questions in the GUEP analysis

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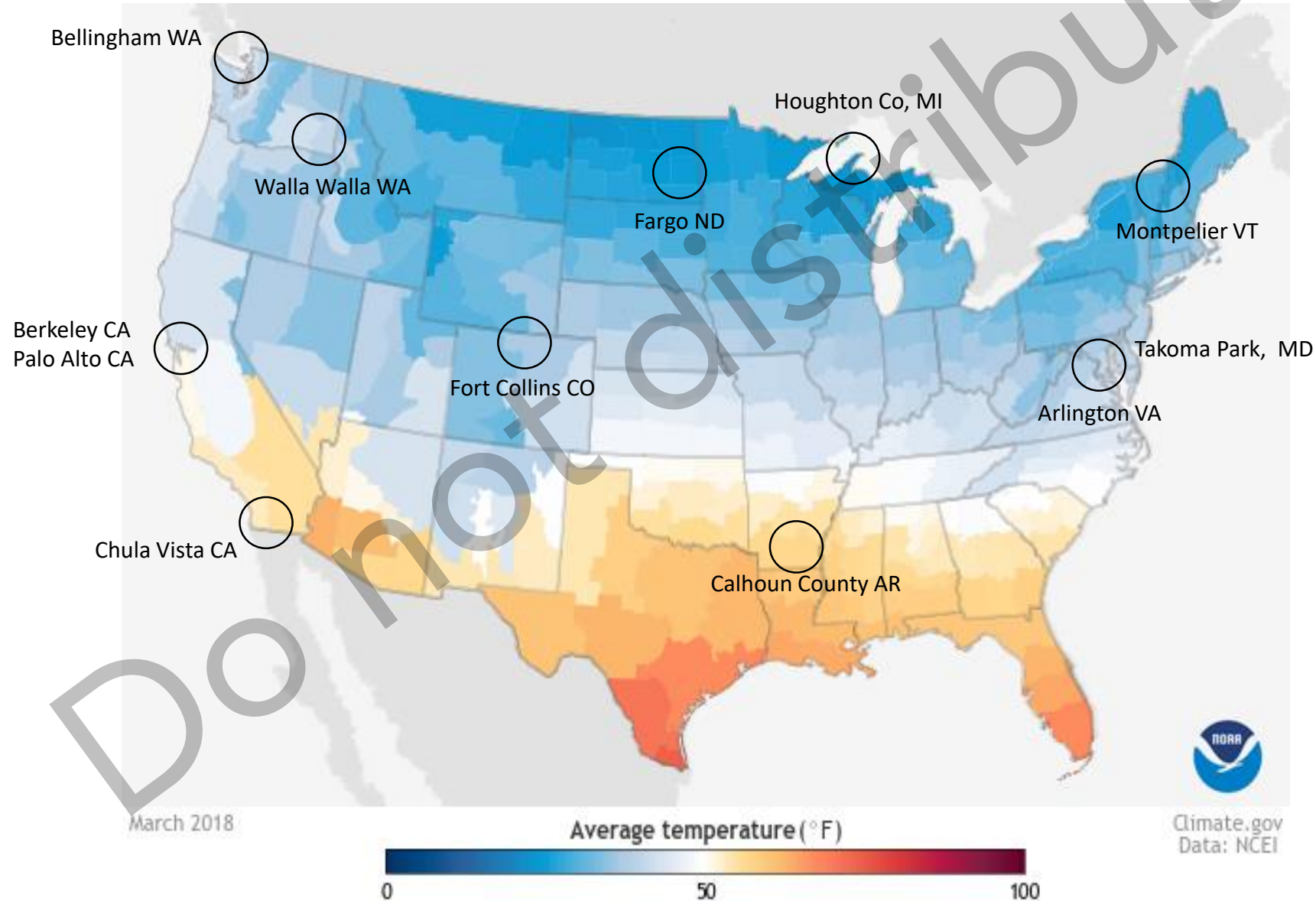
✈ How did community leaders, organizations and institutions participate/organize in the GUEP to reduce the consumption of gas and electricity at municipal and residential scales?

✈ Sub-questions:

- ✈ What were the strategies and incentives that communities implemented during GUEP?
- ✈ Who participated in GUEP activities?
- ✈ How and during which stages of the process did the public and stakeholders participate?
- ✈ What were the energy savings that communities achieved during the GUEP?

Communities in this study

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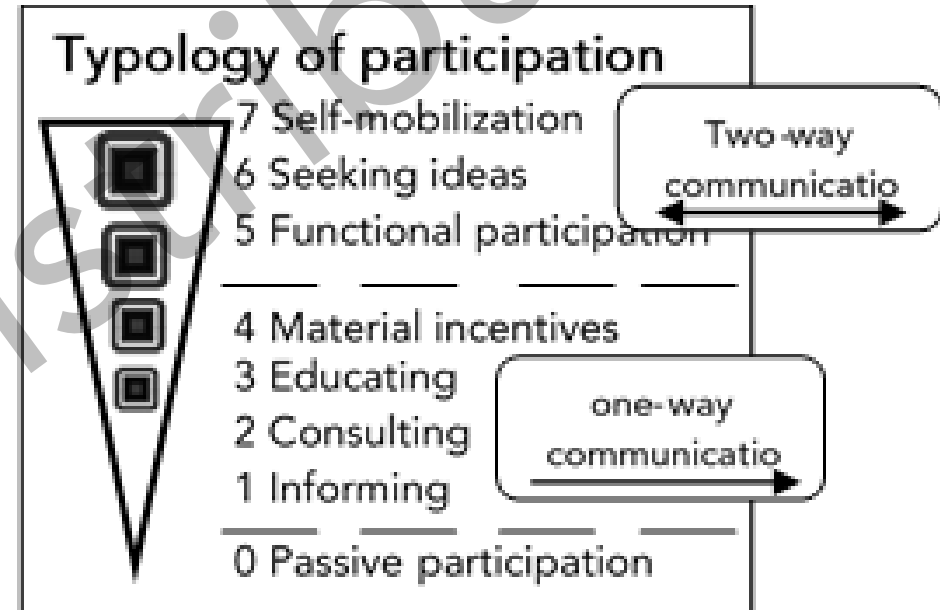
Framework to understand participation

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Breadth of participation



Depth of participation



- ✧ Subjective VS tangible aspects of participation (See Coster & Khetani, 2008)
- ✧ Notions of breadth and depth of participation presented by Farrington and Bebbington (1993)
- ✧ Our typology of participation was inspired by Arnstein's ladder of citizen participation (1969), Pretty's typology of participation (1995), Jackson's stages of public involvement (2001), intensities of involvement (Stauffer et al., 2008), and the IAP2 spectrum (2007)

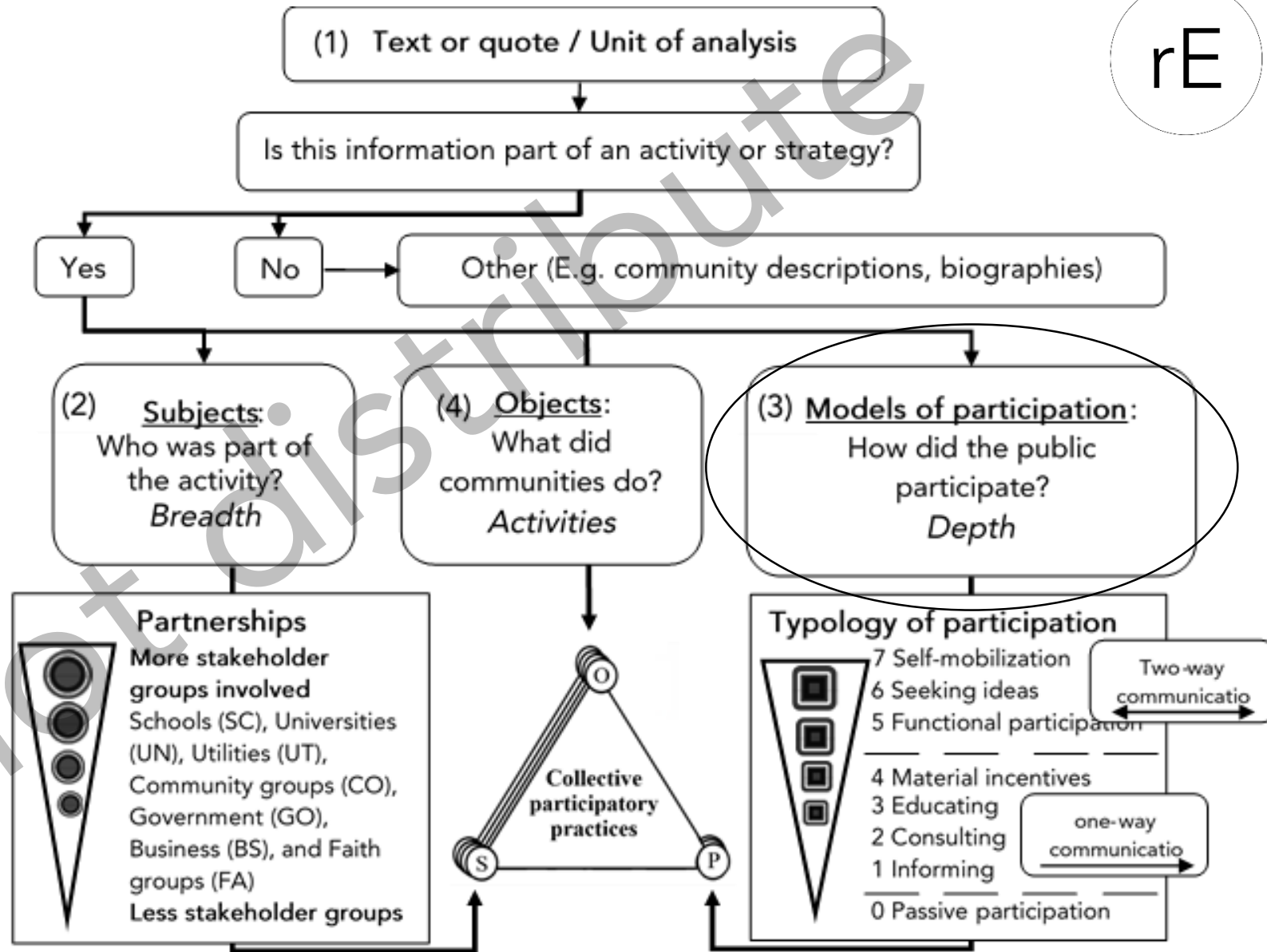
Method of Analysis

🚀 **Data sources:** community plans and updates

🚀 **Systematic analysis in Excel** where we organized the data in small pieces or "codes"

🚀 We used a inductive approach to organize the codes by themes (activities and stages of the process)

🚀 The codes were also **ranked** according to the two scales that we generated based on the literature we consulted



Data analysis flow chart. We borrowed the idea of "Collective Participatory Practices" from the relational co-productionist framework for understanding ecologies of participation in socio-technical systems in (Chilvers et al., 2018)

Typology or models of participation

No communication	Passive Participation Ranking: 0	Form of participation where decisions were made without the involvement of the public . This level also includes codes or units of analysis that did not have enough information to be classified.
One-way communication	Informing Ranking: 1	Form of participation in which the public received information about the program goals and the strategies about energy and water efficiency and water conservation. Information was also available in outreach events and public demonstrations and used digital, traditional and social media , brochures, infographics and reports. Additionally, communities developed targeted messages for special audiences.
	Consulting Ranking: 2	Form of participation where community members agreed on the implementation of services like energy audits, upgrades, on-bill financing programs and installation of energy-efficient furnaces. In the planning stage, for example, some GUEP leaders and community members voted to approve plans, funds and building certification (performance standards) policies. Additionally, <i>stakeholder group types</i> , like schools, agreed on or gave consent to the data collection process.
	Educating Ranking: 3	Form of participation where community members, leaders and teachers implemented educational programs, games, curriculum, workshops and campaigns that taught students, low-income renters, government staff, business and community members in general about the basics of energy, sustainable behaviors and energy efficiency, use, reduction, and conservation.
	Material Contributions Ranking: 4	Form of participation in which individuals and institutions provided material contributions like funds, grants, payments, voluntary extra fees, human resources, infrastructure, and volunteer hours to implement energy efficiency strategies.
Two-way communication	Functional Participation Ranking: 5	Form of participation in which stakeholders like community members, staff or utilities worked together with other institutions and organizations to plan/draft strategies, set goals, pilot programs, achieve the funds and staff requirements, promote renewable energy, etc.
	Seeking ideas Ranking: 6	Form of participation where individuals shared ideas and joined in brainstorming sessions to develop goals and action plans . Some communities organized meetings and workshops to understand their communities' interests, others created working groups to recreate their plans. Additionally, communities used surveys and focus groups methods, innovation theory and feedback to develop messages for intended audiences and inform their plans.
	Self-mobilization Ranking: 7	Our utopia . Form of participation where individuals develop activities and strategies without the intervention of external agencies. This might be the goal of all social program in which individuals in a community are self-organized to fulfil the goals of such projects, so the program disappears.

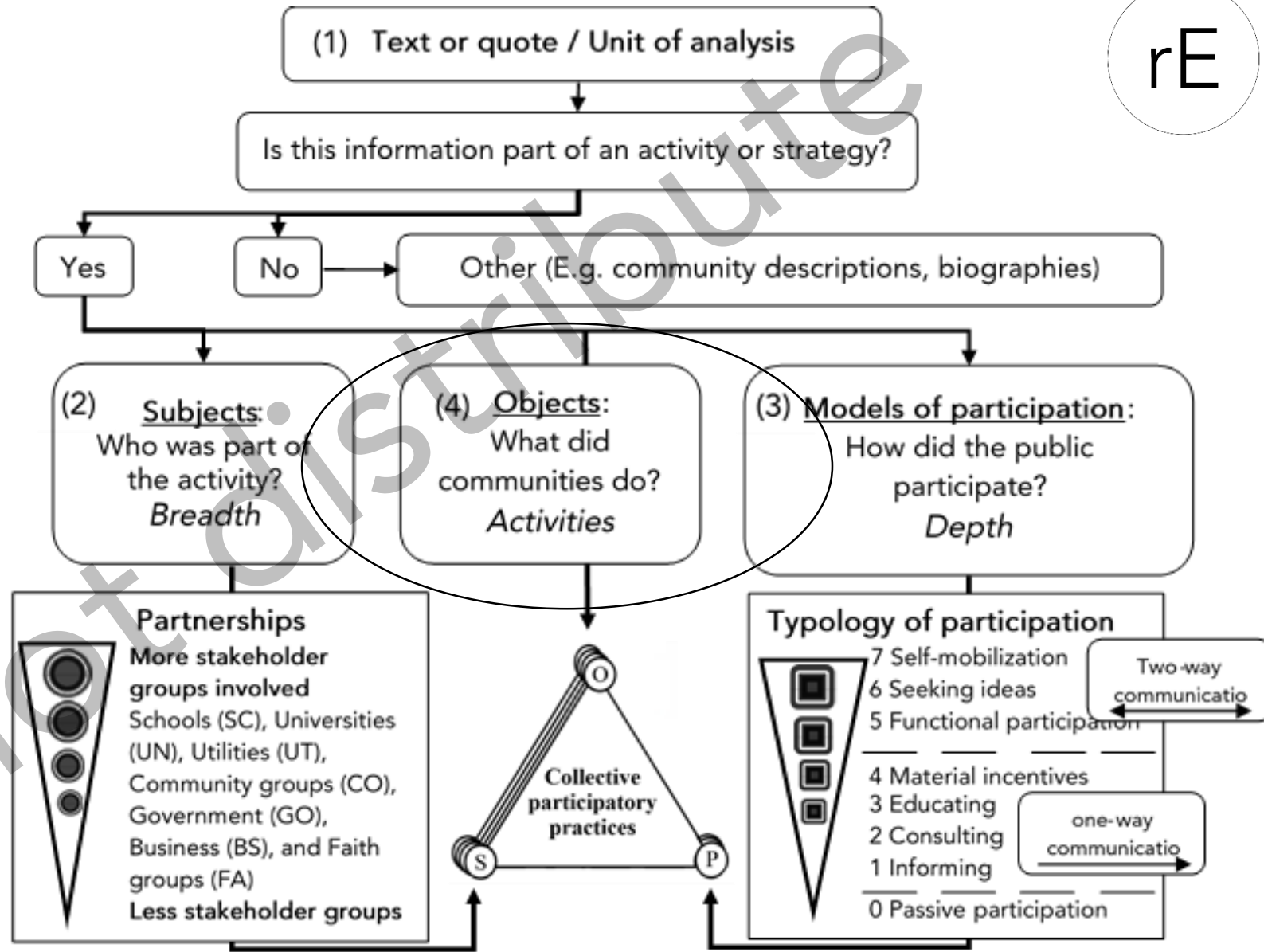
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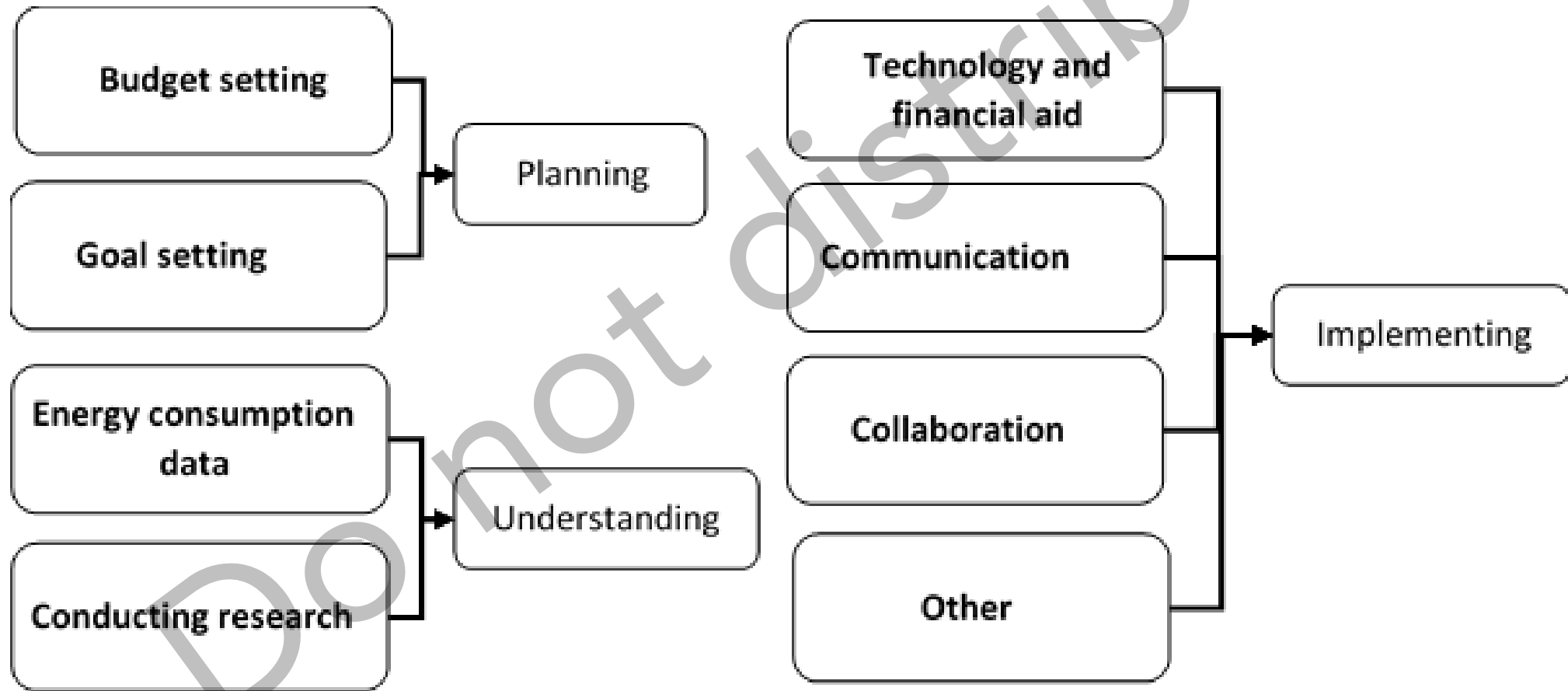
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Data analysis flow chart. We borrowed the idea of "Collective Participatory Practices" from the relational co-productionist framework for understanding ecologies of participation in socio-technical systems in (Chilvers et al., 2018)

Code book: Themes and the stages of the process during the GUEP

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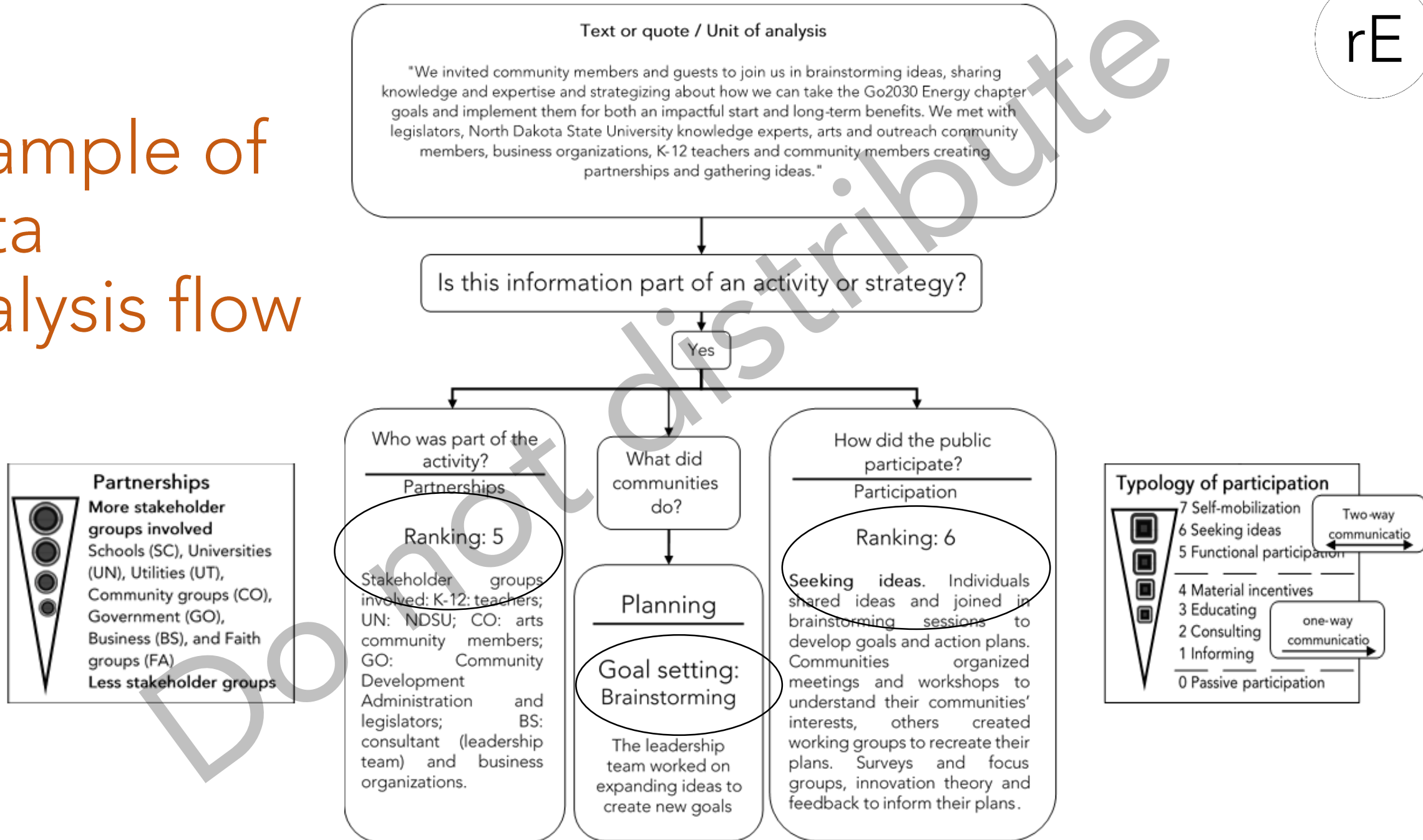


The activities are not necessarily arranged chronologically; the code structure was created based on qualitative method analysis

Objects of participation: Activities conducted during GUEP

Planning	Budget setting	Grants awarded and support for grant writing; fund-raising campaigns and other strategies to fund projects; paid staff and volunteers to implement the programs
	Goal setting	Creation of energy efficiency, gas and water reduction programs; description of goals and programs implemented during GUEP; use of research tools such as ACEE self-scoring to plan goals ; events where stakeholder groups sought ideas to set goals and develop activities, strategies and projects
Implementing	Technology and financial aid	Conducting audits and retrofits: software to rank efficiency, infrared scans, scores for cost-effective improvements, weatherization & LEDs; Providing financial incentives: loans, on-bill financing, rebates, sliding-scale fees, off-peak incentives & no up-front cost upgrades; Certification process: performance standards and energy codes; Promoting renewable energy: solar shares and co-ops, wind & methane
	Communication	Marketing and campaigning: branding and logos, traditional media, printed and online materials, translations, letters and phone calls; Online engagement: websites, social media and online dashboards; Public engagement: community meetings, canvassing, forums, on-site demonstrations, public events like farmer's markets and fairs; Education efforts: trainings, on-site demonstrations, games, curricula, university programs, pedagogical materials & campaigns
	Collaboration	Building partnerships: leadership teams, financial and professional support, knowledge sharing, successful projects & data reporting; competitions: video and K-12 challenges, creation of web apps, reduction of waste, energy and water use & consumer awareness
	Other	Implementation of policies , institutionalization of activities, promotion of guidelines, climate change management, transportation & exception of structural reviews for solar projects
Understanding	Energy consumption data	Collection and disclosure of energy consumption data of gas and electricity: identification of residential (single/multifamily) and municipal accounts by rate class or code, online platforms and apps
	Conducting research	Track process: quarterly evaluations, low-cost and non-intrusive evaluation tools, indicators, benchmarking & cost-benefit analysis; data collection and analysis: surveys and focus groups & case studies; research projects: multifamily energy conservation & target messages

Example of data analysis flow



Formulas

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✈ **Breadth or partnerships = $S_{\text{sum}} / S_{\text{codes}}$**

✈ S = number of stakeholder groups participating per code

✈ S_{sum} = Sum of stakeholder groups participating in the codes of one activity or stage of the process.

✈ S_{codes} = Count of codes that described one idea from an activity or strategy.

✈ **Depth or mode of participation (typology) = $P_{\text{sum}} / P_{\text{codes}}$**

✈ P = ranking of a code based on the typology of participation.

✈ P_{sum} = Sum of the rankings based on the typology of participation.

✈ P_{codes}

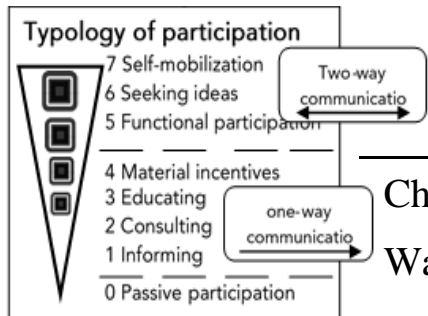
Breadth of participation in 12 GUEP communities rE



Communities	Breadth: Stakeholder groups (% of codes)								Total Subjects		Average
	SC	UN	NO	UT	CO	GO	BS	FA	S_Sum	S_Codes	
Chula Vista, CA (OES -9.5)	6%	1%	13%	42%	54%	100%	22%	0%	267	112	2.4
Walla Walla, WA (OES -9.1)	14%	13%	40%	30%	67%	69%	42%	0%	304	111	2.7
Takoma Park, MD (-7.9)	14%	8%	9%	23%	69%	98%	18%	0%	378	159	2.4
Fargo, ND (OES -6.8)	16%	70%	10%	28%	56%	94%	55%	1%	590	179	3.3
Fort Collins, CO (OES -6.1)	12%	60%	4%	37%	43%	82%	63%	0%	595	200	3
Houghton Co, MI (OES -5.6)	68%	64%	60%	65%	73%	73%	68%	0%	658	140	4.7
Berkeley, CA (OES -4.7)	24%	9%	4%	23%	38%	95%	32%	0%	464	207	2.2
Bellingham, WA (OES 4.4)	36%	31%	44%	41%	48%	64%	39%	0%	797	263	3
Montpelier, VT (OES -4.3)	39%	27%	1%	12%	68%	94%	74%	0%	555	176	3.2
Palo Alto, CA (OES -3.9)	28%	0%	7%	69%	67%	80%	0%	0%	135	54	2.5
Arlington, VA (OES -2.6)	17%	1%	15%	6%	58%	94%	14%	0%	160	78	2.1
Calhoun Co, AR (OES -2.4)	13%	8%	30%	65%	53%	68%	35%	0%	108	40	2.7
Total GUEP	25%	30%	20%	33%	56%	85%	43%	0%	5011	1719	2.9

Depth of participation in 12 GUEP communities

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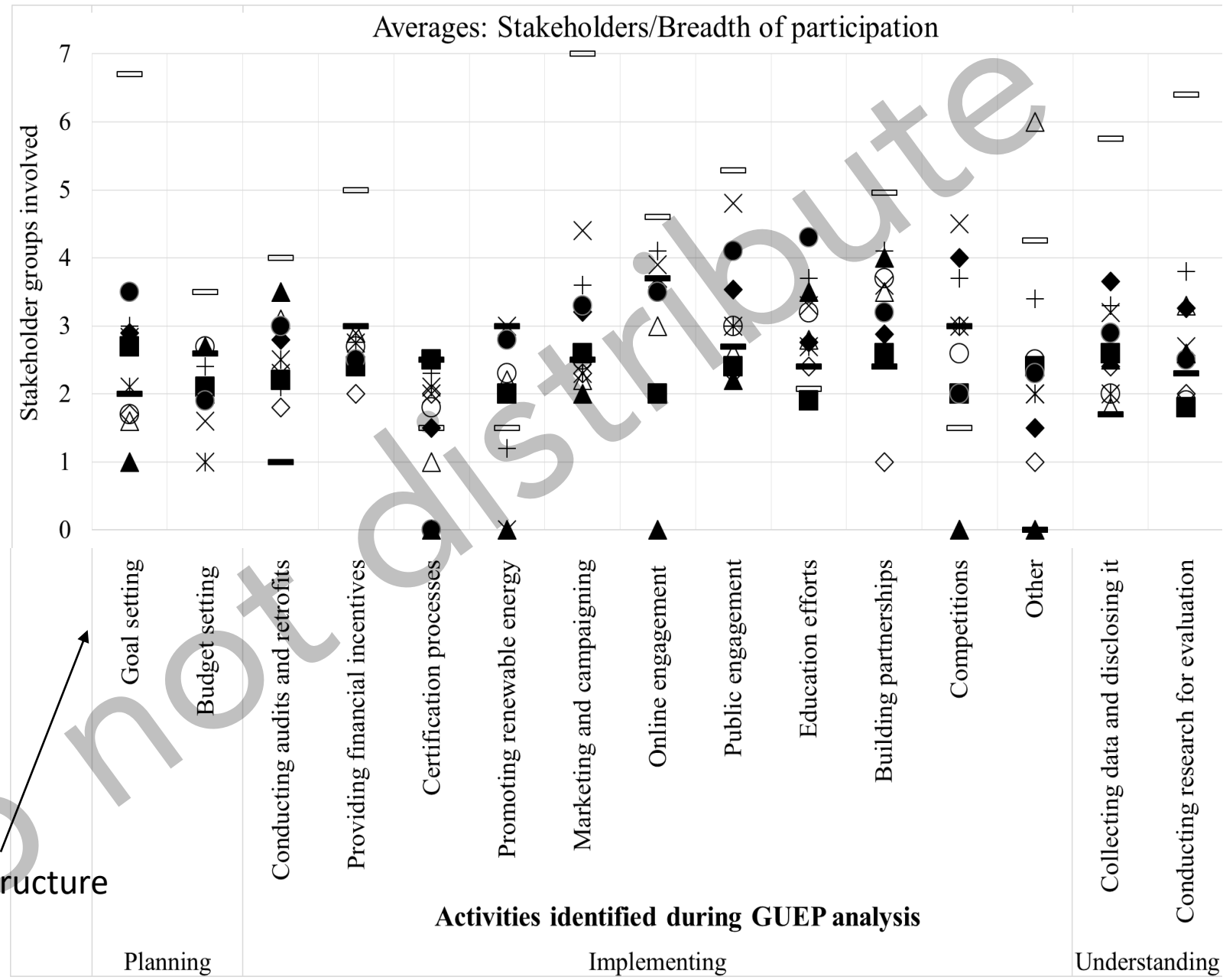


Communities	Depth: typology of participation (% of codes)							Total Models		Average
	1	2	3	4	5	6	7	P_Sum	P_Codes	
Chula Vista, CA (OES -9.5)	28%	12%	11%	5%	38%	6%	0%	277	85	3.3
Walla Walla, WA (OES -9.1)	31%	11%	33%	7%	12%	6%	0%	280	102	2.7
Takoma Park, MD (-7.9)	19%	23%	7%	7%	42%	2%	0%	528	159	3.3
Fargo, ND (OES -6.8)	26%	7%	18%	5%	40%	3%	0%	608	179	3.4
Fort Collins, CO (OES -6.1)	26%	17%	13%	6%	34%	3%	0%	565	180	3.1
Houghton Co, MI (OES -5.6)	17%	10%	14%	11%	39%	9%	0%	458	124	3.7
Berkeley, CA (OES -4.7)	19%	17%	6%	4%	51%	2%	0%	744	206	3.6
Bellingham, WA (OES 4.4)	26%	24%	12%	11%	21%	9%	0%	605	200	3
Montpelier, VT (OES -4.3)	31%	8%	4%	5%	49%	3%	0%	565	165	3.4
Palo Alto, CA (OES -3.9)	19%	5%	16%	19%	30%	12%	0%	160	43	3.7
Arlington, VA (OES -2.6)	16%	11%	21%	8%	33%	10%	0%	223	61	3.7
Calhoun Co, AR (OES -2.4)	16%	18%	5%	34%	26%	0%	0%	128	38	3.4
Total GUEP	24%	14%	13%	8%	37%	5%	0%	5141	1542	3.3

Averages: Breadth of Participation by activity

- ✖ Chula Vista, CA. OES -9.55
- △ Walla Walla, WA. OES -9.11
- Takoma Park, MD OES -7.87
- + Fargo, ND. OES -6.85
- ◆ Fort Collins, CO. OES -6.07
- = Houghton Co, MI. OES -5.57
- Berkeley, CA. OES -4.72
- ✖ Bellingham, WA. OES -4.4
- Montpelier, VT OES -4.28
- Palo Alto, CA. OES -3.93
- ◇ Arlington, VA. OES -2.6
- ▲ Calhoun, AR. OES -2.45

Code structure

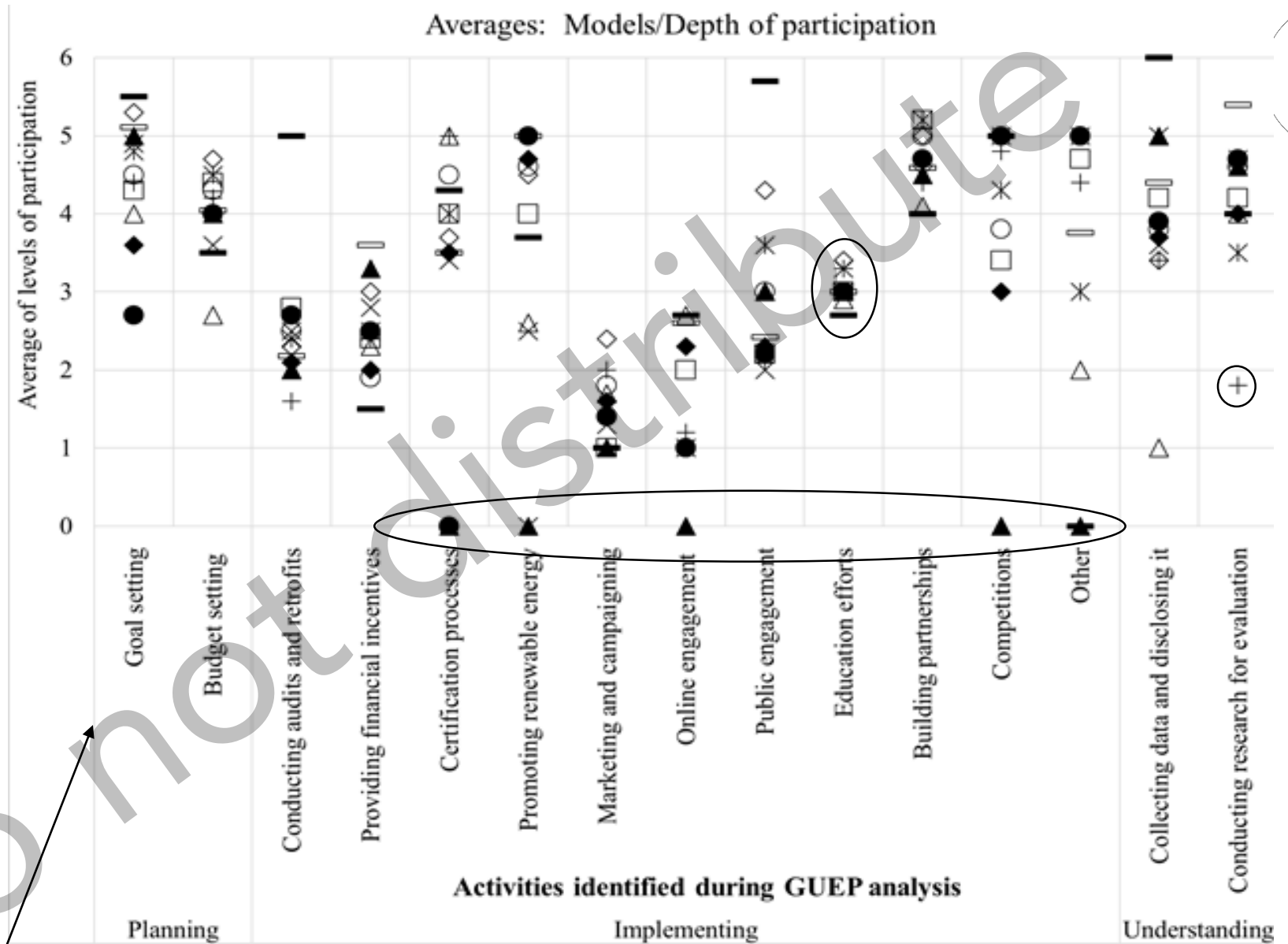


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Averages: Depth of Participation by activity

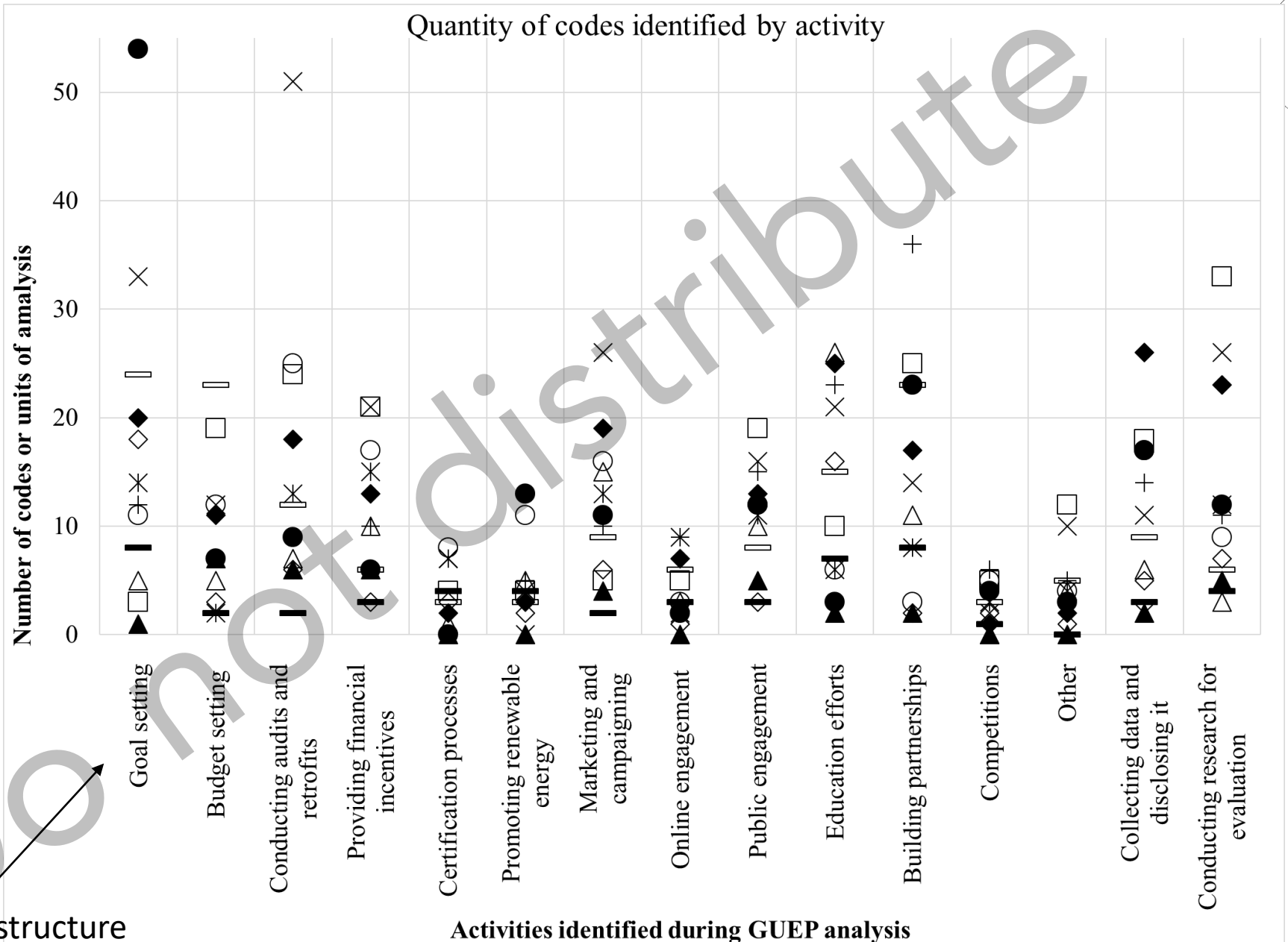
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- ◇ Arlington, VA. OES -2.6
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Count of codes by activity

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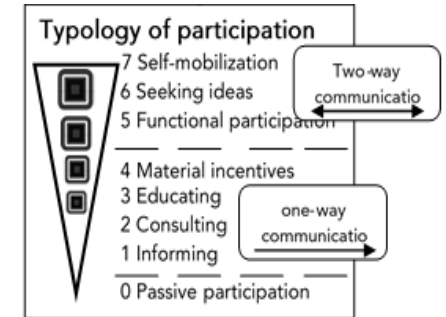
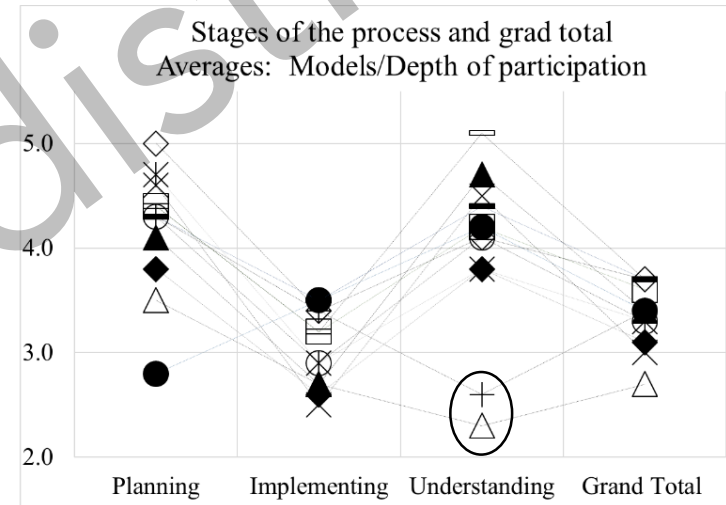
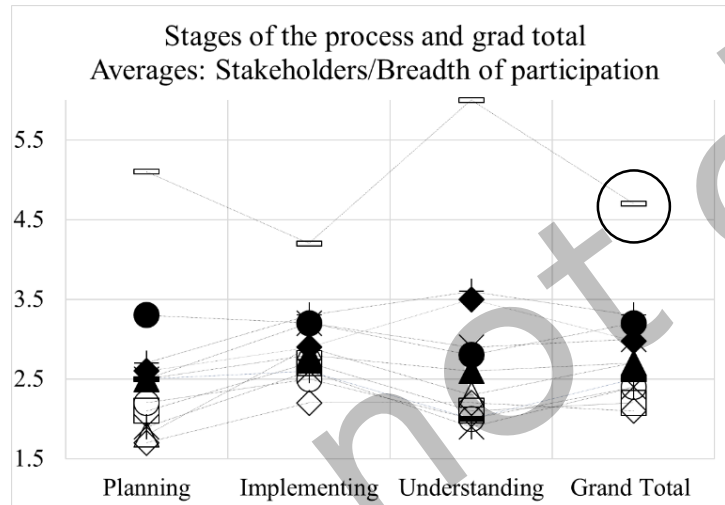
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Averages: process of participation of 12 GUEP communities by stages of the process

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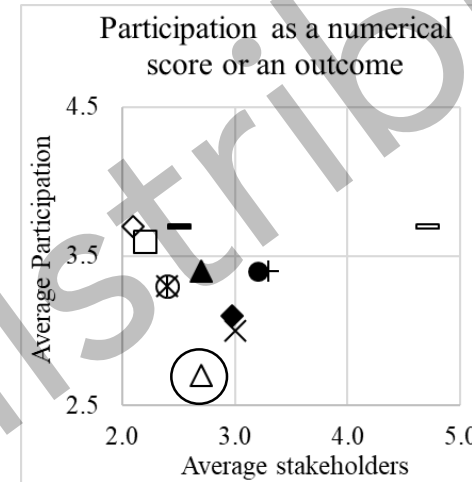
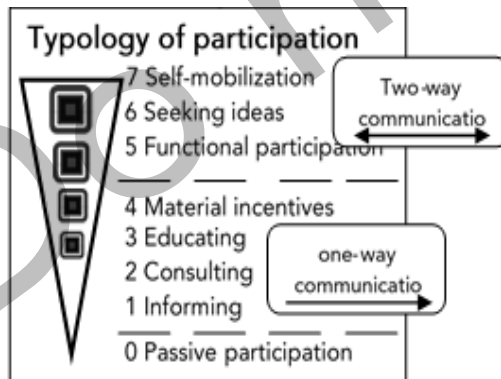
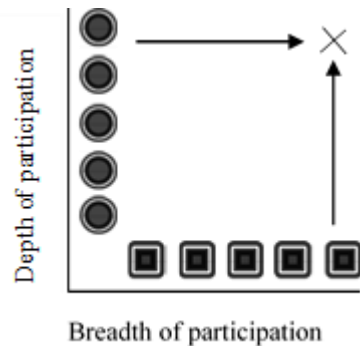


× Bellingham WA ◇ Arlington VA × Chula Vista CA + Fargo, ND — Palo Alto, CA ▲ Calhoun, AR
△ Walla Walla, WA ◆ Fort Collins, CO = Houghton Co, MI ○ Takoma Park, MD ● Montpelier VT □ Berkeley, CA

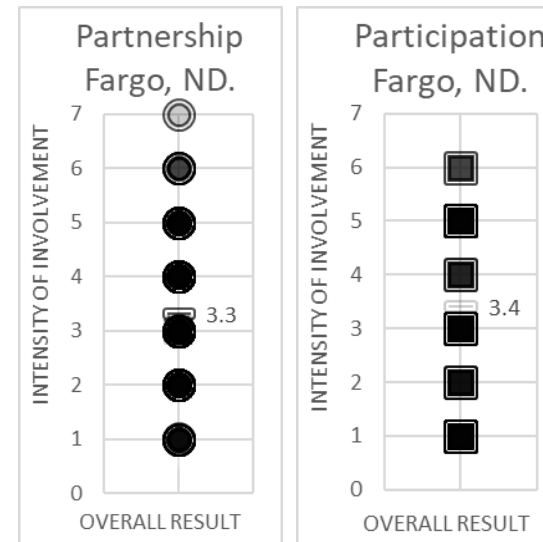
Participation as an outcome

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✈ Participation as an outcome is illustrated in the intersection of our two final average scores: breadth and depth

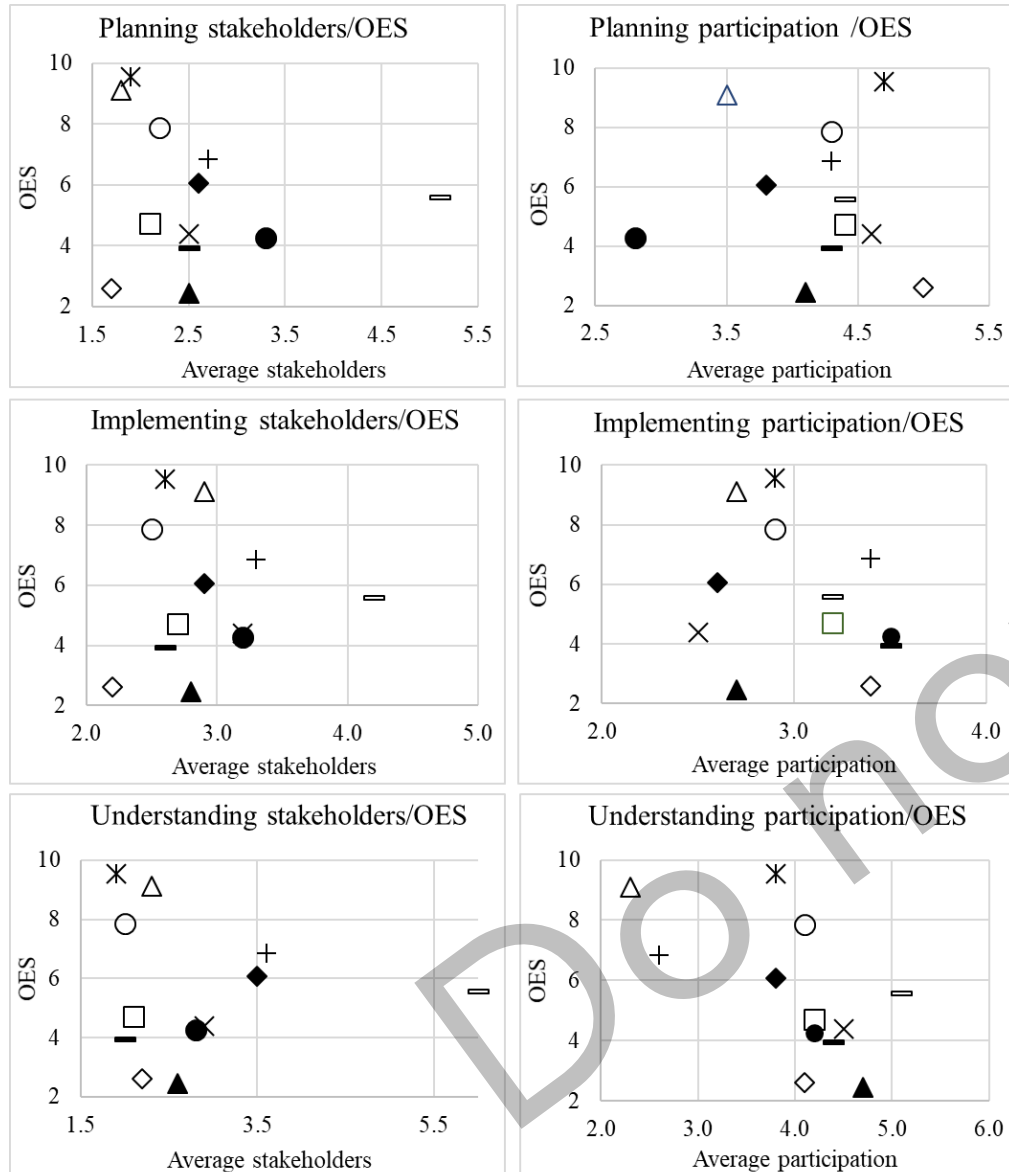


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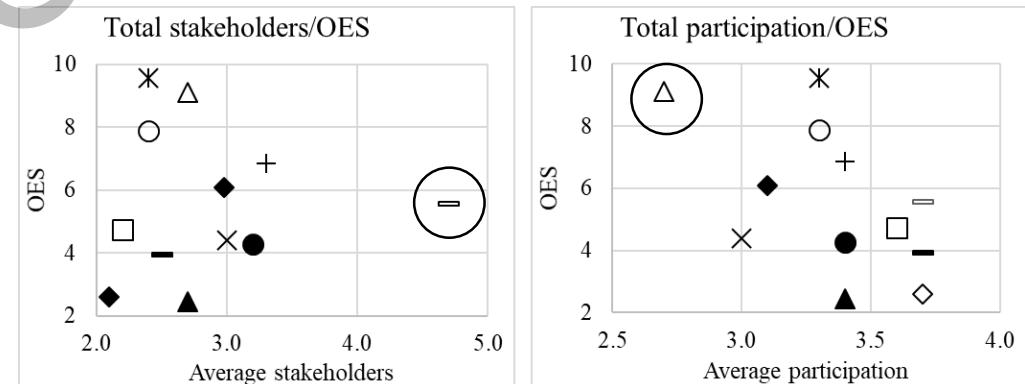


Do more participation predict more OES?

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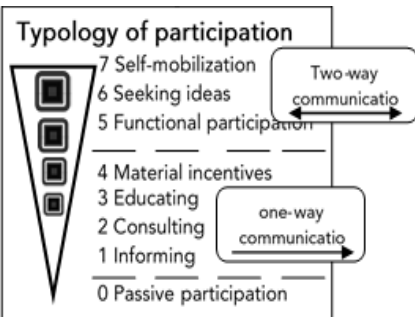
These figures compare the averages of breadth and depth of participation (x-axis) of 12 communities across the process with the communities' OES achieved during GUEP (y-axis). The higher the number in the y-axis, the greater the energy savings.



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Breadth and Depth of participation in Fargo

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Stages of the process	Breadth: Stakeholder groups mentioned (% of codes)								Total		Average
	SC	UN	NO	UT	CO	GO	BS	FA	Sum	Count	
Planning (n=23)	9%	55%	0%	9%	41%	100%	64%	0%	62	23	2.7
Implementing (n=131)	18%	68%	14%	26%	62%	92%	52%	2%	438	131	3.3
Understanding (n=25)	12%	92%	0%	56%	40%	100%	60%	0%	90	25	3.6
Grand Total (n=179)	16%	70%	10%	28%	56%	94%	52%	1%	590	179	3.3

Stages of the process	Depth: levels of models of participation identified (% of codes)								Total Count	Average Participation
	1	2	3	4	5	6	7	Sum		
Planning (n=23)	9%	5%	0%	36%	32%	18%	0%	99	23	4.3
Implementing (n=131)	22%	9%	25%	1%	42%	1%	0%	443	131	3.4
Understanding (n=25)	60%	0%	0%	0%	36%	4%	0%	66	25	2.6
Grand Total (n=179)	26%	7%	18%	5%	40%	3%	0%	608	179	3.4

Table of local results: Fargo, ND

rE

Activity / stage of the process	SC	UN	NO	UT	CO	GO	BS	FA	Sum	Count	Average Breadth
Planning (n=23)	9%	52%	0%	9%	39%	100%	61%	0%	62	23	2.7
Budget Setting (n=11)	0%	45%	0%	9%	18%	100%	64%	0%	26	11	2.4
Goal setting (n=12)	17%	58%	0%	8%	58%	100%	58%	0%	36	12	3.0
Implementing (N=131)	18%	68%	14%	26%	62%	92%	52%	2%	440	131	3.4
Conducting audits and retrofits (n=9)	0%	0%	11%	22%	67%	89%	22%	0%	19	9	2.1
Providing financial incentives (n=10)	0%	40%	0%	50%	70%	60%	30%	0%	25	10	2.5
Certification processes (n=3)	0%	67%	0%	0%	0%	67%	0%	0%	4	2	2.0
Promoting renewable energy (n=5)	0%	0%	0%	20%	0%	100%	0%	0%	6	5	1.2
Marketing and campaigning (n=10)	10%	90%	0%	50%	80%	90%	40%	10%	37	10	3.7
Online engagement (n=9)	0%	89%	11%	56%	89%	100%	67%	0%	37	9	4.1
Public engagement (n=15)	0%	67%	27%	7%	67%	87%	47%	7%	46	15	3.1
Education efforts (n=23)	43%	65%	17%	13%	83%	87%	61%	0%	85	23	3.7
Competition (n=7)	57%	57%	14%	29%	100%	100%	57%	0%	29	7	4.1
Building partnerships (n=37)	22%	89%	19%	27%	41%	100%	68%	0%	135	36	3.8
Other (n=5)	20%	100%	0%	0%	40%	100%	80%	0%	17	5	3.4
Understanding (n=25)	12%	92%	0%	56%	40%	100%	60%	0%	90	25	3.6
Energy consumption data (n=14)	14%	93%	0%	71%	50%	100%	50%	0%	53	14	3.8
Conducting research (n=11)	9%	91%	0%	36%	27%	100%	73%	0%	37	11	3.4
Grand Total	16%	69%	10%	28%	56%	94%	54%	1%	592	179	3.3

Partnerships

More stakeholder groups involved

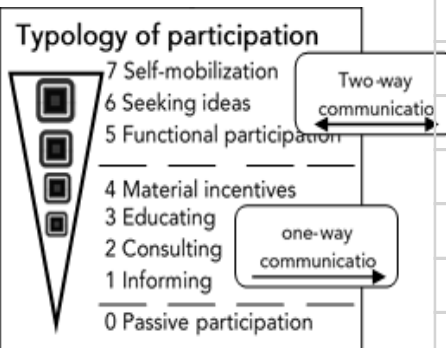
Schools (SC), Universities (UN), Utilities (UT), Community groups (CO), Government (GO), Business (BS), and Faith groups (FA)

Less stakeholder groups

Table of local results: Fargo, ND

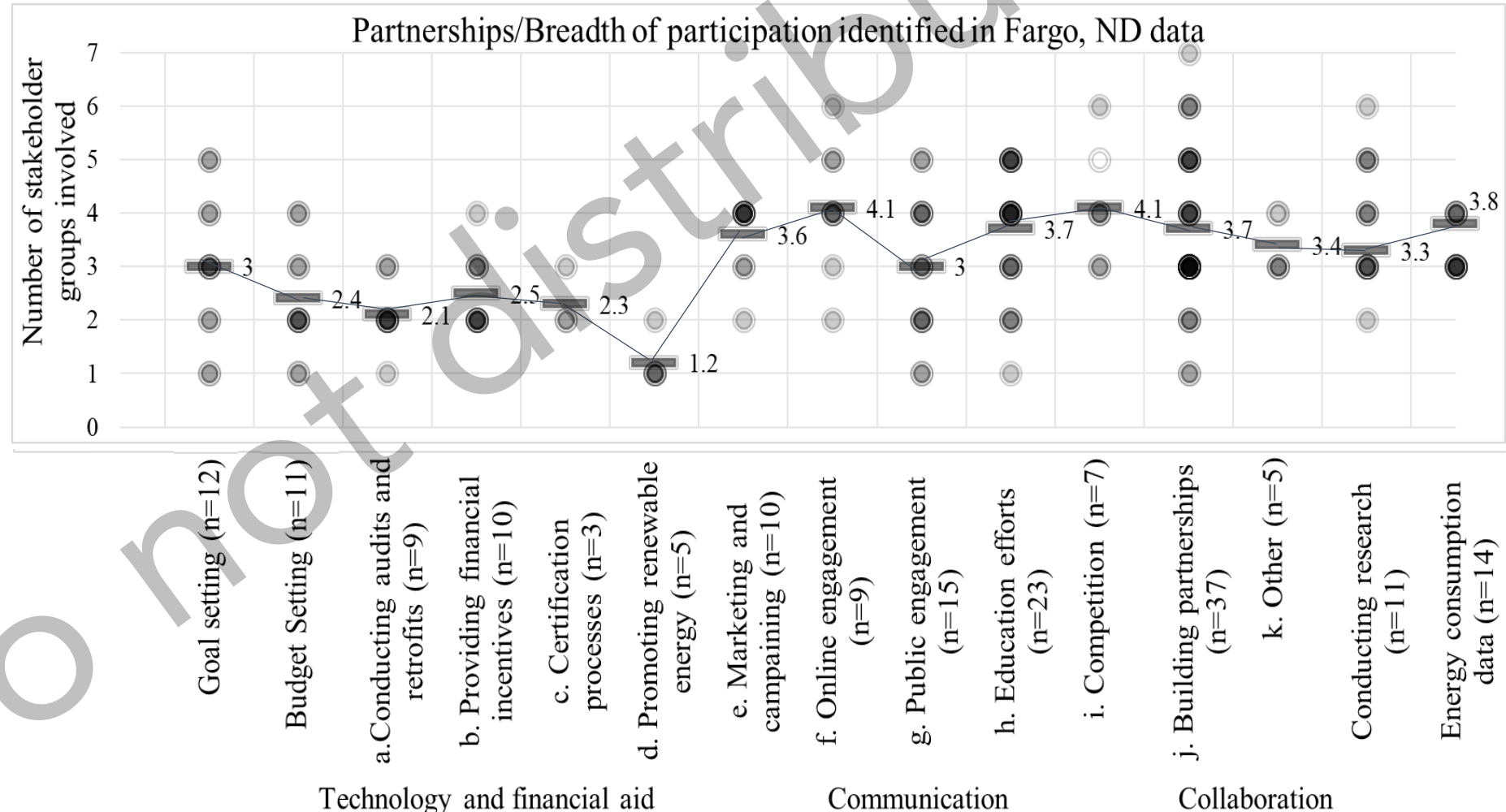
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Activity / stage of the process	1	2	3	4	5	6	7	Sum	Count	Average Depth
Planning (n=23)	9%	4%	0%	35%	30%	17%	0%	99	23	4.3
Budget Setting (n=11)	0%	0%	0%	73%	18%	0%	0%	46	11	4.2
Goal setting (n=12)	17%	8%	0%	0%	42%	33%	0%	53	12	4.4
Implementing (N=131)	22%	18%	25%	1%	42%	1%	0%	443	131	3.4
Conducting audits and retrofits (n=9)	44%	56%	0%	0%	0%	0%	0%	14	9	1.6
Providing financial incentives (n=10)	20%	60%	0%	0%	20%	0%	0%	24	10	2.4
Certification processes (n=3)	0%	0%	0%	0%	100%	0%	0%	10	2	5.0
Promoting renewable energy (n=5)	0%	0%	0%	0%	100%	0%	0%	25	5	5.0
Marketing and campaigning (n=10)	70%	0%	10%	0%	20%	0%	0%	20	10	2.0
Online engagement (n=9)	89%	0%	11%	0%	0%	0%	0%	11	9	1.2
Public engagement (n=15)	47%	0%	47%	0%	7%	0%	0%	33	15	2.2
Education efforts (n=23)	0%	0%	87%	0%	9%	4%	0%	76	23	3.3
Competition (n=7)	0%	0%	29%	0%	71%	0%	0%	31	7	4.4
Building partnerships (n=37)	3%	0%	5%	3%	89%	0%	0%	177	37	4.8
Other (n=5)	0%	40%	0%	0%	80%	0%	0%	22	5	4.4
Understanding (n=25)	60%	0%	0%	0%	36%	4%	0%	66	25	2.6
Energy consumption data (n=14)	82%	0%	0%	0%	73%	9%	0%	46	14	3.3
Conducting research (n=11)	43%	0%	0%	0%	7%	0%	0%	20	11	1.8
Grand Total	26%	14%	18%	5%	40%	3%	0%	608	179	3.4



Fargo, ND: Breadth of participation

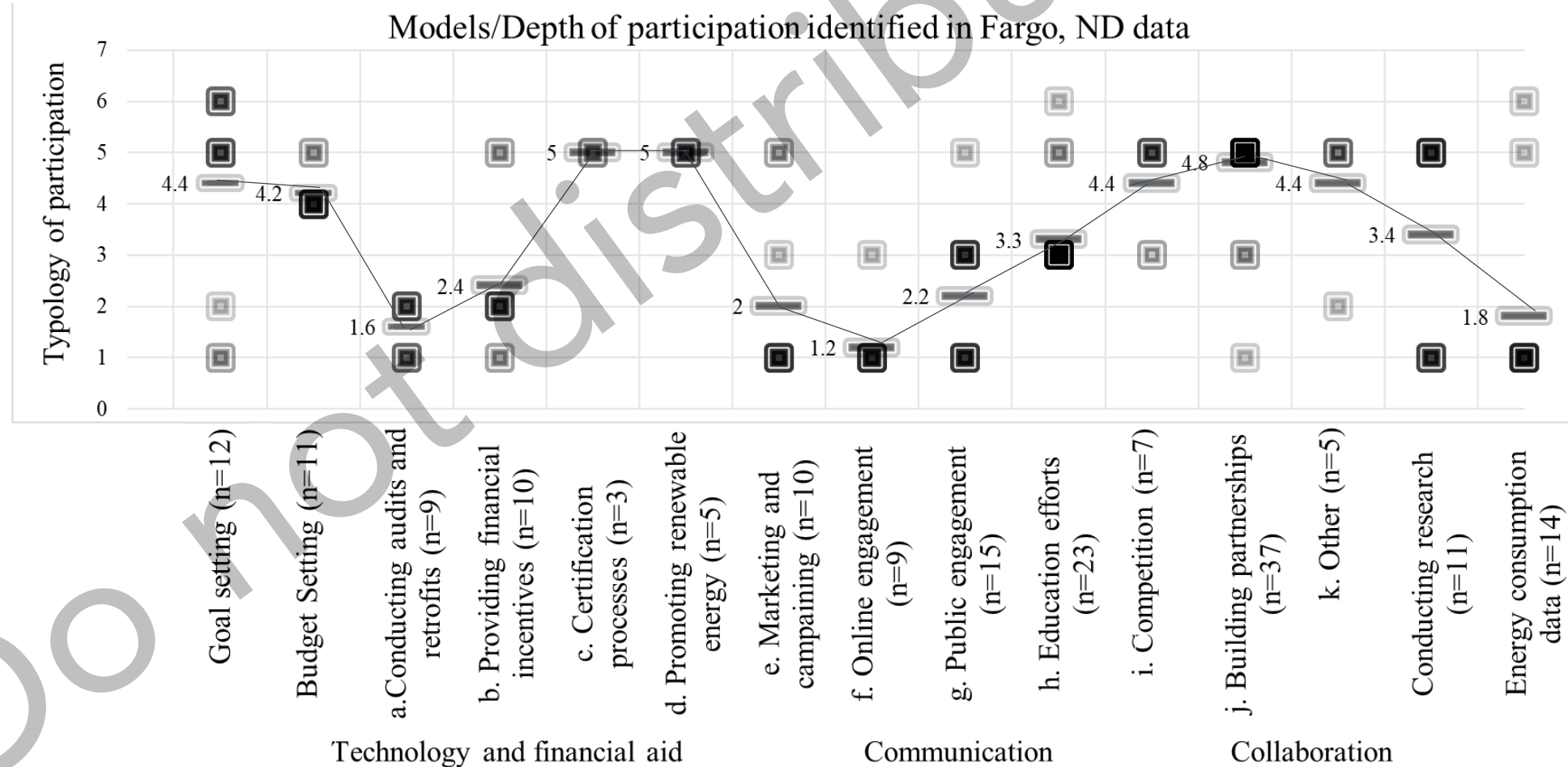
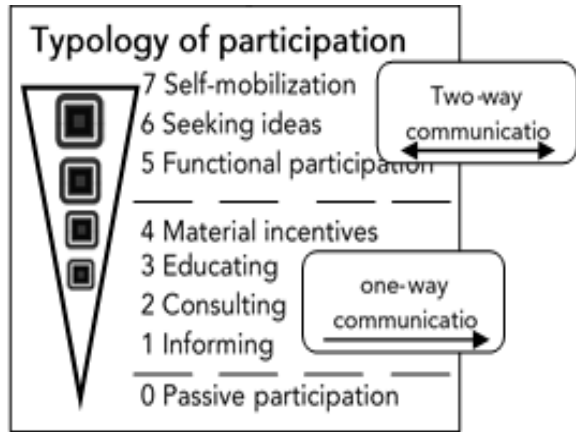
rE



The activities are not necessarily arranged chronologically; the code structure was created based on qualitative method analysis

Fargo, ND: Depth of Participation

rE

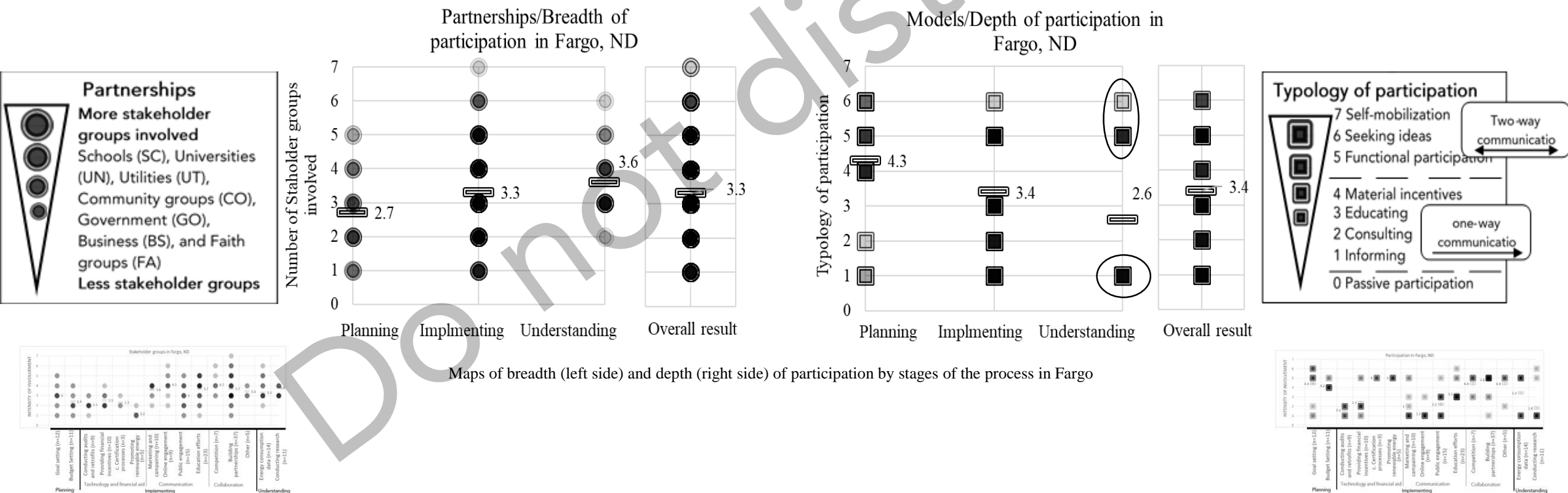


The activities are not necessarily arranged chronologically; the code structure was created based on qualitative method analysis

Local results: Participation as a process

rE

Our qualitative structure and quantitative visualizations (graphs and tables) mapped a process that explains how Fargo, ND was able to organize and reduce their energy consumption during the GUEP



Benefits of this instrument

rE

- ✈ It adds transparency to the decision-making process in energy and development projects
- ✈ It facilitates the comparison and evaluation of participatory strategies across projects, communities or time
- ✈ The method is flexible
- ✈ The method does not add administrative costs

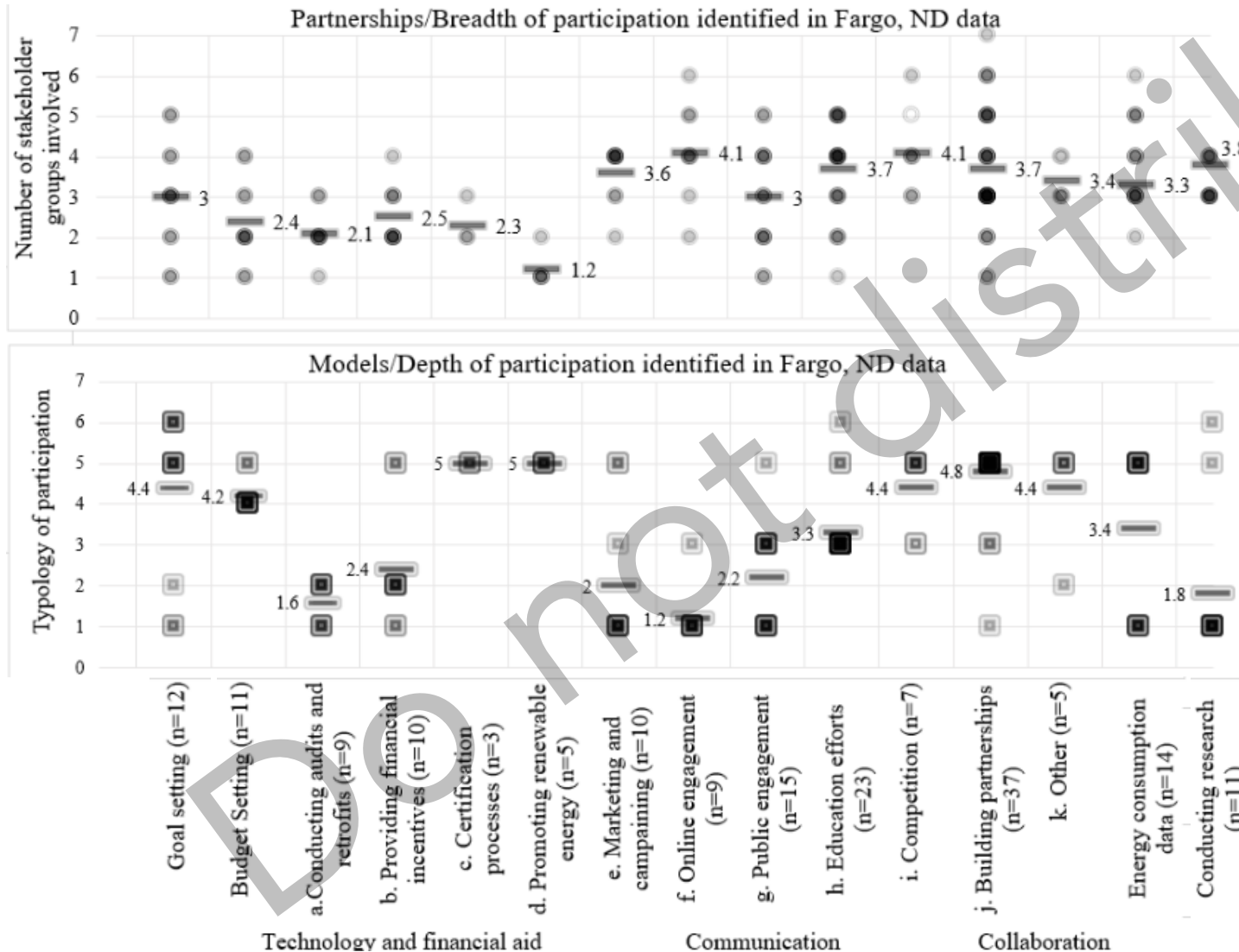
Guide to build your own mapping instrument

rE

1. Define the **goal** of your project
2. List the **activities** that you will conduct to get you to that goal
3. Define who are the **stakeholders** or subjects you will be engaging to reach your objectives
4. Build your own **ladder of participation** that describe the forms of participation (Arnstein's ladder is a good start) that you and your team believe will take you to your objectives
5. Plot these ideas in a graph
6. Share the plan with the community and evaluate it after completion
7. During the implementation of the plan community members could indicate, on a physical graph (think about it as a survey), the depth and breadth of participation that occurs by activity. These data points could latter be used for evaluation

Example of a graph

rE



who

students Δ

mothers Δ

utilities Δ

gov Δ

how?

Activities

Recommendations

- ✈️ Rethink the normativity of participation: higher and deeper does not always mean better
- ✈️ Imagine new forms of engagement to enrich this framework
- ✈️ Averages of breadth and depth of participation must be complemented with the process of participation captured in local results
- ✈️ Rethink who are the stakeholders, communities and individuals included and/or excluded in the analysis
- ✈️ Include community voices in the configuration of the scales of participation
- ✈️ Impact of participation goes beyond energy savings

Conclusion

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- ✈ The diverse components of collective participatory practices help us understand the process of participation during the GUEP
- ✈ The outcomes of our approach were materialized in maps
- ✈ Seek for the **optimum** (A. Cornwall, 2008) combination of Collective Participatory Practices that are sensitive to the communities' context, feasibility, and project's goals
- ✈ We were able to turn our method of analysis into a **bespoke tool** that can help communities understand and research ongoing participatory interventions

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