



ENERGY POVERTY

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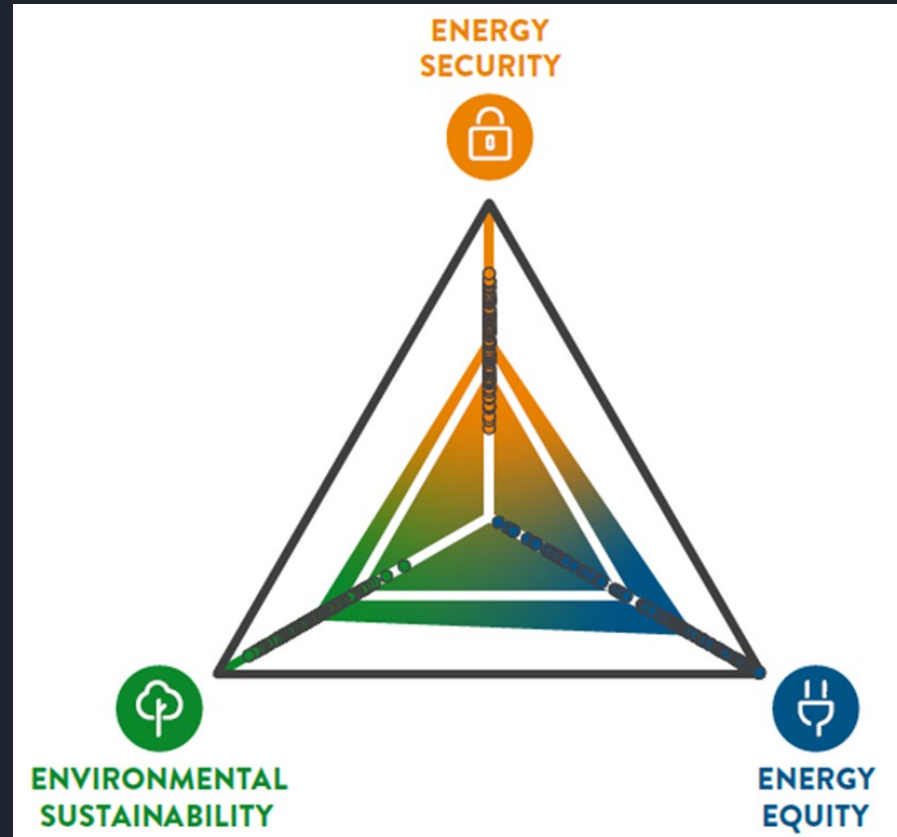
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TODAY

1. The Energy Trilemma
2. Definitions of energy poverty
3. Worldwide data (e.g. Global, Europe)
4. How it is measured
5. The impacts of energy poverty (socio-economic and health)
6. Energy poverty and climate change
7. Policy and regulation to address energy poverty
8. Specific case-study in Israel
9. Energy poverty and renewable energy
10. Key-issues and conclusions

THE ENERGY TRILEMMA



- SDG #7: 'ensure access to affordable, reliable, sustainable and modern energy for all'.
- Sustainable energy systems are based on three dimensions: energy security, energy equity, and environmental sustainability (WEC).
- The 'energy trilemma' is the challenge in balancing the dimensions' goals, which often come at the expense of one another

ENERGY POVERTY: BASIC DEFINITION



- The difficulty of the household to secure sufficient energy for basic needs and functions, such as: cooking, lighting, keeping food and medicine, heating or cooling of the house
- The problem is well recognized in cold weather conditions, but it is now also a growing challenge in hot conditions and high temperatures in the home

ENERGY POVERTY: WIDER DEFINITION



- Not only the ability of the household to afford paying for energy, but the availability, reliability, acceptability, quality, and safety of energy networks and appliances
- Today the definition also refer to clean energy

DIFFERENCES BETWEEN GLOBAL SOUTH AND NORTH



Differences in the way energy poverty is defined, measured, expressed and addressed between developing and developed countries:

- *Lack of access to electricity + dangerous cooking*
- *Thermal conditions of houses (lack of insulation, mold)*



759 MILLION
PEOPLE

LACK ACCESS

TO ELECTRICITY



3 OUT OF **4**

OF THEM LIVE IN

SUB-SAHARAN AFRICA

(2019)

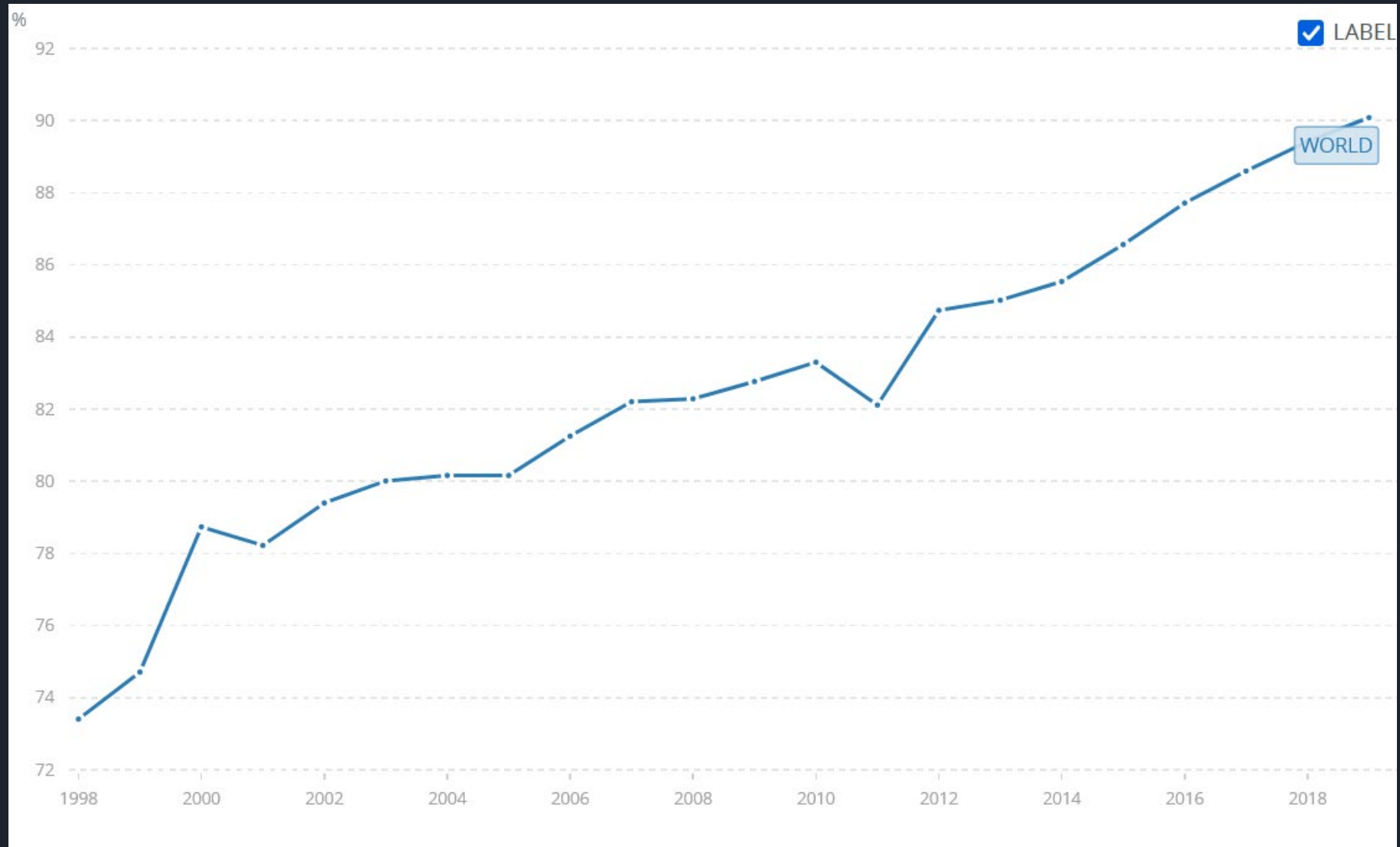
ONE THIRD

OF THE WORLD'S POPULATION USE

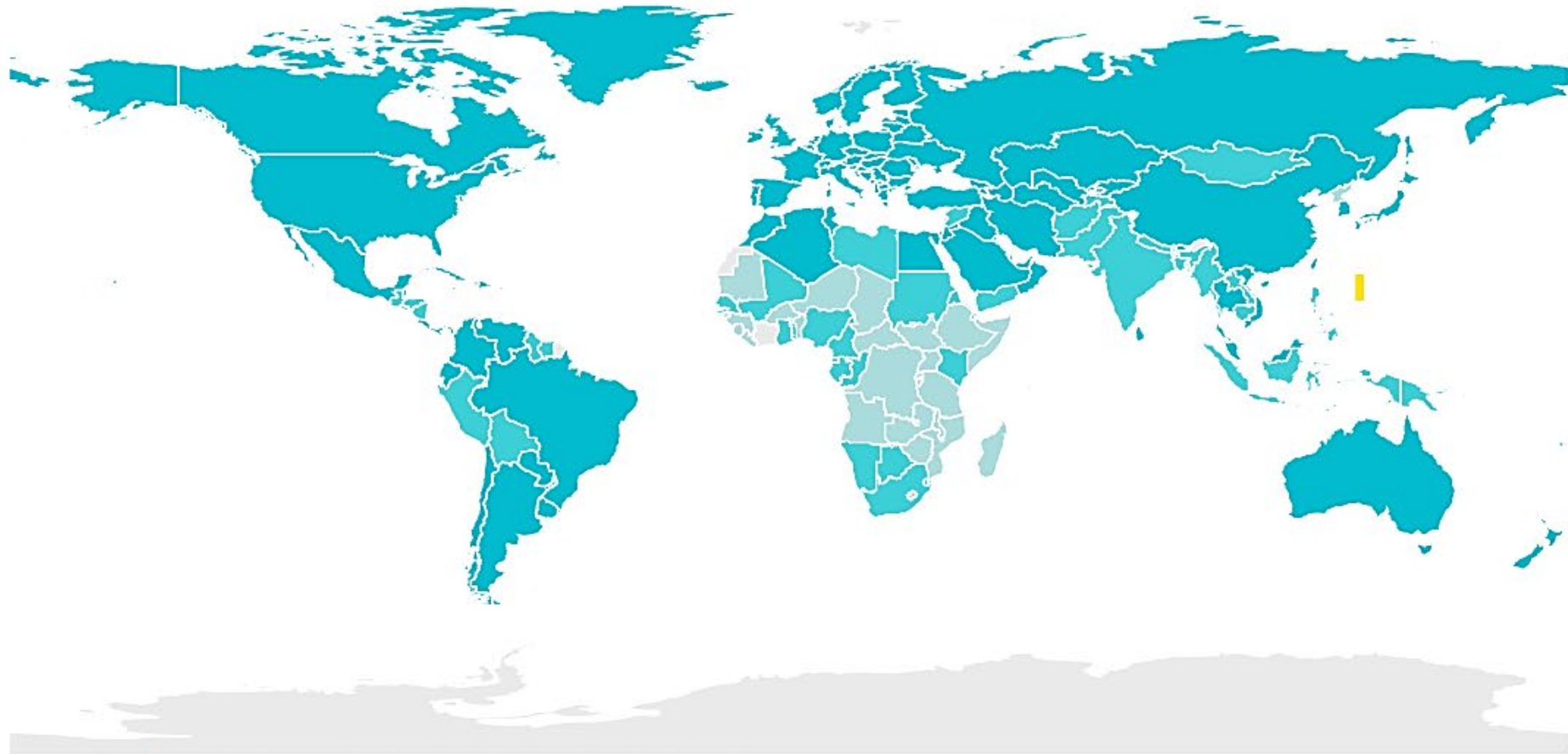
**DANGEROUS AND INEFFICIENT
COOKING SYSTEMS** (2019)


**Europe: More than 50 million
people experience energy
poverty (1 in 4 households)**

ELECTRICITY ACCESS RATES (1990-2019)



ELECTRICITY ACCESS RATES (2019)



 The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of the World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.

Indicator: Electricity access rate (%)

100 99 - 50 49 - 10 <10



Unit: % of population

MEASUREMENTS

Energy poverty measurements and criteria	References
Total monthly expenditure on energy from the household budget, which exceeds a certain predetermined threshold	Foster, 2000
Total monthly expenditure on energy which is more than 10% of the household budget	Boardman, 1991 International Energy Agency
Total monthly expenditure on energy + appliances	Reddy et al., 2009
Determining the minimum level of energy services such as cooking, lighting and heating	Pachauri, 2011
Determining the minimum of energy needs consumed by a household below the poverty line	Foster, 2009
Self-assessment surveys (perceptions based)	EU SILC
Measuring 'comfort temperature' in the bedrooms and the main room	World Health Organization

SOCIO-ECONOMIC IMPACTS OF ENERGY POVERTY

- *Economic burden on the household (choices between buying food, medicine or paying electricity bills)*
- *Rates of educational attainment , access to the internet is crucial*
- *Patterns of employment (what we see during COVID-19 while studying and working from home)*
- *Participating as equal in the society (shame, isolation, stigma)*

IMPACTS OF ENERGY POVERTY ON HEALTH

- *Physical illness: infants' weight gain, respiratory diseases*
- *Mental stress (as a result of facing debt, bureaucracy)*
- *The ability to store medicine*
- *The ability to operate life-supporting equipment*
- *Access to e-Health*
- *Well-being (WHO)*

ENERGY POVERTY IN THE FACE OF CLIMATE CHANGE

Climate change already intensifies vulnerabilities and insecurities (chronic illness, elderly, homeless, poor, undocumented migrants).



STORMS AND FREEZING TEMPERATURES

Suspected hypothermia deaths in homes mount in Texas

Of the around 70 deaths attributed to the snow, ice and frigid temperatures nationwide, more than a dozen were people who perished in homes that had lost their heat.

AP By Jamie Stengle and Marion Renault, Associated Press

Saturday, February 20, 2021

In India, the number of deaths per year linked with abnormal cold temperatures is 655,400, while as the number of deaths associated with high temperatures is 83,700, according to the researchers.

Energy price rises fill elderly with 'absolute dread' and they need more help in freezing weather, charity warns

- This year there is a risk of elderly freezing to death in their homes, says Age UK
- Some will not even try to keep homes warm this winter for fear of bills, it adds
- Charity calls for urgent action by Government to protect elderly as prices soar
- What should you do if you are anxious about big bills? Find out below

By [TANYA JEFFERIES FOR THISISMONEY.CO.UK](#) 

PUBLISHED: 00:01 GMT, 26 November 2021 | **UPDATED:** 00:01 GMT, 26 November 2021

HEATWAVES

Bloomberg Green

Sign In

Climate Adaptation

Record Heatwaves Are Scorching Eastern Europe and Siberia

The extreme temperatures are linked to variations in the jet stream, a phenomenon that's also influencing heat and drought in the Western U.S.

By [Laura Millan Lombrana](#)

June 25, 2021, 3:29 PM GMT+3

Record-breaking heat waves: 7 deadly European summers

2019: Records tumble

Some 2,500 people were killed by two waves of extreme heat in northern Europe in June and July 2019, scientists at the CRED disaster research center of Belgium's University of Louvain estimate.

BBC Sign in Home News Sport Reel Worklife Tra

NEWS

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Canada weather: Dozens dead as heatwave shatters records

30 June



Watch: Canadians say the conditions are "unbearable"

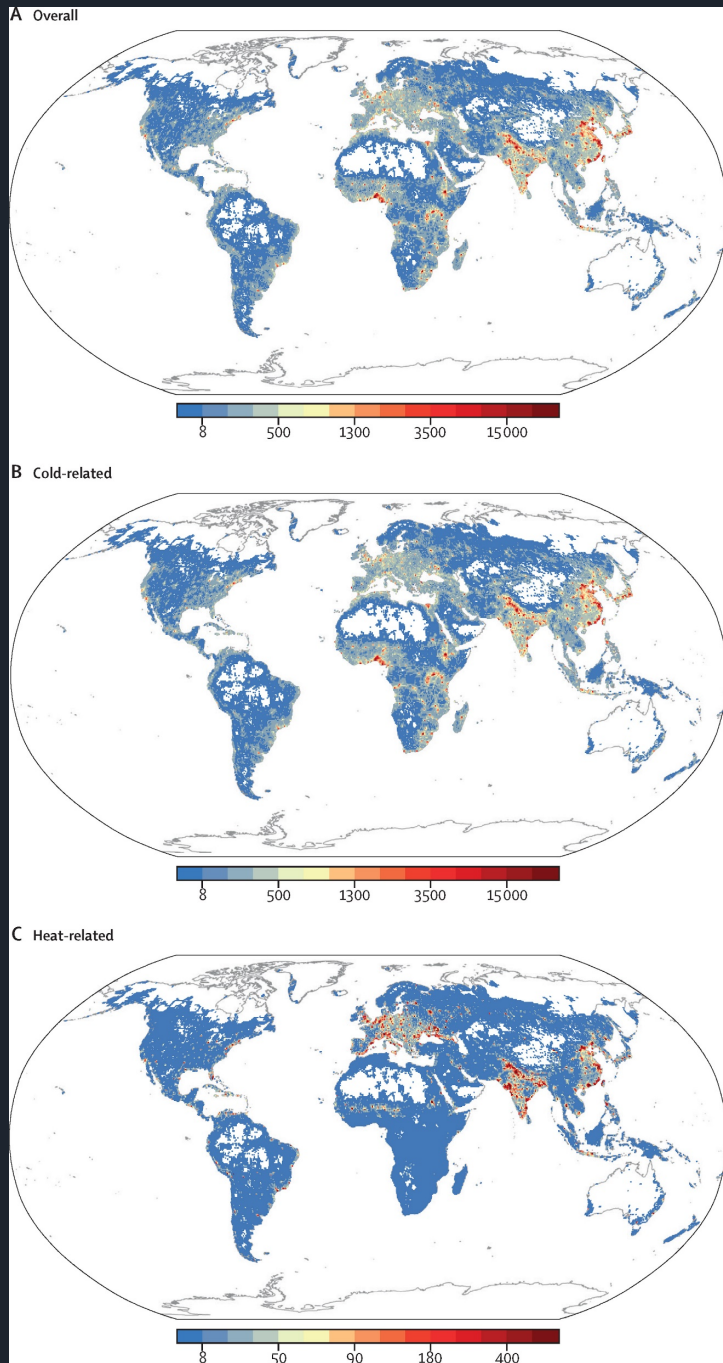


Figure: Average annual excess deaths due to non-optimal temperature

- Globally, 5,083,173 deaths are associated with non-optimal temperatures per year, accounting for 9.43% of all deaths (8.52% are cold-related) – YEARLLY!
- Of all excess deaths, 2,617,322 (49%) occurred in Asia.
- Eastern Europe had the highest heat-related excess death rate
- Sub-Saharan Africa had the highest cold-related excess death rate

Zhao, Q., Guo, Y., Ye, T., Gasparri, A., Tong, S., Overcenco, A., ... & Li, S. (2021). Global, regional, and national burden of mortality associated with non-optimal ambient temperatures from 2000 to 2019: a three-stage modelling study. *The Lancet Planetary Health*, 5(7), e415-e425.

FLOODING, FIRES AND POWER-CUTS

Deeside.com > News

Posted: Mon 29th Nov 2021 Updated: Mon 29th Nov

Power cuts still affecting households in region following Storm Arwen



California power outages increase as strong winds raise fire risk

More than 200,000 customer accounts could lose service in the region around Los Angeles and San Diego, according to the local utilities.



Power companies in California have taken to switching off electric lines in advance of strong winds after a series of deadly wildfires were sparked by their equipment [File: David Paul Morris/Bloomberg]

By David R. Baker and Brian K. Sullivan and Lars Paulsson | Bloomberg

25 Nov 2021



CHENNAI

Chennai rains | Parts of north and central Chennai faced power cuts for several hours



SPECIAL CORRESPONDENT

CHENNAI, NOVEMBER 07, 2021 19:52 IST

UPDATED: NOVEMBER 07, 2021 20:00 IST

SHARE ARTICLE



PRINT

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POLICY AND REGULATION: RIGHT TO ENERGY

- Could be embedded right in the Right to Adequate Housing, not direct (Oren, 2014)

“Energy services are fundamental to safeguarding the well-being of the Union citizens. Adequate warmth, cooling and lighting, and energy to power appliances are essential services to guarantee a decent standard of living and citizens' health. Furthermore, access to those energy services enables Union citizens to fulfil their potential and enhances social inclusion.”¹

- Normative, the specifics are non-binding
- Exceptional examples: Catalonia² & France³ (Hesselman et al., 2019)

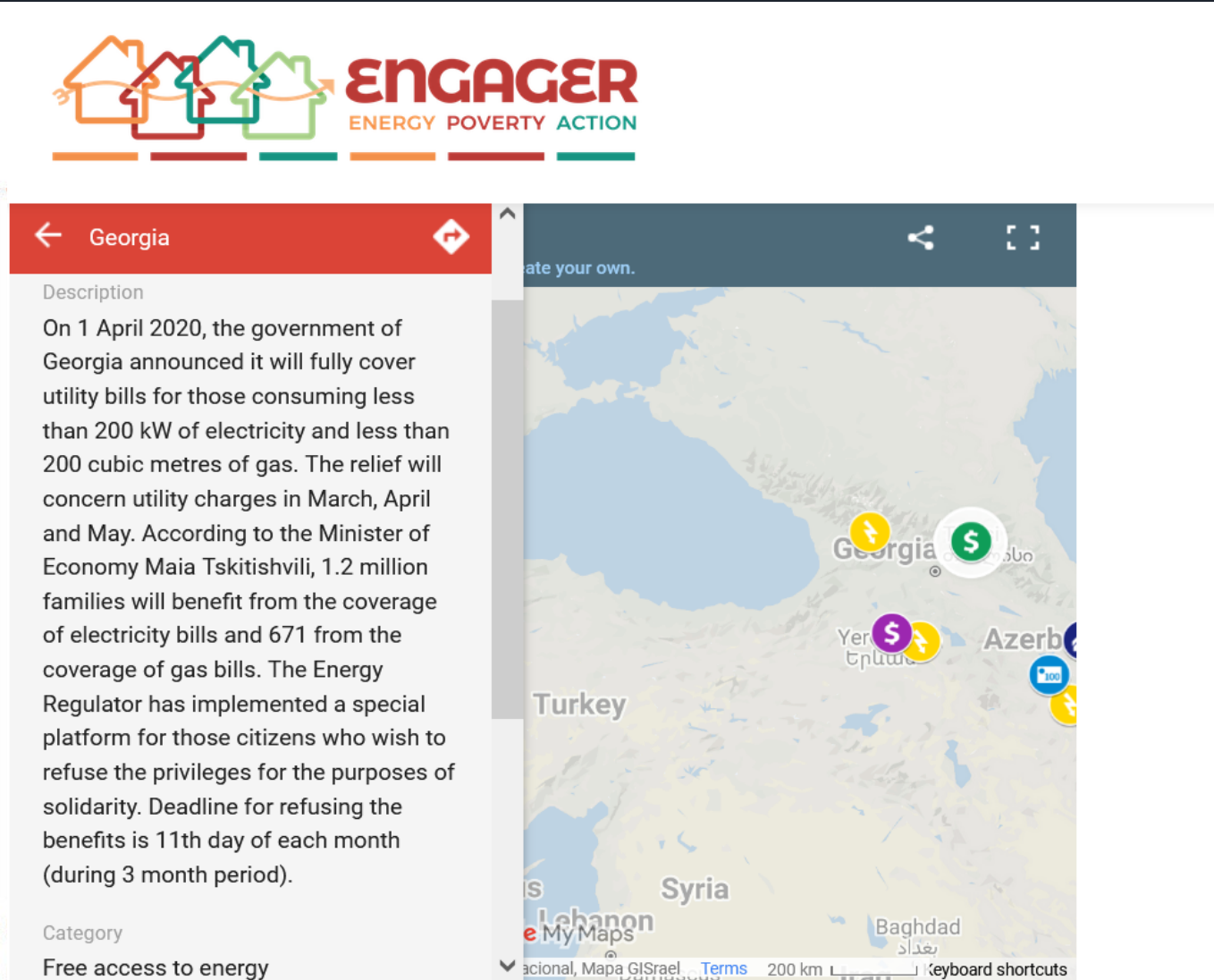
¹Recital (59) of EU Electricity Directive 2019/944 of 14 June 2019

² Law 24/2015 on the housing and energy poverty crisis

³ Energy Code / Law n°2015-992

POLICY AND REGULATION: NATIONAL CONTEXT

- Laws and policies mainly refer to limitations or due-process of disconnections
- Subsidies and support schemes for households according to income
- Pay-as-you-go/pre-paid electricity meters
- Special measures during corona



The screenshot displays the ENGAGER mobile application interface. At the top, the logo features three stylized houses in orange, red, and green, with the text "ENGAGER ENERGY POVERTY ACTION" to the right. Below the logo is a red navigation bar with a back arrow, the word "Georgia", and a home icon. The main content area is split into two panels. The left panel contains a "Description" section with the following text: "On 1 April 2020, the government of Georgia announced it will fully cover utility bills for those consuming less than 200 kW of electricity and less than 200 cubic metres of gas. The relief will concern utility charges in March, April and May. According to the Minister of Economy Maia Tskitishvili, 1.2 million families will benefit from the coverage of electricity bills and 671 from the coverage of gas bills. The Energy Regulator has implemented a special platform for those citizens who wish to refuse the privileges for the purposes of solidarity. Deadline for refusing the benefits is 11th day of each month (during 3 month period)." Below this is a "Category" section with the text "Free access to energy". The right panel shows a map of the region, including Georgia, Turkey, Syria, and Lebanon, with various colored icons overlaid on the map. At the bottom of the map, there is a scale bar for 200 km and a "Terms" link.

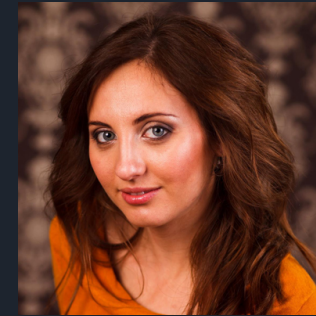
Dr. Stav Shapira



Haneen Shibli



Dr. Anca Sinea

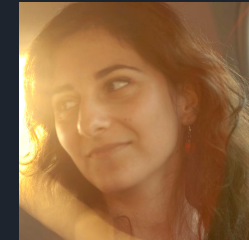


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LOCAL CASE: THE BEDOUIN COMMUNITY IN THE NEGEV, ISRAEL

(Teschner, Sinea, et al., 2020)



Rahat - The largest Bedouin established town in Israel

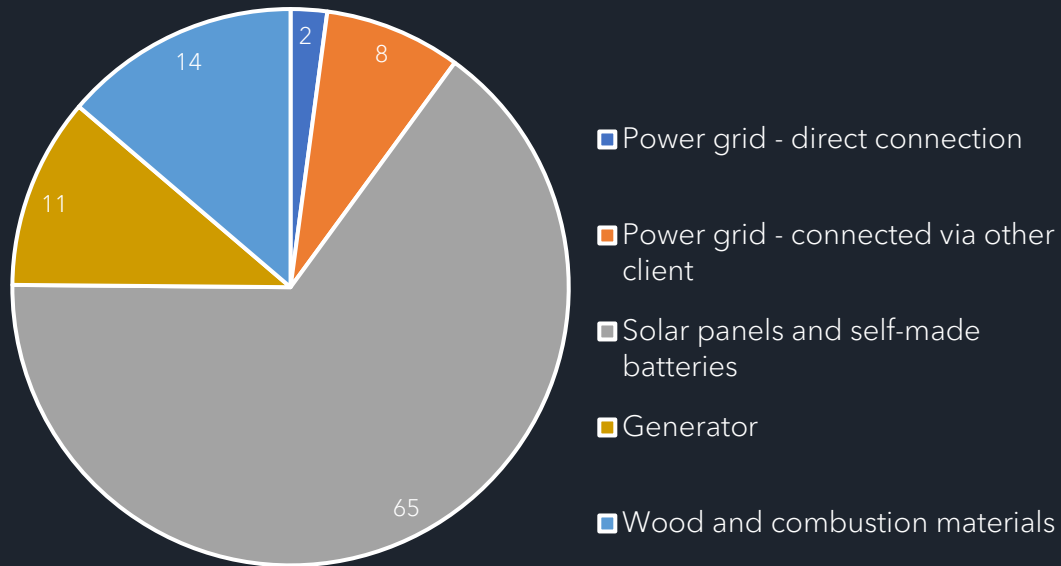


Al-Qren - Informal Bedouin village

(Shapira, Shibli & Teschner et al., 2021)



Primary source of energy in unrecognized villages (%)



N (total) = 279



Al-Qren - Informal Bedouin village

ESTABLISHING A CONNECTION BETWEEN ENERGY POVERTY & COMMUNITY RESILIENCE

- Community Resilience: community's self capacity to overcome changes and crises
- *Perceptual criteria* - sense of community, disaster preparedness, trust in leadership and place attachment, social cohesion
- *Physical criteria* - infrastructure (e.g. electricity, water), economic resources and availability and access to services (e.g. healthcare)



SURVEY DESIGN

- Socio-demographic: Gender, age, marital status, level of education, degree of religiosity and type of settlement
- CR (CCRAM-10) [The community where I live is organized for emergencies; In my community, there is a relationship of trust between the residents]
- EP [How often have you and your family felt that your home is too hot or too cold? How often has the energy supply in your home been interrupted / stopped? Has a lack of electricity prevented you from participating in social activities or activities of your workplace / studies?]

11. ضمن القائمة التالية، أي من الأخطاء موجود الآن في بيتك؟ (يتملكه أن توتر على أكثر من إجابة)

تسليماً أو خسارة ممكنة الإغلاق وايضا بطاريات لاستعمال في حالات الطوارئ

تسليماً أو خسارة ممكنة استعمال في حالات الطوارئ مياه لاستعمال في حالات الطوارئ

تسليماً أو خسارة ممكنة استعمال في حالات الطوارئ موزون أدوية لمدة 3 أيام حتى الآن

تسليماً أو خسارة ممكنة استعمال في حالات الطوارئ تسعة من وصفة الطبيب للأدوية المستخدمة بشكل عام

القسم ب - الأسئلة الأتية تتعلق بالمدينة/البلدة التي تسكنها.

رقم السؤال	نعم	لا	لا أعلم	لا	نعم
1. السلطة المحلية (المجلس) في بلدي تقوم بعملها عدة، كما يجب.	1	2	3	4	5
2. يمكن سكناي هنا مساعدة ممتددة الاهتمام بالبحر.	1	2	3	4	5
3. المدينة/البلدة التي أسكنها كمجهزة لحالات الطوارئ.	1	2	3	4	5
4. أقتصر عندما أخرج بحوري عن مكان سكناي.	1	2	3	4	5
5. العلاقات ما بين الفئات المختلفة في بلدي جيدة.	1	2	3	4	5
6. لدي عدة كبيرة يعجزني القرار في السلطة المحلية (المجلس).	1	2	3	4	5
7. أستطيع الإحصاء على أمن في بلدي لمساعدتي في حالات الطوارئ والأزمات.	1	2	3	4	5
8. السكان في بلدي يترقبون ويتفهمون في حالة الطوارئ.	1	2	3	4	5
9. أتعجب بالانتماء إلى مكان إقامتي.	1	2	3	4	5
10. في بلدي لسوء علاقات عدة بين السكان.	1	2	3	4	5

القسم ج - جودة الحياة

هذا الاستبيان يستعرض صحتكم بما تدرين به فيما يتعلق بوجوه حياتك وصحتك ونواحي أخرى من حياتك. إذا لم تكن تتكلم متكتلة من الإجابة على سؤال فمن رجوك اختيار الجواب الأنسب. رجوك أن تشاركي في اشتراكك هذه وأنتك وما يمتدك ويحكك. نطلب أن تكتري في تعكس حياتك خلال السنة الماضية.

رقم السؤال	جيدة جداً	جيدة	لا بأس	سيئة	سيئة للغاية
1. كيف تقيمون جودة حياتكم؟	1	2	3	4	5
2. التي أي مدى أنت راضية/يه عن مسيئرك؟	1	2	3	4	5

12. اشرح على موقفتي بالاشتراك بالبحث.

قسم أ - معلومات عامة

1. الجنس: 1. ذكر 2. أنثى

2. مكان السكن: (اسم البلدة)

3. نوع البيت الذي أسكنه:

1. بيت ممتد العواقر مشترك (مطلقاً من ____ من عواقر) 2. بيت ملك خاص، سكني

3. بيت مؤتمت وبنلا (مكرفان) آخر

4. بيت مؤتمت وبنلا (مكرفان) آخر

3. هل المعيشة التي تعيشين فيها: 1. تلك الخاصة 2. الإيجار 3. ملك عائلتي

4. سكن عام 5. إيجار لفترة غير محدودة 6. مسكن رعاية دائمة

4. ما هي سنة ميلادك؟ 1 2 3 4 5 6 7 8 9 0

5. الحالة العائلية: 1. أعزب/عزباء 2. متزوج/ة 3. أعزب/الوالدين/مفضل /مطلق / أرمل

6. كم عدد الأشخاص الذين يسكنون معك ولماذا تلك التت؟

7. كم منهم تحت جيل 16 سنة؟ كم منهم فوق جيل 70؟

7. في أي دولة ولدت؟ (اكتبي اسم الدولة)

8. ما هو مستوى تعليمك العلمي؟

1. ابتدائي 2. ثانوي 3. فوق ثانوي (بكالوريوس) 4. ماجستير 5. آخر

9. ما هي دينك؟

1. يهودية 2. إسلامية 3. مسيحية 4. فرعية 5. أخرى

10. هل تترقبين نفسك على أنك -

1. خائف/ة 2. متفهم/ة 3. متيقن/ة 4. متزعزعة 5. آخر

CCRAM © Conjoint Community Resiliency Assessment Collaboration
مركز الأزمات واستجابة الطوارئ في جامعة بنجاب، كندا، ليريل 8 4000@cedm

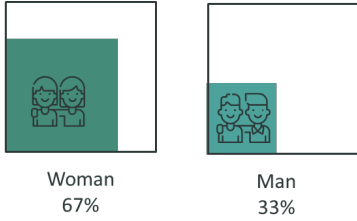
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مركز الأزمات واستجابة الطوارئ في جامعة بنجاب، كندا، ليريل 8 4000@cedm

RESULTS

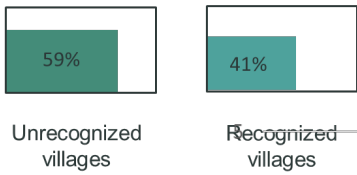
* Correlation is significant $p < 0.05$, ** Correlation is significant $p < 0.01$.

	CR1	CR2	CR3	CR4	CR5	EI1	EI2	EI3	EI4	EI5
CR1: Leadership	1									
CR2: Collective efficacy	.351**	1								
CR3: Preparedness	.619**	.414**	1							
CR4: Place attachment	.234**	.390**	.264**	1						
CR5: Social trust	.262**	.642**	.345**	.468**	1					
EI1: Worry	-.284**	-.131*	-.268**	-.101	-.096	1				
EI2: Interrupt	-.150*	-.036	-.136*	-.151*	-.067	.662**	1			
EI3: Temperature	-.208**	-.118	-.278**	-.141*	-.140*	.584**	.529**	1		
EI4: Change plans	-.205**	-.124*	-.248**	-.080	-.083	.659**	.590**	.688**	1	
EI5: Shame and Stigma	-.179**	-.077	-.176**	-.196**	-.035	.568**	.604**	.538**	.662**	1

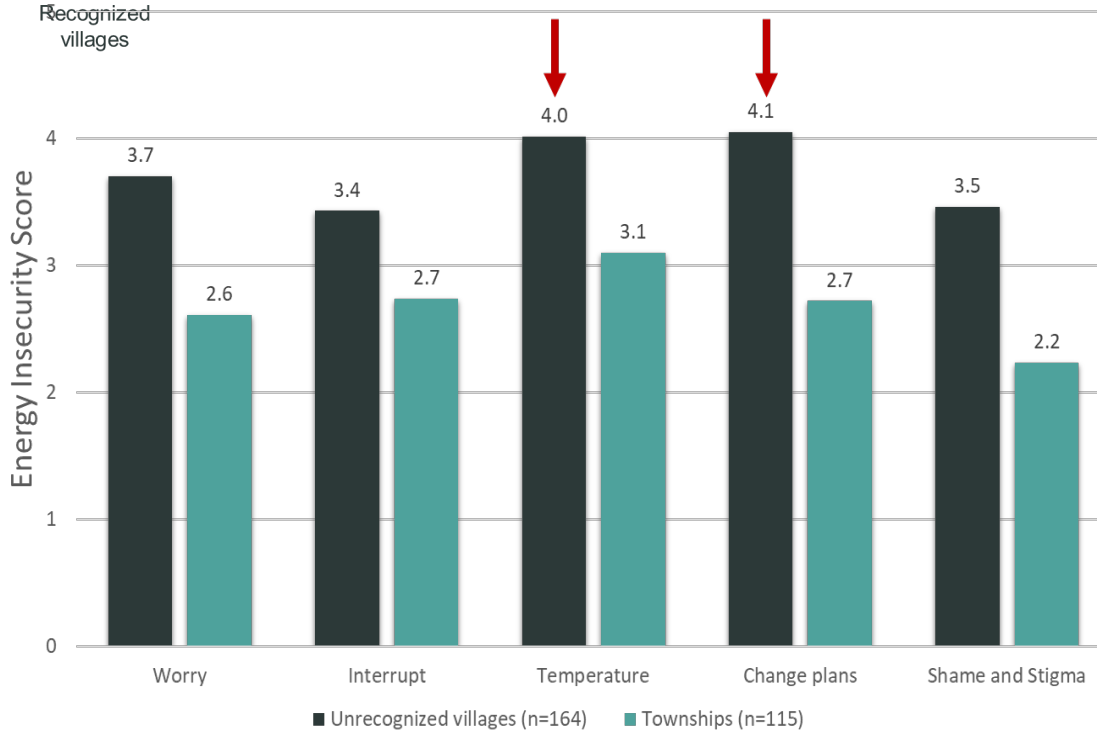
Gender



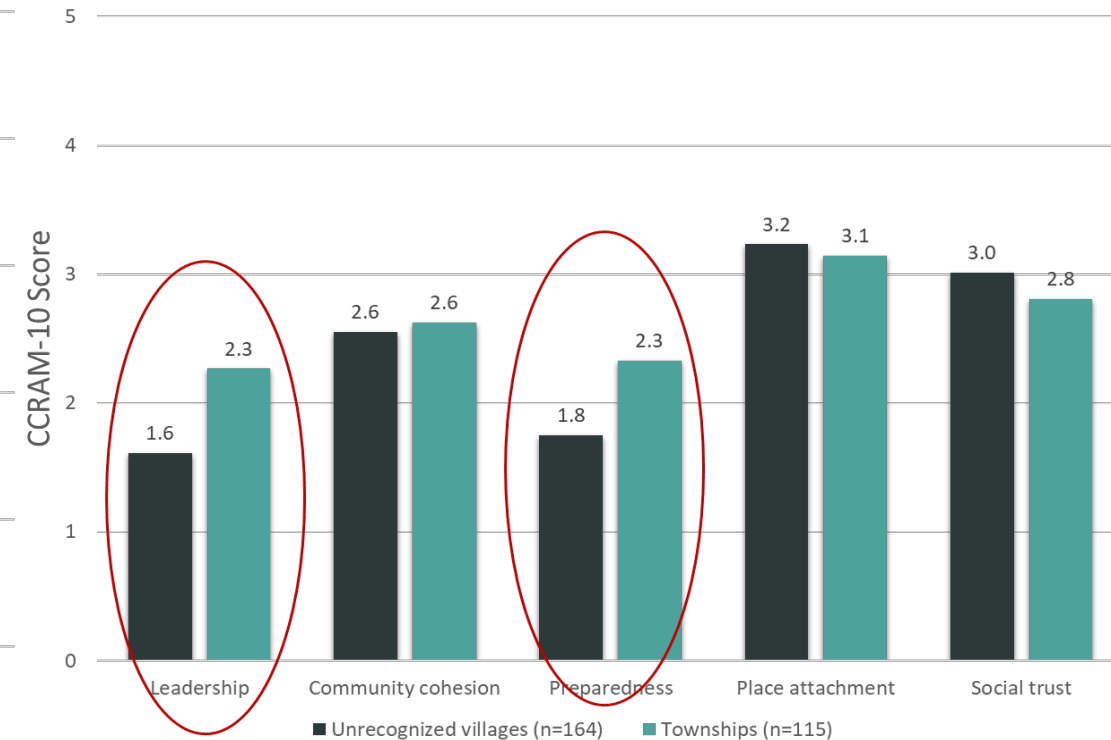
Place of residence



EP



CR



N=279

FINDINGS



- A significant negative association between energy poverty and community resilience. As the energy poverty intensifies, the perception of resilience decreases (not causation!)
- Particularly strong links between energy poverty and the indicator of "trust in local leadership" and "sense of readiness for disaster"
- The factors influencing energy poverty are at the community and systemic level, not only a matter of an individual problem

ENERGY POVERTY AND RENEWABLE ENERGY



- Israel: In the case of the local Bedouin population – off grid solar panels are informal coping strategy, not a permanent official solution
- Belgium: The city of Eeklo bought 25% of the shares of a wind turbine and offered them to vulnerable consumers so that they could become members of *Ecopower* (energy cooperative) and switch to tariff lower than the market.
- France: Encouraging social housing providers to offer renewable energy automatically to their residents by making them members of an energy community by default: easing membership rules
- Germany: Cooperation between energy and housing cooperatives in a low-income district of Berlin: installation of solar panels on the roof of a multi-family house. Low-income tenants pay 10% below the basic tariff. This was legalized by Mieterstrom (electricity for tenants) law.

KEY-ISSUES AND CONCLUSIONS

1. Energy poverty is not "regular" poverty because it depends on large-scale infrastructure (electricity grid, housing, appliances)
2. Expected to worsen due to climate change - a growing demand for energy, population growth
3. Energy as a commodity versus a fundamental right
4. Is renewable energy a sustainable solution for energy poverty? For off-the grid populations?

THANK YOU!
QUESTIONS?

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