

# Key Findings from Annex 80 Policy Actions

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On behalf of the Annex 80 Subtask D working group

venticool webinar: Case studies and policy recommendations  
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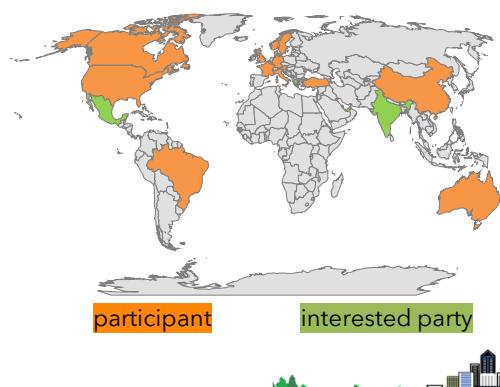


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IEA Annex 80: Resilient Cooling of Buildings is a 20-nation project advancing **passive and low-energy, low-carbon cooling strategies**

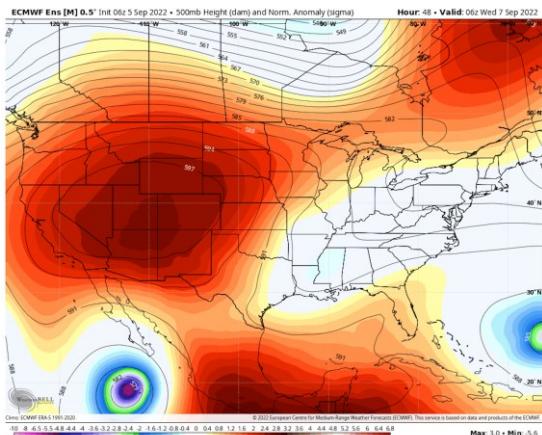
Annex 80's main objective is to support a rapid transition to an environment where resilient low energy and low carbon cooling systems are the mainstream and preferred solutions for cooling and overheating issues in buildings.



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Annex 80 Subtask D (“Policy Actions”) promotes cooling policies that **boost resilience to heat waves and power outages**



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Our approach is to **collect, review, and compare existing policies**, then **prepare recommendations**



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# There are **too many building energy efficiency policies** around the globe for our team to assess all of them

**Policies database**

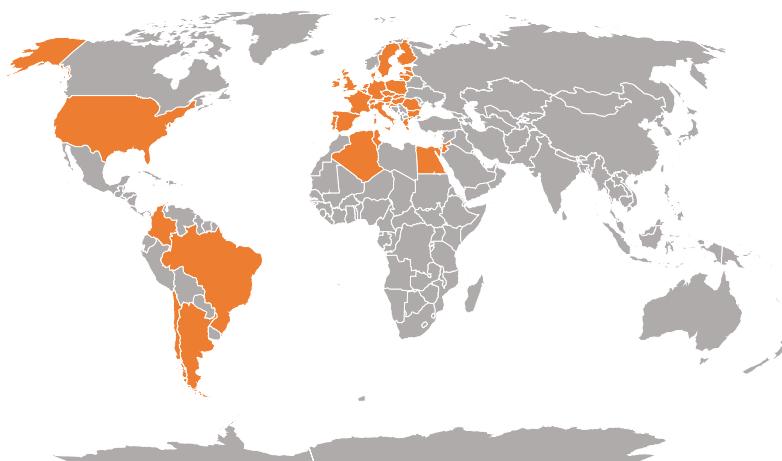
buildings AND energy efficiency  
→ 1,696 policies

**Policies database**

buildings AND energy efficiency AND (heating, cooling and climate control technologies OR space cooling OR building envelope technologies OR room portable ACs OR air conditioners) → 563 policies

5

## 24 Annex researchers from 12 institutions **examined policies from 19 regions** to **find opportunities**, rather than review all policies worldwide

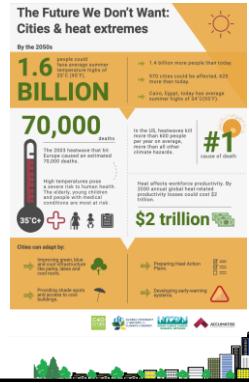
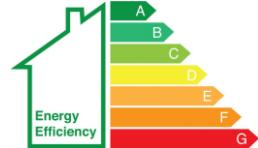


Regions
Algeria
Argentina
Austria
Belgium
Brazil
Chile
Colombia
Egypt
European Union
France
Germany
Italy
Jordan
Lebanon
Singapore
Switzerland
Tunisia
United Kingdom
United States

6

## We considered **eight types of policies** relevant to resilient cooling

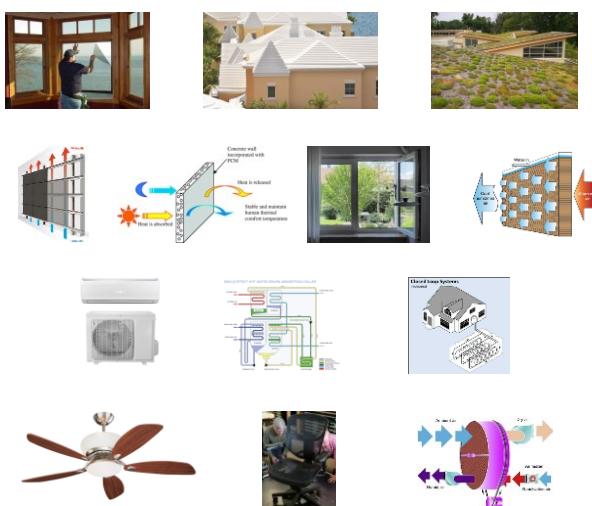
- Building energy efficiency standard
- Green building standard
- Model code (building energy efficiency or green building)
- Green building certification program
- Financial incentive program
- Law, statute, or regulation
- Extreme-heat plan
- Disclosure (label, certificate)



7

7

## We collected policies for cooling strategies that (A) reduce heat gain, (B) remove sensible heat, (C) enhance personal comfort, or (D) remove latent heat; we also reviewed whole-building performance policies



A1: Advanced solar shading/advanced glazing

A2: Cool envelope materials

A3a: Evaporative envelope surfaces

A3b: Ventilated envelope surfaces

A4: Heat storage and release

B1: Ventilative cooling

B2: Adiabatic/evaporative cooling

B3: Compression refrigeration

B4: Absorption refrigeration

B5: Natural heat sinks

B6: Higher-temperature cooling systems

C1: Comfort ventilation

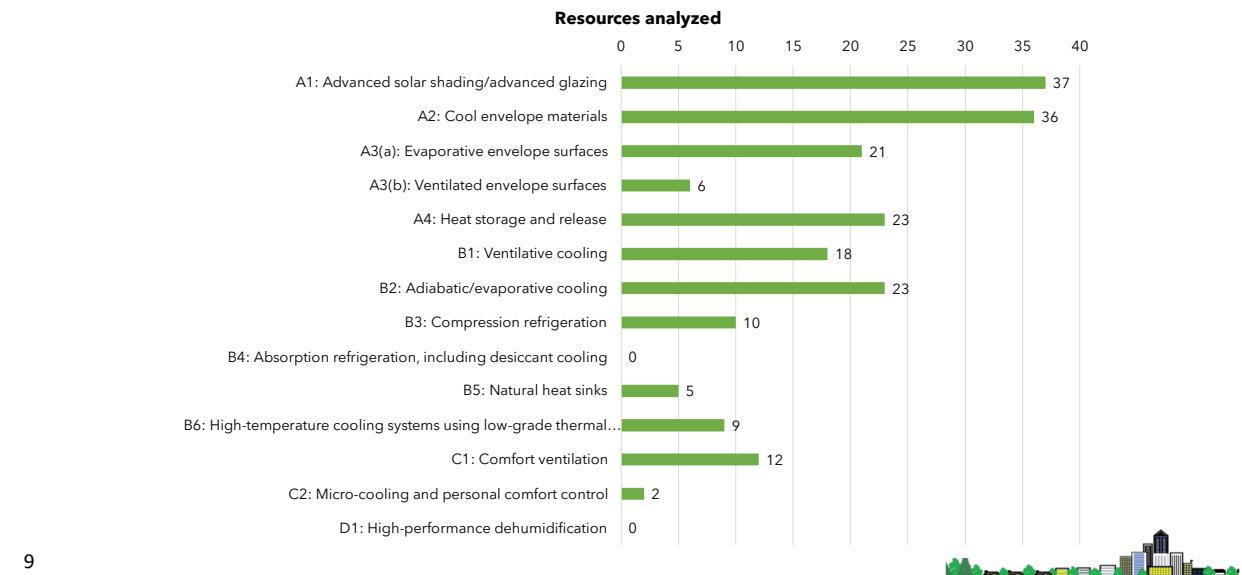
C2: Micro-cooling and personal comfort control

D1: High-performance dehumidification

8



We reviewed 202 policy resources across 12 resilient cooling technologies to **find strengths, weaknesses, and opportunities**



9

We populated a **database** detailing each policy to facilitate comparison and analysis

Strategy/Technology:	A2—Cool Envelope Materials	
Contributors:		
Policy name	2014 Los Angeles Cool Roof Ordinance	2019 California Title 24, Part 11 (CALGreen)
Notes:	The City ordinance requires cool roofs on residential new construction and existing buildings (during new permit process) for pitched and low slope roofs. The following sections specify minimum values for the aged solar reflectance and thermal emittance of roofs to reduce the urban heat island effect. There are Code/Ordinance	
Category		
Organization (example: government, industry group)	Government	Government
Scale (choose one: local, regional, national, international)	Local	Regional
Location (e.g., country, city)	Los Angeles, CA, USA	California
Building type (commercial, residential, single family, multi-family, institutional, other)	Residential	Residential, commercial, health facilities
Building application (new, existing)	New, existing	New (must check whether also applies to existing buildings)
Voluntary or mandatory	Mandatory	Voluntary
Performance or prescriptive	Prescriptive	Prescriptive
Exceptions (e.g., limited to roof replacements greater than half of the roof area)	Excludes roof repair, replacement of up to half the roof, BIPV installation, some other	Excludes vegetative roofs, thermally massive roofs, and rooftop solar equipment
Requirements (e.g., aged solar reflectance greater than 0.65)	Aged SRI ≥ 75 and aged SR > 0.63 (low-slope); aged SRI ≥ 16 and aged SR ≥ 0.20 (steep); TE ≥ 0.75 (either)	Complex requirements for roof SR and TE (or SRI), varying by roof pitch, building category, California climate zone, and performance tier. Also includes measures for Aged SR, TE, SRI
Metrics (e.g., aged solar reflectance)	Aged SR, TE, SRI	
Metric methodologies (e.g., rated by Cool Roof Rating Council)	Radiative properties determined following CRRC-1 product rating manual or various ASTM standards.	(Must check)
Climate (e.g., ASHRAE climate zones 1-4)	LA is in ASHRAE climate 3B	California is in ASHRAE climates zones 3B and 3C, and has 16 individual "California" climate zones
Enforcement mechanisms (e.g., adopted by the State and enforced by local building officials)	Municipal code	Voluntary state code (must check enforcement mechanism)
Implementation effectiveness (e.g., widespread/unlimited compliance with the code; any other notes to indicate success of adoption/compliance)	Mandatory in City of LA	Voluntary in CA

10

10

We prepared a **policy analysis report** that summarizes existing policies and policy opportunities



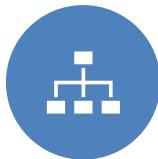
TYPES OF POLICIES  
RELEVANT TO  
RESILIENT  
COOLING



METHODS



REVIEW OF  
POLICIES  
RELEVANT TO  
EACH RESILIENT  
COOLING  
STRATEGY



REVIEW OF  
WHOLE-BUILDING  
POLICIES

11



11

We have generated **70+ ideas** for potential policy recommendations

Provide in-depth guidance to support the uptake of shading technologies, highlighting good practices that were found to provide effective management of solar loads.

Raise the extreme-climate adaptability of ventilated envelopes in the existing building standards, either by granting a bonus for every new technique adapted to the local climate, or by developing more general calculation procedures for building envelope that account for double-skin envelopes.

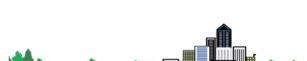
Expand cool-roof policies and programs to include cool walls, accounting for roof-wall differences in materials and physics.

Expand whole-building performance analysis beyond average mild conditions (e.g., typical meteorological years) and also account for extreme events, such as heat waves, power outages, and future climates.

Establish national standards specific for evaporative cooling (EC), with different standards for different types of EC. Only four countries in the world have done so.

Credit indoor air movement in building energy standards. ASHRAE Standard 90.1 should include content about ceiling fans use in buildings.

12



12

## Each idea is tagged with its **implementation mechanism(s)**



### Regulations

Building codes

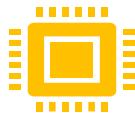


### Information

Training programs

Awareness campaigns

Labeling programs



### R&D

Emerging technology

Demonstrations



### Standards

KPIs

Extreme heat weather files



### Incentives

Competitions

Rebates

Tax credits

13



13

We also note **other characteristics**, such as where it could be applied and how long it would take to implement

Technology Type		Building Application			Implementation timeline	Geography	Cost to implement policy	Promotes resilience to disruption (heat wave/power outage)
Technology specific	Technology agnostic	New buildings (design & construction)	Existing buildings (retrofit/renovation)	Building Operations	Short (months), Medium (1-5 years), Long (greater than 5 years)	Notes on any geographic limitations	Low, Medium, High	Yes, No

14



14

This fall we will generate a **1-page summary** of each policy recommendation that we wish to pursue

<b>Policy Recommendation:</b> [list the technology/strategy; column A]				
<b>Summary:</b> [One sentence description; similar to column D]				
<b>Policy mechanism</b>				
Regulation	Information	Incentives	R&D	Standards
Promotes resilience to disruption (heat wave/power outage)				
Specific	Agnostic	Yes	No	
<b>What:</b> [One paragraph description of the recommendation, including notes on building application]				
<b>Motivation:</b> [What is the motivation for the recommendation, (e.g., gap in current policies)]				
<b>How:</b> [Describe the policy mechanisms, methods, implementation notes; include any limitations]				
<b>Who:</b> <b>Implementers:</b> [Describe who will implement] <b>Target audience:</b> [Describe who is the target audience]				
<b>Where:</b> [Notes on geography, climates, scale of recommendation; note any limitations; similar to column Q]				
<b>Implementation timeline:</b> [Qualitative description on implementation timeline following: short (months), medium (1-5 years), long (greater than 5 years)]				
<b>Cost:</b> [Qualitative description of cost to implement the recommendation; similar to column R]				
<b>Policy model to follow:</b> [Optional; list any relevant model policies to follow]				

15



15

The Annex will **share its technology assessments and policy recommendations** with interested organizations

Annex 80 products to support resilient cooling campaigns and policy efforts include

- Technology profiles
- Case studies
- Policy recommendations



16



16

# Thank you!

