

# Decarbonisation of Buildings: Key Findings from the IPCC AR6 on Climate Mitigation



*Presented in partnership with OpenEXP*

February 16, 2023

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- We will be launching a **survey** when the event ends. Your feedback is highly valuable to us!



# Overview of the Clean Energy Solutions Center

Presented by Rob Horner, U.S Department of Energy

February 16<sup>th</sup>, 2023

# The Clean Energy Solutions Center

## OBJECTIVE

To accelerate the transition of clean energy markets and technologies.

## RATIONALE

Many developing governments lack capacity to design and adopt policies and programs that support the deployment of clean energy technologies.

## AMBITION/TARGET

Support governments in developing nations of the world in strengthening clean energy policies and finance measures

## ACTORS

### Leads:



### Operating Agent:



### Partners:

More than 40 partners, including UN-Energy, IRENA, IEA, IPEEC, REEEP, REN21, SE4All, IADB, ADB, AfDB, and other workstreams etc.

## ACTIONS

- **Deliver** dynamic services that enable *expert assistance, learning, and peer-to-peer sharing of experiences. Services are offered at no-cost to users.*
- **Foster** dialogue on emerging policy issues and innovation across the globe.
- **Serve** as a first-stop clearinghouse of clean energy policy resources, including policy best practices, data, and analysis tools.

## UPDATES

### Website:

[www.cleanenergyministerial.org/initiatives-campaigns/clean-energy-solutions-center](http://www.cleanenergyministerial.org/initiatives-campaigns/clean-energy-solutions-center)

### Factsheet:

[www.nrel.gov/docs/fy22osti/83658.pdf](http://www.nrel.gov/docs/fy22osti/83658.pdf)

**Requests:** Now accepting Ask an Expert requests!

# The Clean Energy Solutions Center



## **Ask an Expert Service**

- Ask an Expert is designed to help policymakers in developing countries and emerging economies identify and implement **clean energy policy** and finance solutions.
- The Ask an Expert service features a network of more than **50** experts from over **15** countries.
- Responded to **300+** requests submitted by **90+** governments and regional organizations from developing nations since inception



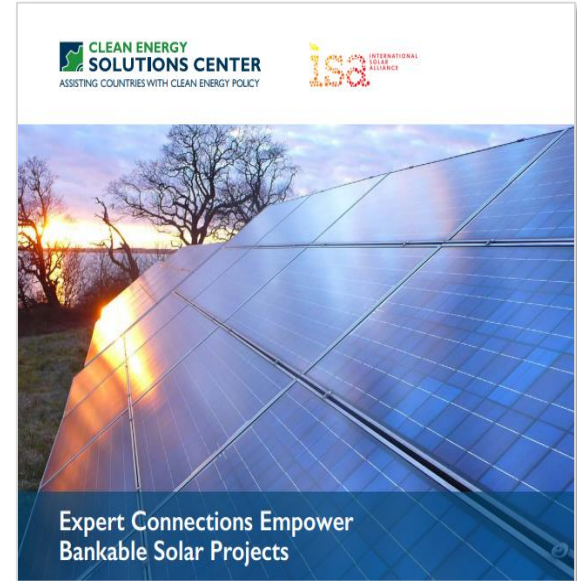
## **Training and Capacity Building**

- Delivered over **300** webinars training more than **20,000** public & private sector stakeholders.



## **Resource Library**

- Over **1,500** curated reports, policy briefs, journal articles, etc.



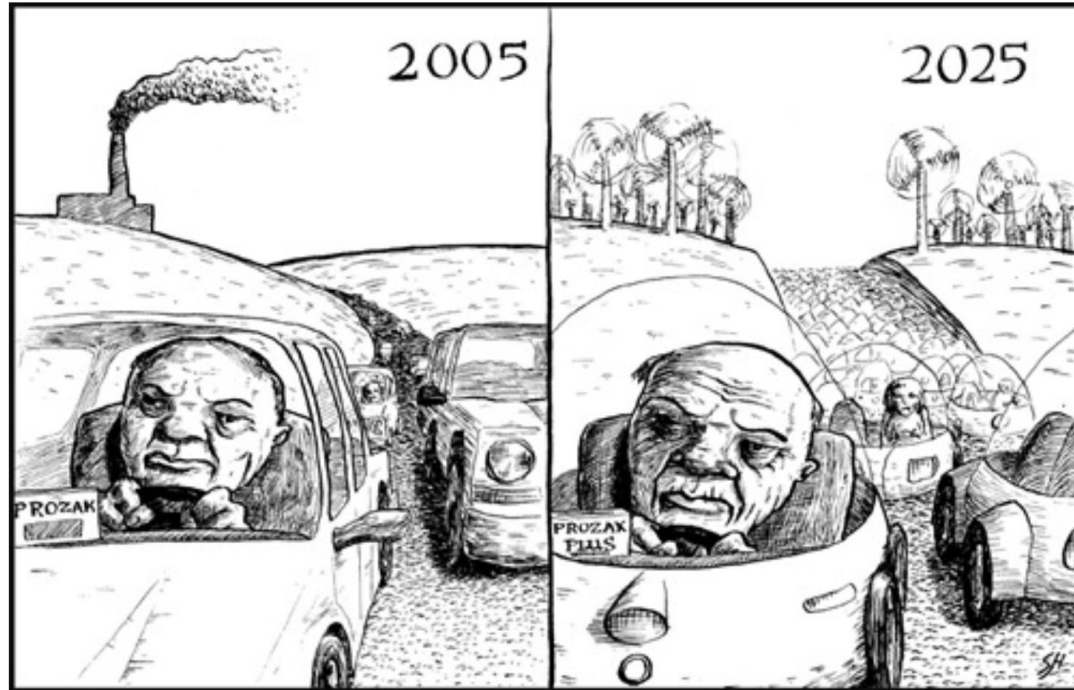
For additional information and questions, reach out to Jal Desai, NREL, [jal.desai@nrel.gov](mailto:jal.desai@nrel.gov)

# Webinar & Speaker Introductions

Presented by Richard Lorch, Buildings and Cities Journal,  
[www.buildingsandcities.org](http://www.buildingsandcities.org)

February 16<sup>th</sup>, 2023

# Ecological Overshoot



The technofixers' best-case scenario

## Authoritative, influential report based on peer-reviewed evidence

- How do we urgently & significantly reduce GHG emissions?
- What is an equitable, just approach?
- What additional cultural, policy, and practical solutions are needed?

**Who:** top-down, bottom-up (individuals) and middle out (organisations)

**What:** reduce demand, increase efficiency, manage better, decarbonise



- **Keynote: IPCC AR6 Main Findings - Buildings**

*Yamina Saheb and Sevastianos Mirasgedis*

- **Round Table Discussion**

*All speakers*

- **Audience Question & Answer Session**

*All speakers*

# Today's Presenters



**Yamina Saheb** is a Lecturer and Researcher at Sciences Po (Paris), a lead author of the Intergovernmental Panel on Climate Change ([IPCC](#)) [report on climate change mitigation](#).

Prior to this position, Yamina was a Senior Fellow Researcher at the University of Münster and previously a Senior Researcher at the University of Lausanne. In 2018, Yamina was the head of energy efficiency unit at the Energy Charter Secretariat. Before that, she was a Policy and Scientific Officer at the Renewables and Energy Efficiency Unit at the Institute of Energy and Transport of the Joint Research Centre (JRC) of the European Commission (EC). She also worked as a senior buildings energy efficiency policy analyst at the IEA.

Yamina holds a Ph.D in Energy Engineering, a Master's degrees on Landscape Architecture and Development Economics, and an Engineering degree in Building technologies.

# Today's Presenters



**Sevastianos Mirasgedis** is a Research Director at the National Observatory of Athens. Dr. Mirasgedis holds a Ph.D. in energy and environmental economics and a degree in Chemical Engineering from the National Technical University of Athens. He has been working for almost 30 years on issues of energy, climatic change, and economy, focusing on their complex interdependences and interactions.

His total number of publications exceeds 200 – among them 56 in peer-reviewed journals and 7 book chapters, while the citations in his published work exceed 2,200, according to Scopus. He has been a Lead Author in the 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> [IPCC Assessment Report on Climate Change](#) as well as in Global Energy Assessment (2013), covering issues related to the sector of buildings.

# Today's Panelists



**Julie Lodewyckx** is the head of the [Plan Bâtiment Durable](#) mission at the Ministry of Ecological Transition and Territorial Cohesion, which ensures permanent dialogue within the building and real estate sector in order to promote the achievement of the sector's energy and environmental efficiency objectives. The Plan Bâtiment Durable is also responsible for monitoring and supporting the implementation of the sobriety plan in tertiary and residential buildings.

She is an EMLyon business school graduate, specialized in the fight against climate change and its effects, and has worked for the environmental and humanitarian non-profit Matter Of Trust for the San Francisco City Council, for the European think tank on carbon transition called "[The Shift Project](#)", and on the Climate Air Energy Plan of the Greater Paris Metropolis.

# Today's Panelists



**Adrian Joyce** is Secretary General of EuroACE, the European Alliance of Companies for Energy Efficiency in Buildings. His role involves the day-to-day management of the affairs of EuroACE, bringing support to the working structure, preparing documentation, and advising the Members, the General Assembly, and the Board of Directors on issues that affect the energy efficiency of buildings. This includes monitoring the work of the European Union Institutions, with a view to distilling those aspects that are of importance to the energy efficiency sector and to the establishment of the market conditions that will encourage a significant increase in energy-related renovations to existing buildings. He also takes particular responsibility for technical issues including projects and the management of surveys, studies, and reports.

He is also the Campaign Director of the [Renovate Europe Campaign](#), which has been initiated by EuroACE in order to bring about a threefold increase in renovation rates of existing buildings by 2020 and to ensure that, by 2050, all existing buildings are at least 80% more energy efficient than they were in 2005.

# Today's Panelists



**Nigel Tonks** is the Arup's United Kingdom, Middle East, India, and Africa (UKIMEA) Board Member for Sustainable Development at Arup. Nigel has over 30 years of experience as a Consulting Engineer, working on sustainable building design with clients and collaborators, and is a passionate advocate for decarbonising the Built Environment industry.

Nigel is a senior advisor to the UNFCCC Climate Champions and a member of the [Building to COP coalition](#), forging global campaigns with non-state actors in the [Race to Zero](#) and the [Race to Resilience](#).

Nigel is the global sponsor for *Zero*, Arup's Whole Life Carbon platform which has assessed nearly 1000 projects in over 30 countries.

# Keynote: Presentation of the IPCC AR6 Main Findings

Presented by Yamina Saheb from Sciences Po (Paris) and Sevastianos Mirasgedis from the National Observatory of Athens

February 16<sup>th</sup>, 2023



# SIXTH ASSESSMENT REPORT

Working Group III – Mitigation of Climate Change

# Decarbonisation of buildings: Key findings from IPCC AR6

Dr Y. Saheb & Dr S. Mirasgedis  
February 16<sup>th</sup>, 2023







# Novelties of IPCC AR6 for buildings require a paradigm shift in the research and policy approach to climate mitigation

- 1. Considering scope 1, 2 & 3 in the assessment of buildings GHG emissions*
- 2. Assessment of buildings GHG emissions, technologies and policies through the lens of the SER (Sufficiency, Efficiency, Renewable) framework*
- 3. Contribution of mitigation actions in buildings to Sustainable Development Goals (SDGs)*
4. Links between mitigation and adaptation
5. The latest development of building services, components, technological and non-technological solutions to mitigate emissions from buildings



# Buildings will play a major role in climate mitigation if scope 1, 2 & 3 of emissions are considered

Sector	Contribution of direct emissions (scope 1) per sector to global GHG emissions in 2019		Sector	Contribution of direct and indirect emissions (scope 1&2) per sector to global GHG emissions in 2019
Electricity and heat	23%	Energy	Electricity and heat	0%
Other energy	10%		Other energy	12%
Industry	24%		Industry	34%
Transport	15%		Transport	15%
Buildings	5.6%		Buildings	16%
Agriculture, forest and land use	22%		Agriculture, forest and land use	22%

*The share of buildings emissions raise to 21% out of global GHG emissions if emissions from the use of cement and steel (scope 3) in buildings are considered*

# The SER (Sufficiency, Efficiency, Renewable) framework is a novel approach to climate mitigation





# Sufficiency is an organising principle to deliver on climate justice within the planetary boundaries

**“Sufficiency policies are a set of measures and daily practices that avoid demand for energy, materials, land and water while delivering human wellbeing for all within planetary boundaries.”**



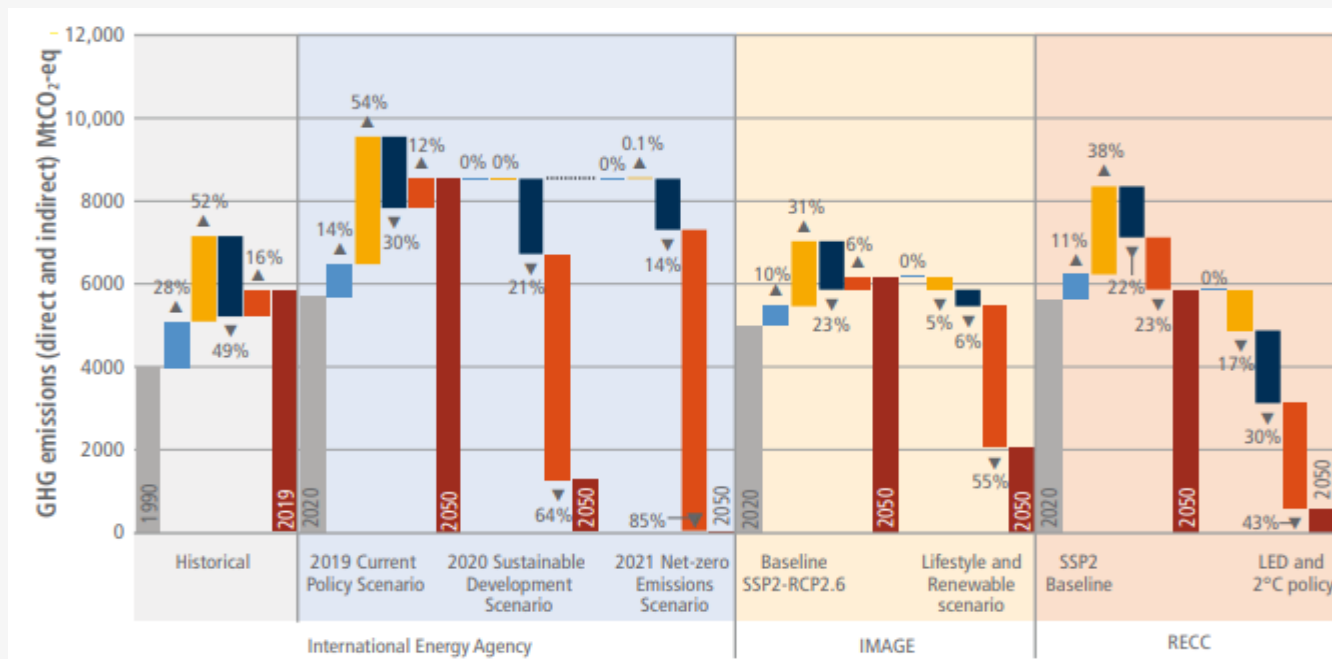
# Sufficiency tackles the causes of climate change while efficiency tackles the symptoms

Sufficiency	Efficiency
Doing the right things	Doing things right
Tackles causes	Tackles symptoms
Requires strong policy intervention	Driven by market actors
Requires system change	Incremental improvement of individual technologies
Absolute reduction of the demand for all natural resources	At the best reduces energy and materials consumption
The cost of climate neutrality is shared	Individuals bear the cost of efficiency improvement



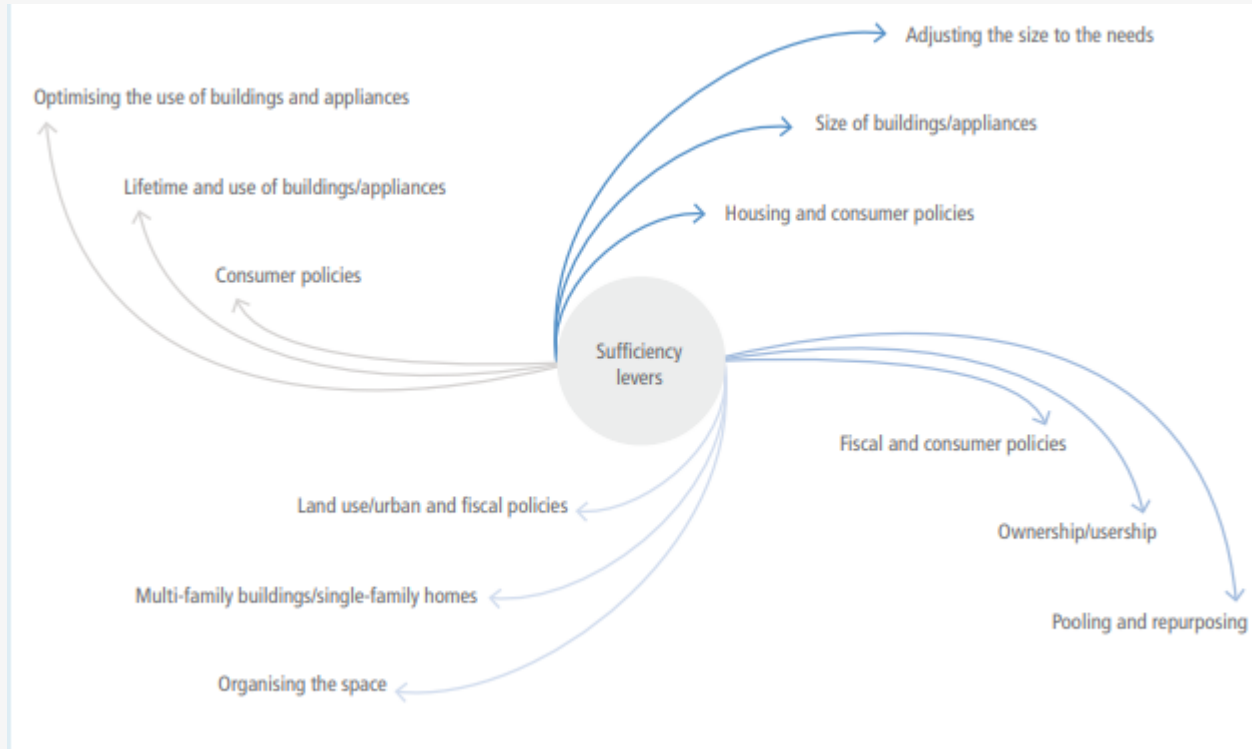
## Decarbonisation of buildings is out of reach without sufficiency policies

*Decomposition of global CO<sub>2</sub> emissions in residential buildings*





## Sufficiency policies go beyond the traditional framing of demand reduction around efficiency and behavior change





## Contribution of mitigation actions in buildings to SDGs: an overview

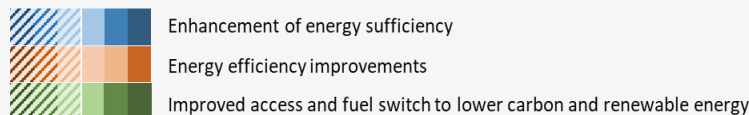
	Mitigation actions	Synergies	Trade-offs	Synergies and trade-offs
S	Building design and performance			
	Change in construction methods and circular economy			
	Change in construction materials			
E	Highly energy efficient building envelope			
	Heating, ventilation and air conditioning (HVAC)			
	Efficient Appliances			
	Demand-side management			
R	On-site and nearby production and use of renewables			

### Confidence Levels

- Low confidence
- Medium confidence
- High confidence

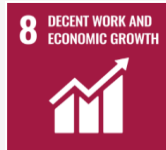


## Contribution of mitigation actions in buildings to SDGs: evaluating the importance





## Example #1:



- Buildings-related labour productivity
  - 1.78-5.27 (average 3.09) more active days per year and person who has actually shifted to a deep retrofitted dwelling
  - 7-12% increase of the overall performance of the workers in office buildings by reducing overheating across Europe
- Enhanced asset values of energy efficient buildings
  - 1.5-28% (median 7.8%) price premium for the highest energy efficient dwellings compared to reference houses with the same characteristics
- Creation of new jobs and contribution to economic development
  - 9-30 jobs per million dollars invested in building retrofits
  - 7-16 jobs per million dollars spent in purchasing highly efficient appliances
  - 8 jobs per million dollars of consumer bill savings that will be spent elsewhere
- Improvements in energy security



## Example #2:



- Improved indoor air quality & Energy poverty alleviation
  - 2 million fewer premature deaths from HAP in 2040 compared to current levels, by achieving universal access to modern energy in developing countries.
  - 24,500 avoided premature deaths due to indoor cold and around 22,300 DALYs of avoided asthma due to indoor dampness in EU-28 if accelerated energy efficiency policies are implemented resulting in reduced the energy demand in residential sector by 333 TWh in 2030.
- Better ambient air quality
- Health-related benefits attributed to the two weatherization programs implemented in the US in 2008 and 2010 exceeds by a factor of 3 the corresponding energy cost savings yield.
- Energy efficient buildings may increase the risk of mould and moisture problems due to reduced air flow rates, and consequently adequate ventilation is needed.



## Policy implications

- The value of the multiple impacts of mitigation actions in buildings are significantly greater than the value of energy savings.
- Appropriate policies are needed in order to maximize these multiple impacts associated with mitigation actions.
- Their quantification/monetization presents significant methodological difficulties and often they are ignored in policy making.
- Quantifying and if possible, monetizing, these impacts would strengthen the adoption of ambitious emissions reduction targets and improve coordination across policy areas.



# Thank You

The report is available [here](#)

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Yamina Saheb ([yamina.saheb@openexp.eu](mailto:yamina.saheb@openexp.eu))

## For More Information:

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IPCC Press Office: [ipcc-media@wmo.int](mailto:ipcc-media@wmo.int)

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# Additional Resources



- Section C7, page 31 of [IPCC WGIII Summary for Policy-makers](#)
- Building section, page 100-104 of [IPCC WGIII Technical Summary](#)
- [Building Chapter of IPCC WGIII Report](#)
- [COP26: Sufficiency Should be First](#), Y. Saheb, Buildings and Cities, October 2021
- [Towards Sufficiency and Solidarity: COP27 Implications for Construction and Property](#), David Ness, 2022
- [Can Personal Carbon Allowances Help Cities Reach Their Climate Targets?](#), Tina Fawcett, Kerry Constabile, Yael Parag
- [Embodied Carbon Emissions in Buildings: Explanations, Interpretations, Recommendations](#), T. Lützkendorf, & M. Balouktsi
- [Net-Zero Buildings: Halving Construction Emissions Today](#), 2023

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**Thank You!**