Rede Urbenerge

Measuring sustainability in urban neighbourhoods

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WHAT is Urbenere?

URBENERE – Energy-Efficient Urban Communities
Comunidades URBanas ENERgeticamente Eficientes

Human Resources Training for the Promotion of Energy-Efficient Urban Neighborhoods

- Ibero-American Network financed by **CYTED**
- Thematic Area : **Energy**
- Duration (months): **48**
- Total number of teams: **11**
- Total number of people: **76**
- Total number of R&D&I teams: **6**
- Total number of companies: **4**
- Total number of participating countries: **8**

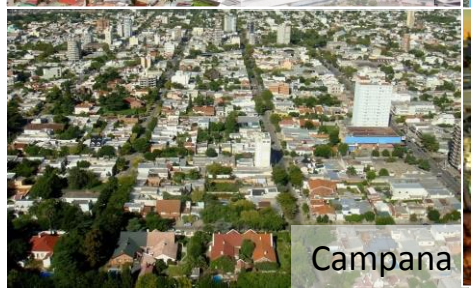
11 grupos y 76 investigadores


Cuenca


Guimarães


Ciudad del México


San Pedro


Campana


Madrid


Figueró dos Vinhos


Concepción


Vila Velha


Vitória


Flores da Cunha

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The Challenge

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Objectives

- goal:
  - technology and know-how transfer
  - development of energy-efficient urban neighbourhoods
  - development and dissemination of technical and scientific educational materials

- training of human resources and publications:
  - focused on the needs of the different markets
  - that increases changes in public policies
  - in accordance with the most advanced current knowledge

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Themes

Theme A: Methodology and tool for the sustainability assessment of urban neighbourhoods

Theme B: Public policies to promote sustainability and energy efficiency

Theme C: Sustainable regional and urban planning

Theme D: Urban mobility

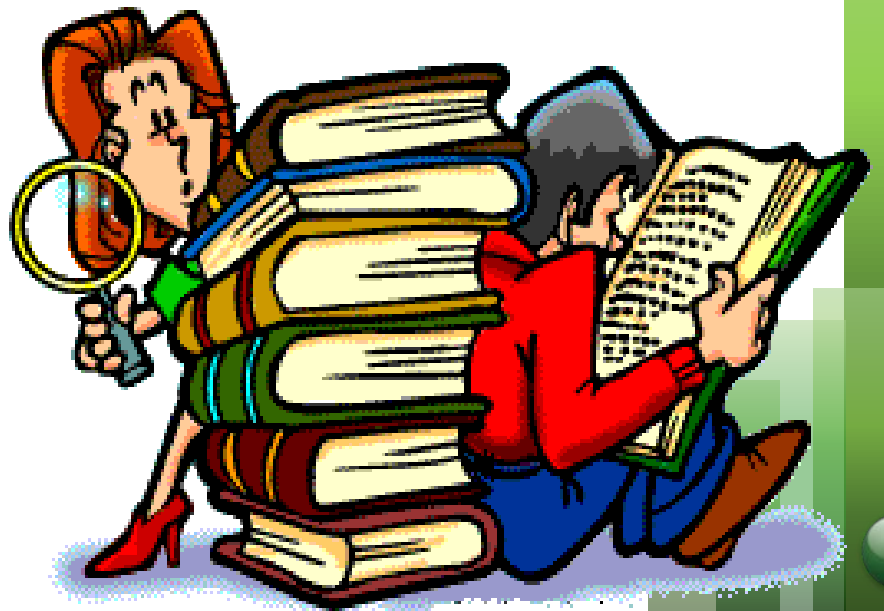
Theme E: Bioclimatic strategies

Theme F: Integrated design of sustainable and energy efficient neighbourhoods

Theme G: Energy systems. Integration of energy systems in buildings

Theme H: Heating, cooling and ventilation

Theme I: Water treatment systems



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2 WHY do we measure?


Measure
Look
Understand
The Complex City
Human miracle
Fabulous creation
Collective construction
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Why do we measure?

- For planning and design so as to reach optimal conditions of life for all the population.
- To establish a common language among the different stakeholders.
- To create membership and desire to improve living conditions.

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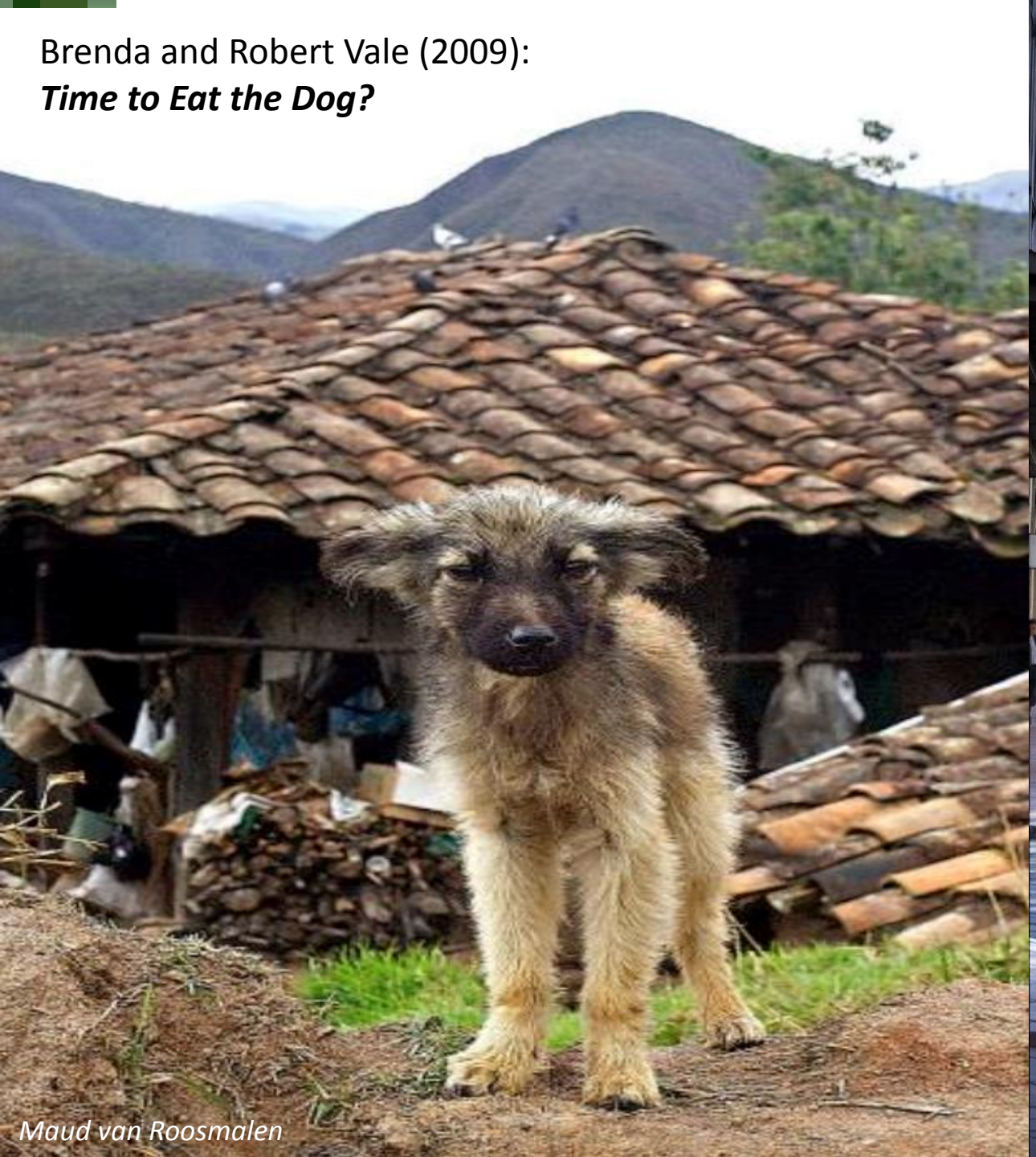
Brenda and Robert Vale (2009):
Time to Eat the Dog?



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Vehicle has a lower footprint than half of a medium dog's size.
Eliminate all pets in favour of cars?
Careful with what you measure and how you do it!

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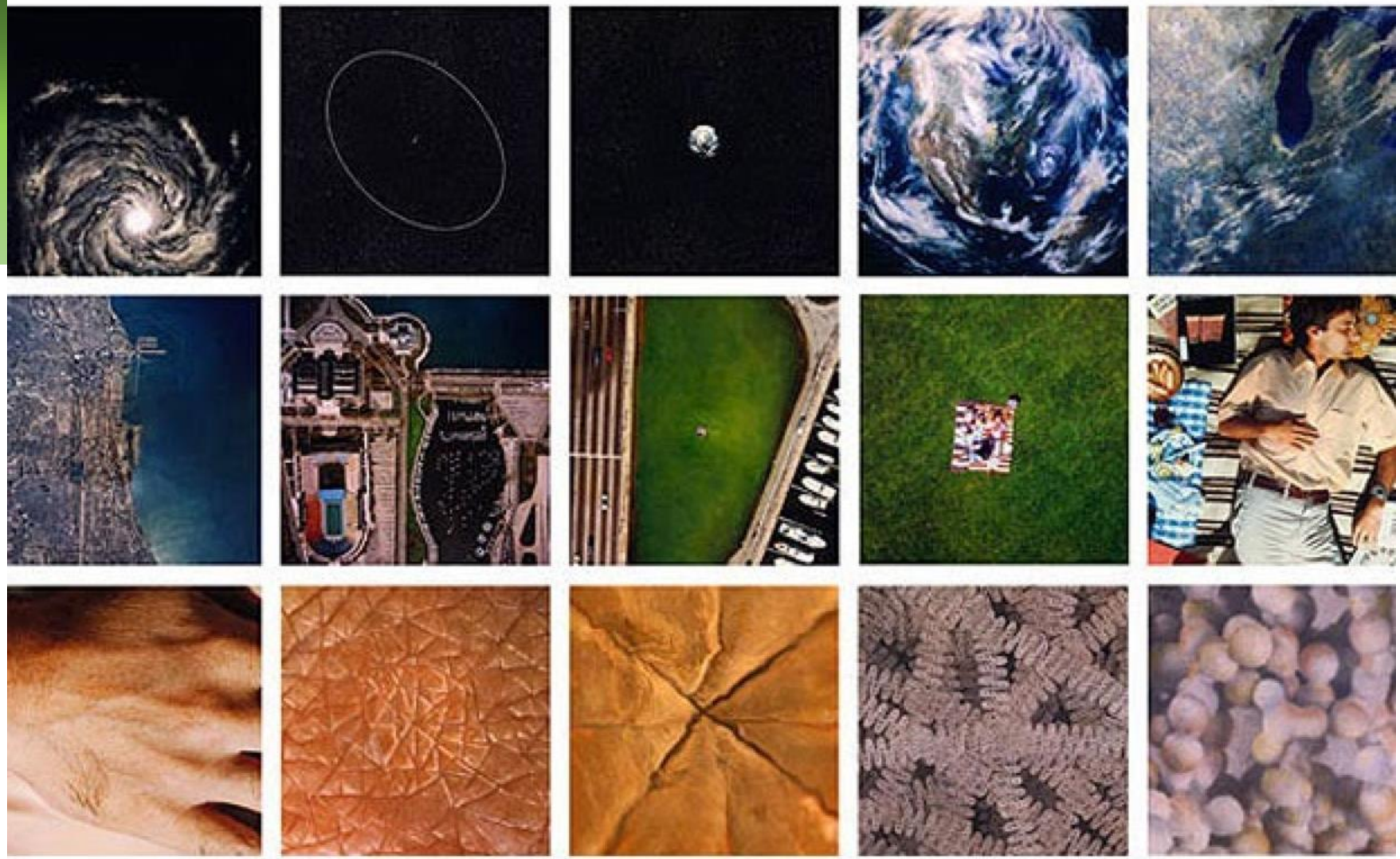
WHERE do we measure?



Potencias de diez nos lleva a una aventura en las magnitudes. A partir de un picnic a orillas del lago en Chicago, esta famosa película nos transporta a los bordes exteriores del universo. Cada diez segundos vemos el punto de partida de diez veces más hasta que nuestra galaxia es visible sólo como una mancha de luz, entre muchas otras. Volviendo a la Tierra a una velocidad vertiginosa, nos movemos hacia el interior de la mano del hombre en el picnic con un aumento de diez veces más cada diez segundos. Nuestro viaje termina dentro de un protón de un átomo de carbono dentro de una molécula de ADN en una célula de sangre blanca. Charles Eames, Ray Eames, Eames Office, 10-10-10, potencias de diez, exponentes, ciencia, matemáticas

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Territory **City** **Neighbourhood** **Building** **Material**

Neighbourhood

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- The neighbourhood is the smaller territorial unit within the city.
- It is directly related to the proximity and the ordinary activities and relations.
- It is based on the flows and the movement of the inhabitants.

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It is at this scale where you can implement ideas related to:

- Land use and compactness,
- Alternative systems of mobility,
- Reduce energy consumption,
- Create liveable and healthy environments,
- Implement quality of urban services,
- Generate environmental awareness and effective capacity of citizen participation

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HOW do we measure?


Model definition
Secondary data revision
Workshops for the definition of indicators
Draft list of indicators
Qualitative evaluation of indicators
Recommended indicators

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Conceptual definition

Environment

Economic

Institutional

Social And Cultural

Sustainable energy

Urban heat island

Sustainable neighbourhoods

Urban Sustainability in Neighbourhoods

Water savings

Urban metabolism

Water reuse

Energy efficiency

Energy poverty

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Analyse criteria:

- Can they be translated at the neighbourhood level?
- Do they provide information for the description of sustainable energy?
- Can they be applicable to various locations and socio economic status?
- Are they applicable at the operational phase?

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Measuring Areas

5 measuring areas

1. Built space
2. Natural environment
3. Environmental service
4. Institutional involvement
5. Quality of life

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Who is planning and designing our cities today?

The BUILT SPACE must be planned so as to promote energy efficiency, reduce greenhouse gases and heat island effect. It includes:

a. Compactness.
b. Diversity of uses.
c. Urban microclimate.

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Are we promoting a green environmental friendly design?

The NATURAL ENVIRONMENT must be preserved and improved in the urban environment to mitigate the effects of climate change and the heat island effect. We need to think about the:

a. Urban green
b. Environmental conditions

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Are we promoting smarter energy grids?

We need to encourage the use of systems for energy efficiency in URBAN SERVICES and it includes:

a. Energy management in public space
b. Energy management in building
c. Waste management in public space and buildings

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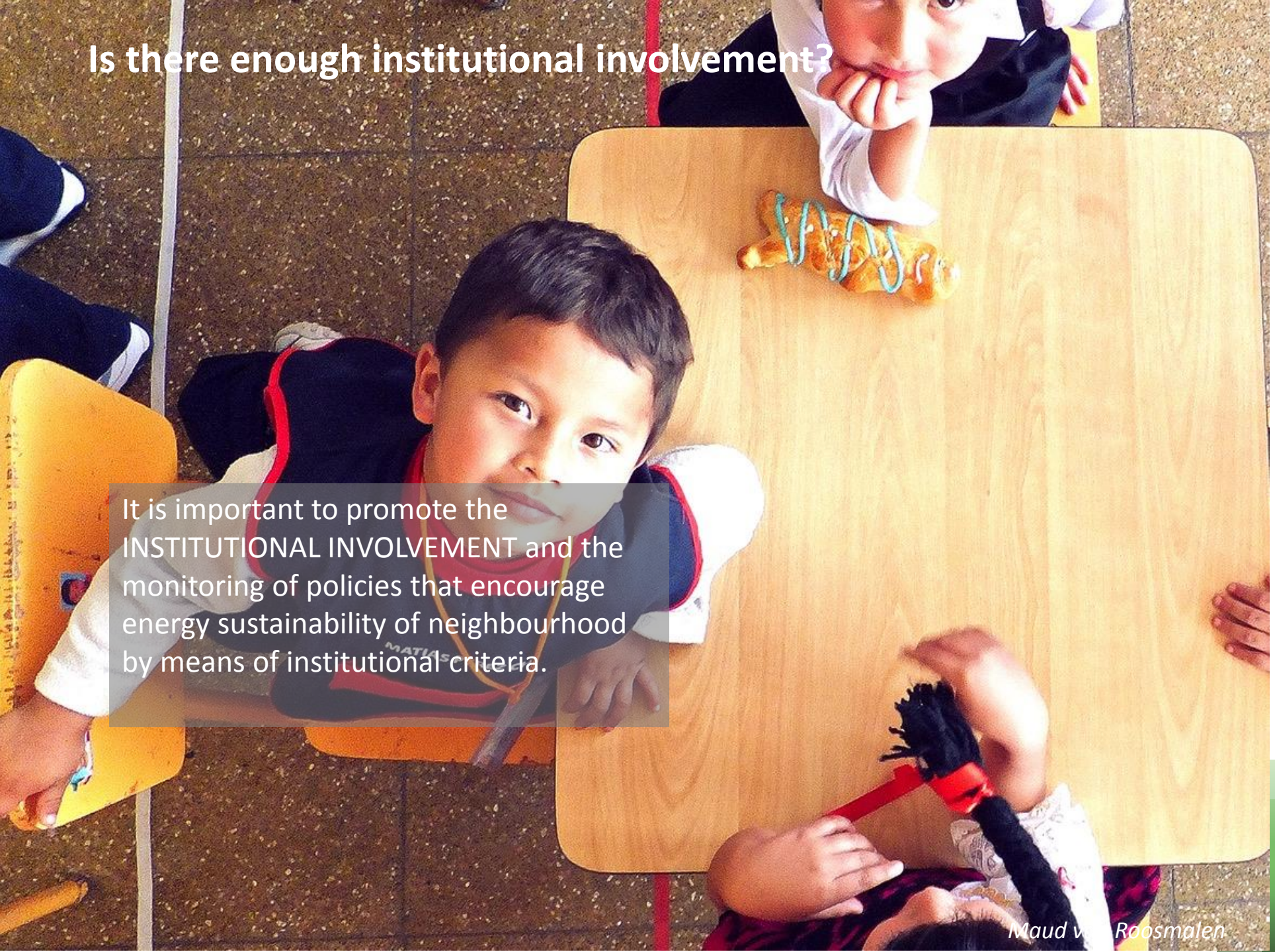
Is there enough institutional involvement?



It is important to promote the INSTITUTIONAL INVOLVEMENT and the monitoring of policies that encourage energy sustainability of neighbourhood by means of institutional criteria.

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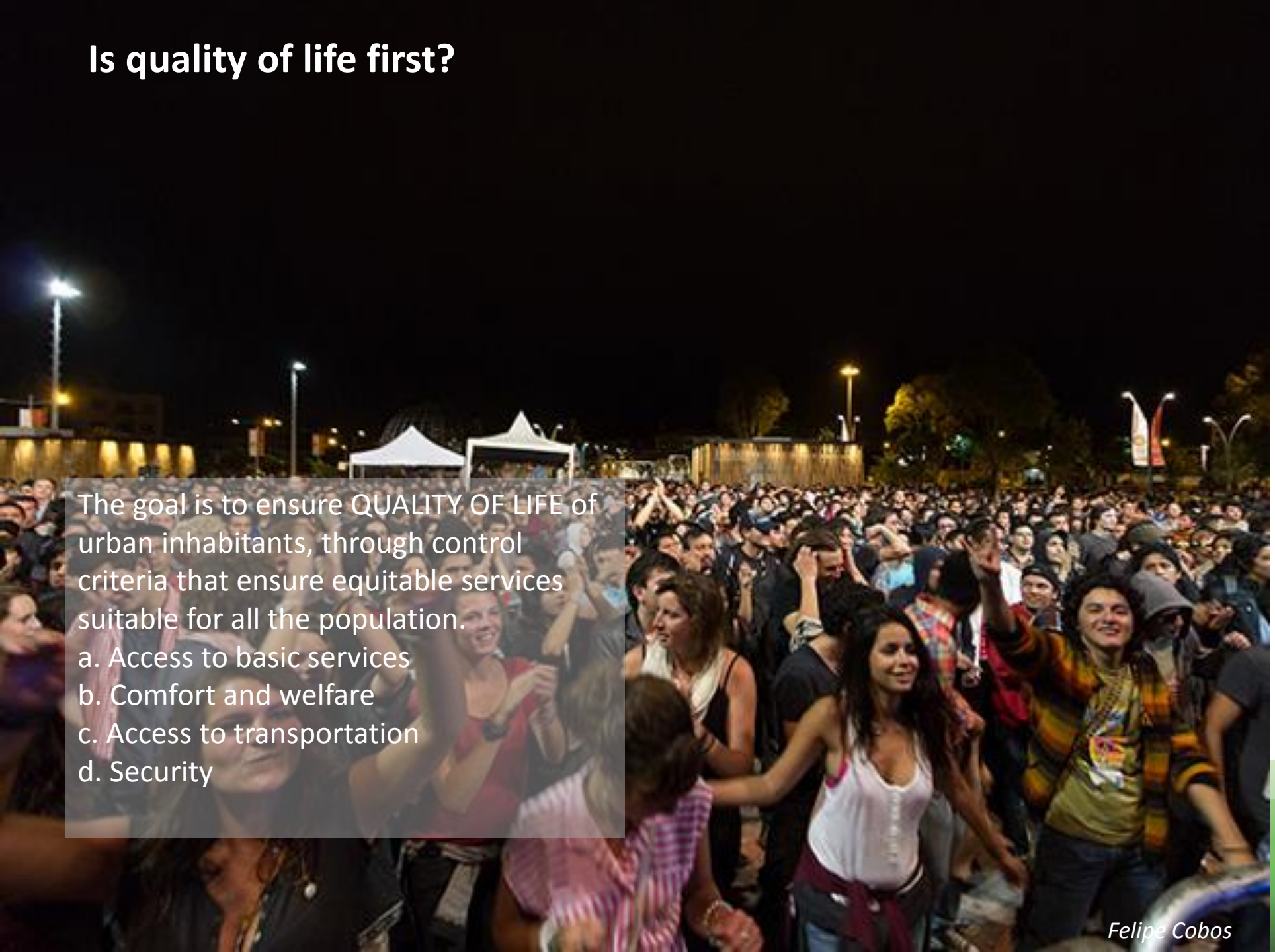
Is quality of life first?



The goal is to ensure QUALITY OF LIFE of urban inhabitants, through control criteria that ensure equitable services suitable for all the population.

a. Access to basic services
b. Comfort and welfare
c. Access to transportation
d. Security

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Validation Criteria

Evaluation and validation of the criteria was done by a group of experts with special attention to:

- Availability.
- Cost – effectiveness.
- Simplicity.
- Representation and validity.
- Sensitivity to detect changes.
- Independence.
- Priority and usefulness.

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- **Availability**

Is the necessary data easy to obtain and has no restrictions of any kind?

- **Cost – effectiveness**

Is it possible to cover the costs for the construction of the criteria, its measurement and monitoring, and its sustainability in time?

- **Simplicity**

Is it easy to measure and replicate the criteria in the long term?.

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- **Representation and validity**

Has the criteria the ability to actually measure the phenomenon that is to be measured and not others?

- **Independence**

Does the criteria depends significantly from other criteria that limit its quantification and monitoring in the long term?

- **Priority and usefulness**

Has the criteria relevance for the evaluation of the energy sustainability of a neighbourhood and for decision-making regarding its planning?

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Proposed Indicators for Energy Efficiency Assessment of Urban Neighbourhoods

CATEGORIES	INDICATORS
BUILT ENVIRONMENT	1. Density of inhabitants
	2. Density of buildings
	3. Proximity to transportation networks (not including private vehicle networks)
	4. Radiation and ventilation
NATURAL ENVIRONMENT	5. Green surface per inhabitant
	6. Distribution of green areas in the public space
URBAN SYSTEMS	7. Non-renewable energy consumption in public space
	8. Percentage of non-renewable energy consumption with public lighting
	9. Drinking water consumption in public space
	10. Non-renewable energy consumption
	11. Electrical consumption for residential end use
	12. Drinking water consumption
	13. Percentage of drinking water consumption with additional sources to the Public Network
	14. Annual production of solid waste
	15. Use of functional and environmentally efficient materials

CATEGORIES	INDICATORS
INSTITUTIONAL ENVIRONMENT	16. Existence, monitoring and compliance with air quality standards
	17. Existence, monitoring and enforcement of noise pollution standards
	18. Existence, monitoring and compliance with energy efficiency standards
	19. Existence of an inventory of greenhouse gases and monitoring
	20. Existence, monitoring and compliance of standards on water consumption and effluent treatment
	21. Existence, monitoring and compliance with standards on solid urban waste management
	22. Percentage of dwellings connected to the city's water network
	23. Percentage of buildings with regular solid waste collection
QUALITY OF LIFE	24. Outdoor comfort
	25. Percentage of citizens who feel safe
	26. Accessibility to public transport
	27. Percentage of preserved buildings or natural areas identified as relevant

Next steps: all invited!

Definition of scenarios will help as deftermine the measurement parameters for each reality and also explore the “what if…” in each case.

The scenarios could be characterized by:

- Climate and comfort of each city
- Source of energy supply (renewable or non-renewable)
- Land use (residential, commercial, industrial, mixed)
- Socioeconomic status
- Environmental control strategies applicable (passive, mechanical, or mixed

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