



## Sense-Scapes: Natural Darkness and Quietness for the Sustainable City

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## Content

- ▶ Introduction: Light and noise pollution
- ▶ Light and Darkness
- ▶ Monitoring and governing light
- ▶ Traditional acoustic planning versus the soundscape-based approach to the sustainable city. Best practices.
- ▶ The Beyond the Noise project for planning “quiet areas” in Berlin
- ▶ Conclusions: new ways of integrating light and sound into sustainable planning

Own Photo



## Light and Noise Pollution... The Need for Darker and Quieter Places

- ▶ Quietness and darkness as new “luxury goods”
- ▶ The relations and analogies between light and noise pollution, natural darkness and quietness
- ▶ The need for near natural darkness and quietness for the sustainable city
- ▶ The neglect of both aspects in urban planning

## Light and Darkness



## ■ Light Pollution

- ▶ Unwanted effects of light:
  - Glare – objectionable brightness (disability glare, discomfort glare)
  - Light Trespass – light spill where it is not wanted
  - Sky glow – illumination of the night sky
  - Over illumination – too much light, unused light
- ▶ With negative effects on:
  - Humans
  - Sky visibility
  - Fauna and flora
- ▶ Loss of natural darkness

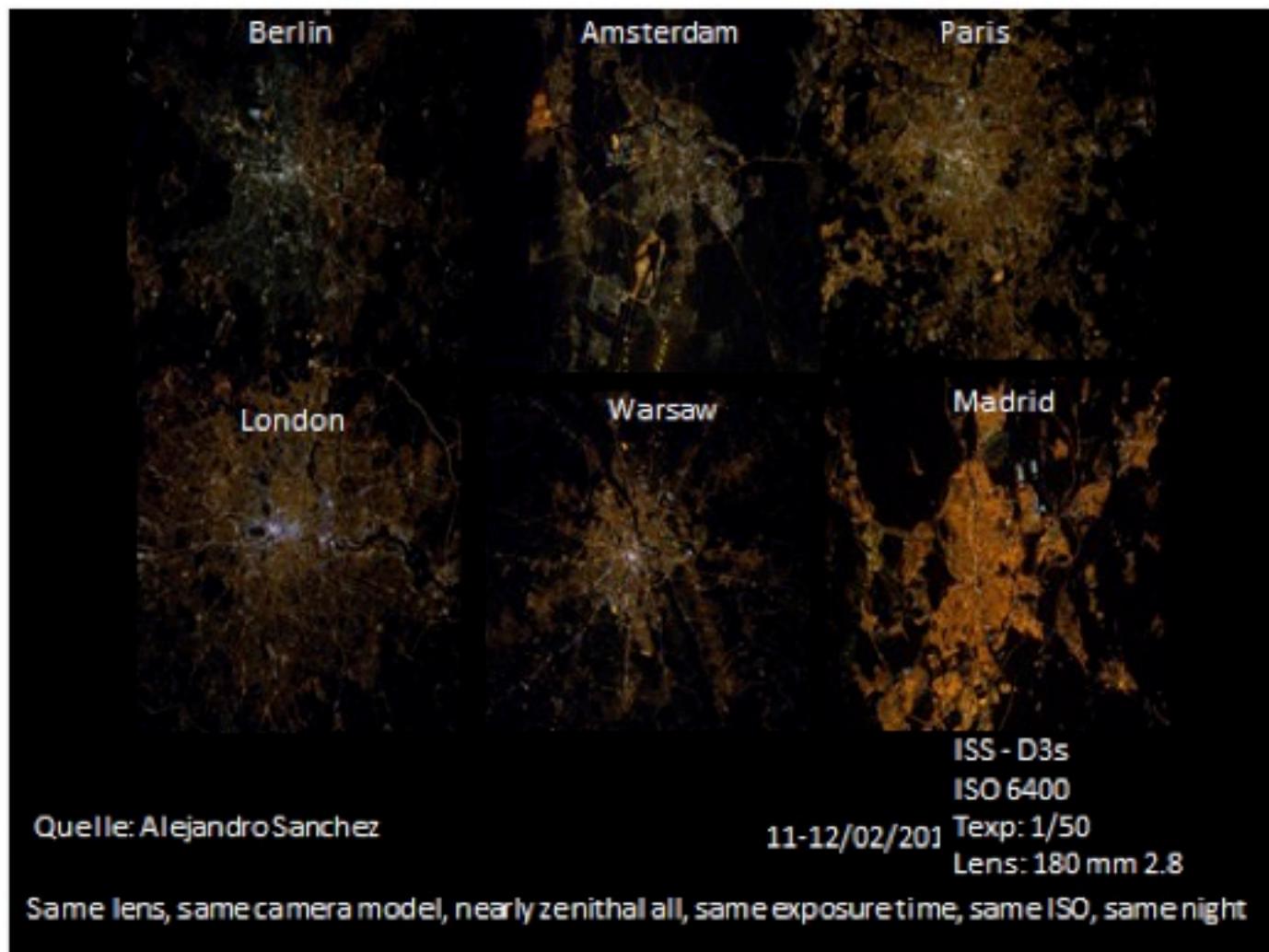
Potsdamer Platz Berlin, own photo

## ■ Lighting Situation in European Capitals in Comparison

Very different  
lighting  
intensities in  
European Cities

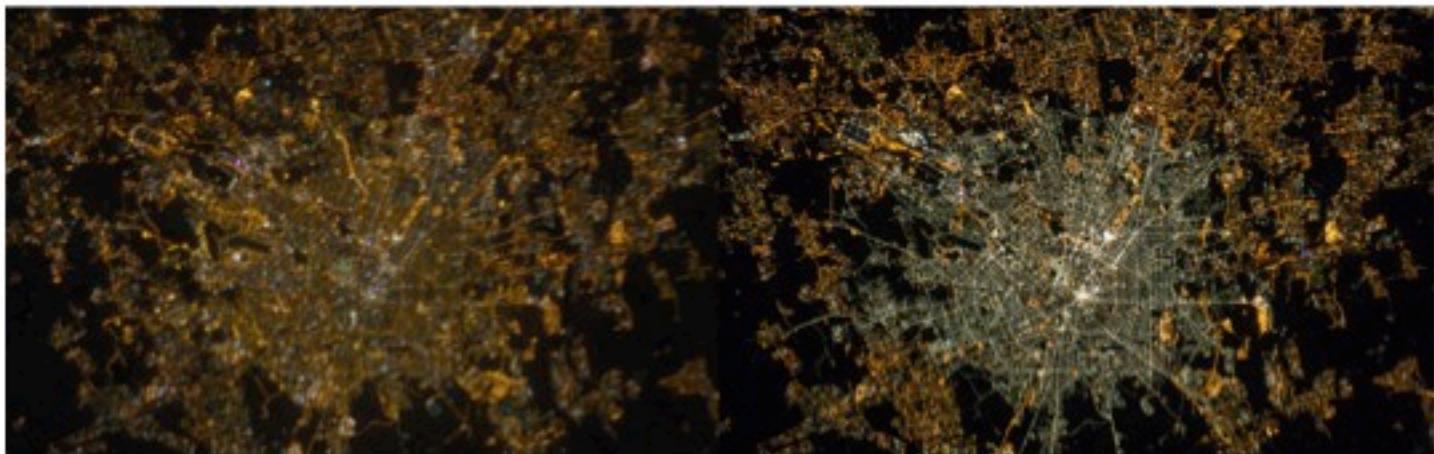
**Indication of:**

- Different technologies
  - Different path dependencies
  - Different lighting regimes



Alejandro Sanchez based on Nasa

## Milan at Night 2012 and 2015



Retrofitting of Light in Milan: From low pressure Sodium to LED:

- Done mostly in 2015: Aim 85 per cent till the opening of EXPO
- Done by a private company. No lighting master plan, mostly a technical effort
- Even if satellite images of LED seem darker, the lights are normally much brighter

<https://pbs.twimg.com/media/CH4CnqeUkAAKId2.png>; <https://pbs.twimg.com/media/CH4Cn13VAAAoeyM.png>; own photo

# Berlin

Upward emitted light:  
The airport (bright spot in the north-west angle) is responsible for about 5 per cent of all the upward emitted light.  
Clearly visible: road net, major squares, agglomerations of different functions, special functions (sports, prisons, factories, etc.)



© Chris Kyba

## Berlin: Lighting Situation 23:30 pm and 3:00 am at Alexanderplatz and Potsdamer Platz

Time lapses

Berlin

[https://  
vimeo.com/  
channels/city  
nightlapse](https://vimeo.com/channels/citynightlapse)

Remarkable differences in lighting situations at different times – due to different types of light and different responsible actors

Alexanderplatz



Potsdamer Platz



23:30



03:00

03:00

Own photos



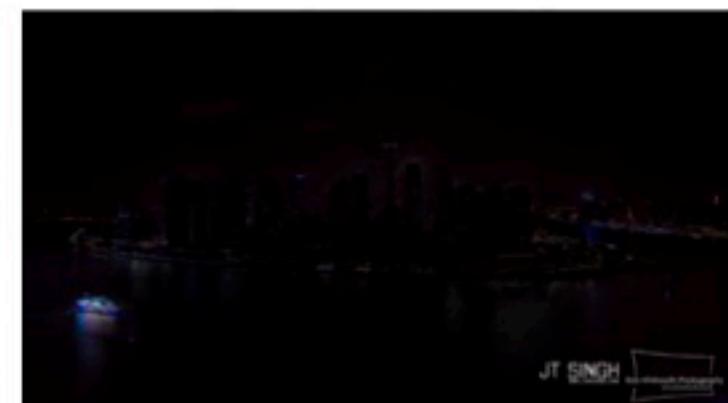
## Differences of Lighting Situations indicate...

- ▶ ... at least some of the lighting situations cannot be sustainable
- ▶ ... there is a lot of potential for more efficient and sustainable lighting



<https://vimeo.com/63635193> Minute 01:01 Abruf 09.03.2015

Shanghai, Nasa



<https://vimeo.com/63635193> Minute 01:04 Abruf 09.03.2015



## ■ Protecting Darkness

- ▶ Recently measures to reduce illumination and protect natural darkness have come into practice, e.g.:
  - Parks/green areas should generally not be lit
  - Residential areas should be lit to lower levels than urban centers
  - Lights should be dimmed/switched off during part of the night
- ▶ Some (but still only a small number of) cities have developed lighting master plans (e.g. Lyon, Zürich, Berlin) setting these agendas

*Own photo*

## ■ Urban Light Planning as a Necessary Urban Duty



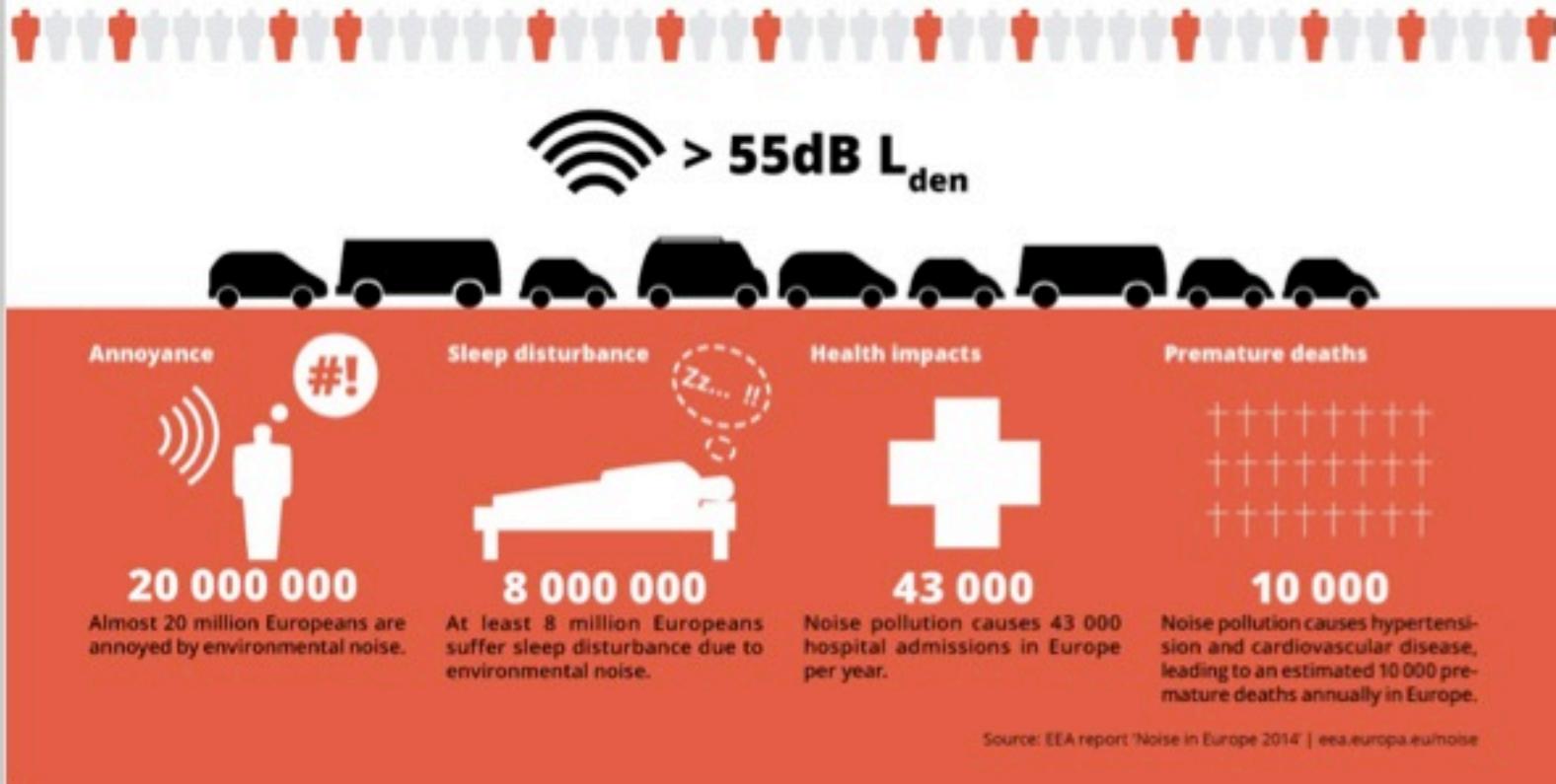
- ▶ An integrated governance of lighting has to take into account:  
costs, security, aesthetics, orientation, environmental impacts
- ▶ Key aspects of light quality
  - Purpose/function of illumination
  - Type and quantity of light
- ▶ Key aspects of efficiency: Light only
  - **where** it is needed
  - **when** it is needed
  - at the **amount** needed

*Lighting Masterplan Lyon*



## Noise, Sound and „Quietness“

## Noise Pollution in Europe



"Noise levels from road traffic that are greater than 55 dB<sub>den</sub> affect an estimated 123 million people – one in four Europeans"



# ■ ENVIRONMENTAL NOISE DIRECTIVE 2002 (dB/L<sub>den</sub>/L<sub>night</sub>)

## NOISE MAPS

i.e. Firenze Noise Map

>>>>>>>>>



+ QUIET AREAS  
- NO METHODS

## NOISE ACTION PLANS

i.e. Berlin Noise A. Plan

>>>>>>>>>



## ■ NOISE, a cultural concept [Schafer, 1977]

UNWANTED  
SOUND—

unmusical  
sound—

ANY LOUD  
SOUND—

disturbance in  
any signaling  
system—



© Roy Lichtenstein

## ■ The notion of SOUNDSCAPE & Its methodological consequences

"The **soundscape**, which we define as **the relationship of people and sonic environments of any kind...**"

(Barry Truax, 1974)

## ■ ACOUSTIC PLANNING VERSUS THE SOUNDSCAPE-BASED APPROACH

ACOUSTIC PLANNING

SOUNDSCAPE APPROACH



noise(scape)  
quantitative measurements  
sources  
top-down  
acoustical criteria  
noise maps  
acoustic zoning

sound(scape)  
qualitative/field recordings  
people/environment  
bottom-up  
subjective criteria  
sound maps  
soundscape planning

## ■ WHY IS THE SOUNDSCAPE APPROACH RELEVANT?

**Information\***

**Value\***

**Immaterial  
cultural heritage\***

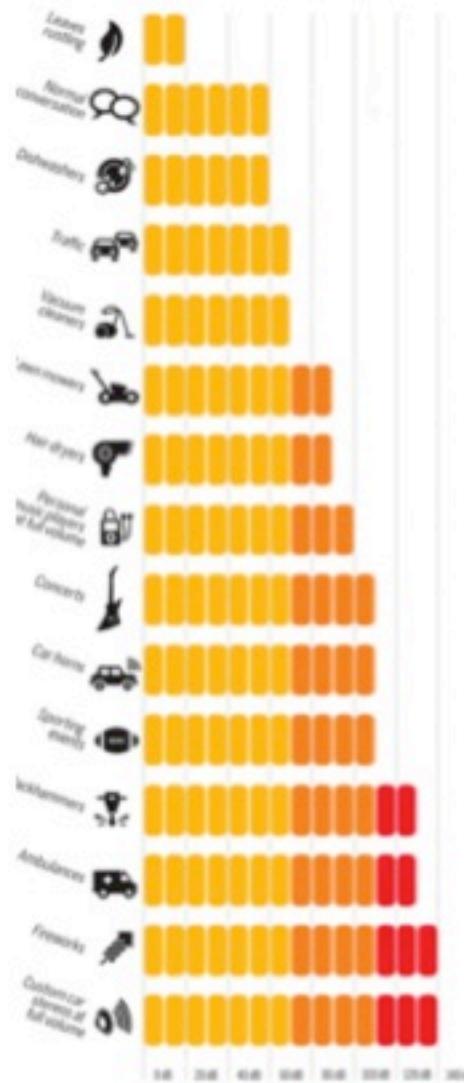
**Emotion\***

**Memory\***

**Power\***

**Hidden places\***

**Social diversity\***



**SOUNDS**  
**totally safe**  
**dangerous over 30 min**  
**use hearing protection or avoid**

## ■ WHICH TOOLS ARE AVAILABLE SO FAR?

### SOUND MAPS

i.e. Firenze Sound Map

>>>>>>>>>>



### SOUNDSCAPE DESIGN PROJECTS

i.e. The Sea Organ

>>>>>>>>>>



## ■ WHAT'S NEXT?

### OPEN QUESTIONS

>>>>>>

- ▶ Development of methodology and tools
- ▶ Combination of qualitative and quantitative data
- ▶ Integration of the Soundscape Approach with acoustic and urban planning

## ■ „BEYOND THE NOISE: OPEN SOURCE SOUNDSCAPES“

### A QUALITATIVE METHODOLOGY



- + “open source soundscape” approach
- + pilot study in Berlin
- + public participation
- + fieldwork analyses
- + open source e-tools
- + “everyday quiet areas”
- + human voice

## PILOT STUDY

### OUTER CITY

**Quiet areas' size:**  
 $> 100 \text{ ha}$

>>>>>>>>

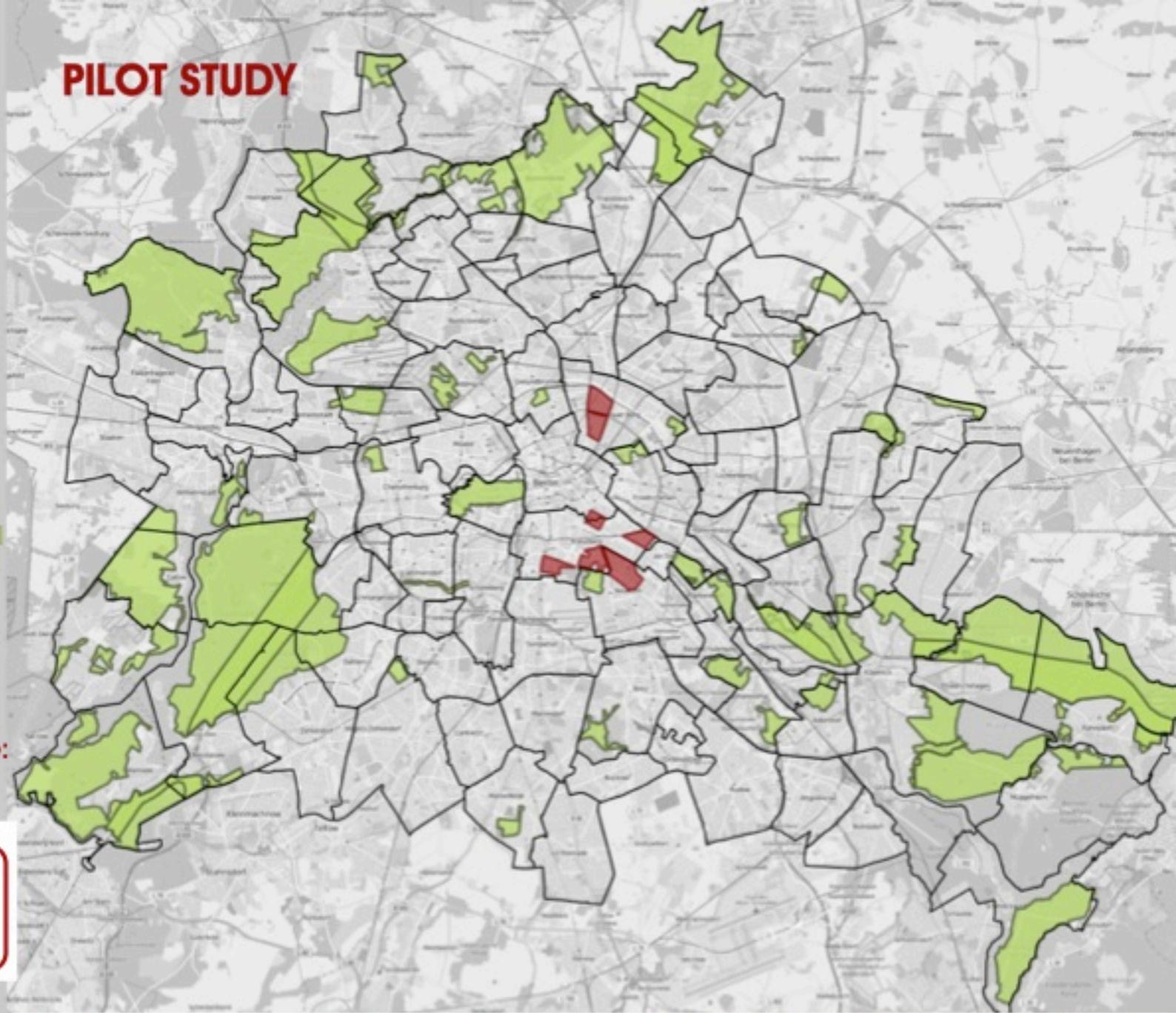
### INNER CITY

**Urban recreational areas' size:**

$30 > x > 100 \text{ ha}$

>>>>>>>>

**Kiez's average size:**  
 $< 30 \text{ ha}$



## ■ BEYOND THE NOISE: OPEN SOURCE SOUNDSCAPES

EXPECTED  
RESULTS

>>>>>>

&

POSITIVE  
IMPACT ON

>>>>>>

SIDE POSITIVE  
IMPACT ON

>>>>>>

### THE BERLIN OPEN SOURCE ATLAS

FREE / OPEN / DIGITAL

The Berlin Everyday Quiet Areas Plan

The Berlin Everyday Quiet Areas Master Plan

other maps, plans, data of the Berlin Senate

- + BOOSTING social interaction & oral communication
- + IMPROVING the sonic quality of urban public spaces
- + REDUCING the harmful effects of noise pollution
  
- + PUBLIC'S AWARENESS of the sonic environment
- + THE SPREAD of the open-data/open-source movement

## ■ Conclusions

- ▶ Sustainable planning and the enhancement of urban quality calls for:
  - the integration of lighting governance and design
  - the integration of acoustic planning and the soundscape approachinto formal and informal urban planning taking advantage of new technologies and involvement of all stakeholders and citizens

19:40

20:30

21:20

22:10

23:00

23:50

00:40

01:30

02:20

03:10

04:00

04:50

05:30

# Thanks for Your Attention

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**VERLUST** der NACHT



**c**cost

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