Global Approaches to Light Pollution Legislation

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AIMS OF THE PAPER

• A critical analysis of regulatory examples –
  – France
  – Korea

• What makes good regulation?
VITAL- a full understanding of light pollution

- Balance of the interests
- Lighting in the right place
- At the right time
- At the right level
- Of the right spectrum
REGULATION MUST BALANCE

- Safety and security*
- Advertising*
- Leisure*
- Architecture
- Nuisance
- Human rights
- Nightscape/ecology/energy
HOW?

• Hard law (binding)
• Soft law (guidance)
• Bolt on - weaker

• Dedicated laws-
  – Objective metrics
  – Curfews
• Building regulations & eco buildings
  – Sleeping people/ecology
• Upgrading street lighting
  – Sleeping people/ecology
• Advertising regulations
• Balance advertising benefits/sleeping/ecology
NEW CHALLENGE - DAYLIGHT LIGHTING

Gas

Tungsten - Blue rich
Streetlight Comparison. Top to bottom: 35W SOX, SON and (4200K?) LED
A BALANCE OF INTERESTS?
Cities that consume 30% less energy?

Certainly.
EXAMPLE LAW: FRANCE

- Dedicated LP law with guidance
- Environmental law - energy/carbon emissions/ecology & the night sky
  - Not metrics based limits - uses curfews
  - Avoids quantifying light
FRANCE

• Covers most non-domestic lighting

• Curfews, indoor lighting-
  – Off an hour after the last employee leaves
    Night security guards?

• Curfew exterior lighting-

• Off 1-7am Includes illuminated shop windows
FRANCE

**Excludes** consumer lighting

A common cause of problems
FRANCE

• Excludes
• Commercial lighting on sensors
  – Good- lighting is not always on
  – Compromise/ acceptance by business & consumer over safety and security
FRANCE

• Exclusions

• Christmas & permanent cultural lights (Art. 4)

• **Good** - balance of culture, tourism, business, against the effects of LP?

• **Bad** - open to abuse?
FRANCE

• Bad-
• No installation control
• Sensors not enough
• LED? Not enough
KOREA: LIGHT POLLUTION PREVENTION ACT 2012

Objective **metrics** based on CIE 150

**Advantages**-
Transparency for business/consumers
Objective- easier for regulators to enforce

**But**- Getting the levels right?
• **Objective** standards-
  • Window illuminance
  • Advertising and decorative lighting
KOREA

• Zoning- varying maximum levels
  – Light travels (c.f. noise)
  – Mixed use areas?
<table>
<thead>
<tr>
<th>Vertical</th>
<th>Illuminance on windows</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>E2</td>
</tr>
<tr>
<td>E3</td>
<td>E4</td>
</tr>
<tr>
<td>10 lm/m²</td>
<td>10 lm/m²</td>
</tr>
<tr>
<td>10 lm/m²</td>
<td>25 lm/m²</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum luminance from decorative lighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
</tr>
<tr>
<td>E3</td>
</tr>
<tr>
<td>20 (average of 5) cd/m²</td>
</tr>
<tr>
<td>180 (average of 15) cd/m²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum luminance from advertising lighting</th>
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</thead>
<tbody>
<tr>
<td>E1</td>
</tr>
<tr>
<td>E3</td>
</tr>
<tr>
<td>50 cd/m²</td>
</tr>
<tr>
<td>800 cd/m²</td>
</tr>
</tbody>
</table>
KOREA

- Curfews not used
- Energy waste from all night lighting?
- Blue rich light and bedroom windows?
SUMMARY

• Dedicated laws work best (France and Korea)

• Need a full understanding of the LP problem - education
SUMMARY

• Best law probably a combination of French and the Korean approach

• Hard law & guidance
• Objective metrics
• Curfews
SUMMARY

• Guidance support/ eco buildings etc-
  – fill in gaps, especially installation guidance/spectral type & health
  – Not just energy efficiency
  – Can impose lighting limits