Wintegrate
Legal framework of small building-mounted wind turbines

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Context of Brussels

Few projects of building-mounted WT exist in Brussels

A. Unstudied projects failed

B. Brussels’ legislation does not stimulate the development
   ‣ Brussels’ decree 2007 (quorum for green certificates)
   ‣ RRU – GSV Prohibits development
   ‣ Environmental permits are not dedicated
Goals

Our objectives for this research

A. Innoviris Platform
   - Develop a report on legal and planning aspects of building-mounted wind turbines

B. Region and municipalities
   - Reach out the decision-makers to develop dedicated legal framework for building-mounted wind turbines

Sources

Diversity of codes and countries

- Codes of ordinances, Municipal codes, land development codes, ...
  - 21 Counties or Towns

- Planning portal, Renewable UK.
  - Wales, Scotland, England

- Planning permit, Environmental permits, Decrees, Memorandum.
  - 3 regions
### Sample of representative cities

- Diversity in size, number of inhabitants and buildings, building height

<table>
<thead>
<tr>
<th></th>
<th>North Kansas City</th>
<th>Anchorage</th>
<th>Los Angeles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface [km²]</td>
<td>11</td>
<td>4396</td>
<td>1215</td>
</tr>
<tr>
<td>Altitude [m]</td>
<td>366</td>
<td>31</td>
<td>81</td>
</tr>
<tr>
<td>Inhabitants</td>
<td>4 200</td>
<td>300 000</td>
<td>4 000 000</td>
</tr>
<tr>
<td>Number of high-rises</td>
<td>4</td>
<td>19</td>
<td>532</td>
</tr>
<tr>
<td>Highest building [m]</td>
<td>58</td>
<td>90</td>
<td>310</td>
</tr>
</tbody>
</table>

### Methodology

**A. Compare the different procedures**
- Permits required
- Permitted development right
- Limitations

**B. Compare the different criteria**
- Main: Dimensions and Power
- Secondary: Sometimes not present in the codes
Methodology

A. Compare the different procedures
   - Permits required
   - Permitted development right
   - Limitations

B. Compare the different criteria
   - Main: Dimensions and Power
   - Secondary: Sometimes not present in the codes

Comparison between procedures

Two recurring permits at the city level
- Planning permit
- Construction,
- Demolition,
- Transformation,
- City development, ...

- Environmental permit
- Activities or equipment having impact on environment (nature and people)
Comparison between procedures

Requirements for each geographical area

<table>
<thead>
<tr>
<th>Codes</th>
<th>U.K.</th>
<th>U.S.A.</th>
<th>Flanders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning Perm</td>
<td>Depends</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Building Regulations</td>
<td>Comply with</td>
<td>Comply with</td>
<td>Comply with</td>
</tr>
<tr>
<td>Environmental Perm</td>
<td>Not Required</td>
<td>Not Required</td>
<td>Depends</td>
</tr>
<tr>
<td>EIA</td>
<td>Depends</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ecological Concerns</td>
<td>Yes</td>
<td>Limited</td>
<td>Limited</td>
</tr>
</tbody>
</table>

Procedures’ facilitation

- U.K. ➔ Planning Permit
- Flanders ➔ Environmental Permit

Comparison between procedures

“Permitted Development Rights” (PDR)

- 10 – 15 criteria
- Material, colour, specific areas, certificates
- Size of the system
  - Not protrude 3 m above the top line of the roof OR
  - Not exceed 15 m, whichever is the lesser
  - Swept area lower than 3.8 m²
Comparison between procedures

Limitations in the codes (if no PDR)

- U.S.A. always provide a limit AND review
- U.K. let the applicant propose, THEN review.

CONCLUSION

1. Planning and environmental permits exist everywhere
2. Permitted Development Rights facilitate the procedure
3. Limitations drive the development

Methodology

A. Compare the different procedures
   - Permits required
   - Permitted development right
   - Limitations

B. Compare the different criteria
   - Main: Dimensions and Power
   - Secondary: Not present in all the codes
Comparison of criteria

Main Criteria (3)

• Height
• Setback distances
• Swept area (or power)

Secondary Criteria (17)

• Nuisance: Noise, Vibrations, Shadow flicker, ...
• System: Structure, Colour, Material, ...
• Long term: Maintenance, Replacement, Wind access protection, ...
• Security: Illumination, Advertisements, Test Facility, ...

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Comparison of criteria

1. HEIGHT

Height limitations are specified as:

- Height of the building
- Permitted building height
- Existing buildings’ height
- Defined limit

**Examples:**

- Height of the building: 10 feet below 60 feet, percentage above
- Permitted building height: 20% above
- Existing buildings’ height: 15 feet above
- Defined limit: 25 to 45 feet above grade

Antennas in Brussels?

Comparison of criteria

2. SETBACK DISTANCES

**Examples**

- Property lines: 0.75 to 2 times H
- Public right of ways: 1 to 1.1 times H
- Telecommunication towers: 1.1 times H
- Public utility lines: 1 times H
- Roof edges: 10 feet
- Grade clearance: 15 to 25 feet
- Other wind turbines: 1 to 3 times H
Comparison of criteria

3. POWER – SWEPT AREA

- U.S.A. (Examples)
  - Diameter: max 20 feet (6 m)
  - Power limits

<table>
<thead>
<tr>
<th>Town Code</th>
<th>District</th>
<th>Rated power capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchorage, AK</td>
<td>Residential zoning</td>
<td>No more than 10 kW</td>
</tr>
<tr>
<td>North Royalton, OH</td>
<td>Non-residential zoning</td>
<td>No more than 25 kW</td>
</tr>
<tr>
<td>Fillmore, MN</td>
<td>No restrictions</td>
<td>No more than 1 kW</td>
</tr>
</tbody>
</table>

Comparison of criteria

Main Criteria (3)
- Present in almost all codes
  - Height, Setback distances and Swept area (or power)

Secondary Criteria (17)
- Limited recurrence
  - Nuisance: Noise, Vibrations, Shadow flicker, ...
  - System: Structure, Colour, Material, ...
  - Long-term: Maintenance, Replacement, Wind access protection, ...
  - Security: Illumination, Advertisements, Test Facility, ...
Comparison of criteria

1. SHADOW FLICKER EFFECT
   - U.S.A.
     - Minimise the shadowing beyond the property lines
   - Wallonia
     - 30 hours per year and 30 min per day

2. FEASABILITY STUDY
   - Only one code proposes this regulation
   - Time and money saving
Comparison of criteria

CONCLUSION AND SUGGESTIONS

- Brussels - No dedicated framework
- Wintegrate - Pilot projects in progress
- Survey of existing codes
  ‣ Development is stimulated and bonded

→ Collaboration with the region and municipalities