

Guidelines for integrating small wind turbines into urban areas

Solearth Architecture

Opportunities for small wind turbines in urban areas

11th May 2017, Brussels



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Guideline Scope

What aspects should be considered ?

guidance to the reader as to how to prioritise, and weigh various aspect of the process of deciding how to integrate a SWT





Guideline Scope

Who is the reader ?

Customer / Owner / Developer ?

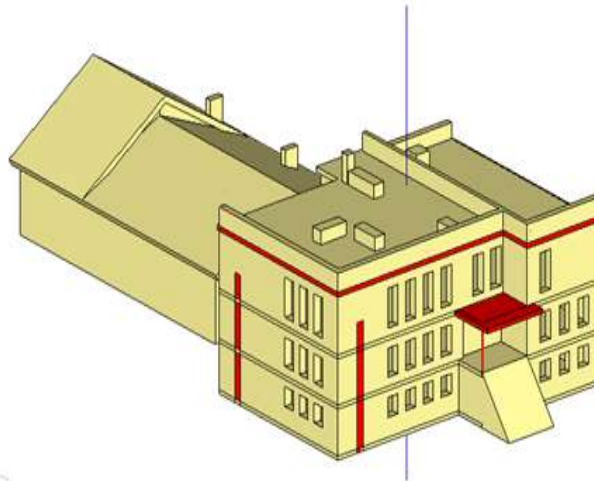
Planner / Regulator ?

Neighbour / Community ?



Specific To General

SWIP Pilot Sites





Knowledge Scope.

Unknowns

**Cost /
Return on
Investment**

**Turbine
Manufacture
Transport**

**Regulations,
Exemptions ?**

Quality Durability

**Wind Resource
Assessment of
building/site**

**Noise,
Vibration**

**Construction
Disturbance**

**Colour /
Material**

**Grid
Connection,
Back up ?
Smart Meter**

**Tax
Grants ?
Export Fees**

**Near? At? On?
the buildings**

Height Number

**Hz
Vt
Cfw ?**

Neighbours ? Community



Knowledge Scope

Key Questions

1. What is micro-generation ?
2. How are SWTs used to capture energy?
3. What kind of location is suitable for a SWT ?
4. Is my building/site suitable suitable for harnessing wind energy with a SWT ?
5. What are the regulatory challenges for a SWT installation?
6. Can I integrate my turbine on my roof or on a mast fixed to the building?
7. What permissions do I need before connecting to the grid ?
8. How can I asses the energy potential at my site/building for an SWT ?
9. What are the main benefits of small scale wind power?
10. How much electricity can I expect a SWT to produce?



Knowledge Scope

Key Questions

11. By how much will my electricity bill reduce if I install a SWT ?
12. Will I get paid for electricity exported to the grid ?
13. Can I sell or give excess power to a neighbour ?
14. What are the tax implications when making my own electricity?
15. How much does a SWT system cost?
16. Is there a grant available for installing a SWT ?
17. How big are a SWTs blades and masts?
18. Is it structurally safe and what about vibration ?



Knowledge Scope

Key Questions

19. What are the benefits and differences between different types of SWT ?
20. What are noise levels like, is vibration an issue ?
21. What is smart metering and is it relevant to SWTs ?
22. Can I get an import/export meter?
23. What about stability ? Should I add batteries or rely on the grid as back - up?
24. Can I heat water or the building by using SWT produced electricity ?
25. How long should the turbine last and what happens when it becomes obsolete ?
26. how much maintenance is required?
27. What is the financial payback period for investing in SWT

Knowledge Scope.

Owner

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Knowledge Scope.

Regulators

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Knowledge Scope.

Neighbours

**Cost /
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Knowledge Scope

A Research Framework

Objectives and Requirements
of Different Parties.

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Decision and Procedures
to Implement SWT Installation



Objectives

What are the Customers Main Requirements ?

Reputational Value-
Visibility, Iconic Presence

GreenHouse Gas Reduction

Return on Investment

Social Acceptance
Avoid Nuisance

Energy Stability



Decision and Procedures

What Decisions Need to be Taken ?

Location

Environmental Evaluation

Energy Resource Assessment

Energy Integration

WT type

Regulatory procedures

Integration-Architecture

Structural

Noise

Vibration

Aesthetic Detail

Construction

End of Life



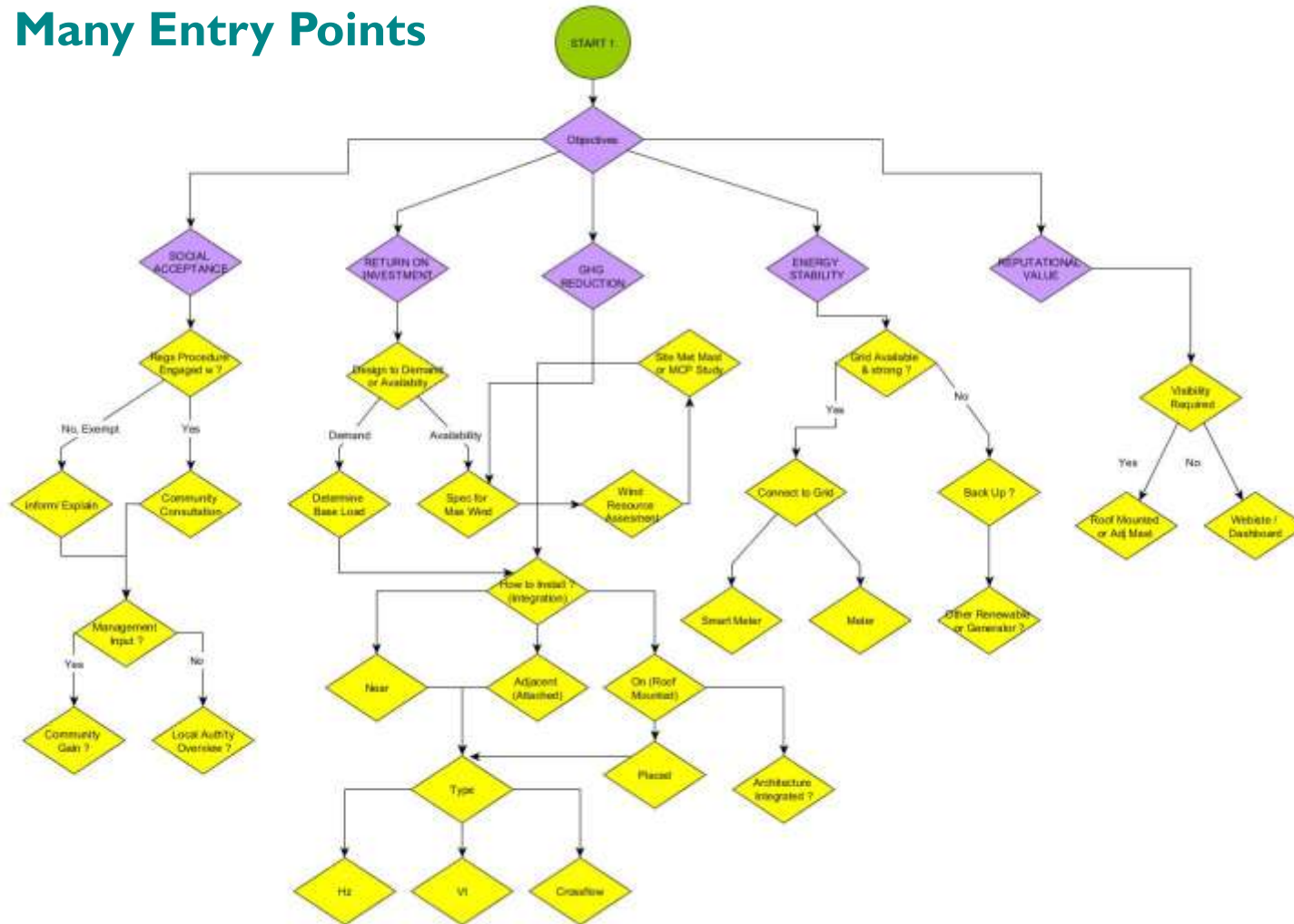
Interrelationships

Objectives and Decisions/Procedures;

Objectives Decisions/ Procedures	Reputational Value	Greenhouse Gas reduction	Return on Investment	Social Acceptance Avoidance of Nuisance	Energy Stability
Locational Decisions			X	X	
Environmental Evaluation	X	X		X	
Energy Resource Assessment			XX		X
Energy Integration					X
WT Type	X			X	X
Regulatory Procedures	X			X	
Architectural Integration			X		
WT Size		X		X	X
Noise Reduction				X	
Vibration Minimisation			X		
Aesthetic Details	X			X	
Construction Procedure	X		X	X	
End of Life			X		X

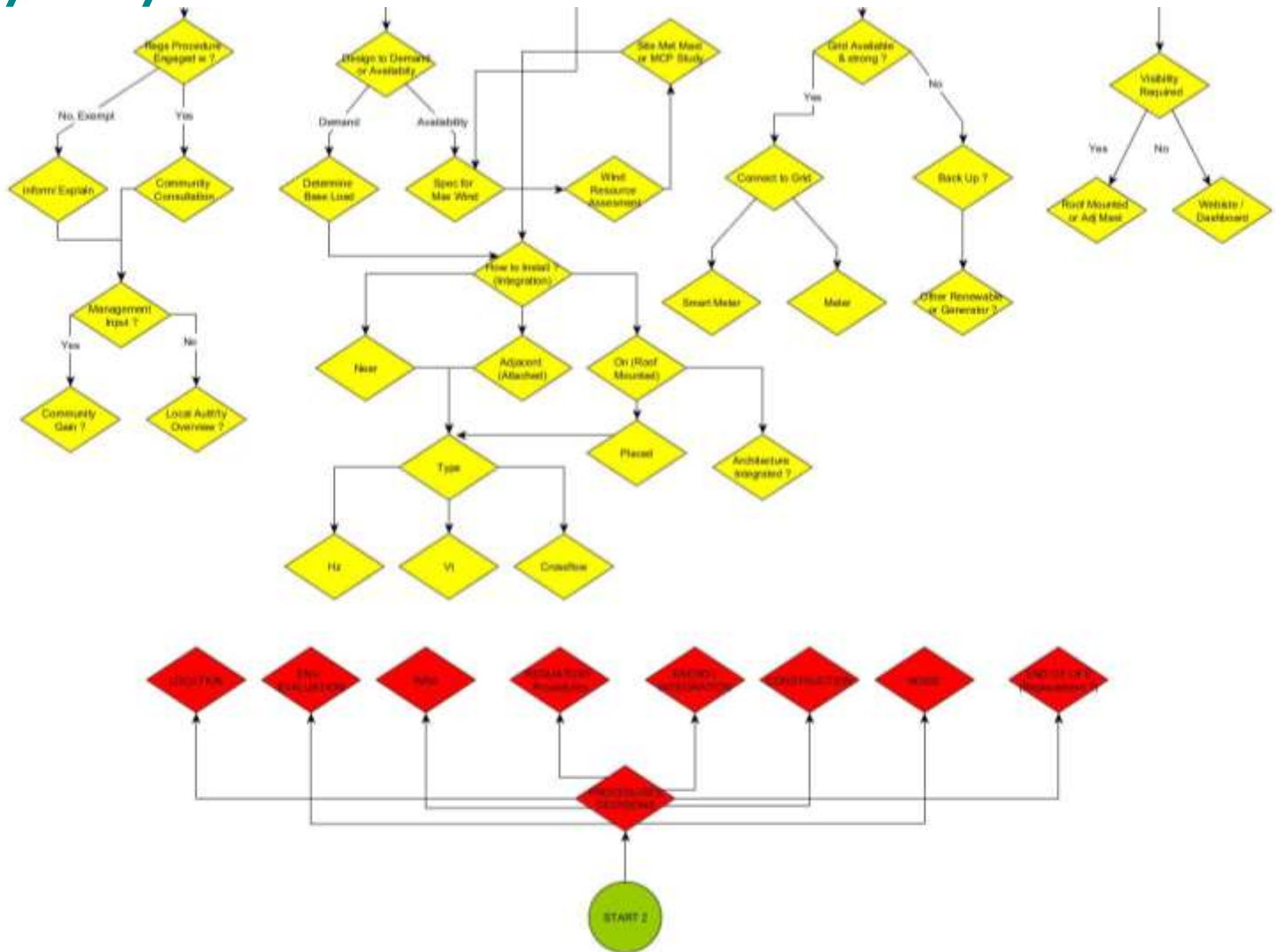
Decision Paths

Many Entry Points



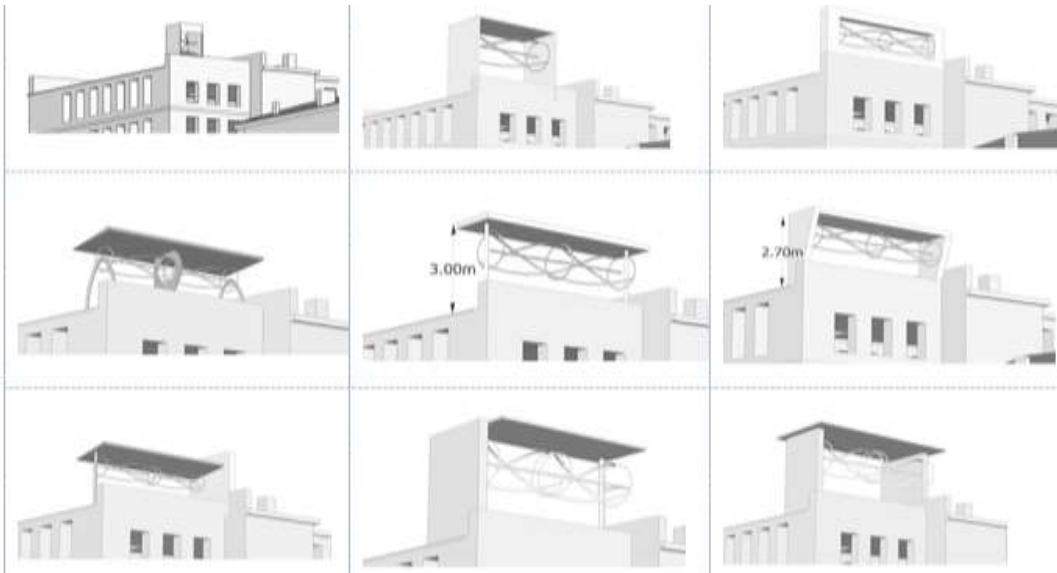
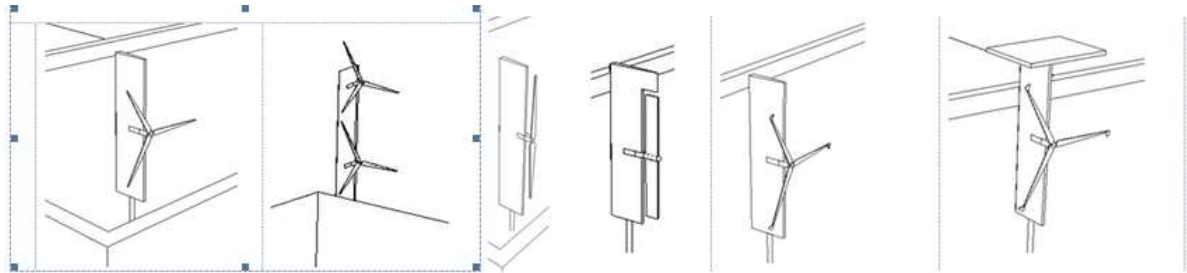
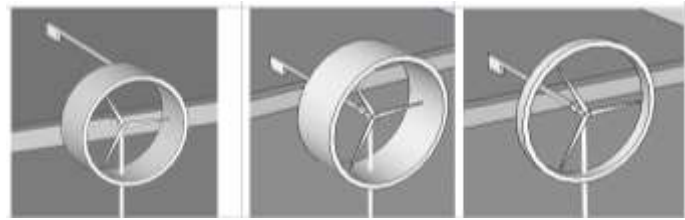
Decision Paths

Many Entry Points



Integration

ARCHITECTURAL



Acceptance

Architectural Detail



Aesthetic Explorations	Type	3 - 6 KW			10 - 20 KW	
		Multi Blade Horizontal	Tube Hz	Vertical	Inclined	Large
MAST		✓	✓	✓	✓	
BLADE SHAPE		✓		✓	✓	✓
HOUSINGS / RINGS			✓		✓	
NACELLE						✓

THANK YOU VERY MUCH FOR YOUR ATTENTION

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