



# Making the best use of an outstanding wind energy resource: Measuring and mapping wind energy in Barbados

*Tom Rogers*

Faculty of Science & Technology  
The University of the West Indies  
Cave Hill Campus

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# A windy island





# A windy island



**Why modern wind energy?**

# Why wind energy?

- It's the cheapest way to generate electricity, by far.

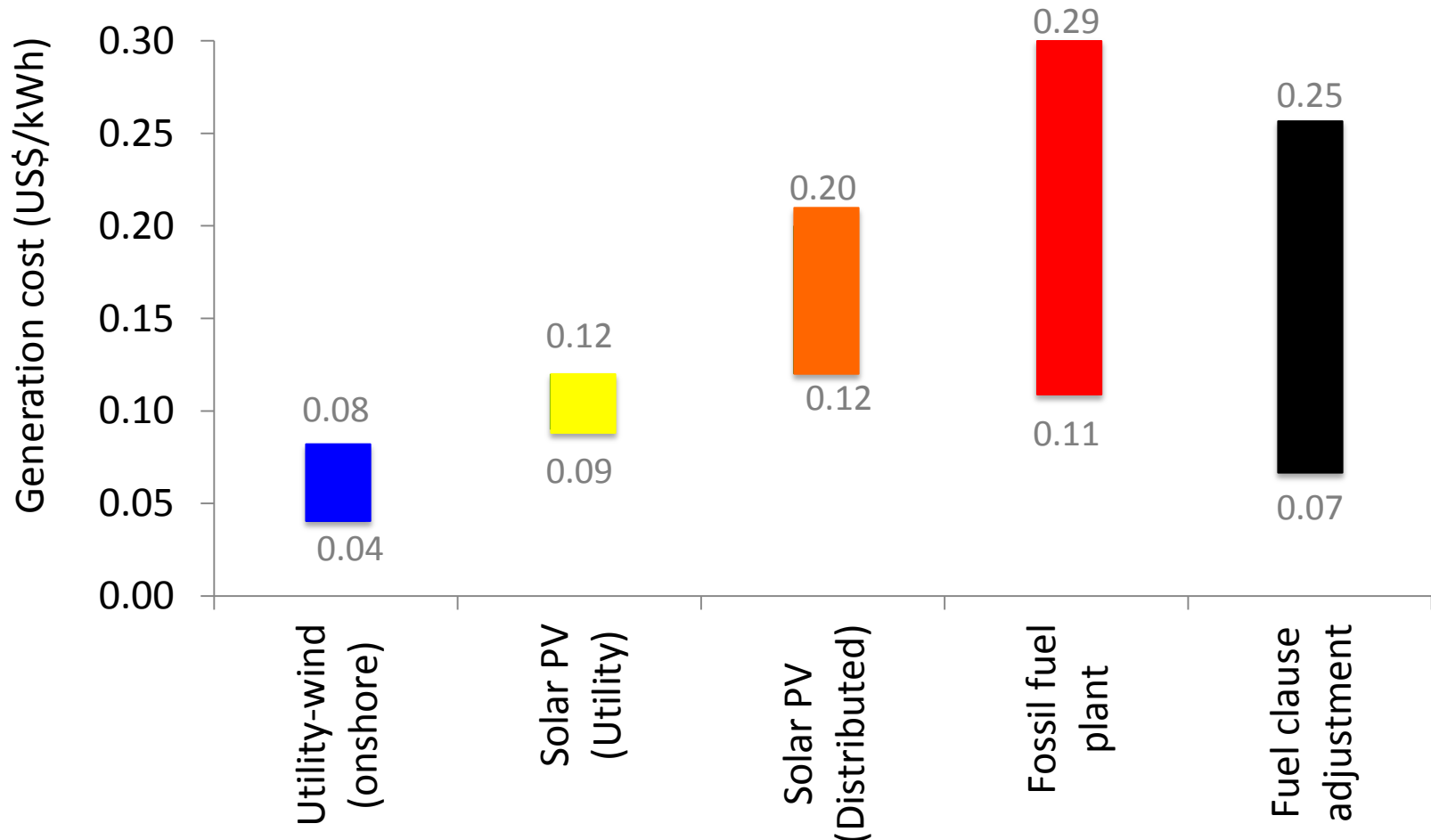


Figure 1. Estimated generation costs for Barbados.

# Why wind energy?

- Likely to remain the cheapest method of generation for some time

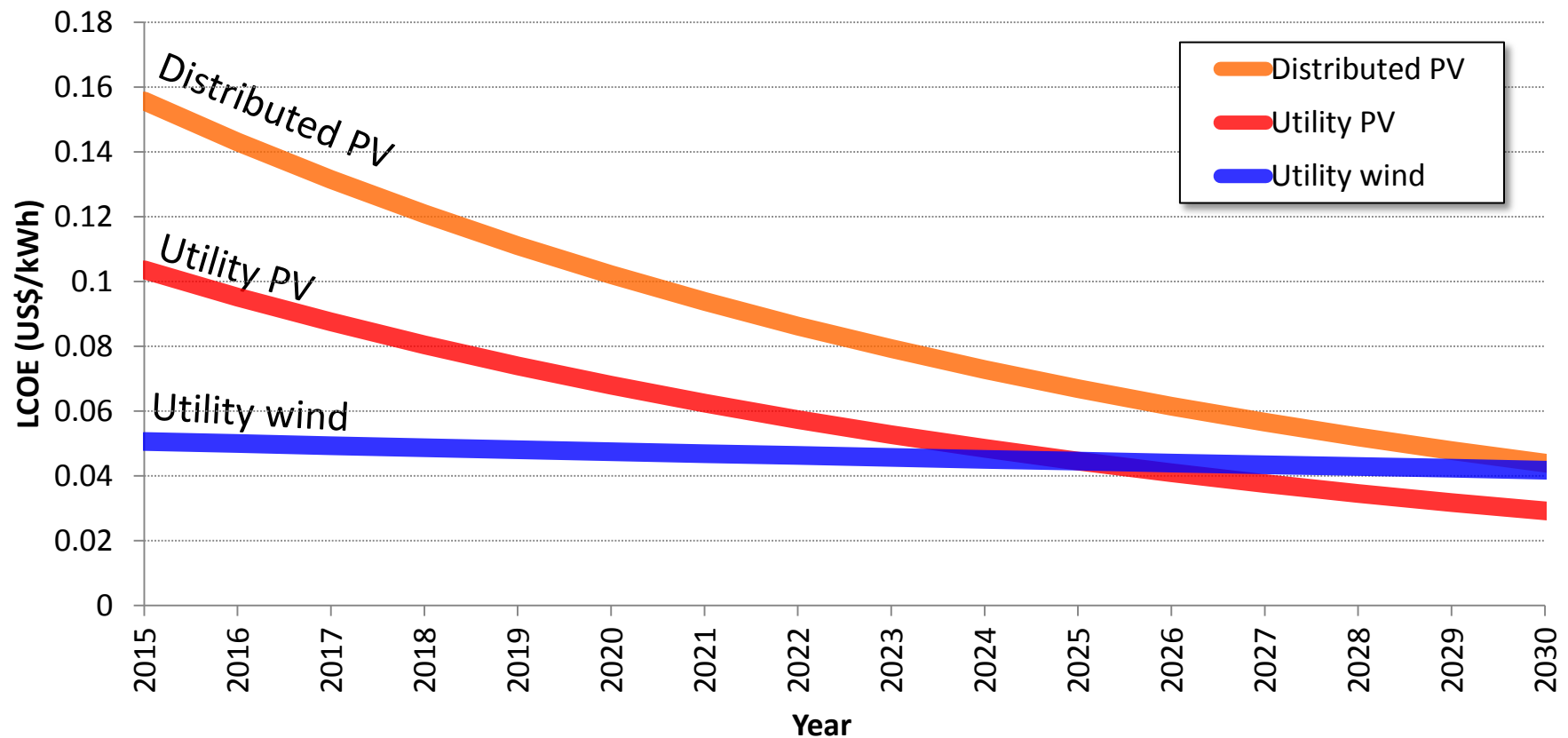


Figure 2. Expected future generation costs for wind and solar

# Why wind energy?

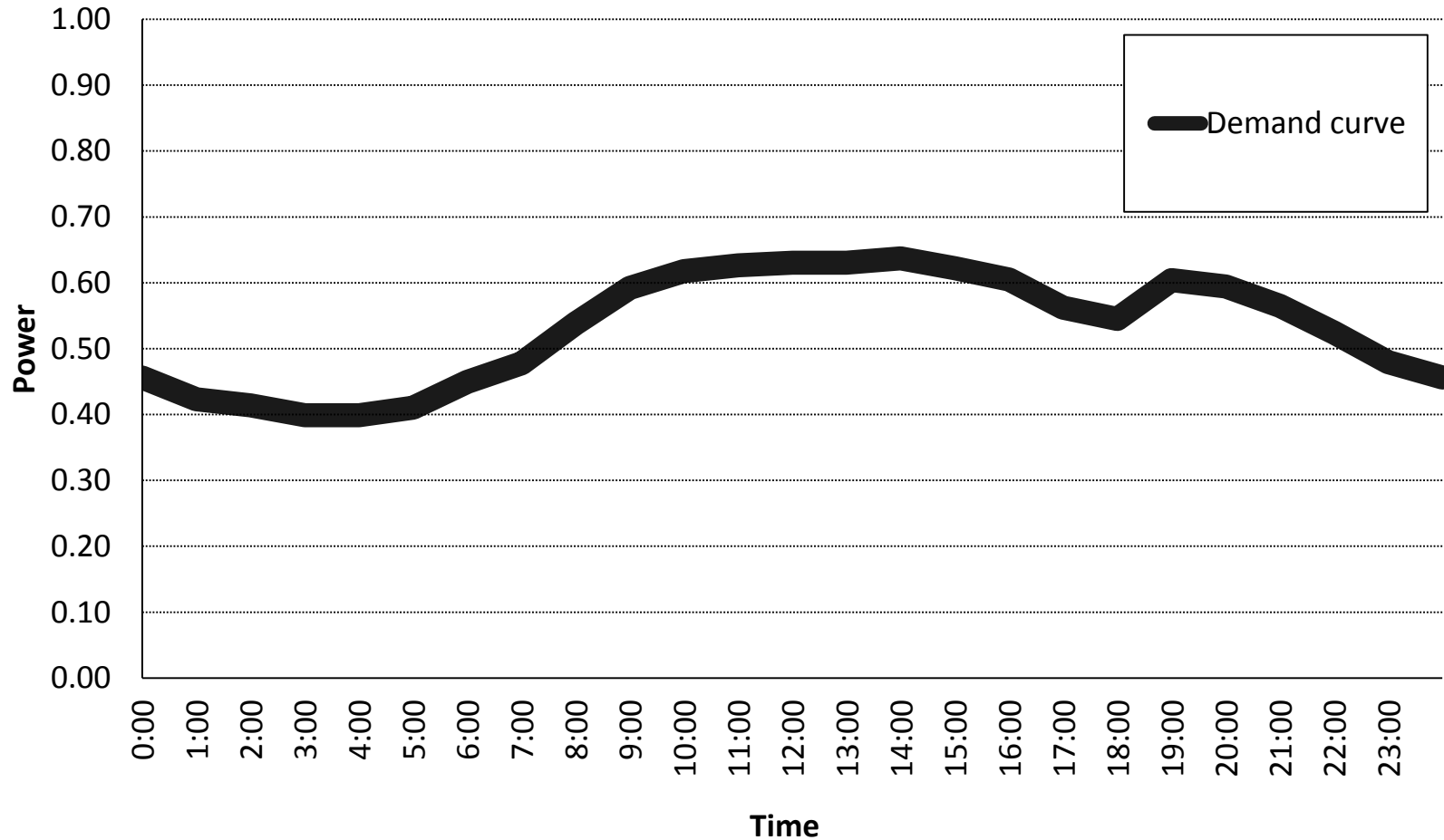
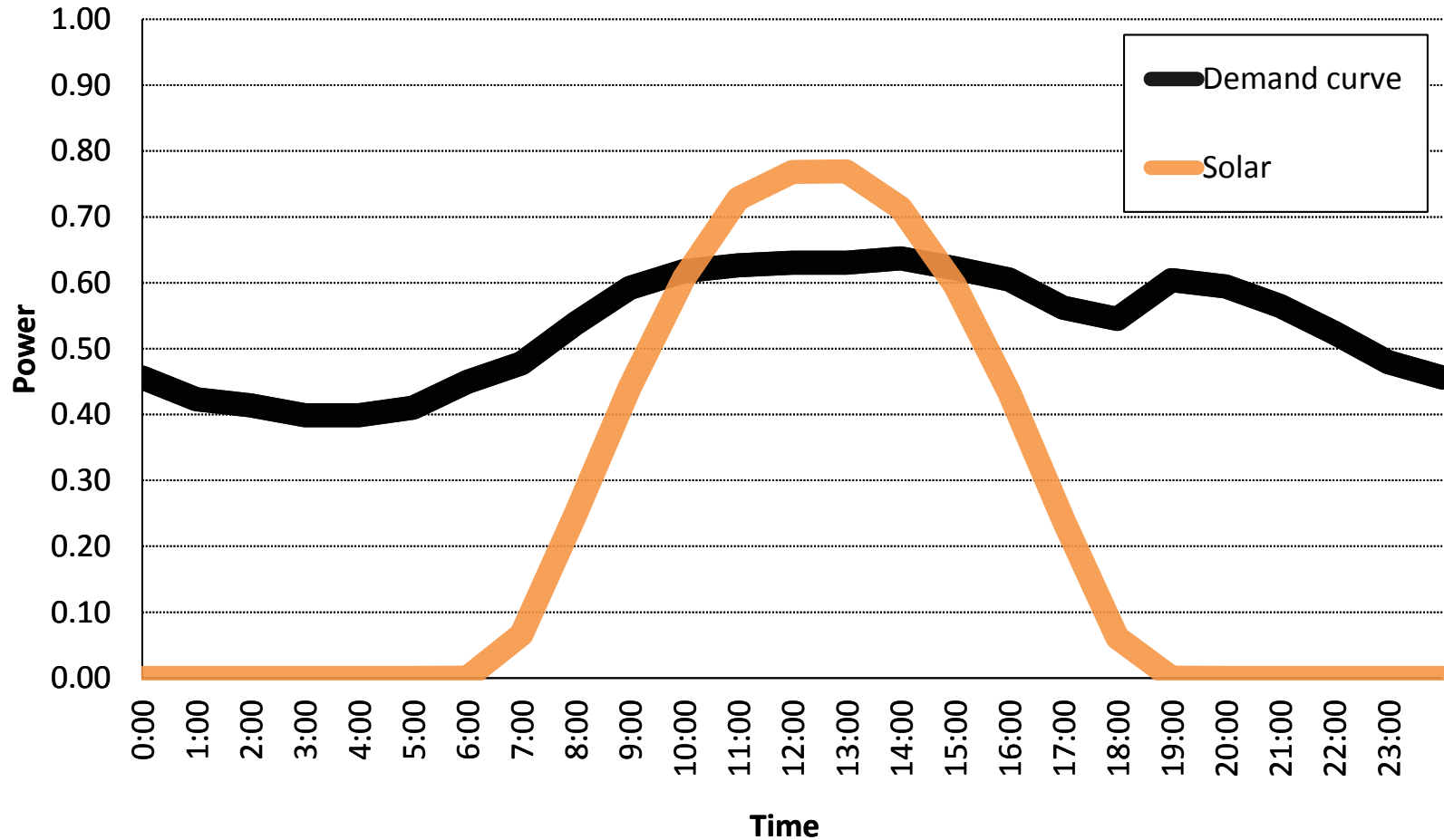


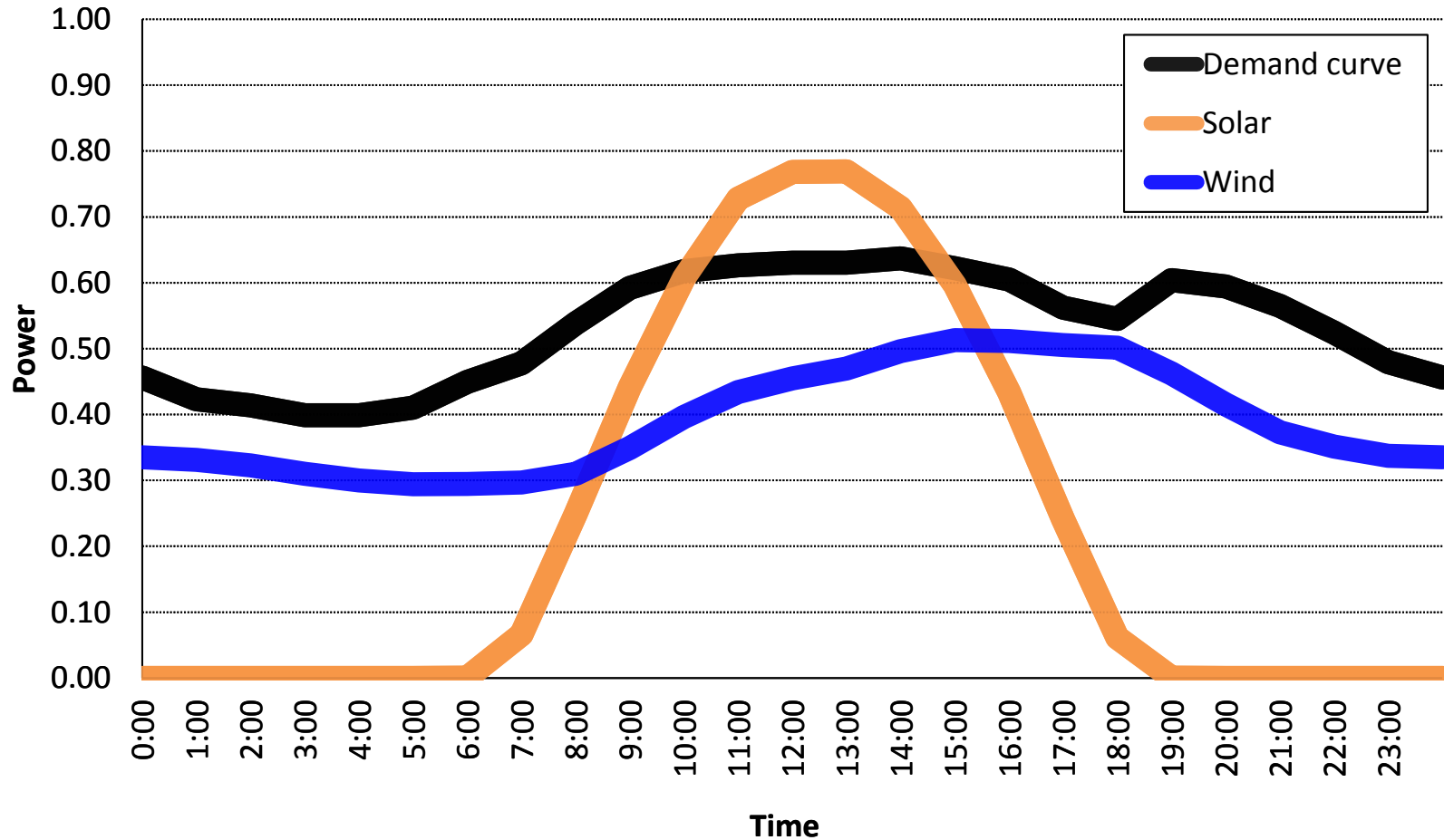
Figure 3. Daily power variation of demand, solar and wind

# Why wind energy?

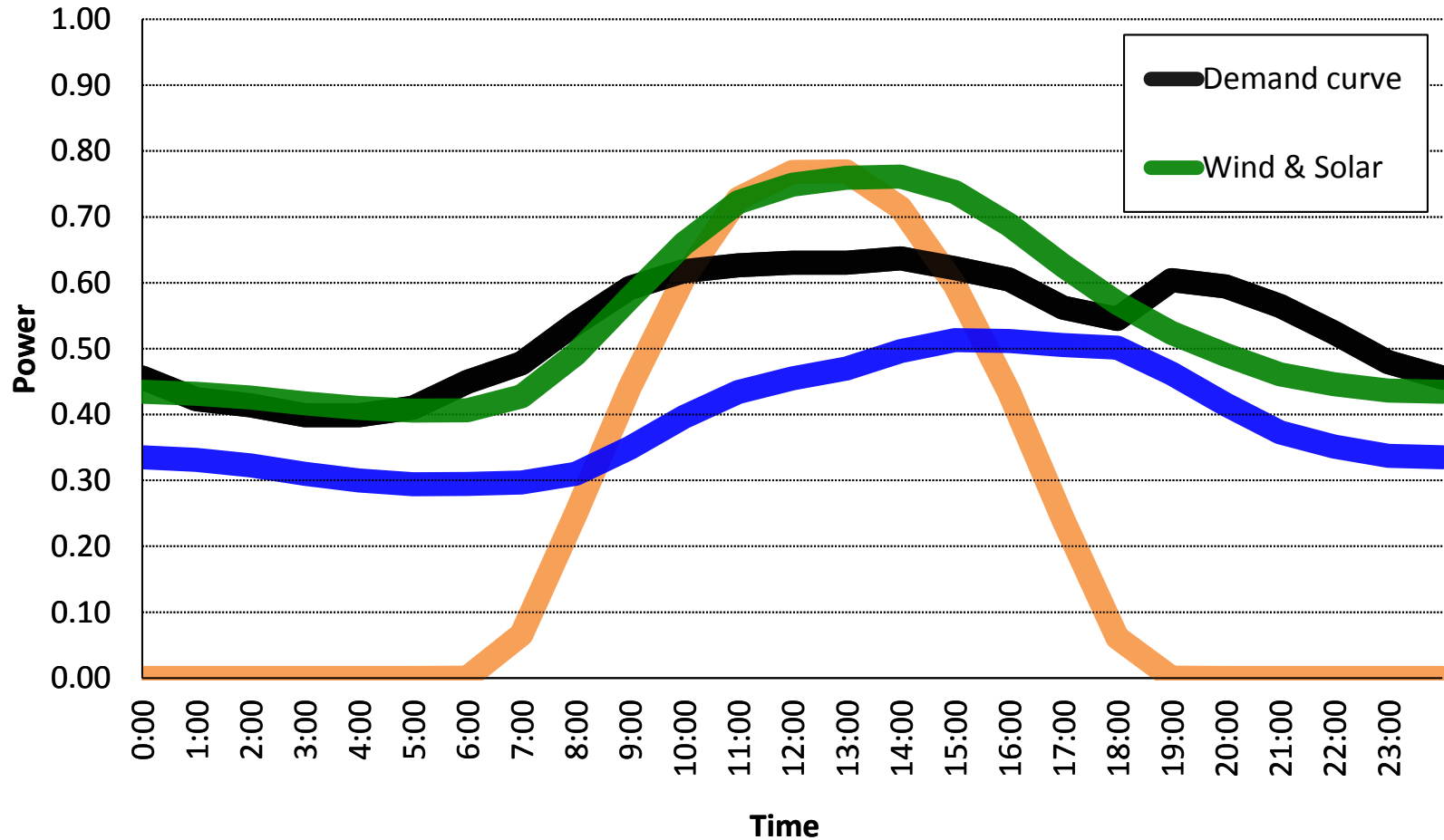




# Why wind energy?

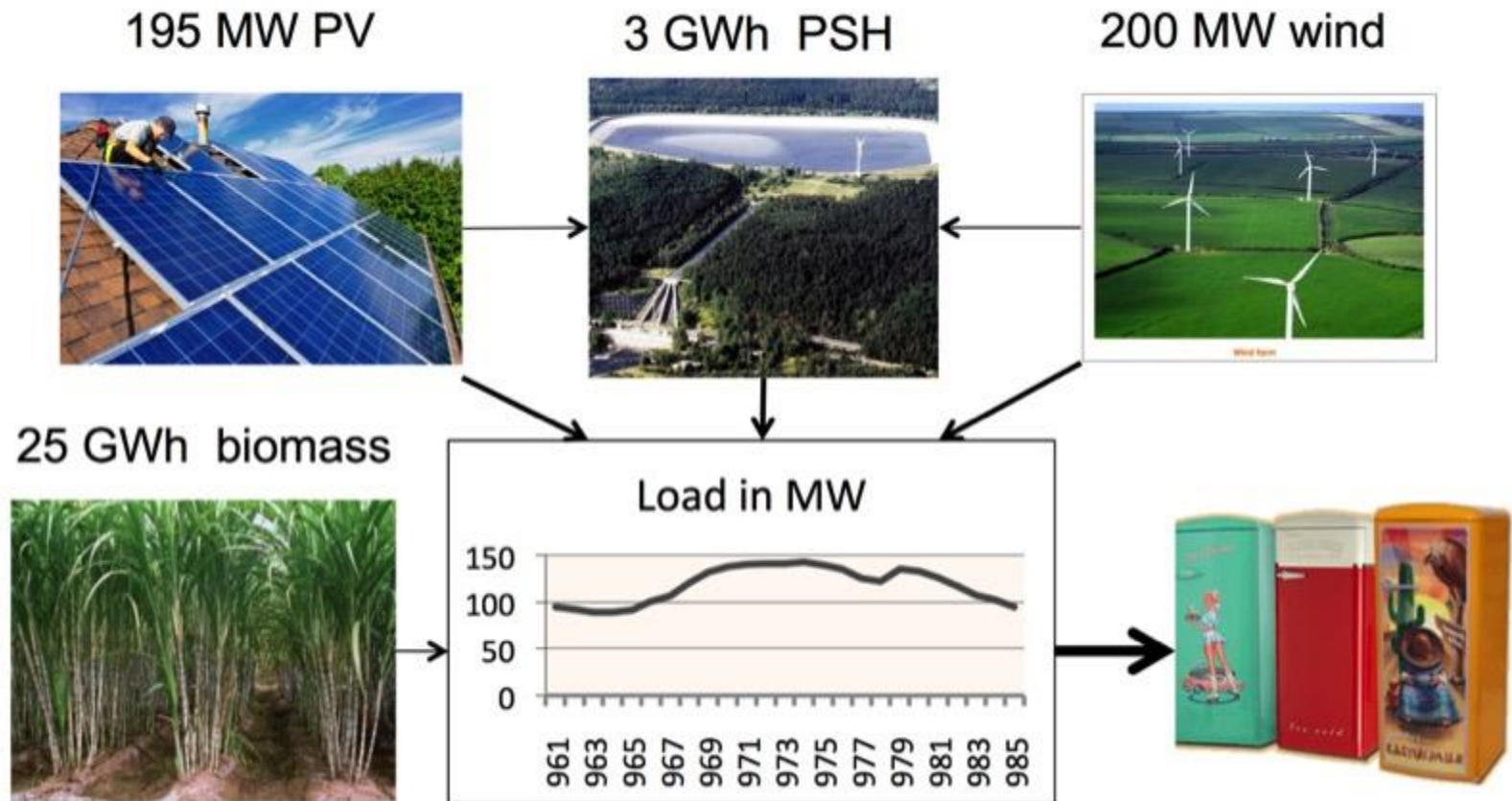


# Why wind energy?



# Wind potential for Barbados

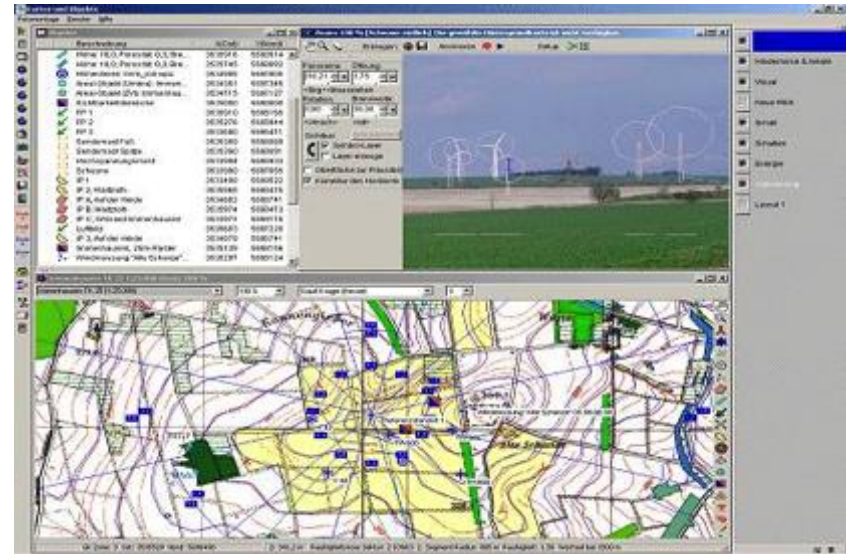
# A 100% renewable scenario for Barbados



# A desktop study of wind potential for Barbados

The study used some wind farm analysis software, called:

## WindPRO 3.0



### Inputs

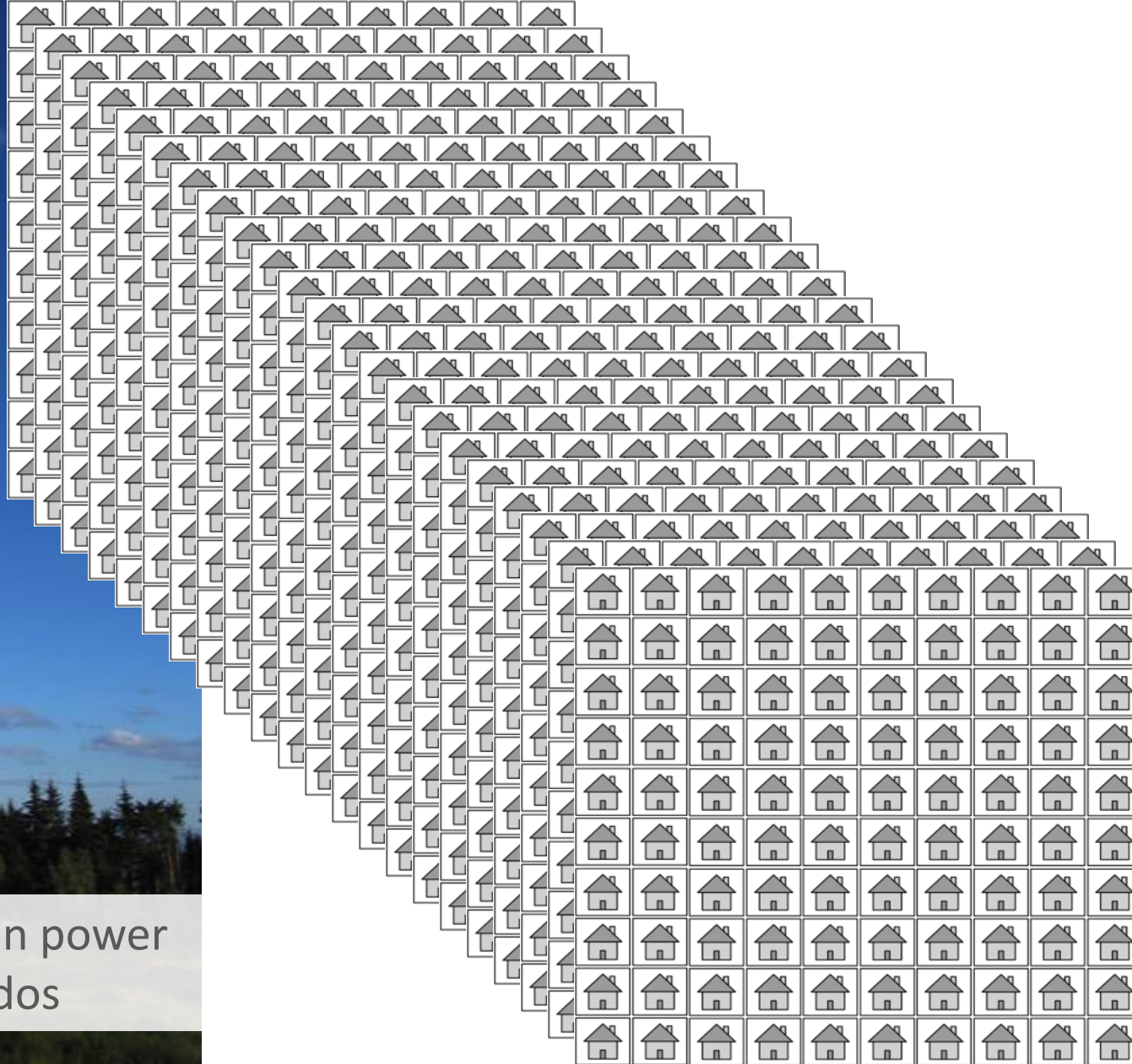
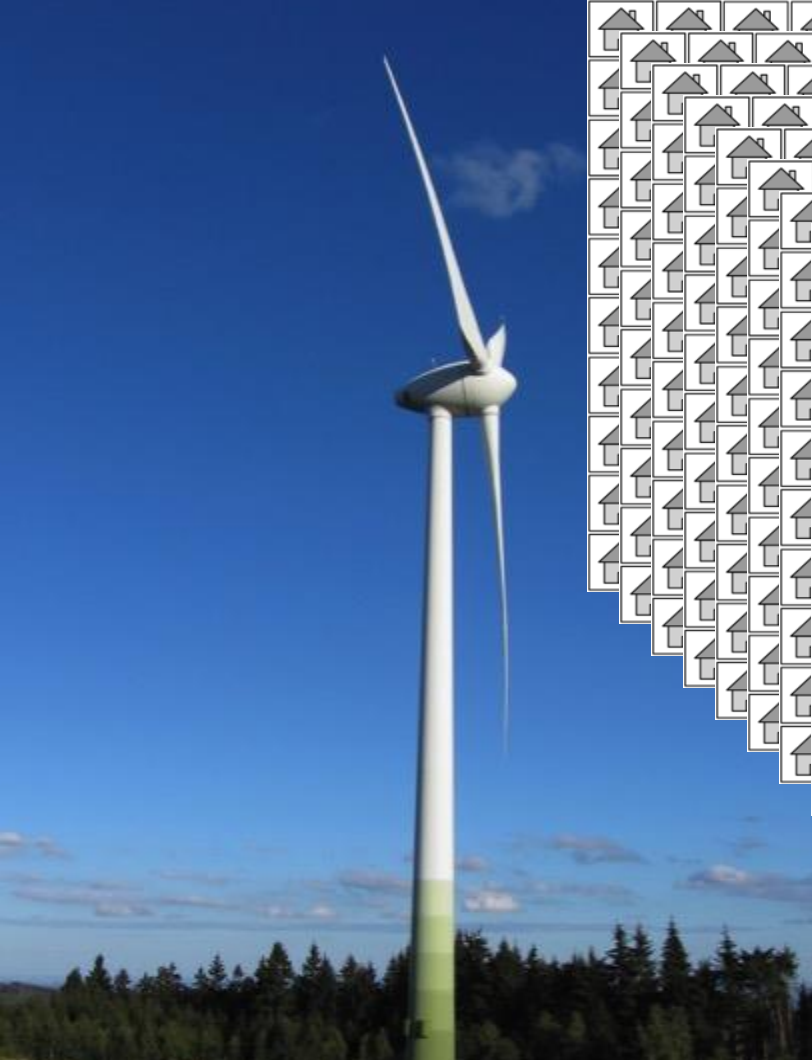
- Weather data
- Terrain data
- Surface roughness data
- Wind turbine selection and location

### Outputs

- Energy yield prediction
- Financial modeling
- Electrical integration modeling
- Noise maps
- Shadow flicker maps
- Photomontages



# Wind turbine selection



A 2MW wind turbine can power  
~2,400 homes in Barbados

## ***Consideration of location***

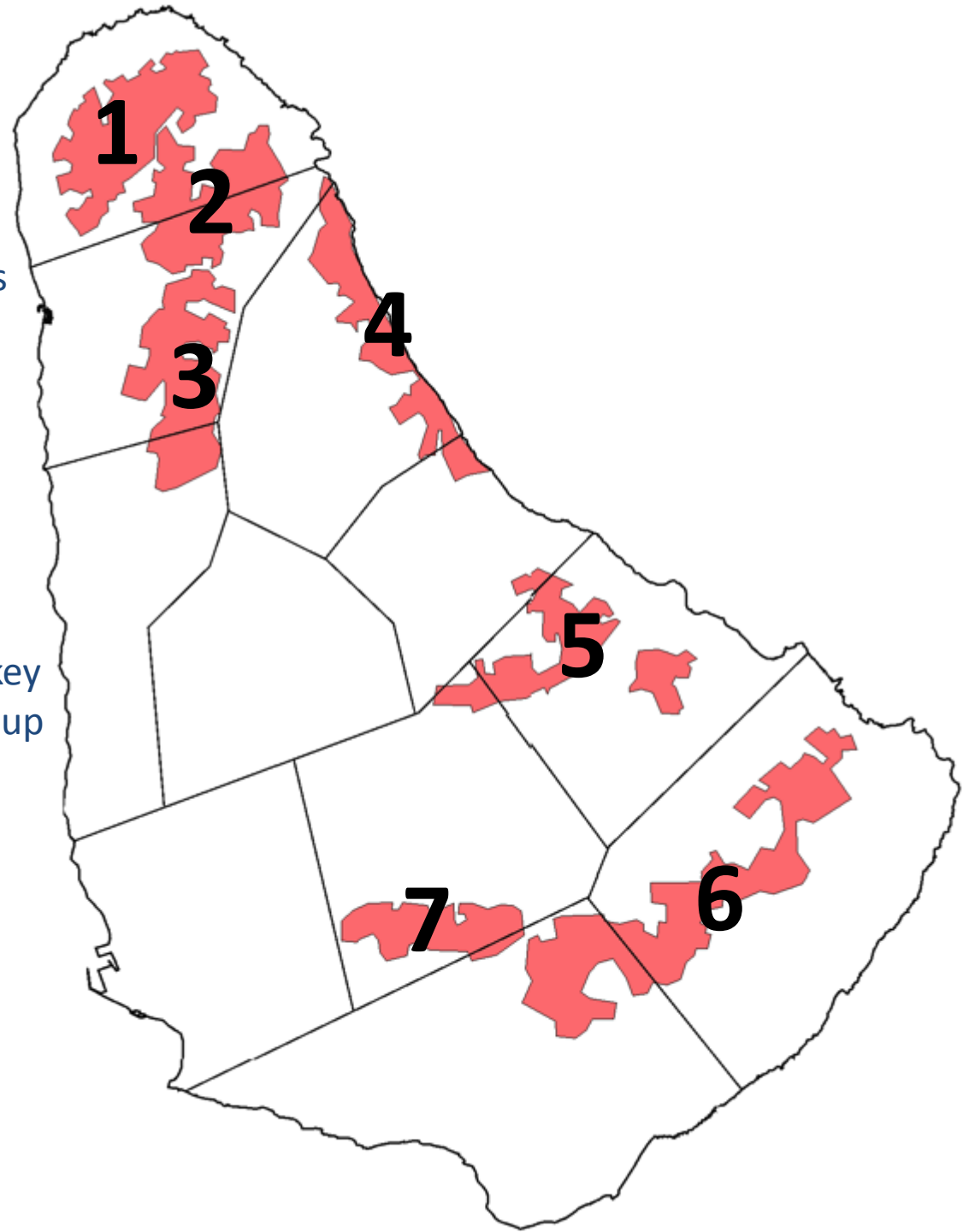
### ***T&C Planning input***

1.5 times height from roads/buildings

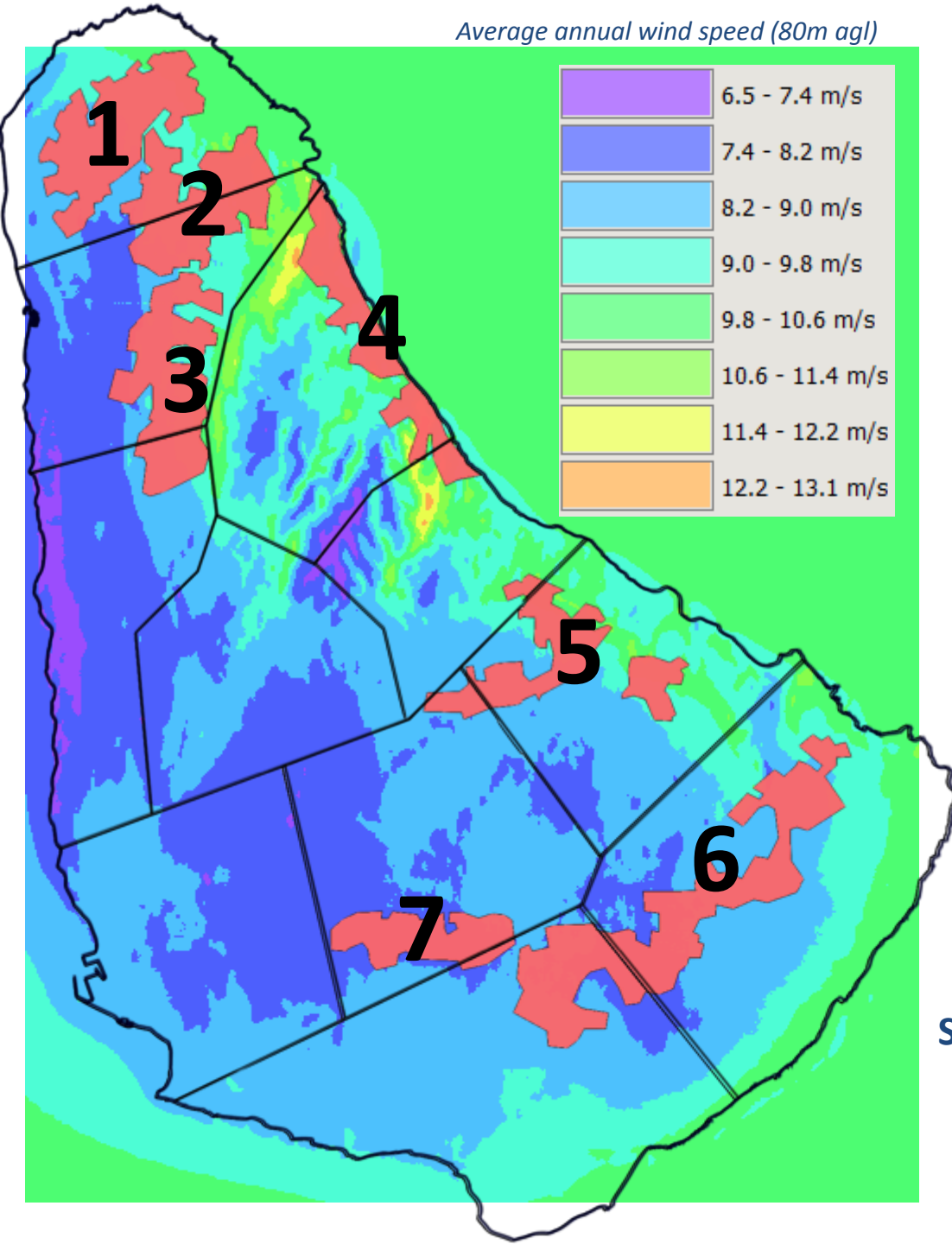
Noise levels – 55dB(A) daytime  
45dB(A) nighttime  
[Settled on 350m]

### ***The process***

Satellite imagery used to determine key locations for wind turbines, followed up with site visits...



Average annual wind speed (80m agl)



Zone	Area (km <sup>2</sup> )	No. 2MW turbines	Annual yield (GWh)
1	9.4	34	218.1
2	9.2	33	218.0
3	9.4	30	193.1
4	7.0	34	245.5
5	7.9	27	166.7
6	16.2	58	301.1
7	5.2	20	94.7
<b>64.2</b>		<b>236</b>	<b>1,437.3</b>

Space for 472MW of wind

Current Barbados electricity demand is ~950 GWh/year!

**Turning potential into reality**

# Next steps for turning technical potential into reality

1. More detailed wind resource assessment
2. Wind power electrical integration study
3. Incorporation of wind into the next PDP
4. Radar system at GAIA
5. Public involvement in the ownership and benefits of wind



*1MW wind turbines*



Mt Poyer. Looking west across St Lucy



# *1MW wind turbines*





## *3MW wind turbines*

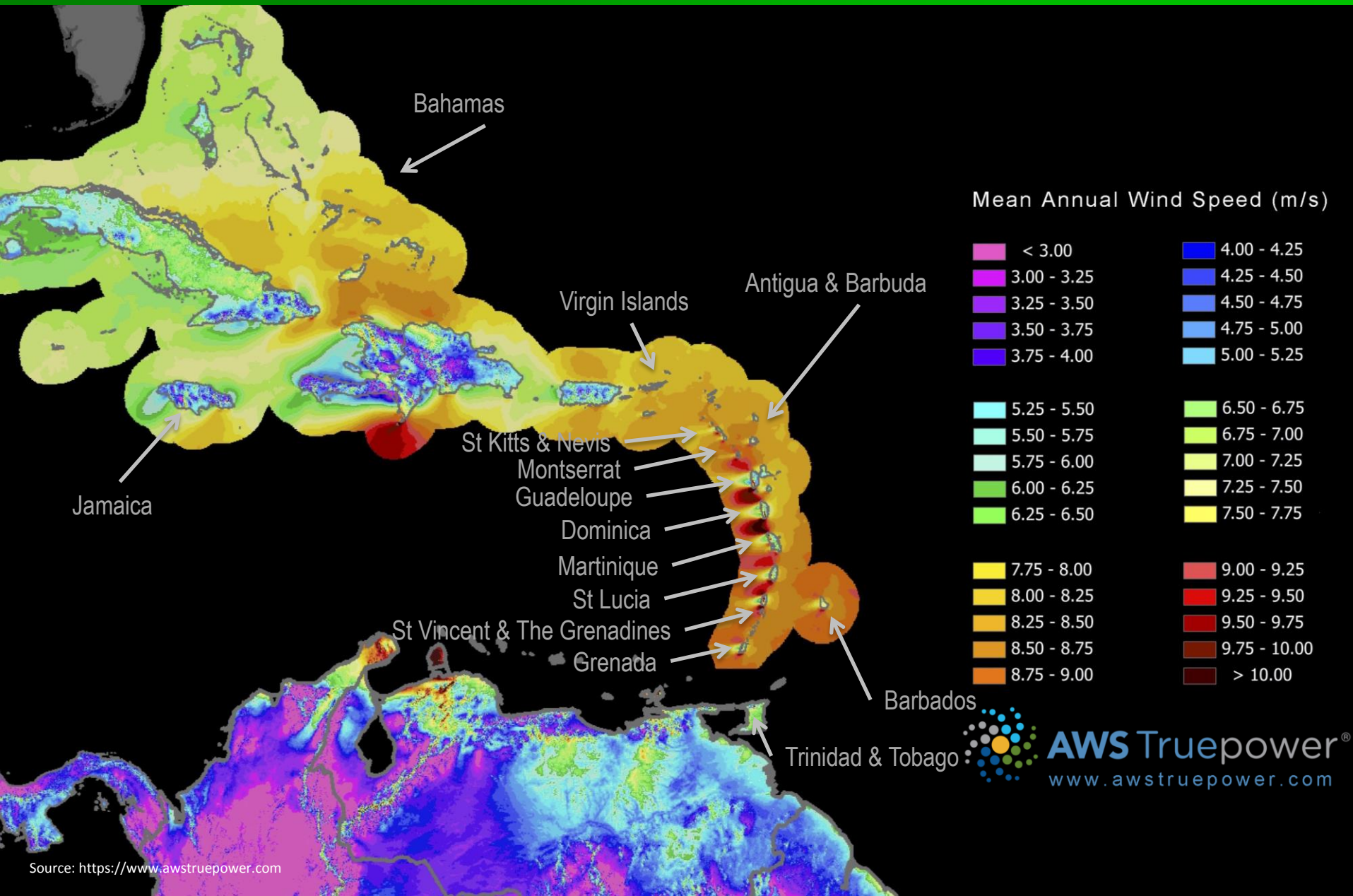


# Wind turbines located in Zone 1 - St Lucy



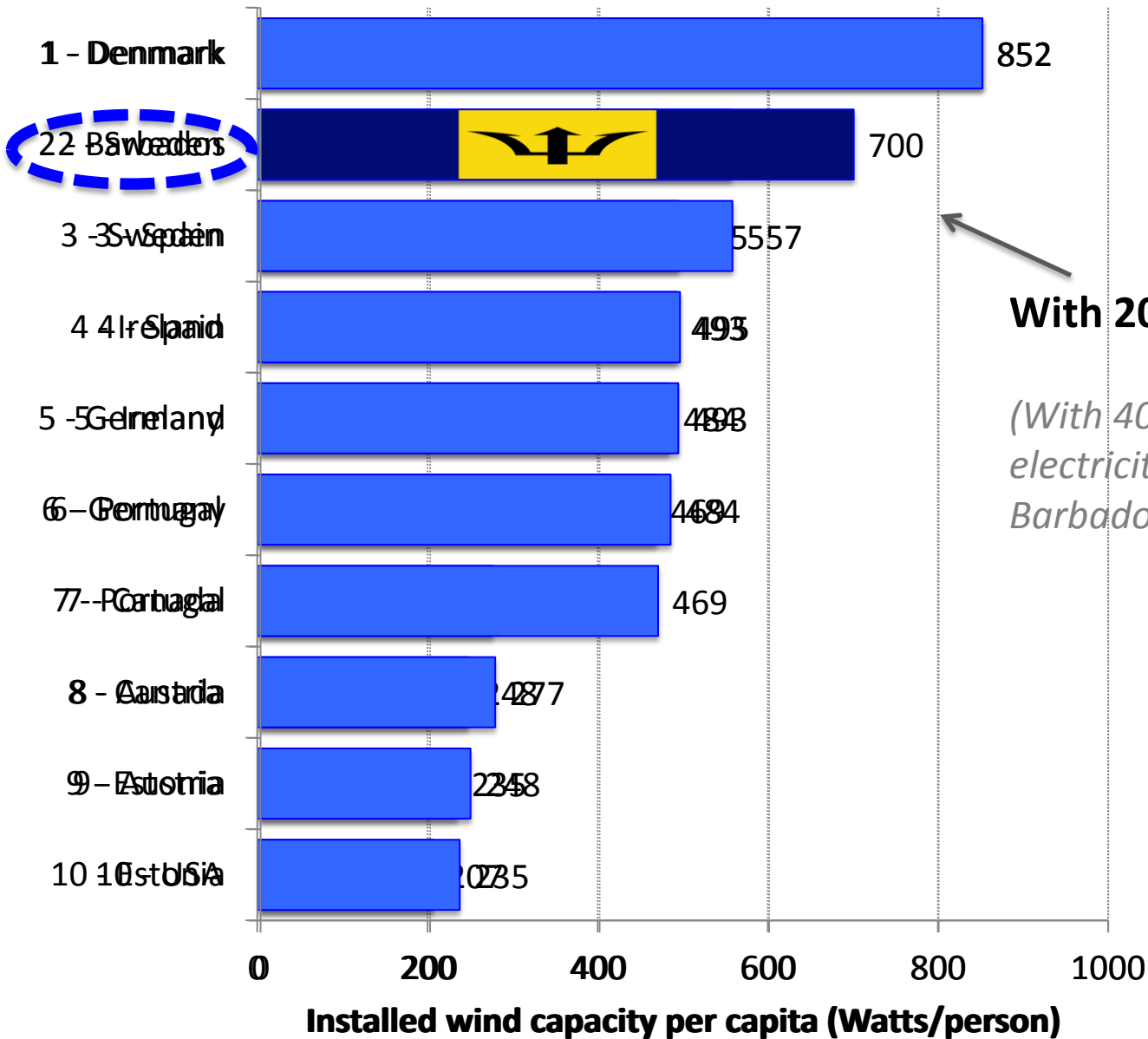


# Wind speeds across the Caribbean





# What if?



**With 200MW of wind**

*(With 400MW, for electricity and transport, Barbados would be first!)*