

Why do windfarms fail economically and what can owners do about it?

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WINDFARMS IN SWEDEN HAVE GONE BANCRUPT

Problem:

Windfarm owners are struggling to keep their windfarms profitable in markets like Sweden, where revenues from renewable energy have dropped significantly in recent years and where windfarm revenues are exposed to the volatility of the energy market prices.

Objective:

The objective is to identify the reasons why windfarms have ended up in distress and discuss and propose economic, technical and managerial measures to avoid ending up in distress or to turn the windfarm back into profitability.

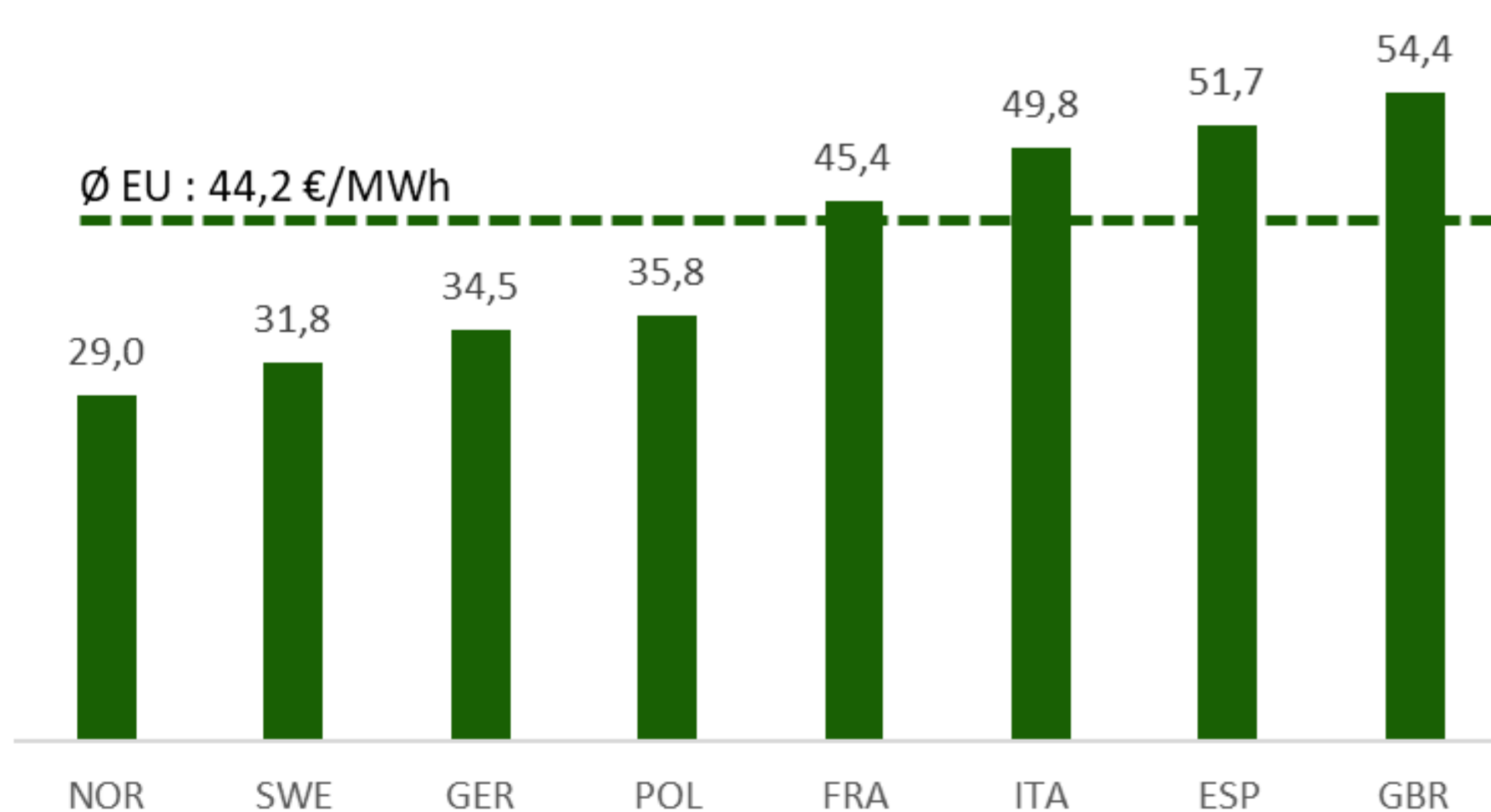
RESEARCH APPROACH IN 6 STEPS

1. Examine European market context to understand how the Swedish model differs from other support schemes
2. Identify and describe suitable case examples
3. Introduce an financial model for windfarms to simulate economic distress and impact of improvement concepts
4. Propose economic, technical and managerial measures to improve the situation of distressed windfarms
5. Verify and quantify the impact of improvement measures
6. Derive management guidelines for windfarm owners

LOW & VOLATILE ENERGY INCOME CAN BE FATAL

Key Finding 1:

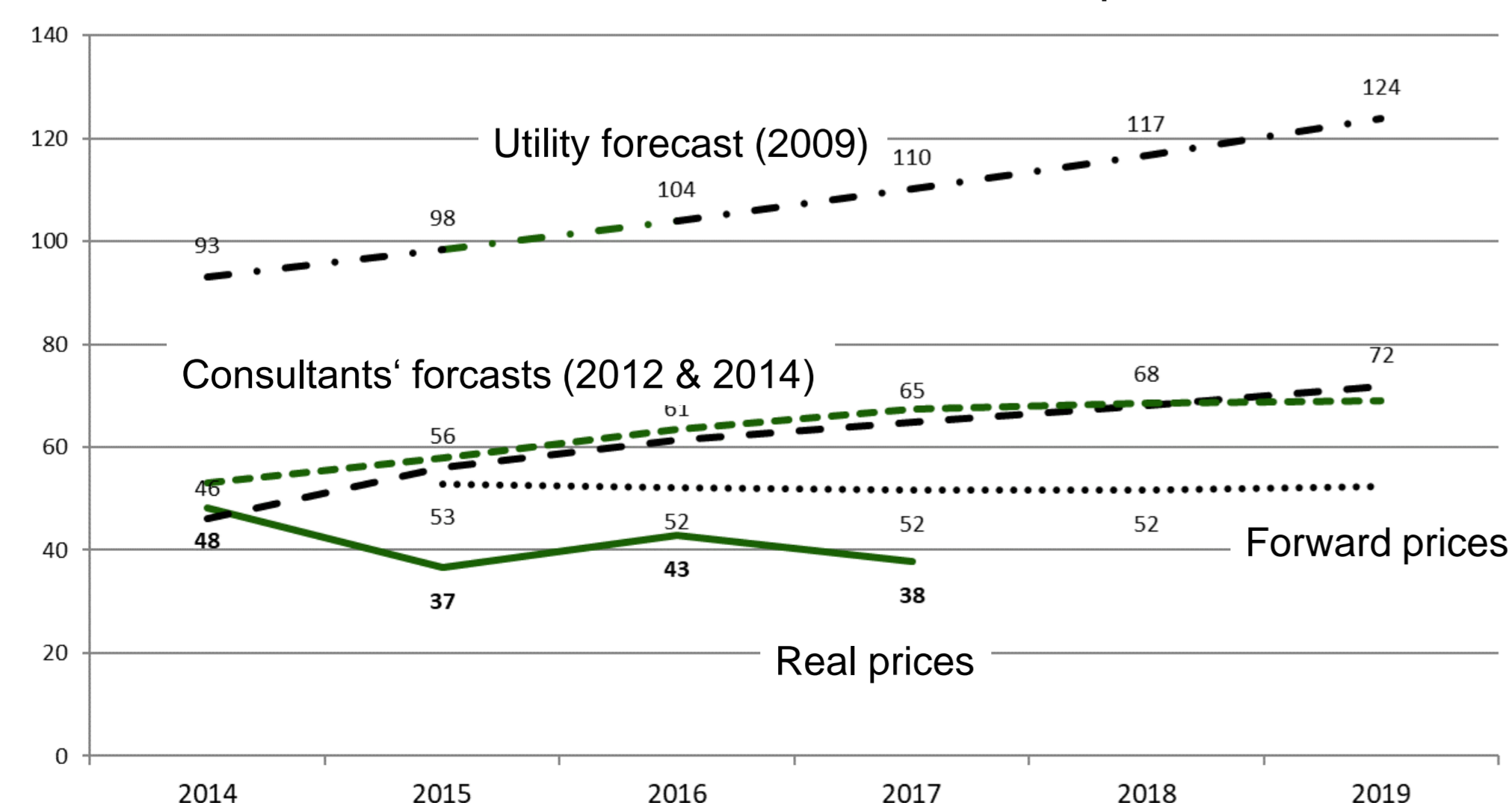
Sweden and Norway have the lowest Energy Prices in the EU around 30 €/MWh – no fixed tariffs for windpower



EU wholesale baseload electricity prices in €/MWh, average Q3 2016 – Q2 2017 (European Commission, 2016)

Key Finding 2:

Revenue forecasts for windfarms were much too optimistic



8 IMPROVEMENT MEASURES FOR WINDFARMS

Improvement measures	Main impact on				
	Finance cost	Production	Revenues	Opex (shortterm)	Opex (longterm)
Refinancing	X				
Technical upgrades		X			
Asset management		X		(X)	X
Rebuild service setup		X		X	X
Energy storage			X		
Re-negotiating		(X)		X	
Strategic forest clearing		X			X
Performance improvement		X			X

IRR IMPROVEMENTS BY MORE THAN 6% POSSIBLE

	Real Case	Improvement scenarios					
		Passive Owner			Active Owner		
		Min	Exp	Max	Min	Exp	Max
Equity IRR	-1,4%	2,2%	2,7%	4,3%	2,7%	3,1%	4,9%
Equity IRR improvement	0,0%	+3,6%	+4,1%	+5,7%	+4,0%	+4,5%	+6,2%
Net AEP improvement	0,0%	+6%	+10%	+18%	+9%	+12%	+20%
Revenues (k€/MW/year)	129	136	140	152	139	143	155
Opex (k€/MW/year)	65	53	54	57	53	54	56
Opex improvement	0%	-19%	-17%	-12%	-19%	-18%	-15%

MANAGEMENT GUIDELINES & CONCLUSIONS

1. Pursue several initiatives in parallel to reduce financing cost, minimize Opex and increase production. Stand-alone initiatives may not be enough.
2. Improvement programs can be customized to suit both passive and active owners.
3. Passive owners need to become more active and challenge their service providers continuously, e.g. with regular competitive tender initiatives or Re-negotiations of existing contracts (up to 22% price reductions achieved).
4. Any owner should start with re-negotiating existing service agreement(s) and then assess need for further actions
5. The best results can only be achieved by owners who take an active ownership role implementing a hybrid service set-up¹.
6. Even with low energy price of 38 €/MWh, the most expensive measures to increase production have a positive IRR effect.
7. Energy storage systems for windfarms are today not yet commercially viable (except for island solutions)
8. Other European markets, where windfarm owners are still less cost sensitive (due to higher tariffs and/or guaranteed income streams), will sooner or later end up in a similar situation where Sweden is already today once support schemes are being further suspended.

Swedish windfarm owners can function as a **international role model** due to low energy income in combination with uncertainty of future income streams

1) Hybrid set-up means to de-bundle the full-service scope into separate specific services and choose the best and most cost-efficient provider for each of those services. No availability warranty.