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Wind in the Sails: Reducing the Policy and Regulatory Risks of Wind Project Development in Switzerland

Dr. Anna Ebers Broughel
St. Gallen, 12 May, 2017

Permitting wind parks in Europe

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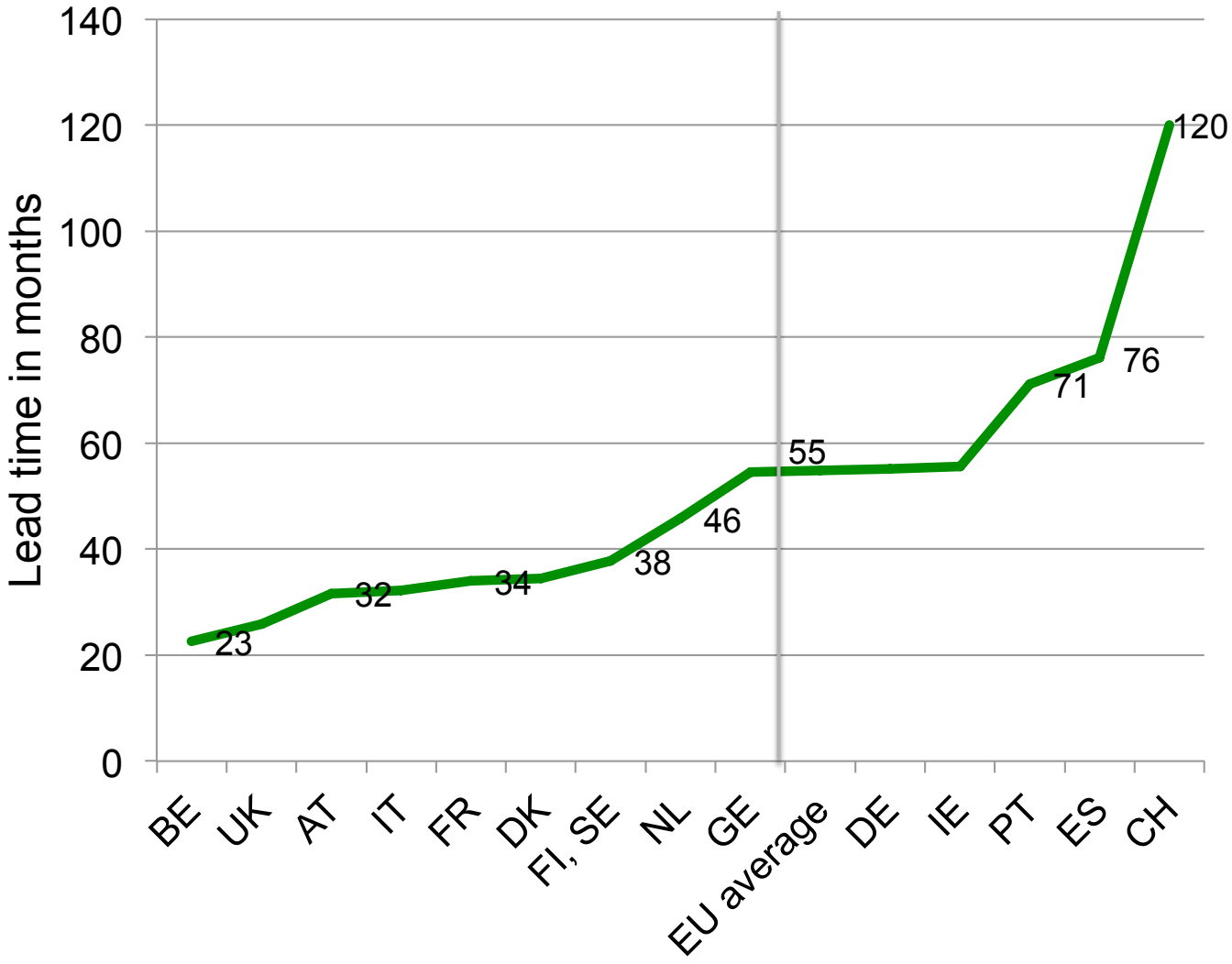
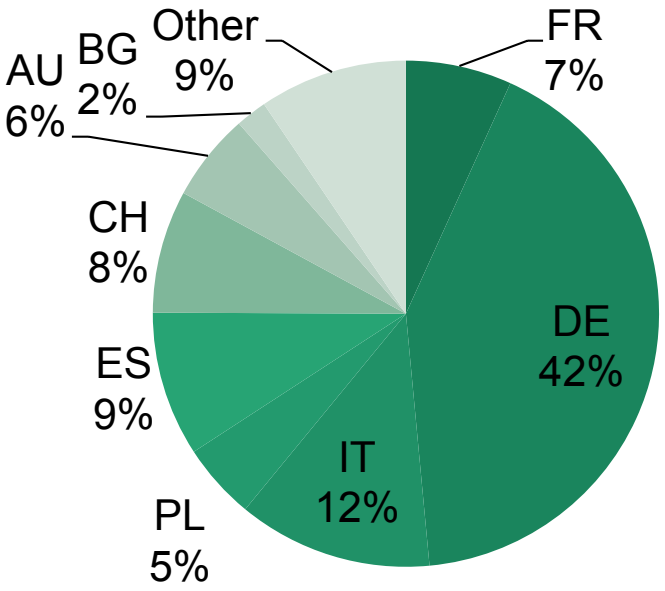


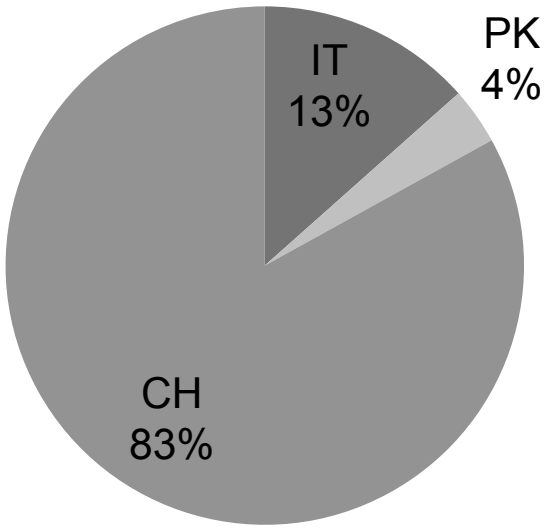
Source: EWEA 2010. Wind barriers report. Own representation. Swiss data point: own optimistic estimate.

Past Swiss investments in wind and hydropower (2004-2015)

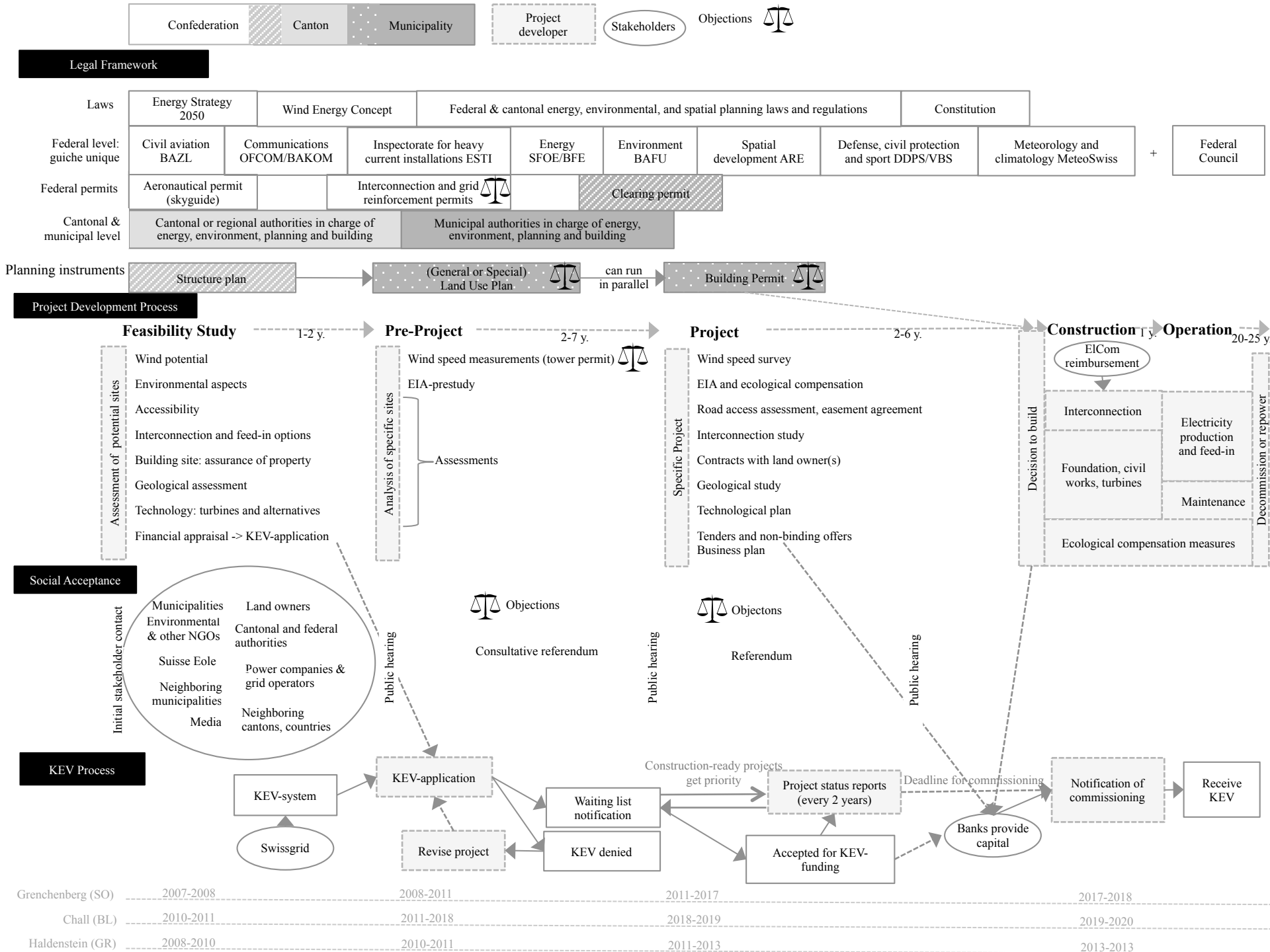
Investment in wind power



Investment in hydropower



Source: Bloomberg New Energy Finance 2015. Slide credit: adapted from Yuliya Karneyeva


Confederation
Canton
Municipality
Project developer
Stakeholders
Objections
Legal Framework
Laws
Energy Strategy 2050
Wind Energy Concept
Federal & cantonal energy, environmental, and spatial planning laws and regulations
Constitution
Federal level: guiche unique
Civil aviation BAZL
Communications OFCOM/BAKOM
Inspectorate for heavy current installations ESTI
Energy SFOE/BFE
Environment BAFU
Spatial development ARE
Defense, civil protection and sport DDPS/VBS
Meteorology and climatology MeteoSwiss
+
Federal Council
Federal permits
Aeronautical permit (skyguide)
Interconnection and grid reinforcement permits
Clearing permit
Cantonal & municipal level
Cantonal or regional authorities in charge of energy, environment, planning and building
Municipal authorities in charge of energy, environment, planning and building
Planning instruments
Structure plan
(General or Special) Land Use Plan
can run in parallel
Building Permit
Project Development Process
Feasibility Study
1-2 y.
Pre-Project
2-7 y.
Project
2-6 y.
Construction
1 y.
Operation
20-25 y
Assessment of potential sites
Wind potential
Environmental aspects
Accessibility
Interconnection and feed-in options
Building site: assurance of property
Geological assessment
Technology: turbines and alternatives
Financial appraisal -> KEV-application
Analysis of specific sites
Wind speed measurements (tower permit)
EIA-prestudy
Assessments
Specific Project
Wind speed survey
EIA and ecological compensation
Road access assessment, easement agreement
Interconnection study
Contracts with land owner(s)
Geological study
Technological plan
Tenders and non-binding offers
Business plan
Decision to build
ElCom reimbursement
Interconnection
Foundation, civil works, turbines
Electricity production and feed-in
Maintenance
Ecological compensation measures
Decommission or repower
Social Acceptance
Initial stakeholder contact
Municipalities
Land owners
Environmental & other NGOs
Cantonal and federal authorities
Suisse Eole
Power companies & grid operators
Neighboring municipalities
Media
Neighboring cantons, countries
Public hearing
Objections
Consultative referendum
Public hearing
Objectons
Referendum
Public hearing
KEV Process
KEV-system
Swissgrid
KEV-application
Revise project
Waiting list notification
KEV denied
Construction-ready projects get priority
Project status reports (every 2 years)
Accepted for KEV-funding
Deadline for commissioning
Banks provide capital
Notification of commissioning
Receive KEV
Grenchenberg (SO)
2007-2008
2008-2011
2011-2017
2017-2018
Chall (BL)
2010-2011
2011-2018
2018-2019
2019-2020
Haldenstein (GR)
2008-2010
2010-2011
2011-2013
2013-2013

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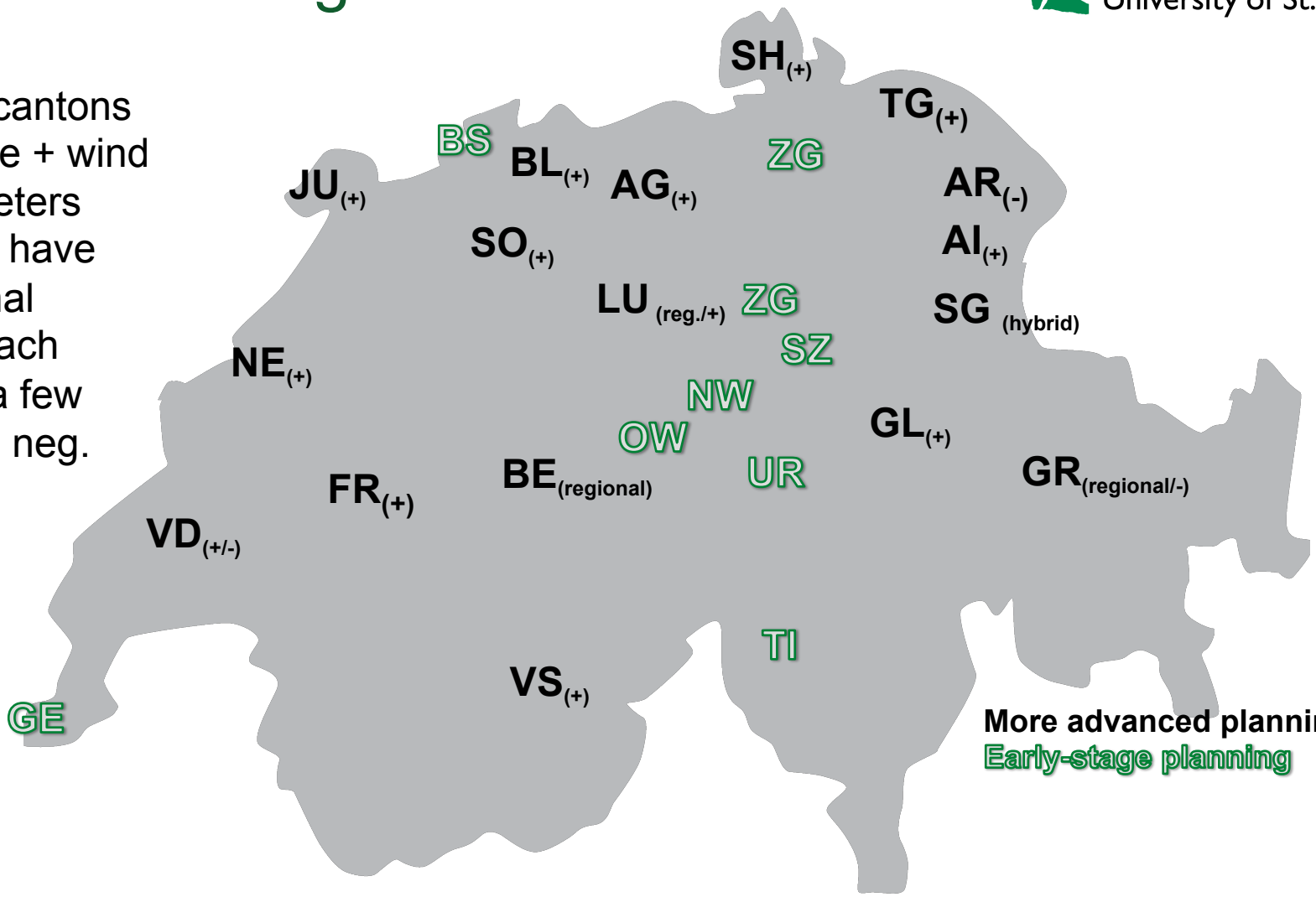
Cantonal zoning rules for wind

- Most cantons choose + wind perimeters
- Some have regional approach
- Only a few define neg. zones



Map: http://www.sieber.ch/. Source: own research

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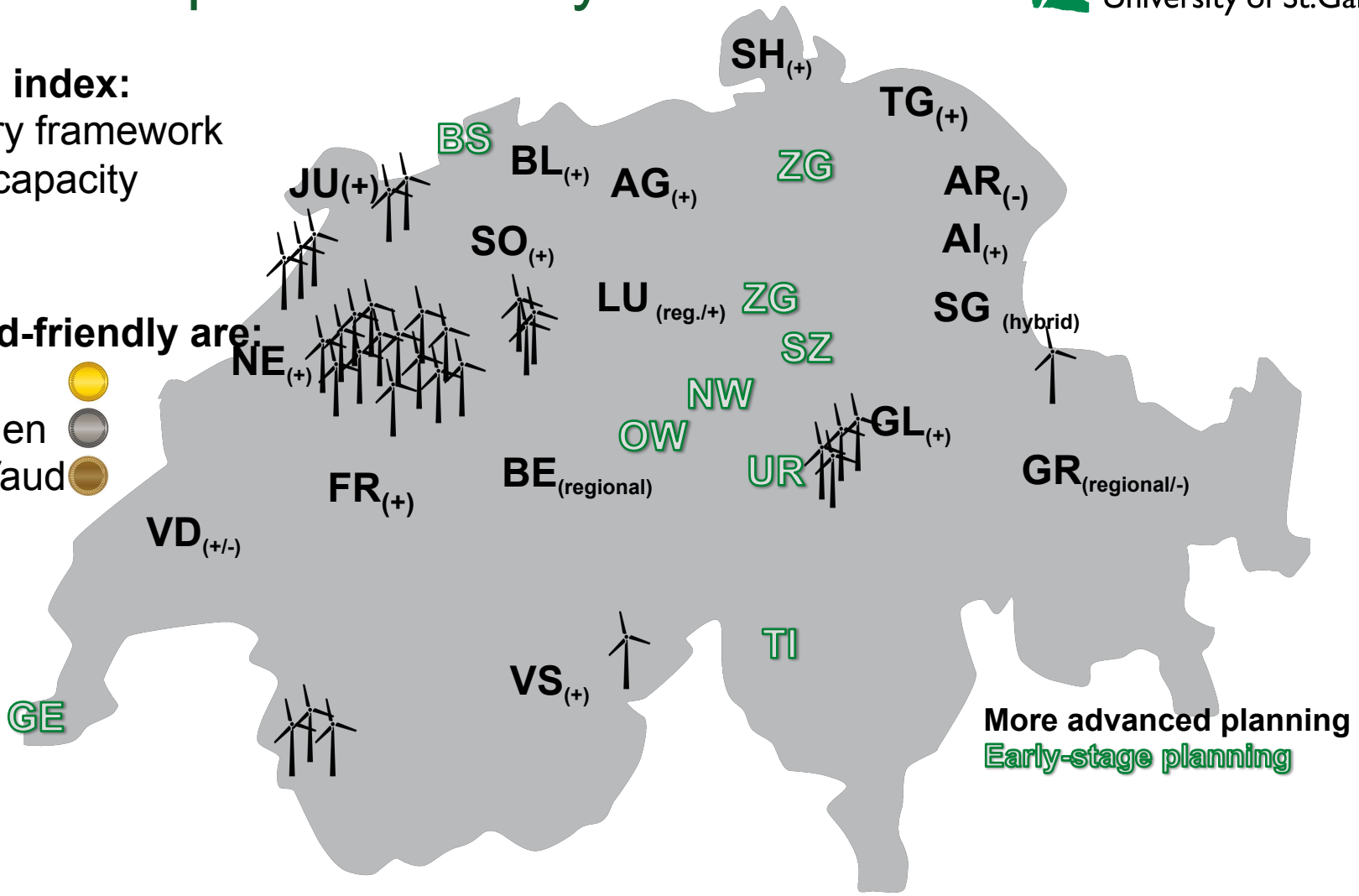
Most wind power friendly cantons

Cantonal index:
Regulatory framework
Installed capacity
KEV

Most wind-friendly are:
Jura
Graubünden
Aargau, Vaud



Map: http://www.sieber.ch/. Source: own research

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Reference case

Technical parameters	Value
Number of turbines	9
Turbine capacity (MW)	3
Capacity factor (%)	27.3%
Decrease in turbine's output (% per year)	1.6%
Planning stage (years)	7
Construction stage (years)	1
Operating stage (years)	20

Financial parameters	Value
WACC	3.97%
Depreciation, years	20
Corporate tax rate (%)	18%
Inflation rate (%)	0%
KEV yrs 1-5 (CHF/MWh)	215
KEV yrs 6-20 (CHF/MWh)	135
Electricity price (CHF/MWh)	40

Building parameters	Value
Construction cost (CHF/MW)	2,200,000
Interconnection cost (CHF)	660,000
O&M (CHF/year)	-540,000

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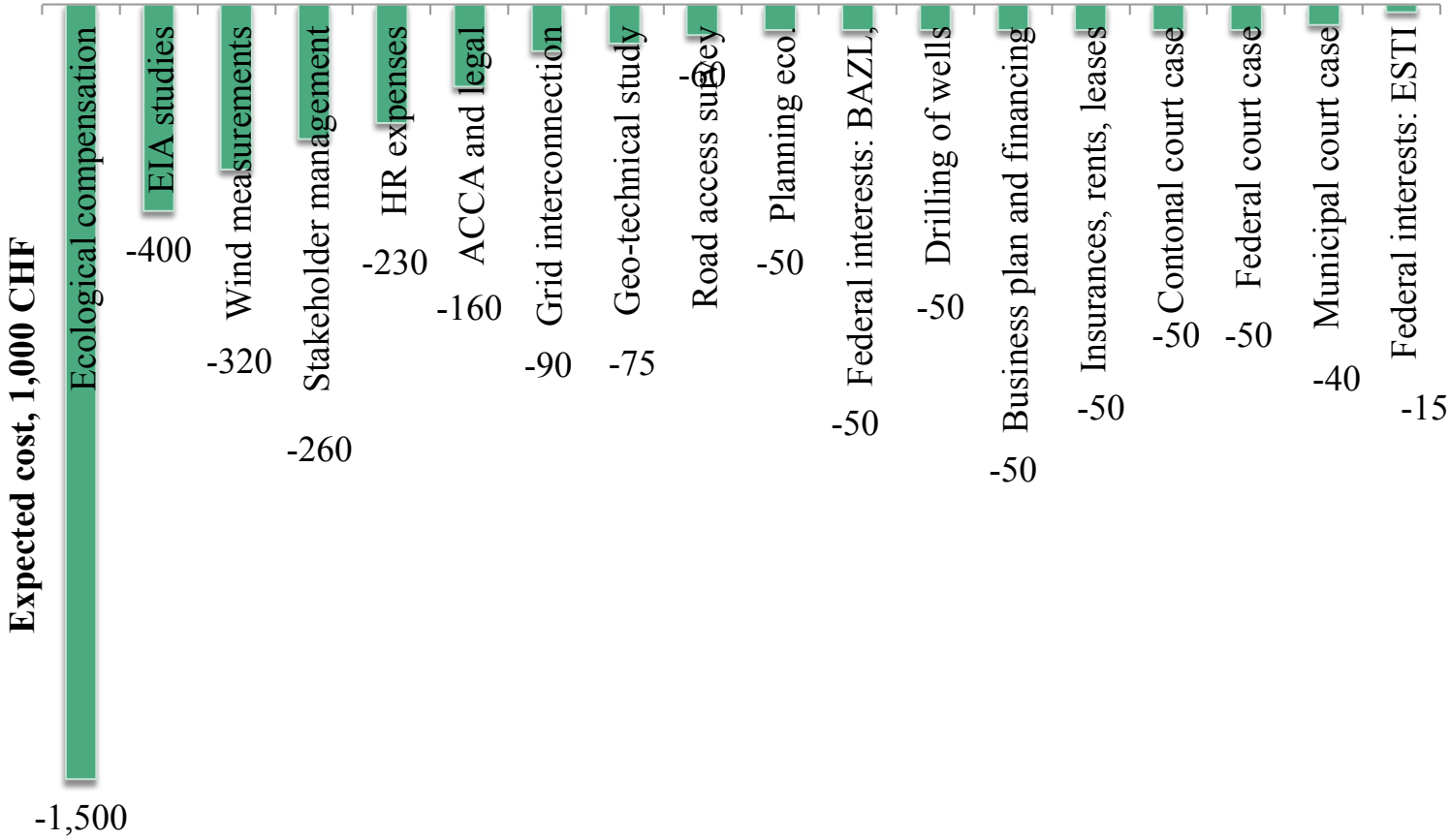
Reference case

Planning expenses

Based on interviews



Planning costs 3.5 Mio CHF over 7 years

Single year of delays: 0.1% loss in IRR

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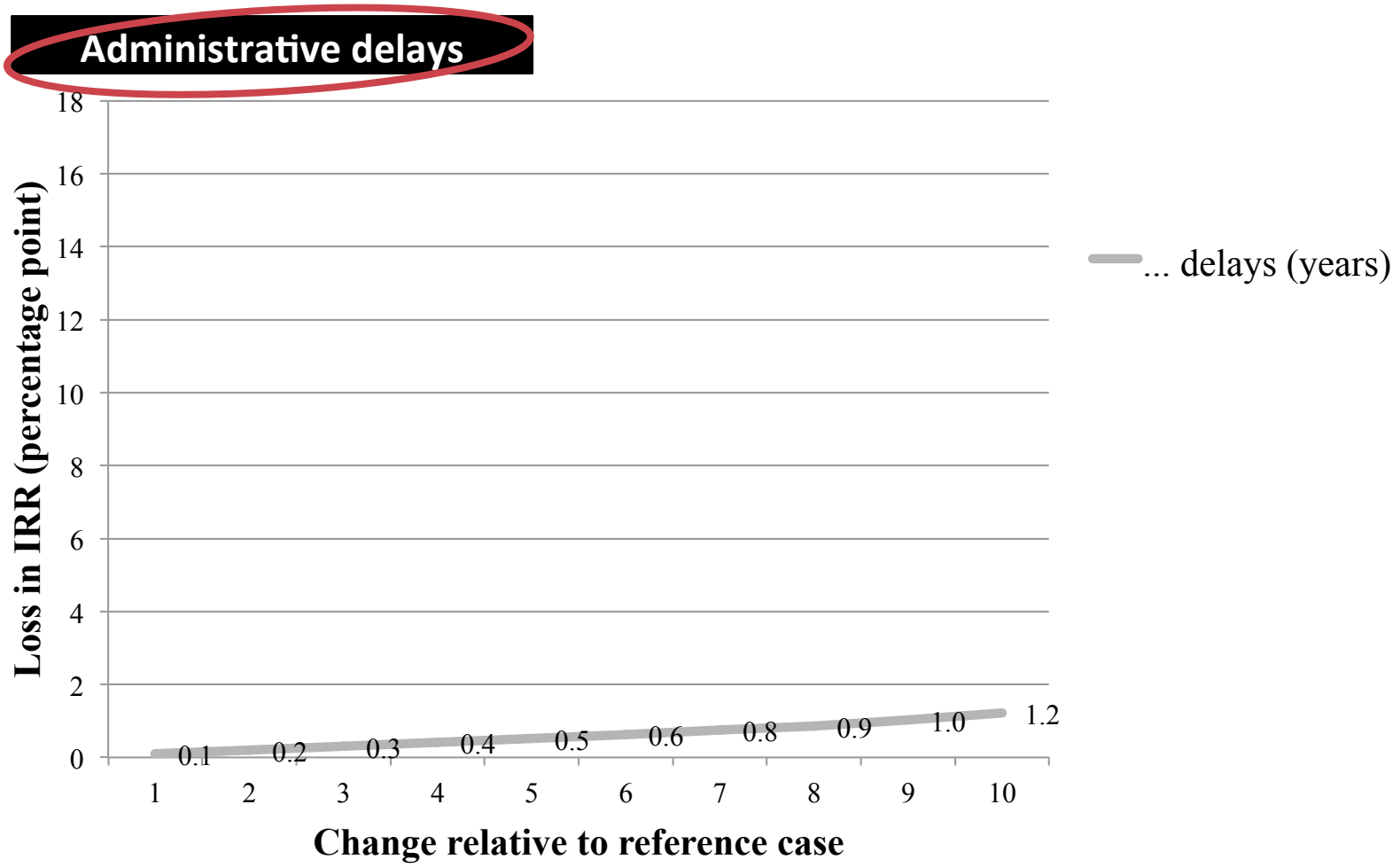

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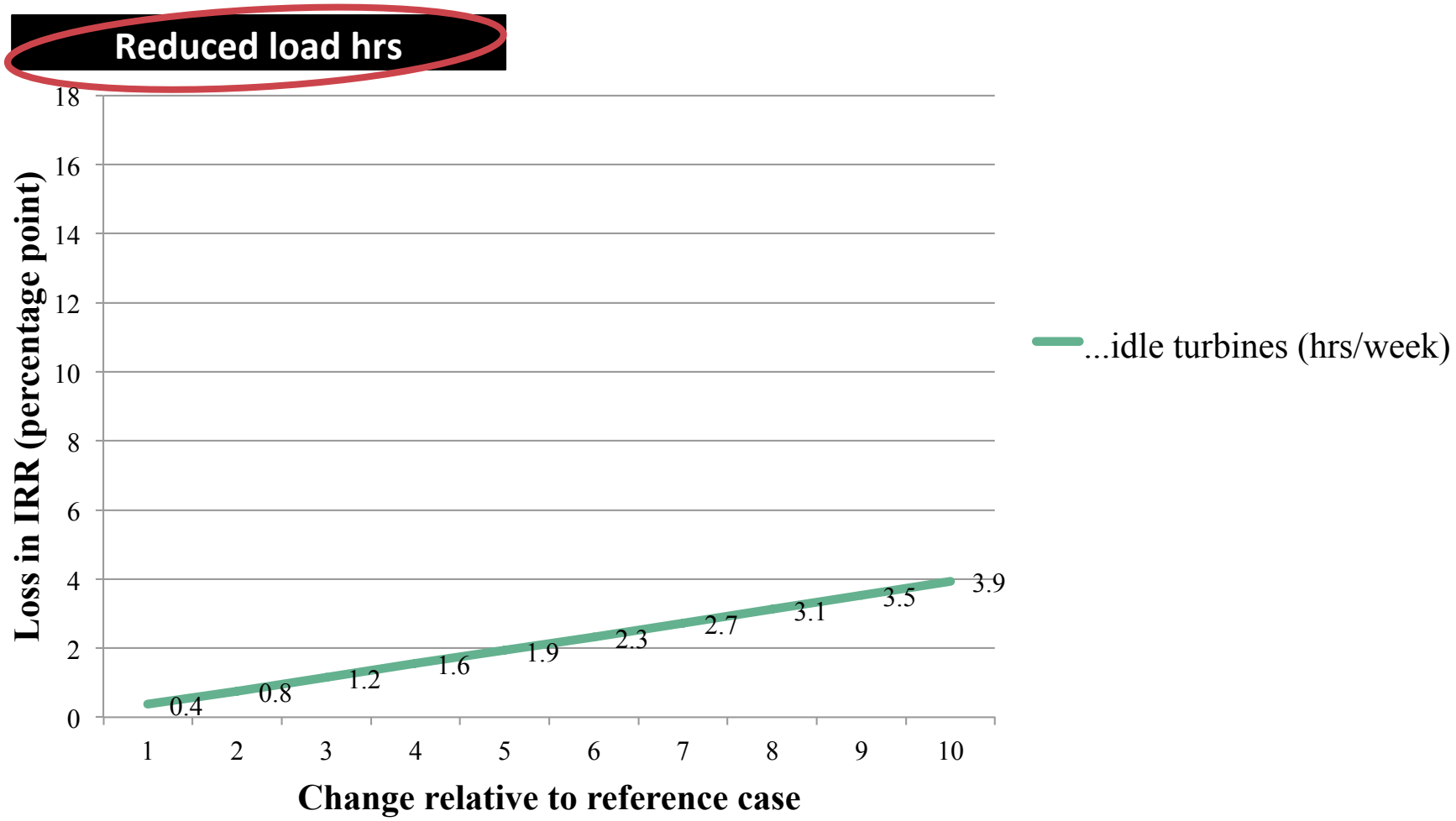
Reductions in capacity factor – big loss in IRR



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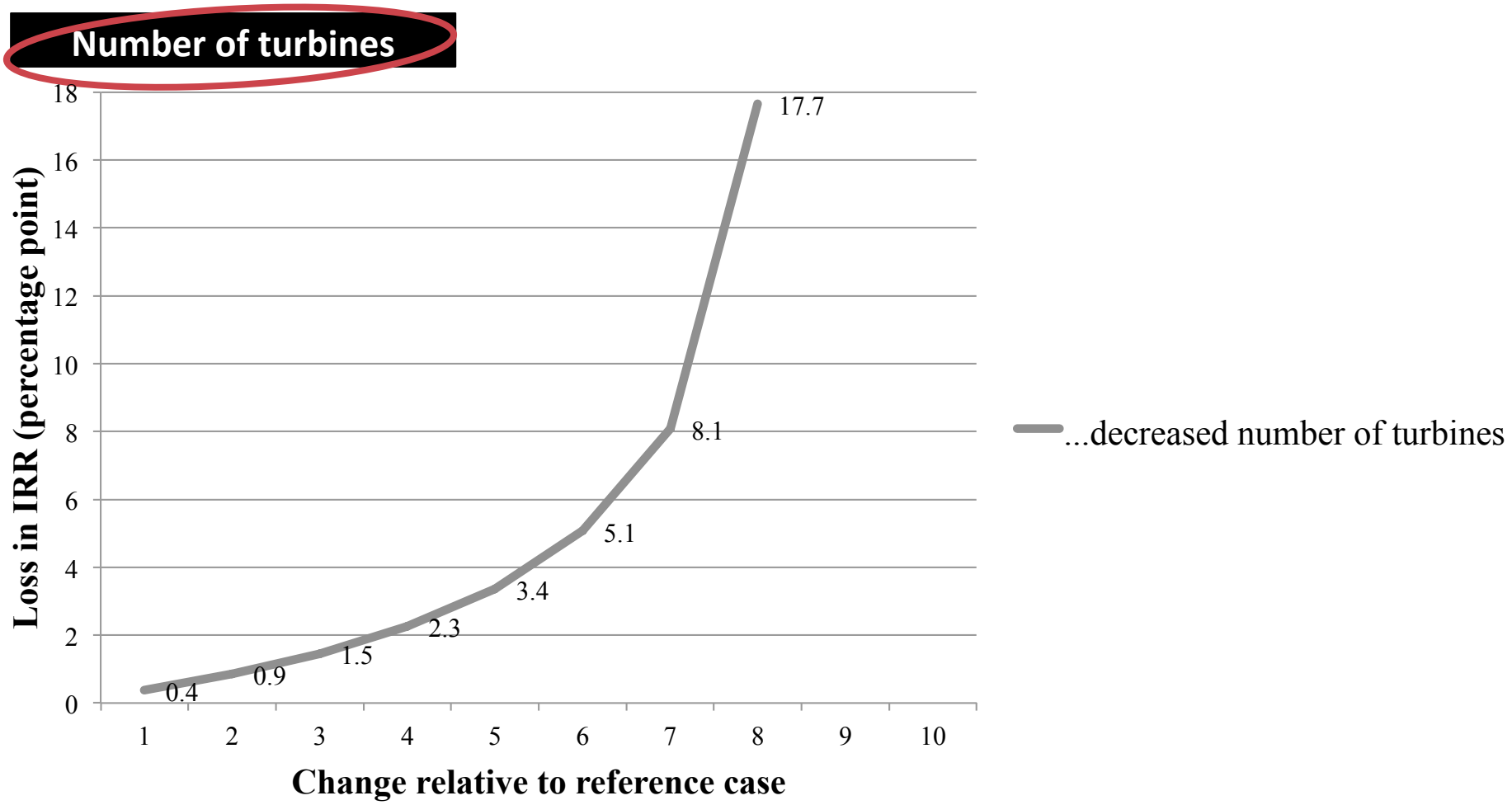
Larger parks spread admin costs among turbines



Several years in KEV delays = project becomes unattractive financially

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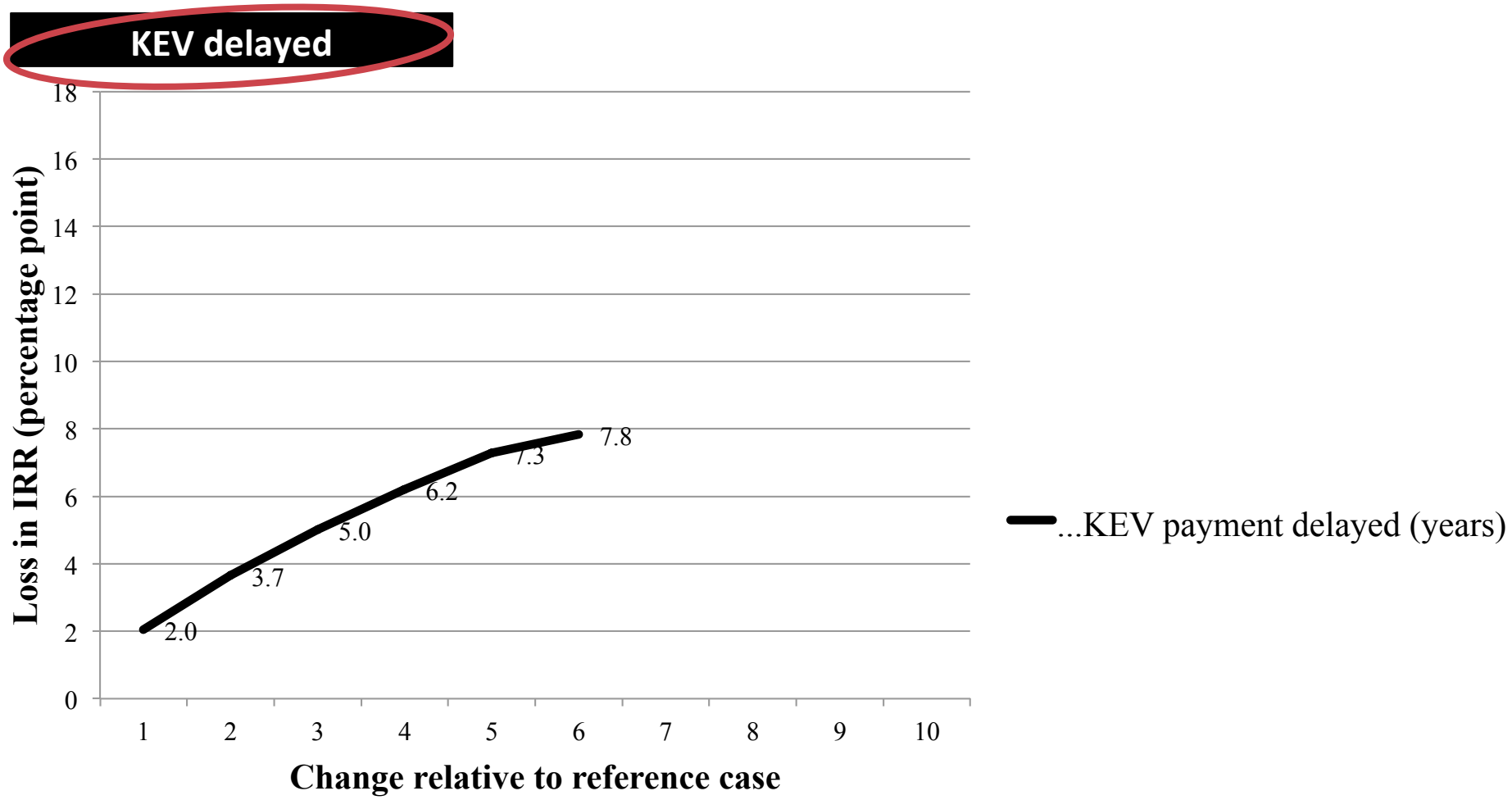

Uncertainty about KEV = area of concern

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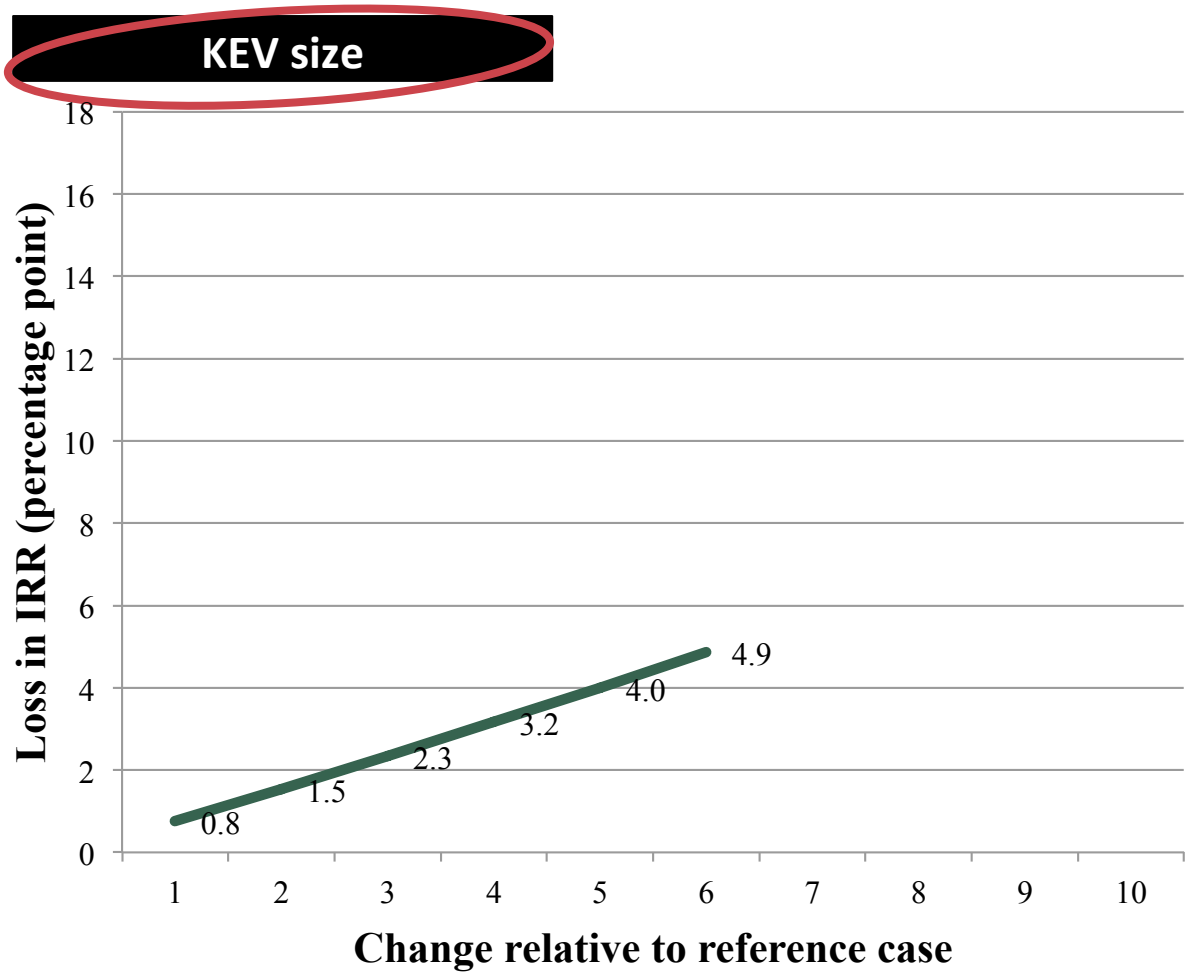

Electricity prices too low to make wind energy profitable

...KEV reduced (1=5%, 2=10%, 3=15%, 4=20%, 5=25%, 6=30%)

More realistic scenario: combination of cases

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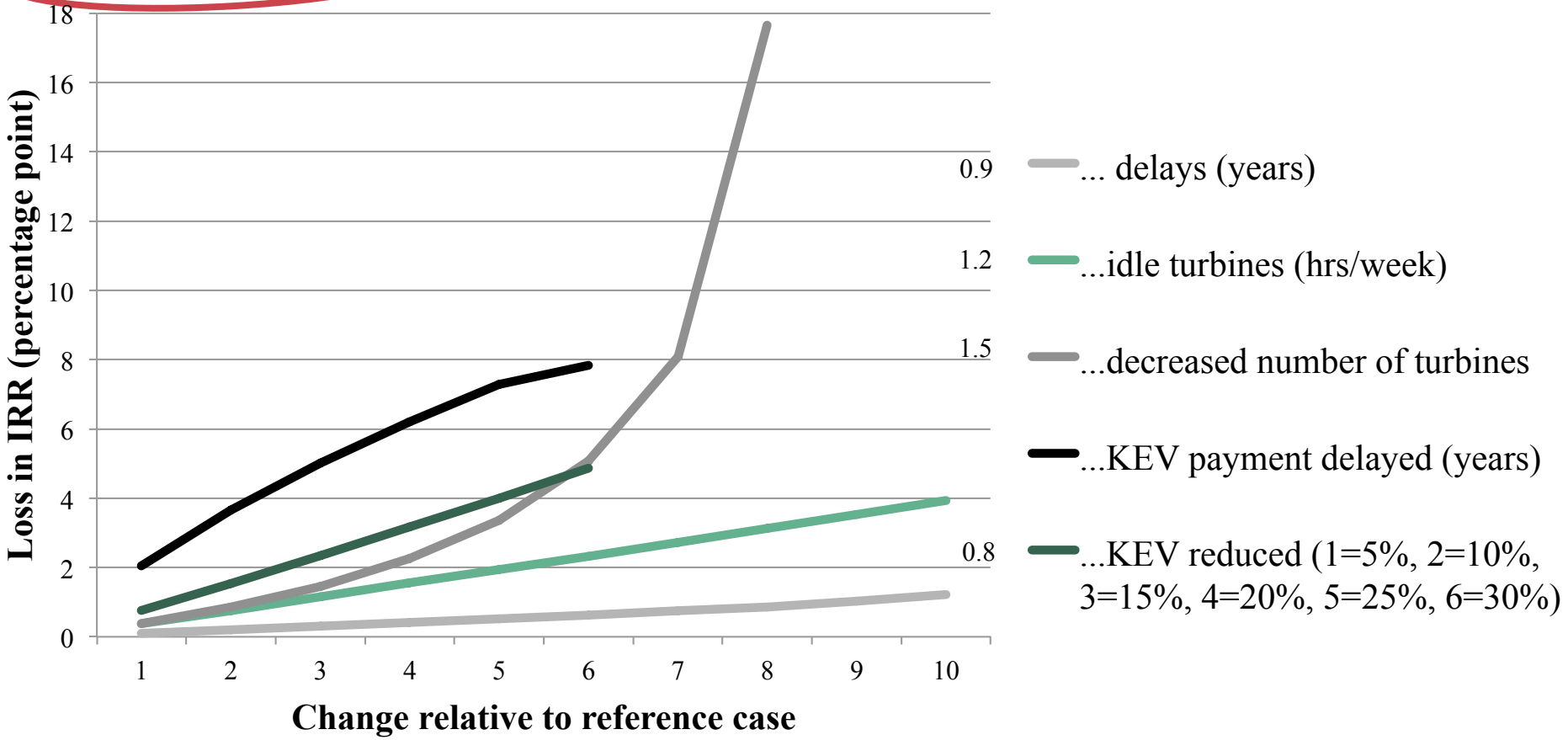
Realistic scenario

Total loss in IRR: 4.4%



Not accounting for:
additional studies
legal expenses
project management hours

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More indirect costs:

- Opportunity cost of capital

Invest 2 Mio CHF @ 3% = 60,000 CHF opportunity cost/year 1

Invest 4 Mio CHF @ 6% = 240,000 CHF opportunity cost/year 1

- Foregone revenues from electricity sales

Seen & unseen costs of project development

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Direct ‘seen’ cost

Indirect ‘unseen’ costs

Delays in wind project development cost more than we conventionally think