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3rd Prize

Wind in the Sails: Managing Social Acceptance of Wind Energy Projects

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This case is accompanied by a teaching note and a discounted cash flow model, available to faculty only. Please send your request to freecase@oikosinternational.org. The author is thankful for any feedback and suggestions to further develop this case to anna.ebers@unisg.ch

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Wind in the Sails: Managing Social Acceptance of Large Wind Energy Projects in Switzerland

Abstract

Shortly after the Fukushima meltdown of 2011, the Swiss government developed an Energy Strategy 2050, aimed to build up renewable energy capacity, improve energy efficiency and phase out nuclear energy. Yet, growth in the wind sector had been disappointing. This case study examines the factors that took the wind out of sails of large wind projects in Switzerland, paying special attention to the risks associated with public policy and stakeholder opposition. Though focusing on Switzerland, the lessons learned from the case study are applicable internationally, with multiple examples of large infrastructure projects being halted or severely delayed by public opposition and red tape.

Staged in May 2017, the case centers around Nadine Haller, who has been developing a large wind project for the last five years. She has just learned the news that the Energy Strategy 2050 has been accepted by the popular vote and she is contemplating what this result means for her project.

The case study is based on interviews with more than 20 wind project developers and permitting authorities. Several teaching options are included. The storyline can be updated as relevant news develops, creating new challenges for Nadine. The case offers an accompanying cash flow calculation model, teaching students that social acceptance and regulatory compliance come at a significant cost. Another option is a role-play game, where students try wearing hats of different project stakeholders: the project developer, the head of municipal government, a local landowner, a journalist, and a member of an environmental NGO, among others. The case also offers a framework to systematically approach project-related risks and develop risk-mitigating strategies. It should be relevant to graduate students from a variety of backgrounds, including communications, finance, law, and economics.

Keywords: renewable energy; stakeholder engagement; public opposition; regulation; project management

Case

It's better to go slow in the right direction than go fast in the wrong direction.

-Simon Sinek-

1. Introduction: Building a Wind Park in Switzerland¹

May 21st, 2017 was anything but a quiet Sunday for Nadine Haller. Her social media accounts exploded with comments on the Energy Strategy 2050 vote results. The Energy Strategy (ES) 2050 has been accepted by the 58.2% of popular vote at the referendum in May 2017 (Federal Chancellery, 2017). On the one hand, the new law simplified the complex permitting process that she has been struggling with. Moreover, wind energy received the status of 'national interest', thus giving energy production the same level of importance as other national interests, such as landscape or environmental protection (EnG, 2016). On the other hand, no subsidies will be earmarked for wind energy projects after the end of 2022. What impacts will this vote have on her wind power project?

Project developers like Nadine were ready to build every wind turbine they could. Financially, wind projects were attractive because of a generous federal feed-in tariff, which paid a fixed price for electricity production from renewable sources (Stiftung KEV, 2017). It had been confirmed that Nadine's project was going to receive the feed-in tariff for 20 years after being built, so theoretically her cash flows should be safe. But a complex and lengthy permitting procedures, as well as stakeholder objections, created considerable delays and cost overruns for her.

The waiting and uncertainty did not discourage Nadine. She had worked hard for the last five years to obtain the permits for the turbines, with the full realization that it might take five or even ten more years to actually see the blades turn for the first time. In the last couple of years, only a handful of new wind turbines had been commissioned (Krummenacher, 2016). Despite being accepted by local popular vote, nine wind energy projects were bogged down in court battles, brought by the opposing residents and NGOs (ibid).

Nadine had reasons to be optimistic: the landowner had recently signed a pre-contract granting her company the right to use their land. The project had been added to the cantonal and municipal zoning plans, and the municipal heads were willing to cooperate, especially since the municipalities would receive a share of the revenues from the project.

¹ This case is loosely based on the data gathered through more than twenty interviews with wind energy project developers and several cantonal authorities in different parts of Switzerland, analysis of publicly available documents, as well as media analysis. The author has disguised names and other identifying information to protect confidentiality.

Currently, she found herself in the last step of the process, waiting for a decision from the authorities about a building permit. She had submitted the full application with supporting documents (a dossier) to the authorities eight months ago and was awaiting their response.

But there were also reasons for pessimism: her lawyers had been calling the zoning office every two weeks for updates and had heard they might be asked to do an avian study to extend their environmental impact analysis. Such a study would cost tens of thousands of Swiss francs (CHF²) and would take a year or even two to complete. Already, Nadine had spent 2 Mio CHF on project development, more than half of her 3.7 Mio CHF budget, which was intended to last 7 years.

Once the building permit was approved, the project would be up for a municipal referendum, and things looked promising. There was a small group of skeptics in the region, but they were not (yet!) very organized and only latently had shown resistance in the local media. She knew, though, that the municipality head was up for re-election in two years and his challenger would likely oppose the wind project. In addition, an influential environmental NGO in Switzerland was preparing a court challenge, and there were likely to be other court cases from environmental organizations.

Given all this uncertainty, Nadine was well aware that the project needed a careful stakeholder management strategy. Unless a compromise was found, these stakeholders could delay the project considerably, or even stop it altogether. Nadine had to find a way to balance the tradeoff of appeasing stakeholder interests while still keeping the project profitable.

2. Not Only Cheese, Watches, and Chocolates: Swiss Energy Landscape

Development of renewable energy has risen high on the political agenda of countries worldwide. There are number of benefits from deploying renewable energies: reduced CO₂ emissions and mitigation of climate change, enhanced energy security, reduced threat of a nuclear meltdown, and an increase in “green” jobs (REN21, 2016). As of 2014, Switzerland was producing most of its electricity from large hydropower (55%), nuclear and other non-renewables (41%), and renewable energy (4%) (Kaufmann, 2015). Due to this energy mix, Switzerland has one of the lowest per capita CO₂ emissions among economically developed countries, and ranks 2nd globally in energy equity and 3rd in environmental sustainability (World Energy Council, 2016).

At the same time, the Swiss energy landscape has its own challenges. Since the 1970s, Switzerland had a negative energy trade balance, importing millions CHF worth of electricity

² The exchange rate of Swiss franc (CHF) to US dollar (USD) is nearly 1/1 at the time of writing this case study. The author continues to refer to the original currency of Swiss franc, but the conversion to US dollar is fairly straightforward.

and fuels from abroad (Tradingeconomics, 2017). In recent years, the gap has been narrowing: Switzerland is still a net importer of natural gas, but it exported slightly more electricity than it imported in 2015 (SFOE, 2016a). Swiss energy companies have been struggling to make a profit, however, as electricity market prices have dropped over 70% compared to 2009 due to overcapacity and a strong franc (Reuters, 2016; Albrecht and Vuichard, 2016). Both the hydropower and nuclear energy sectors struggle to stay in the black, as they produce electricity that costs well above the market price they receive (ibid). In fact, the largest Swiss utilities, Alpiq and Axpo, which have fully opened their business to electricity market forces, have been posting losses totaling nearly 1.9 billion CHF since 2014 (Reuters, 2016). These losses are likely to become a public burden, as many Swiss utilities (e.g. above-mentioned Axpo, BKW, and a number of smaller energy providers) are co-owned by cantons. The electricity market is only partially liberalized and most end-consumers cannot switch between providers, a contrast to the more liberalized European markets (Alpiq, 2017). In order for Switzerland to be integrated into the European power market, full market liberalization is necessary to enable cross-border electricity trading. However, the political feasibility of full market liberalization and an electricity trading agreement with the EU are at the moment questionable.

After the Fukushima accident in 2011, Swiss energy policy experienced a U-turn on nuclear (SFOE, 2016b). The revised Energy Law bans building new nuclear power plants in the country (EnG, 2016). The country is home to five nuclear power reactors, marked as red signs in Exhibit 1. Beznau 1, operating since 1969, is the oldest nuclear power plant in the world (Kernenergie, nd). Beznau 1 has been offline since March 2015 due to a technical issue and has not been allowed back online due to safety concerns, costing its owner, AKW Leibstadt, 1 Million Francs a day in losses (SRF, 2016). An identical reactor, Beznau 2, was commissioned just a few years later. Located less than 40 kilometers away from the populous city of Zürich, both power plants have been protested by Greenpeace, a group that urged closing them on safety grounds in 2014 (Swissinfo, 2014).

With hydropower and nuclear power supplying the majority of electricity in Switzerland, the renewable energy sector has not yet witnessed a large-scale uptake. Solar photovoltaic (PV) installations are usually small and have been mostly developed by private individuals, farmers, and community associations (Chassot, 2012). The current social and political sentiments go against large solar PV “brownfields”. Still, solar photovoltaic installations have outperformed the 2011 projections of Energy Strategy 2050, while wind power has been lagging behind (Kaufmann, 2015). By the end of 2016, there were 75 MW of wind energy capacity installed in the country, producing roughly 128 GWh of electricity, which corresponds to energy demands of 36,600 Swiss households (Suisse Eole, 2017). Most wind installations have been small turbines with capacities of less than 1 MW (light blue

circles in Exhibit 1) (Wind Data, 2016). There were only several large wind turbines (dark blue circles) and even fewer wind parks with multiple turbines (purple circles).

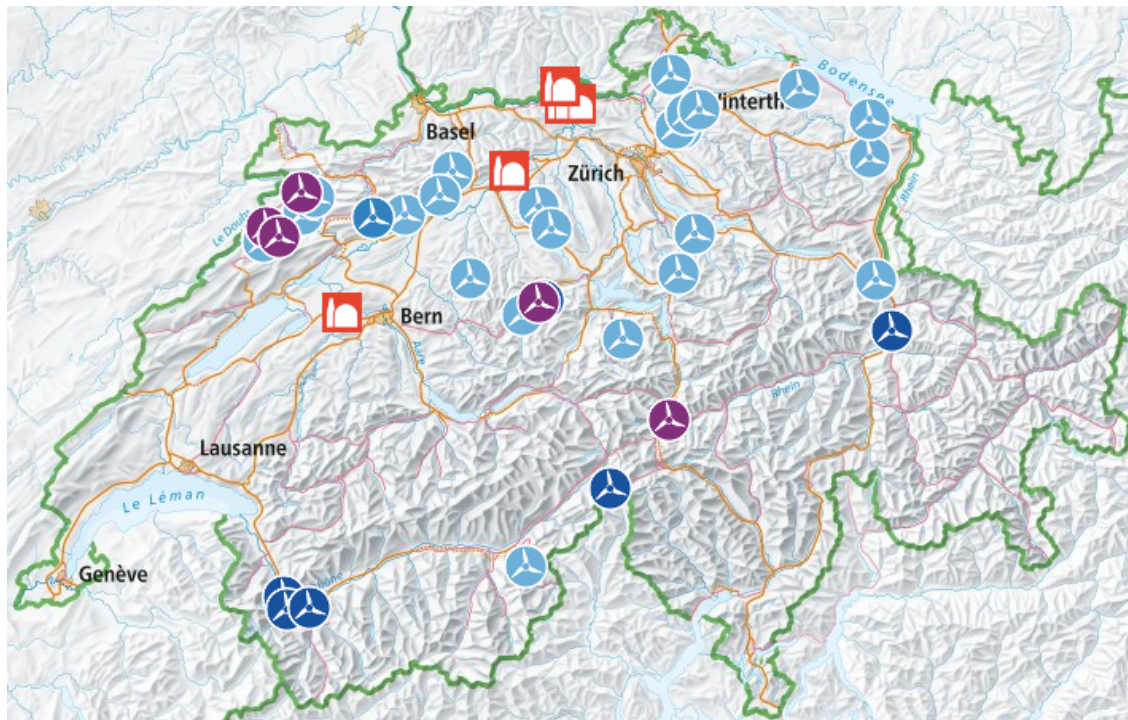


Exhibit 1: Location of Swiss Nuclear Power Plants and Wind Turbines. Source: Wind Data 2016.

Despite its potential, development of geothermal energy is marginal. After surprise-earthquakes, two geothermal projects were infamously abandoned near the cities of St.Gallen (in 2014) and Basel (in 2009) (Swissinfo, 2014). Even though the danger posed to geothermal projects by earthquakes has not been unambiguously proven, the image of the projects was severely damaged and they were called off.

3. Headwinds and Tailwinds: Governmental Support of Wind Energy

In order to incentivize renewable energy installations, the Swiss government has been offering a generous feed-in-tariff, called *KEV* in German, since 2009. The KEV is a fixed rate paid for electricity produced from renewable sources for the duration of 20 years (SFOE, 2016 c). Once the project is approved for KEV, the developer receives a payment of 0.215 CHF per kWh for the first 5 years of operation, which subsequently drops to 0.135 CHF per kWh for the remaining 15 years. Wind turbines on elevations above 1,700 m receive an additional payment of 0.025 CHF per kWh, because the air is thinner at higher latitudes, which reduces electricity output. The KEV ensures that electricity generators receive compensation for the green power they produce. By comparison, average market prices for base-load electricity are predicted to stay within a range of 0.05-0.1 CHF per kWh (SFOE, 2016d). The KEV shields wind project cash flows from market price volatility, and wind

energy enjoys preferential treatment in the KEV system, meaning that a new KEV application from a wind project developer would be considered for KEV-support before other technologies (ibid).

Even though KEV offers an attractive subsidy, it is plagued by policy design problems. There are not enough funds to support all renewable energy projects. The KEV-fund is replenished by a small levy paid by electricity consumers, which does not match the high demand for support from renewable electricity producers. As a result, only 34 wind parks in Switzerland receive KEV and there were 361 wind projects with the capacity of 843 MW waiting to be approved for the KEV-support in the beginning of 2017 (Stiftung KEV, 2017). Another 509 planned wind projects, like the one developed by Nadine, have secured the feed-in tariff once/if they are built (ibid). Due to the long waiting list and the planned KEV phase-out, the majority of wind projects on the waiting list as well as new applicants have virtually no chance of being seriously considered for KEV.

Thus, the future for wind developers is highly uncertain. Revised Energy Law, which incorporates the Energy Strategy 2050, will become law in 2018 (EnG, 2016). This should increase investment confidence in wind parks for several reasons. Among the ES2050 measures is to reduce the KEV-waiting list by increasing the levy on electricity consumers, to remove wind capacity caps, and to streamline administrative processes (SFOE, 2016b). Another planned measure is to define wind energy as a “national interest” - a crucial precondition for putting wind energy development on the same footing as other Swiss national priorities, such as landscape protection. Still, it remains unclear what kind of support system will be in place after KEV is phased out. The political discussions point in different directions, from introducing some unspecified market-based solutions, e.g. a quota, a feed-in premium on top of the market price, a new steering tax on fossil fuels or a system of auctions for electricity produced from renewable sources (SFOE, 2015). In sum, these regulatory uncertainties make planning of wind energy projects rather challenging.

Project developers say:

„Without KEV, no wind project will be profitable...”

“For a successful project, one needs good wind, a building permit, and KEV...”

4. If it Keeps Moving, Regulate it: Rules and Regulations Impacting Wind Power in Switzerland

In Switzerland, there are three levels of government involved in regulating wind power installations with turbine heights above 30 meters. The project developer has to receive clearance from authorities on the federal, cantonal, and municipal levels. Even

though federal agencies are in charge of some permitting, the cantons and municipalities have the real regulatory power when it comes to wind energy installations.

On the federal level, the project developer has to go to several agencies in order to obtain permits, including an aeronautical permit, a meteorological permit, a high voltage permit, and a forest clearing permit in case large clearings are needed, just to name a few. To simplify this permitting process, a suggestion has been made to set up a one-stop-shop, called ‘guichet unique’ (Scruzzi, 2015). This would allow project developers to have a single point of contact with federal authorities, instead of having to coordinate among multiple agencies.

In order to help cantons identify suitable locations for wind parks, federal authorities have prepared ‘Wind Energy Concept’ handbooks in 2004 and 2010 (SFOE, 2016e) and a spatial planning guideline (SIB, 2014). Not legally binding, these handbooks outline conditions on the planning and construction of wind parks. Generally, authorities recommend concentrating wind power developments in the areas with high wind potential that are already developed, thus avoiding locations where citizen might want natural setting to be preserved (ibid.). The federal government created wind maps for Switzerland, roughly identifying places with high wind speeds (SFOE, 2017). Some regions in Switzerland have wind speeds that are comparable to Northern Germany, signaling high potential to developers.

In addition to federal permitting and favorable wind conditions, it is necessary for a project to be approved by the cantonal authorities in charge of energy, environment, zoning, and building. The project has to be added to a cantonal structure plan, which is the first hurdle in the administrative planning process. The structure plan identifies wind perimeters, which are the areas where wind parks can or cannot be built. Every canton has a slightly different administrative process for structure planning and only half of Swiss cantons identify wind perimeters at all. This step can take several years to complete, because it usually has to be approved by cantonal authorities and the Federal Council. Once a project is in the structure plan, it has to be added to the land use plan, which is a joint planning instrument of the municipality and the canton. Finally, the municipality decides whether to grant the project a building permit.

The Swiss pride themselves on their inclusive democratic planning process, where different parties can get involved and influence outcomes. But as a result, permitting decisions can be challenged every step of the way, which can delay or even stop a project. For example, local residents and environmental NGOs with standing can take a project developer to court over a building permit, while the municipality can stop the project by means of a referendum. The court process is especially time-consuming, as there are three levels of courts in Switzerland. The courts conduct a ‘weighting of interests’ procedure, which

evaluates the benefits of a wind project against the costs it imposes on the local environment and landscape (Plüss, 2017). This weighting has become a contentious matter, as it is difficult to monetize ecological and social benefits. On average, wind developers are engaged in nine court cases per project, but most of these cases are dropped after negotiations (own research). Some plaintiffs are interested in creating a court precedent, so there is no room for compromise. Generally, the project is halted until the court provides a verdict, which can be challenged at the next court level, up to the federal court. Every court instance takes six months to a year to hear a case, while the federal court might require even longer. It concerns project developers that some plaintiffs might use court cases as a time-waiting strategy to force project developers to abandon their projects.

Project developers say:

If you go high enough, there will always be wind.

Without the cantonal structure plan, it is nearly impossible to get a building permit.

5. Project Development Process in Switzerland³

5.1. From Cradle to Grave: 5-Steps of Wind Project Development

Planning wind energy projects in Switzerland can only be carried out by developers with a lot of patience: the average planning time is over 10 years (Guy-Ecabert and Meyer, 2016; Suisse Eole, 2016). By comparison, the European average for permitting onshore wind projects is 4.5 years (Ceña et al., 2010).

Planning can be divided into three phases: the initial phase starting with a feasibility study, the pre-project phase, and the main project (**Error! Reference source not found.**). All projects go through rigorous technical, financial, ecological, and geological evaluation, with the involvement of multiple stakeholders (Twele et al., 2016). After a project receives all necessary permits, the construction phase starts. In order to install wind turbines, a number of infrastructural improvements (clearing forests, building roads) are often needed. The next phase is the operational phase, which is the longest phase of the project. It can last 20 years or more, and it is the time when the project is generating revenues. During this period, the project developer also implements ecological compensation measures to mitigate project impacts on flora and fauna. After the end of the operational phase, the project can be either decommissioned or repowered (Deloitte, 2015). Repowering means installing more modern, updated technologies.

5.2. Feasibility study

³ This section is based on information obtained during interviews.

5.2. Feasibility study

A feasibility study is the first exploratory stage of a wind project, which includes rough wind potential evaluations, initial consideration of environmental impacts, and accessibility of potential wind sites. Project developers either conduct these evaluations themselves, or they hire specialized engineering bureaus to conduct independent analysis. The feasibility study includes a preliminary geological assessment of the site, suggestions for suitable wind turbines, and an initial financial appraisal.

This is also the time of initial contact with stakeholders. Of paramount importance is the initial approval by the land owner(s), where the project is going to be located. This is usually accomplished through a preliminary contract. A project needs to be connected to the electric grid, so interconnection options are discussed with the grid operator. Finally, the project developer typically gets in touch with the respective cantonal authorities, in order to investigate the options for adding the proposed project location to the cantonal structure plan. Federal authorities are contacted for information on federal permits. If all of these elements sound promising, the developer moves into the pre-project phase.

5.3. Pre-project

At this stage, a project developer needs to obtain reliable wind speed data. To accomplish that, a wind measurement tower must be built to measure wind speeds for at least a year. It is also time to apply for the KEV by submitting a free-of-charge online application to the national grid operator, Swissgrid. If granted KEV-approval, the project developer has up to seven years to build the turbines. Every project aspect is also investigated in more detail at this stage, and the dossier of the pre-project is submitted for evaluation to the municipality and the canton, so that the project can be integrated into the land use plan.

5.4. Main Project

The main project stage builds upon the existing dossier and includes a number of detailed studies to satisfy the building permit application requirements. This stage can take 6 years, but can stretch out even longer if there are pending court cases. The main project dossier usually includes the following components: a wind speed survey, an environmental impact assessment (EIA) and suggested measures of environmental compensation, a road assessment, an interconnection study, contracts with the land owner, a technical plan, and a business plan. In case a project needs external funding, the business plan might later be submitted to a bank. Generally, obtaining funding for a project already approved for KEV is rather unproblematic.

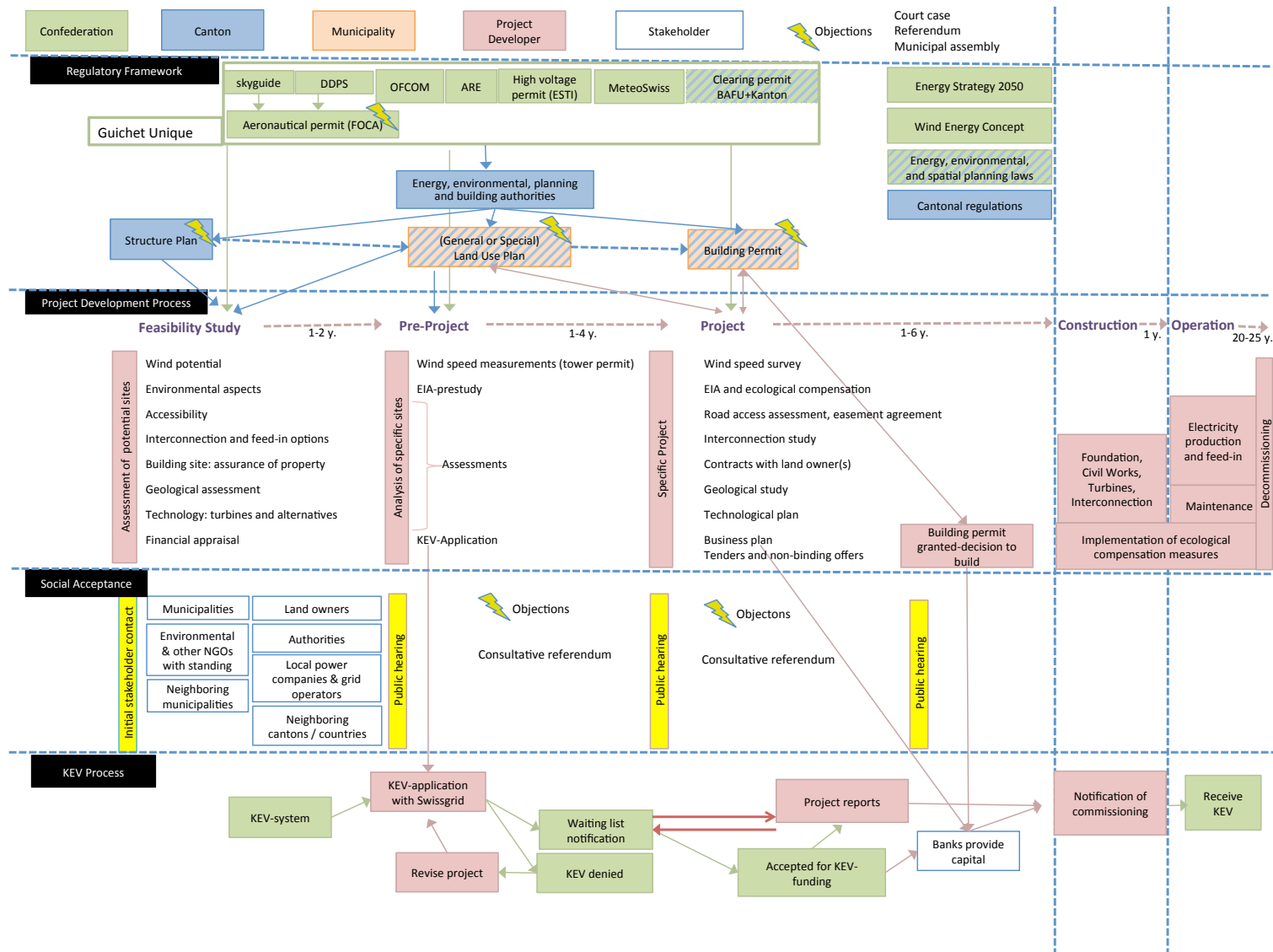


Exhibit 2: Planning steps for a large wind project in Switzerland. Source: author's representation

The EIA is an especially important part of the dossier, as it tests a project's impacts on flora, fauna, landscape, and noise levels. The EIA often represents a stumbling block for project developers. Authorities, the courts and external stakeholders often require additional ecological studies, which are expensive (ranging between 30,000 and 300,000 CHF) and take months to complete.

5.5. Counting Chickens Before They Hatch: The Developer's Evaluation of Project Expenses and Revenues

Renewable energy projects have several defining features, which need to be taken into account by investors. Projects are characterized by rather high upfront costs (CAPEX), which includes the 'hard costs' (wind turbine, civil works, and grid connection), as well as 'soft' planning costs (Exhibit 3) (Helms et al., 2015). These 'soft costs' are dominated by the cost of permitting, ecological compensation, and the environmental impact analysis (Exhibit 4). Revenues from electricity production are the only positive cash flow from a project. To be profitable, these revenues have to be high enough to cover both the soft and the hard costs of the project, while also accounting for risk and the differential timing of outlays and cash inflows.

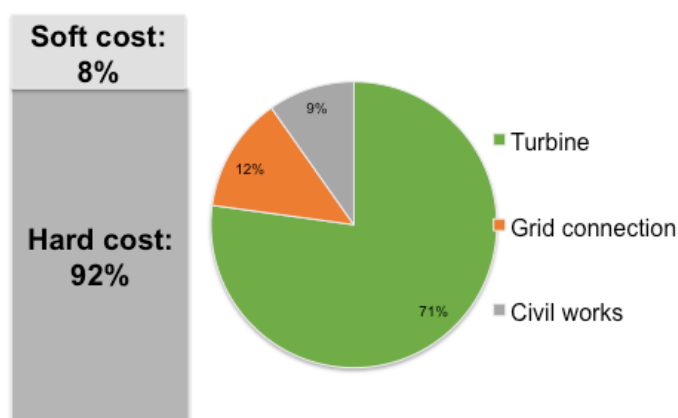


Exhibit 1: Hard and Soft Costs of a Wind Energy Project. Source: adapted from Blanco (2009) and Krohn et al. (2009)

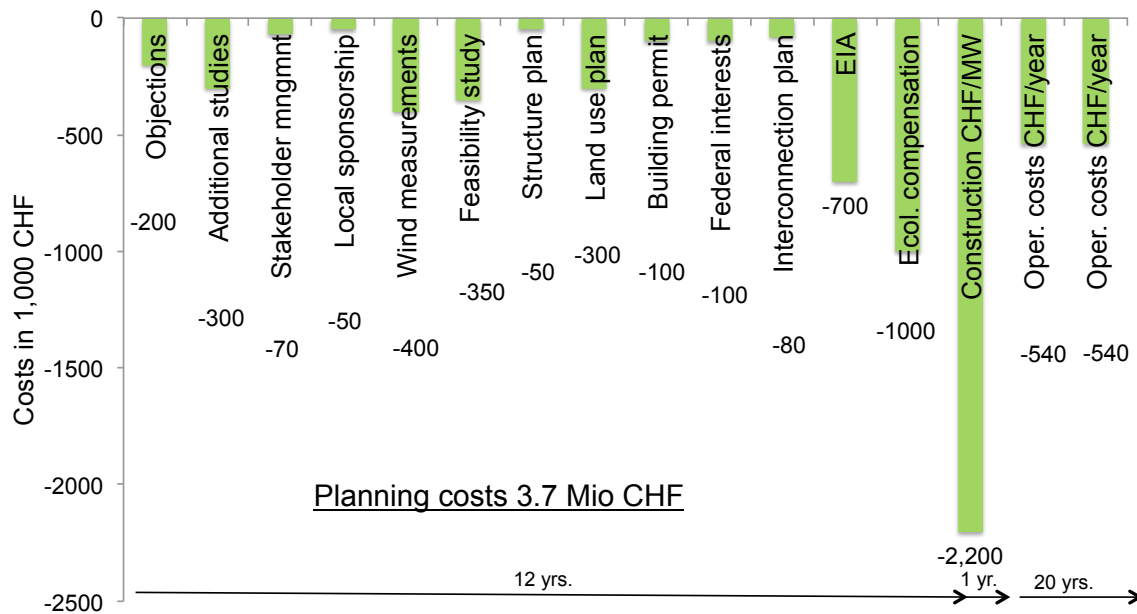


Exhibit 4: Examples of Wind Park Expenses. Source: author's research.

By contrast, operating costs (OPEX) for wind farms are relatively low compared with the capital costs, since wind blows for free (Helms et al., 2015). The building phase of the wind farm is usually financed through a mix of debt and equity. Such a financing structure allows financial participation of additional stakeholders, including municipalities, private individuals, local utilities, or other project partners. Research has shown that allowing financial participation of local stakeholders might increase projects' social acceptance (Tabi and Wüstenhagen, 2015).

A common way to evaluate a project's profitability is using Net Present Value (NPV) and Internal Rate of Return (IRR) calculations, which are standard methods in finance (Brealey et al., 2016). These calculations are based on a discounted cash flow model that records revenues and expenses. For the developer, it is easy to predict project revenues, as they are connected to the feed-in-tariff, KEV, and the level of output. By contrast, project expenses and delays are more unpredictable.

At the beginning of any project, the developer earmarks a planning budget, usually in the range of 3 to 6 Mio CHF. The planning expenses include costs for wind measurements and environmental studies, salaries for lawyers, engineers, financial managers, and community outreach managers, all of whom work on the project dossier. It is rather unusual for developers to account for monetary losses due to project delays, such as foregone profits or the opportunity cost of capital. The developers might need the revenues from operational projects to make up for the planning-phase losses of delayed or abandoned projects.

5.6. Great Achievements Involve Great Risk: Risk Categories in Wind Energy Investment

When embarking on a project development journey, wind park developers face a number of risks. These risks can be systematized in a framework that includes ten risk categories, adapted from Noothout et al. (2016) (Exhibit 5). Careful consideration and weighing of these risks are paramount for successful project management.

Country risk applies to all projects in Switzerland and affects projects over their full lifecycle. Switzerland is known for its advanced economic and social development, strong franc, rule of law, and low corruption levels. Due to this stability and the current very low interest rates, investors are able to finance projects at a relatively low cost of capital. At the same time, Switzerland is a rather small market, which makes large-scale wind energy developments impossible. As a result, a lot of Swiss developers provide capital for building wind farms outside of the country (Aargauer Zeitung, 2015; Müller, 2012).

In the planning phase, one of the largest risks is connected to social acceptance. Opposition might emerge due to the NIMBY, ‘not-in-my-backyard’, phenomenon, which characterizes the rejection of a wind project due to its direct proximity to a stakeholder (Dear, 1992). After early project failures due to social acceptance, most Swiss developers have learned to create a comprehensive communication plan and stakeholder involvement strategy. In case the wind project is located near cantonal lines, stakeholders from another canton might need to be involved in the planning process, too.

The next four risk categories can be jointly seen as ‘policy risks’. Administrative risk stems from complex permitting procedures, varying procedures by jurisdiction, long administrative lead times, multiple opportunities for objections, and a high number of authorities involved. Policy design risk is connected to opportunities and threats arising from the policy instrument choice by the authorities. In the academic literature, there is an ongoing debate as to whether price-based instruments, such as feed-in-tariffs, are better at promoting wind energy than quantity-based instruments, such as production quotas (Butler and Neuhoﬀ, 2008; Dong, 2012). While the evidence is mixed, it seems that it is not the policy instrument that matters, but how the policy is designed. Policy design elements include the duration of support, its size, and whether there is a cap on supporting funds.

The unintended consequences of an unfortunate policy design, paired with shifting political winds, increase the risk of policy changes. Swiss energy policies are difficult to predict, which creates large policy change risk to project developers. On the other hand, it is not very likely that policies will change suddenly in Switzerland. Retroactive policy changes like those that occurred in Spain (Couture and Bechberger, 2013) or Romania (Karasz, 2013) are rather unlikely.

Risk category	Definition
Country risk	Risk from country-specific factors such as political stability, level of corruption, economic development, design and functioning of legal system and exchange rate fluctuations.
Social acceptance risk	Risk of opposition to wind energy projects from stakeholders
Administrative risk	Risk stemming from complex permitting procedures, which lead to additional expenses and delays
Policy design risk	Risk originating from governmental policies, often connected to unintended consequences of policy design
Policy change risk	Risk of unexpected policy changes due to shifting political winds or an unfortunate policy design
Market design risk	Risk connected to regulations that provide fair and non-discriminatory market access to all electricity producers
Grid access risk	Risk due to uncertainties in gaining access to the electric grid
Financing risk	Risk stemming from financial institutions' willingness and ability to finance projects
Technology risk	Risk relating to technological maturity of available technology
Management risk	Risk connected to the knowledge and experience of the project developer and her team

Exhibit 5: Risk in Wind Energy Investment. Source: adapted from Noothout et al., (2016)

Market design risks are not negligible in Switzerland. The market has yet to be liberalized. The electricity market is dominated by large public or partially publicly owned companies, which makes it difficult for smaller privately held players to compete.

In contrast, financing risks do not loom large in Switzerland. The country is awash with capital and it is not difficult to get financing for a lucrative wind project. There is a catch, though –banks will only finance projects that secure KEV-support. Without KEV, projects are exposed to market electricity prices and have a difficult time obtaining financing. Project developers need to persuade lenders that a project will generate positive cash flows, by securing, for example, a long-term power purchasing agreement.

A project developer greatly depends on the availability of grid connection to be able to transmit the produced electricity to buyers. If there are no connection options available, the developer usually abandons the project idea, because building new electric infrastructure is prohibitively expensive. Generally, it is crucial to collaborate with the local grid operator, who

is obliged to accept electricity produced by wind projects, but cost-sharing among parties for grid improvements is often subject to negotiations (Swissgrid, 2017).

The remaining risk categories are not policy-related. Technology risk relates to the level of technological maturity of wind energy technology. Even though wind turbines are still a novelty in many regions, the technology of producing electricity from wind power is mature. In the recent years, technological progress has enabled building of increasingly larger turbines for increasingly lower cost, which tremendously improved cost-efficiency of wind energy per MW of installed capacity. From a project developer's perspective, project delays have an unexpected upside; more advanced wind turbines become available on the market over time. However, project delays in Switzerland are sometimes so severe that by the time a project obtains all the necessary permits, the technology specified in the permitting documentation is not available or is outdated.

Next, management risk is related to the overall experience level of a project developer to successfully plan, commission, operate, and decommission or repower a wind project. Given the complex developmental procedures involved, there is a significant potential for risk reduction as project developers learn by doing.

Project developers say:

"It is difficult to obtain grid connection in the network area of another provider. One should be ready to provide them a stake in your project, or negotiations might go nowhere."

"When we have the permits and the KEV-support, it is usually a matter of half a day to secure the project finance."

6. Tilting at Windmills: Wind Energy Stakeholders and Social Acceptance

Securing social acceptance is recognized as one of the musts for a successful wind project. Internationally, examples abound where large-scale wind energy projects were severely delayed (e.g. Cape Wind in the US) or abandoned (e.g. Project Hayes in New Zealand) due to public opposition (Edens, 2012). Such examples are not exclusive to wind energy and include other large infrastructure developments, such as the building of electric transmission lines in France (Späth and Scolobig, 2017) or shale gas exploration in the Netherlands (Cuppen et al. 2016). Thus, a deeper understanding of social acceptance, its elements and drivers, is important for successful project management in many fields.

One way to measure social acceptance is to conduct opinion polls. Public opinion polls often show high approval ratings of wind energy. In Switzerland, polls have consistently showed favorable public disposition to wind energy (Geissmann, 2015; Ebers and

Wüstenhagen, 2016). A study in Eastern Switzerland showed that increased energy independence and contribution to the local economy were perceived as the main benefits from wind energy (Exhibit 6) (Tabi and Wüstenhagen, 2015). More than a third of respondents believed that the turbines could be good for tourism, which is an important industry for the Alpine country. A small minority of respondents thought that wind turbines destroy landscapes and cause health problems.

This broad public support for wind energy does not mean that all stakeholders are on board with large-scale wind energy deployment. Often, there is a highly organized and influential opposition, which presents a variety of arguments against wind development. These concerns are usually related to impacts of wind turbines on different aspects of local life: environmental (impacts on local flora and fauna, fragmentation of landscapes), emotional (place attachment), technological (mistrust of wind technology), health-related (impact of noise, flicker), and economic (high perceived costs and low benefits) (e.g. in Wolsink, 2000). While some of these arguments might be well-founded, some of them might have no grounding in reality (e.g. belief that wind turbines will ‘steal’ the wind and change the weather, or that cows will produce less milk if the pasture is near the wind park). The term NIMBY is often used pejoratively to characterize the motives of project opponents. However, portraying the opposition as uneducated and selfish just widens the divide among the stakeholders and does not improve the chances of a project’s success. It might be more productive to address the concerns of opponents in the light of equity and fairness (Wolsink, 2007). Following good practices to foster social acceptance is recommended for institutions, authorities, and communities (e.g. handbook by EIA, 2013).

Wind energy projects...

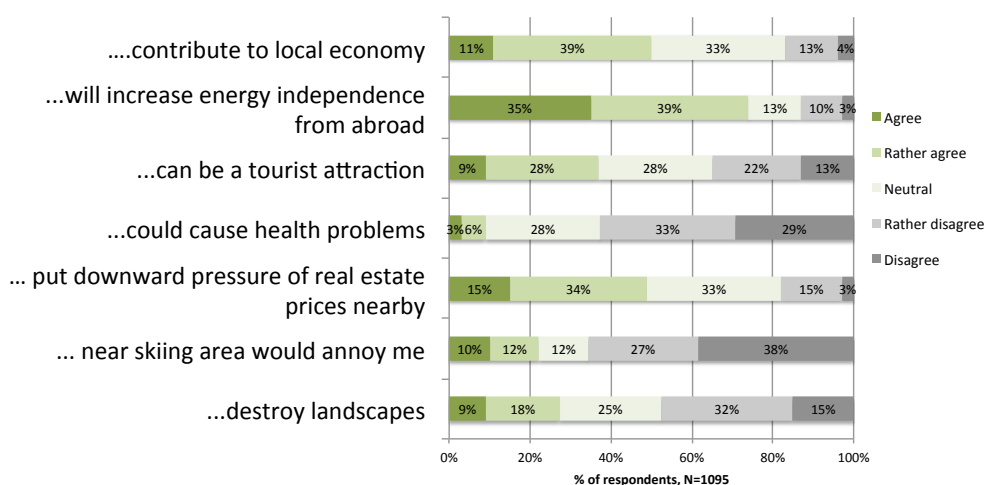


Exhibit 6: Public opinions about wind energy projects in Eastern Switzerland. Source: Tabi and Wüstenhagen (2015), author’s representation

In any case, securing local acceptance is in the best interest the project developer. Social acceptance risk has considerable impacts on the cash flow of the project developer (Exhibit 7). First, objections lead to direct monetary expenses, such as remuneration for lawyers, expenses for commissioning new studies and crisis management. The project manager is involved in settling objections, which increases burden hours and non-hour costs. Second, objections lead to considerable delays, putting projects on hold for the duration of court deliberations. The monetary losses due to delays are more difficult to account for, but they are not negligible. While a project is on hold, the project developer is losing potential profits from electricity production. Additionally, the capital earmarked for the project could have been invested in a profitable enterprise elsewhere (opportunity costs of capital). The project developer foregoes these opportunities due to delays. Finally, the least tangible component of social acceptance risk is the uncertainty that the objections create. The higher the risk of a project being delayed and subsequently abandoned, the higher the project developer should discount future cash flows, thus reducing the expected net present value of the project. Uncertain cash flows might lead a developer to abandon the project, or to invest abroad instead (Müller, 2012).

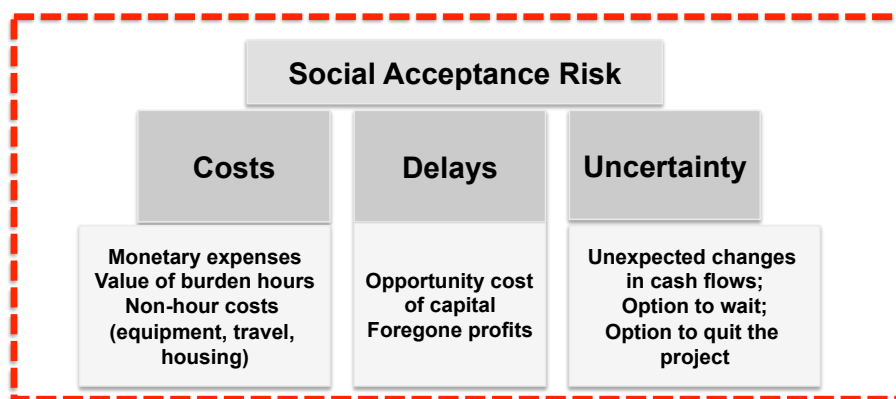


Exhibit 7: Social Acceptance Risk Framework. Source: author's representation

How does one manage social acceptance risks in order to avoid the costs, delays and resulting uncertainty? Here, an ounce of prevention is worth a pound of cure. Early and comprehensive inclusion of project stakeholders in the process is of paramount importance. As a first step, it is necessary to identify the key decision-makers among the involved stakeholders. The usual suspects are: municipal, cantonal, and federal authorities; the local electric utility; national, regional, and local environmental NGOs; landowner(s) on whose property the park is planned; the local population at large; and neighboring communities, municipalities, cantons or even countries. The media is likely to get involved at some stage of the project as well, but a proactive media work can often be helpful.

Next, it is important to hear out, understand and respond to any raised concerns. To facilitate such dialogue, project developers often adopt a multi-channel communications

strategy. This might involve: organizing informational meetings and focus groups, creating a project website with comprehensive information, distributing printed materials to local inhabitants, holding personal meetings with local landowners, or creating an advisory group that can raise concerns directly to the project developer. It is often expected that a project developer will be integrated into the local community, so building trust and community ties is important. It is especially helpful if the project developer is originally from the region (Tabi and Wüstenhagen, 2015). It might be well received if a project developer financially contributes to some aspect of local life, for example, by supporting a festival, a sporting event, or a school activity. Developers usually dedicate between 50 and 100k CHF per year on stakeholder management. At the same time, financial involvement could backfire, when it is perceived as a “bribe”. Opponents might be especially sensitive to such sponsorship, as it could be perceived as “selling out”.

Some of the toughest opponents to wind energy development in Switzerland, and internationally, are environmental NGOs (Pronatura, 2016; Woody, 2012). Even though wind energy has proven environmental benefits (no greenhouse gas or NO_x emissions), wind turbines are opposed on the grounds of their impacts on local flora and fauna. NGOs are often concerned that wind turbines interfere with bird migration and result in death of birds and bats. A recent Swiss study has shown that a single wind turbine kills on average 20.7 birds per year (Federal Council, 2016). Project developers usually search for collaboration and compromise with NGOs. Compromise might involve commissioning of additional studies, introduction of ecological mitigation measures, changing the location of turbines, reducing the number of turbines, and switching off turbines during times when birds and bats are most likely to be impacted. These measures can have large financial consequences for the project developer.

Project developers say:

We plan projects for a long time, but those projects that are realized have high social acceptance.

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