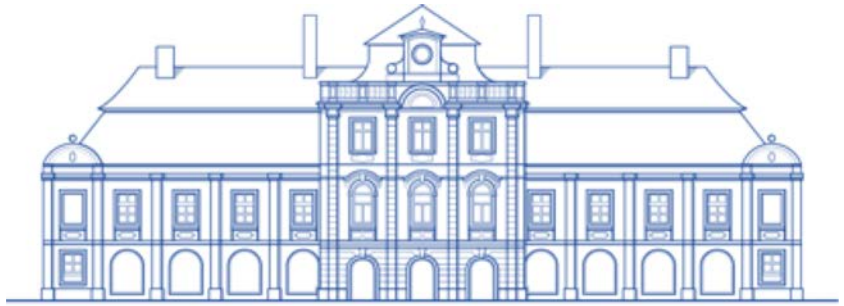
Vilemov Castle Energy Plan

Reducing the carbon footprint of heritage, options and strategies to play our part.



Vilémov Castle
1119-2019

European Historic Houses

Asociace majitelů hradů a zámků

Agenda

- Introduction
- Purpose of the Plan
- Solar Opportunity
- Master Energy Plan
- Next Steps and Timeline

Vilemov History

900 years and counting…

Monastery Founded

1119

Bohemian noble brothers, Vilem and Herman founders. First monks from Brevnov oldest Benedictine abbey in Bohemia

Royal Death

1278

King Premysl Otakar II dies in battle
political unrest ensues
Monastery burned down

Expansion

The Monastery expands and becomes a center of education and culture in the region

Bohemian Hungarian War

King Jiri z Podebrady vs Mattias Corvinus in battle outside Vilemov
1469

Fortress

The Thirty Years' War brings devastation to the region and the monastery is severely damaged and rebuilt as a fortress 1578

Baroque

The fortress is rebuilt and becomes a center of Baroque art and architecture

Reisky z Dubnic

1852

Millesimo descendant Francis Vaclav Baron Reisky de Dubnic inherits the castle

Stolen

1948

Reisky de Dubnic family thrown out of their home by the Communist regime

Restored

1991

Vilemov is restituted back to Vladimir Reisky de Dubnic after Velvet Revolution

12th century | 13th | 14th | 15th | 16th | 17th | 18th | 19th | 20th

Silver

1250-1280

Monastery mining and processing silver in Havlicuv Brod mines

Famine

1281-82

Political unrest and famine bring hardship and suffering

Plague

1360

the Black Death would kill more than 20 million people in Europe—almost one-third of the continent's population

Hussite Wars

Monastery burned down by Hussites
1421

Prosperity

The Monastery experiences a period of prosperity and expansion under the leadership of Abbot Jan Velenovsky

Millesimo

1676

Count Caretto de Millesmio of Savona buys the Fortress and rebuilds a Baroque Castle

Napoleon Wars

The castle converted into a war time field hospital **1809-10**
296 soldiers die here

WW II

1945

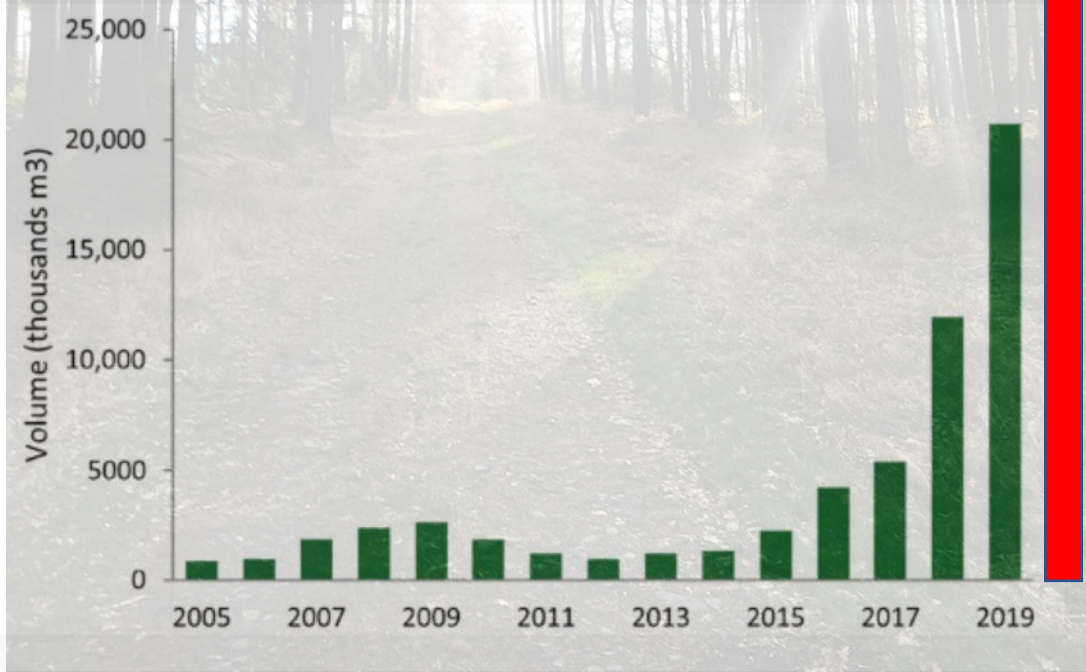
The castle taken by the Russian army is used for various purposes including a prison and a military barracks

Our business is changing

- We face an increasingly uncertain future in the CZ (EU) forest business
- End of an epoch - 350 years of forest stewardship
- Need to find new revenue streams to support long term future of our estate
- 3 to 5 year window to address loss of wood business
- Outside of the forest, the castle is our biggest asset
- Planned investments in the Hospitality Business (HB) today will enable a business transition to preserve this heritage and culture
- Gaps in todays HB offer are identified as food, room standard, and guest experience
- By filling in the missing gaps we can reach our objectives

https://www.scientificamerican.com/article/european-forests-have-become-more-vulnerable-to-insect-outbreaks/

Figure 5. Recorded volume of infested spruce wood harvested in the years 2005 to 2019. Source: Ministry of Agriculture of the Czech Republic, 2020 [31].



Renovations for Hospitality Business

Buildings:

- Bedrooms 21
- Kitchens 3
- Bathrooms 13
- Living rooms 3
- Windows and doors 131
- Fitness room
- Wine cellar
- Storage areas 10
- Roof repairs x3 VC, GP, MP

Inspections and permits:

- Life safety - fire and egress
- Electrical
- Chimneys 6
- Lightning protection
- Hygiene
- Building use, public access
- Heritage foundation reviews

Garden & Park

- Pool area new cover and landscaping
- Boule court
- Fountain
- Trees health and fitness
- Parking lot
- Walls and fencing
- Automation of lawn care

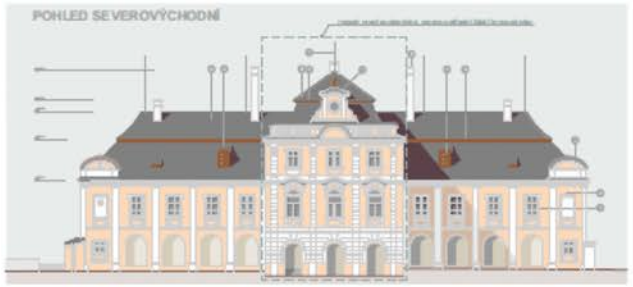
Liberty stables:

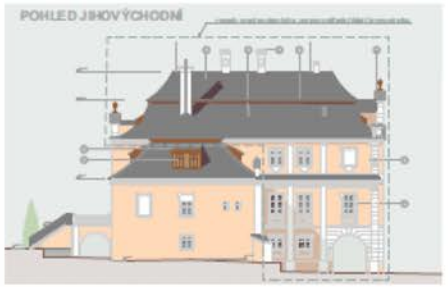
- 21 stalls
- Tack room
- Bathroom
- Riding rings
- Parking

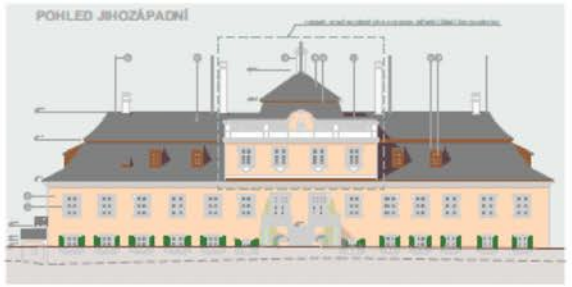
New website

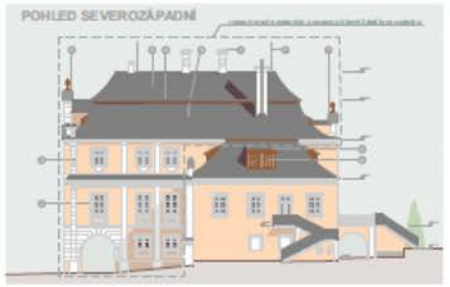
Guest map

5 Year Energy Plan





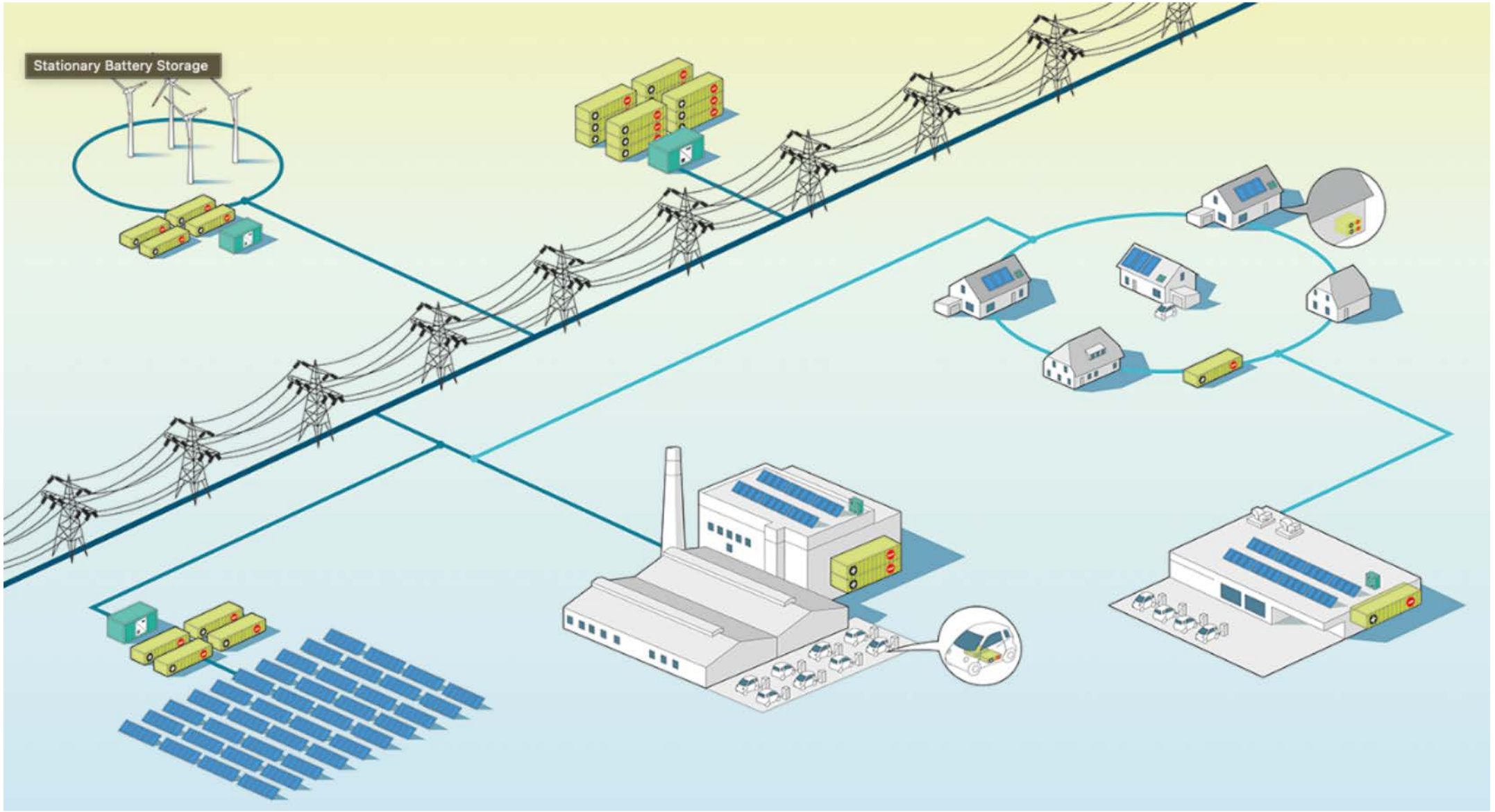




Purpose of the Energy plan

- Diversify our income streams from forest business
- A comprehensive energy development plan for the next five years
- Optimize energy efficiency, reduce costs, and transition to sustainable energy sources
- Respect the Historic Building restrictions and limitations
- Work with all stake holders for a win-win-win solution to energy needs

Solar is our best hedge against increasing energy cost



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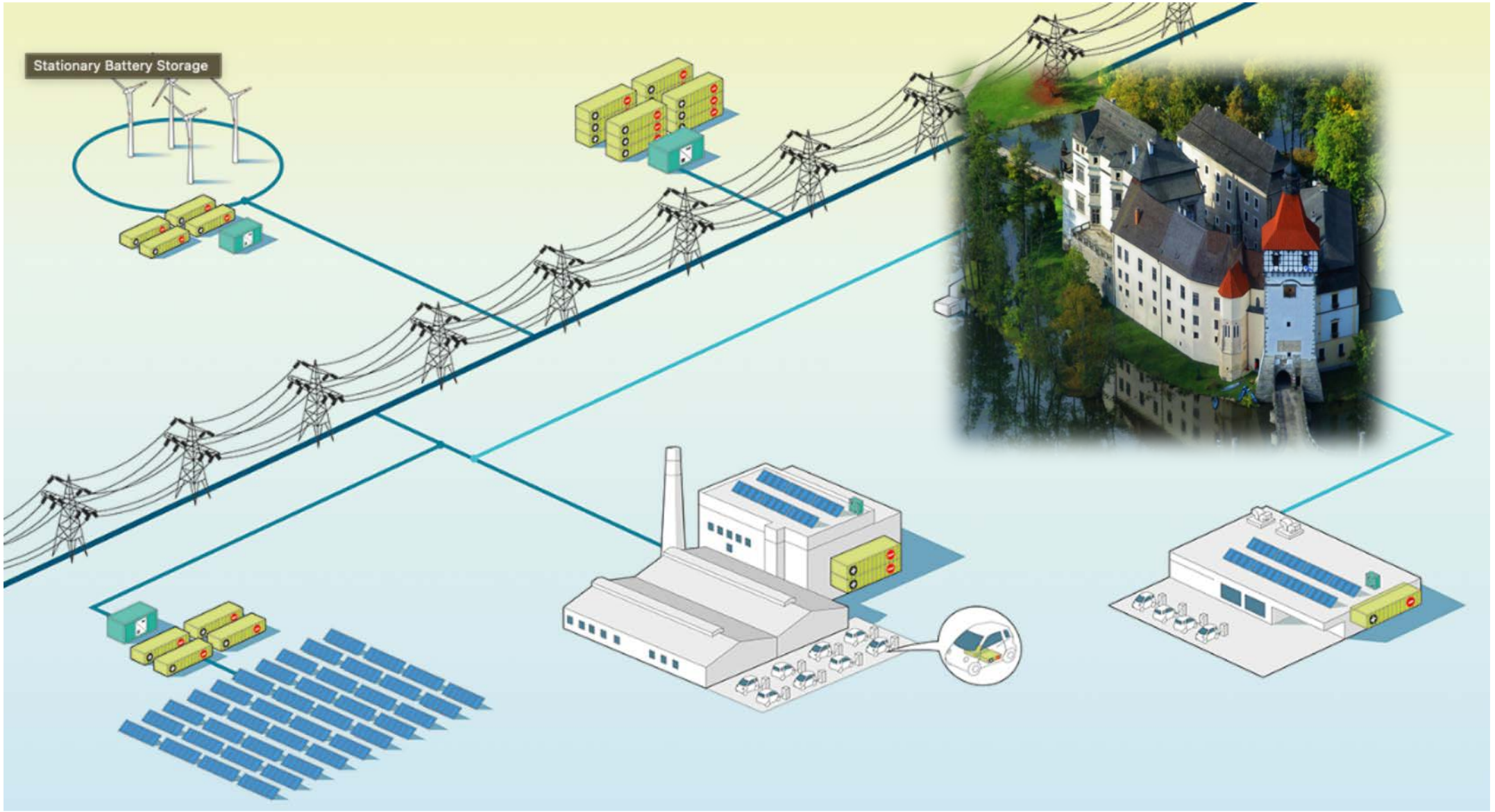
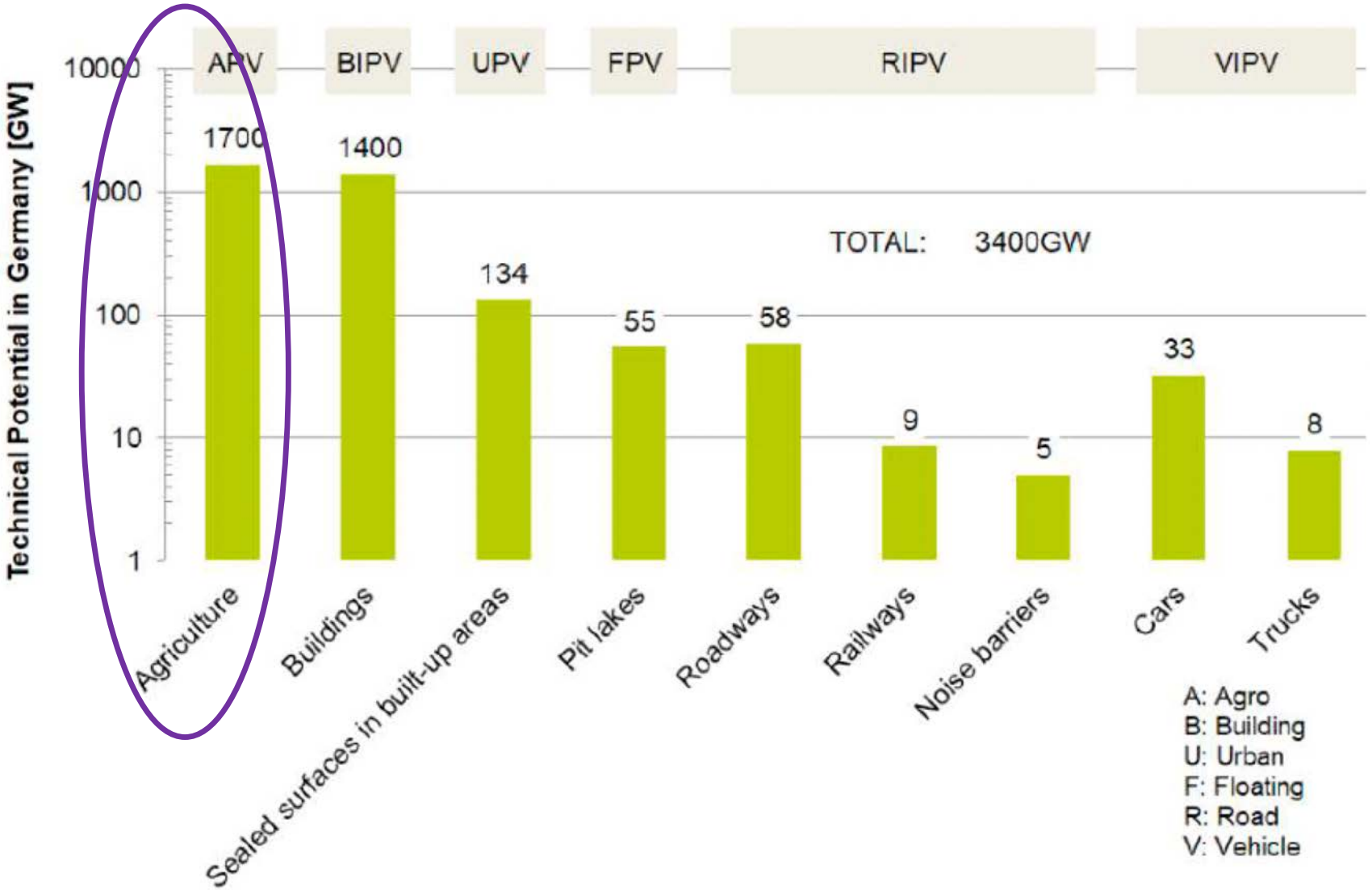


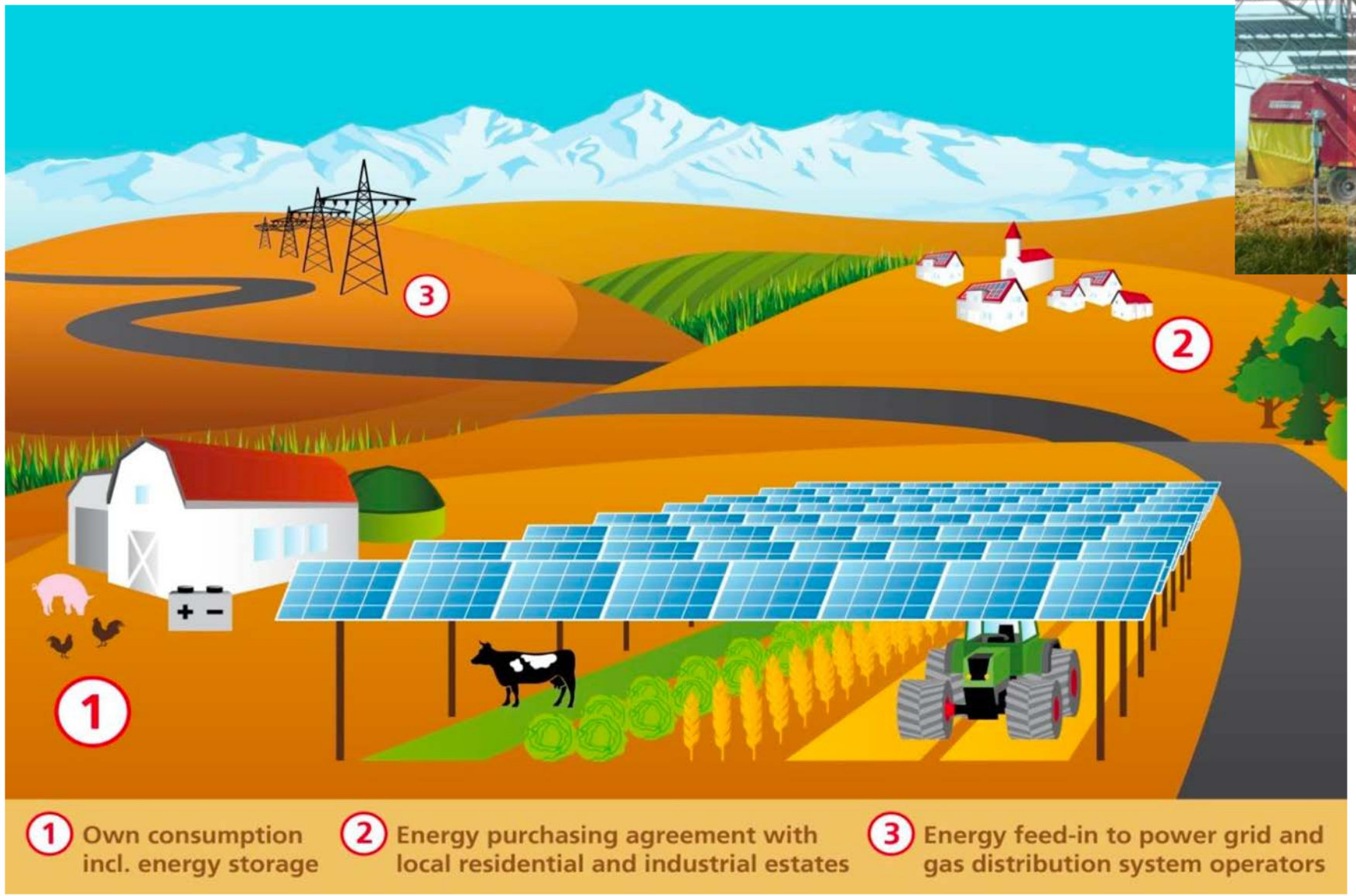
Energy Goals and Objectives

- Increase share of renewables in our energy mix
- Improve efficiency and reduce overall consumption
- Enhance the resilience and reliability of our energy infrastructure.
- Decrease dependence on fossil fuels and reduce greenhouse gas emissions

The biggest opportunity of our generation



Agrivoltaics ”Solar Fields” concept



Global installed power of 14 GWp

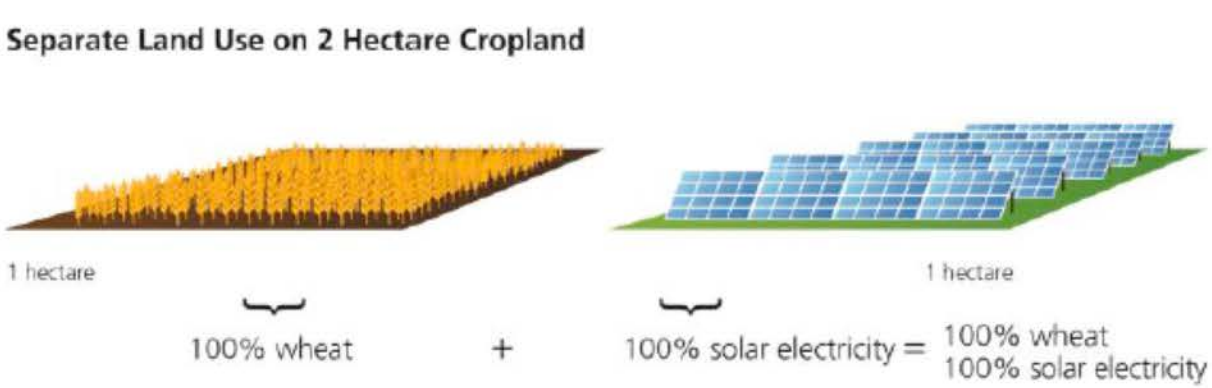
Advantages:

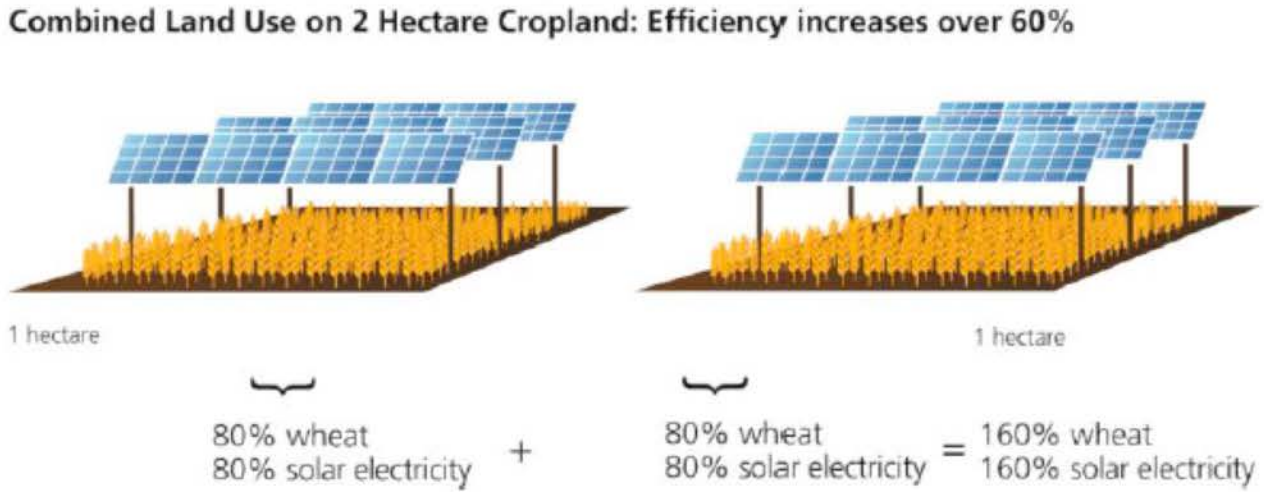
- enormous land area potential
- less expensive than small rooftop PV systems
- additional benefits for agriculture including protection against losses due to hail, frost and drought

Benefits of Agrisolar for farmers and landowners:

1. Additional **Revenue**
2. Land **Optimization**: Maximizing the productivity
3. **Diversification**: Farmers can diversify their income sources
4. Reduced **Energy Cost**
5. Environmental **Sustainability**
6. **Crop Protection**: Solar panels in agrisolar projects can provide shade and protection for certain crops, shielding them from excessive sunlight or extreme weather conditions.
7. **Water Conservation**: Agrisolar systems can be designed to capture rainwater, which can then be used for irrigation, promoting water conservation and reducing reliance on external water sources.
8. **Land Preservation**: By utilizing existing agricultural land for solar energy production, agrisolar projects help preserve farmland and prevent its conversion into other non-agricultural uses.
9. **Community Engagement**: Agrisolar projects can foster community engagement by providing educational opportunities and raising awareness about renewable energy and sustainable agriculture practices.
10. Long-Term **Investment**: Agrisolar projects offer long-term financial benefits, as the revenue generated from solar energy production can continue for decades, providing a stable and predictable income source.

Combined land use yields 60% improved land use efficiency*

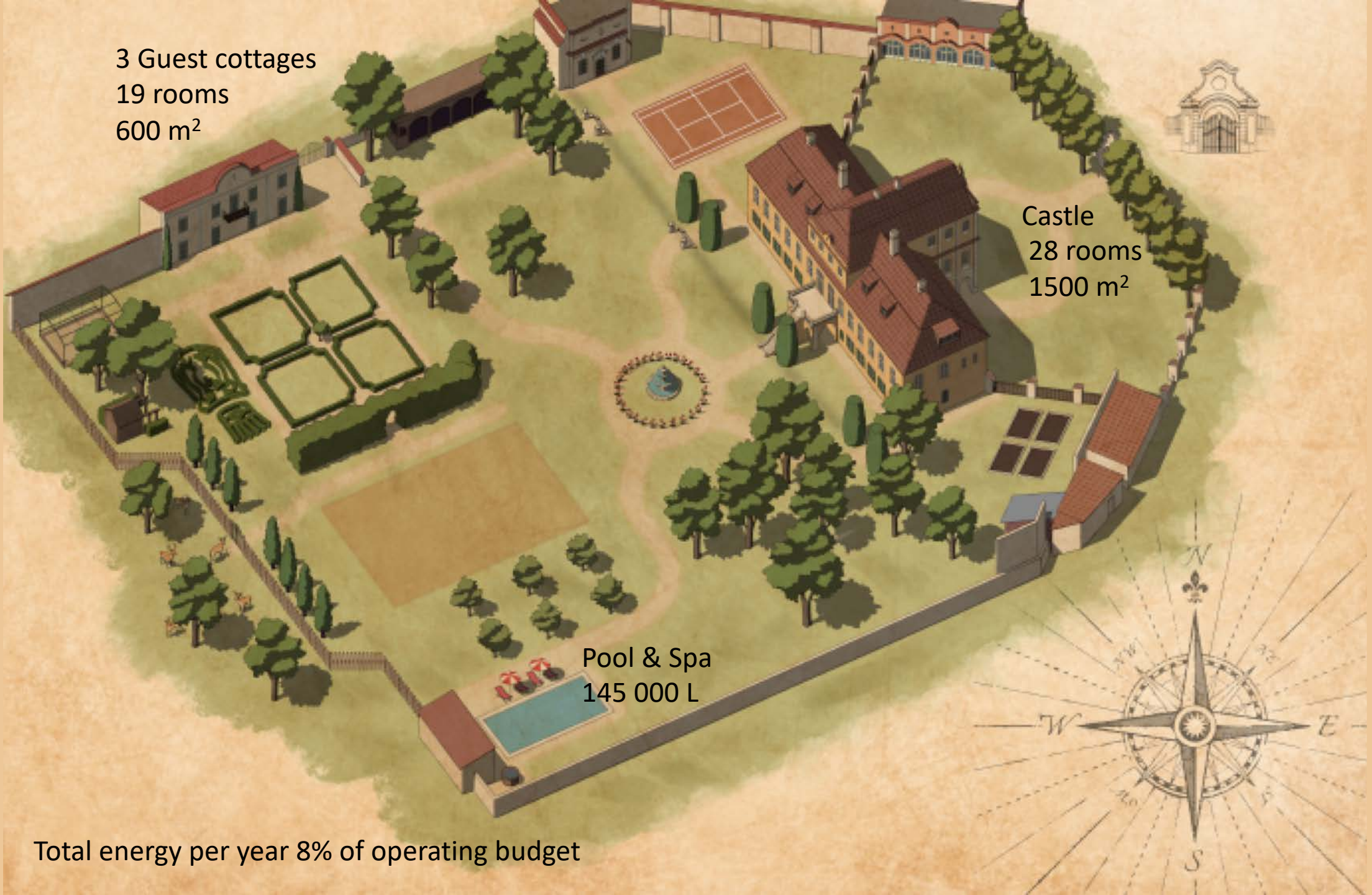




*Performance Indices for Parallel Agriculture and PV Usage - Approaches to quantify land use efficiency in agrivoltaic systems

Max Trommsdorff, Fraunhofer Institute for Solar Energy Systems ISE
EU PVSEC 2020, Online conference: 10th of September 2020

https://www.ise.fraunhofer.de/en/research-projects/adapt.html

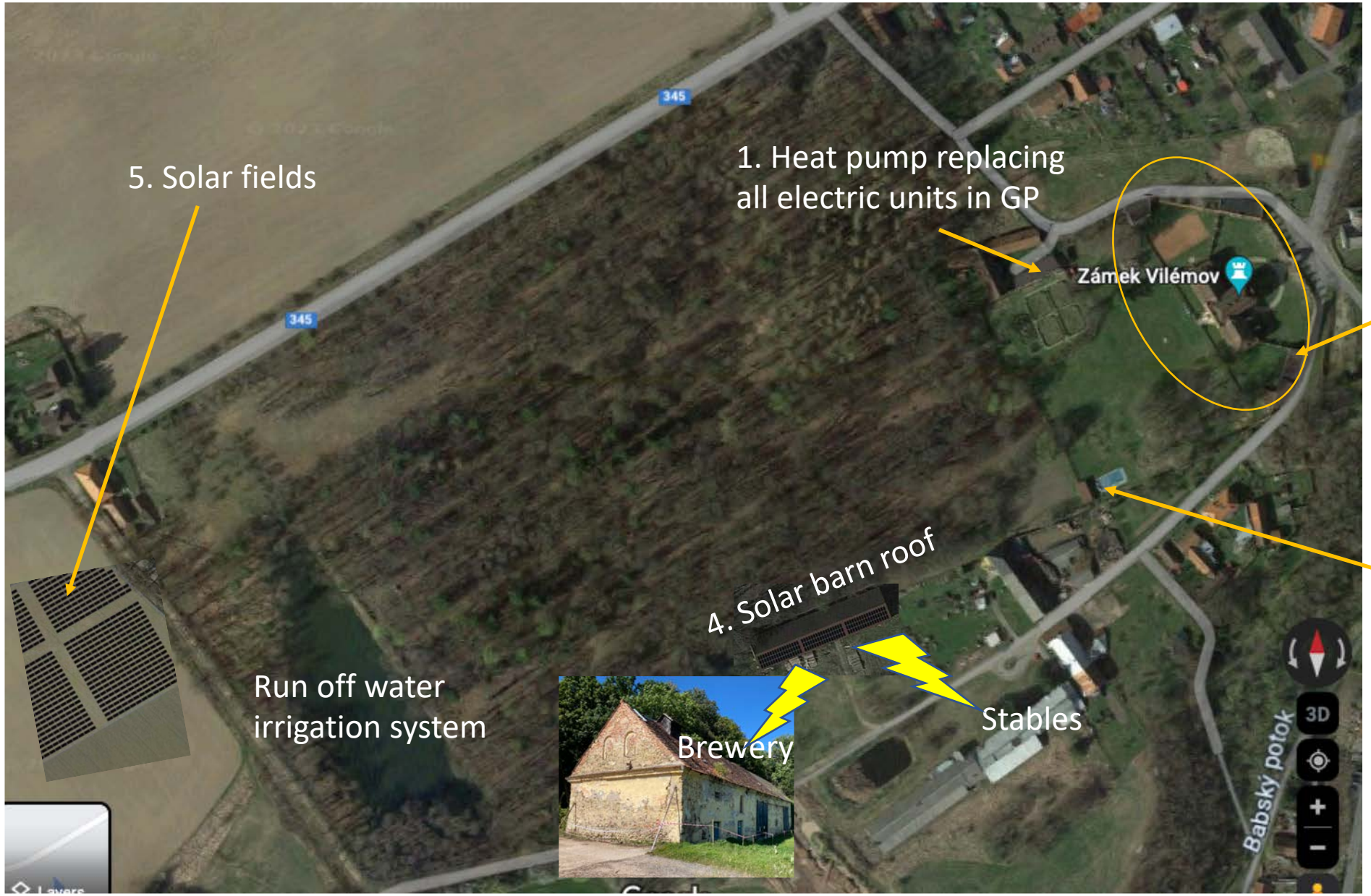


Total energy per year 8% of operating budget

Existing Energy Plant

- Assessment of Current Energy Sources and Consumption
- Evaluate the current sources of energy in Vilemov Castle, including electricity, heating, and ventilation
- Analyze energy consumption patterns to identify areas of improvement and potential energy-saving opportunities.
- Assess the cost trends of the existing energy mix and identify areas for cost reduction.

VC site map of planned solar & energy efficiency projects



Vilemov

- Population 1 388
- 750 homes
- 2.5MWp
- <5 ha land for solar power
- < 1% of VC land holdings

Master Energy Plan

Phase I. Energy efficiency improvements to existing plant and buildings

Phase II. Installation of Initial Solar Panels

- Start by installing a small-scale solar panel system to gain practical experience and evaluate performance
- Assess the feasibility and effectiveness of solar energy generation for Vilemov Castle

Phase III. Expansion of Solar Capacity

- Based on the success of the initial solar project, gradually expand the solar capacity
- Increase the number of solar panels to generate a larger portion of the castle's energy needs
- Collaborate with supplier to design and implement an efficient and scalable solar installation solution for local village needs

VC Energy Audit

Building	Existing Energy source	Proposed Energy source	Investment	Simple Payback in years	Notes to the information
Vilemov Castle	Wood chips fuel boiler for heating. of water	Install heat exchangers and storage to use waste heat for VM & CH	150,000 CZK Water storage tank, 400 000CZK for pipes and rediators	See below for effect	The boiler is over 25 years old but still going strong
Villa Millesimo	Electric direct heaters (10)	Waste heat from boiler	See VC	1.5 year	Each electric heater uses 2.5kW
Carrage House	Electric direct heaters (12)	Waste heat from boiler	See VC	1.5 year	Each electric heater uses 2.5 kW
Garden Pavilion	Electric direct heaters (14)	2x Heat pump units air to water	450,000CZK	3 years	Each electric heater uses 2.5kW
Pool House					
Pool	Electric filter and pump	Solar panels on top of Pool house plus heat pump to heat pool water		3 years	
Hot tub	Electric heat, filter & pump	Solar panels on top of Pool house		2 years	
Effecincy Investments	Light and equipmment in all buildings	Replace all lamps with low energy bulbs, motion detectors for all comon space lighting		2 years	

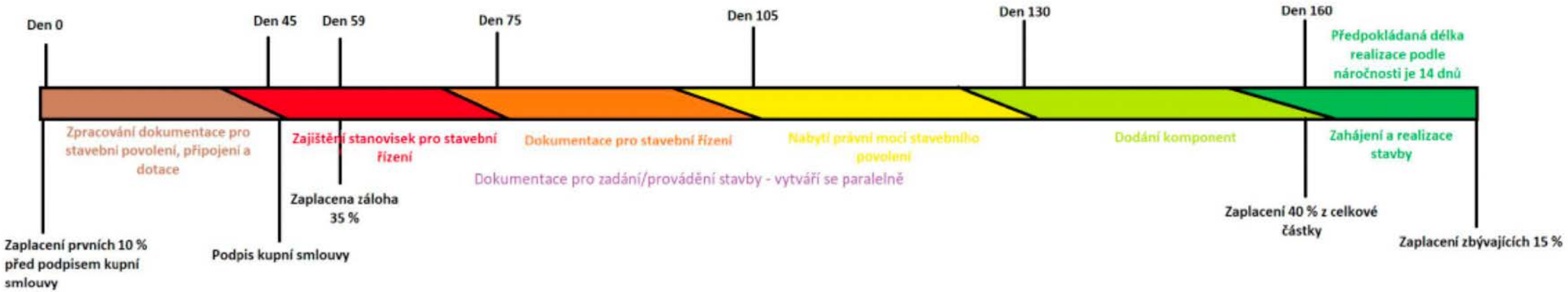
VC Solar Proposal Summary

Solar projects	Existing Energy source	Annual heating / Energy cost	Proposed Energy source	Investment	Savings	Simple Payback in years	Notes to the information
Barn roof	84 kWp / Batery storage	Savings on direct use and also selling to the grid	Solar energy will be used to power Stables and Brewery	4 344 905 kr	After payback the CF is about 1.5MCZK /yr	3 years	Possible to get grants up to 40%, and sell energy back to grid
Solar field in Vilemov	550 kWp	Selling energy to the grid	Proposal for alternate field in Vilemov	24 361 240 kr	After payback the CF is about 9MCZK /yr	3 years	New proposed site behind town hall 11,000 sqm=1,1ha 550kWp
Forest land re-purpose as solar farm	1375 kWp	Selling energy to the grid for 500 houses	Proposed forest locations where connection to grid is nearby	75 000 000 kr	After payback the CF is about 24MCZK /yr	3 years	Use a Solar developer as partner. We provide land and get a royalty from the project

Next Steps and Timeline

Implementation schedule:

ÿ Processing of documentation for building permits, connections and subsidies (Even before signing the purchase contract)	45 days
ÿ Provision of opinions for construction management (Signature of purchase contract)	30 days
ÿ Documentation for construction management	30 days
ÿ Acquisition of legal force of building permit ÿ	25 days
Documentation for commissioning/implementation of construction (Created in parallel with other permits)	115 days
ÿ Delivery of components (Starting production of components is after paying the first deposit of 35%)	30 days
ÿ Start of construction ÿ	1 day
Total until the start of construction (The duration of applications depends mainly on the authorities)	5-6 **months**



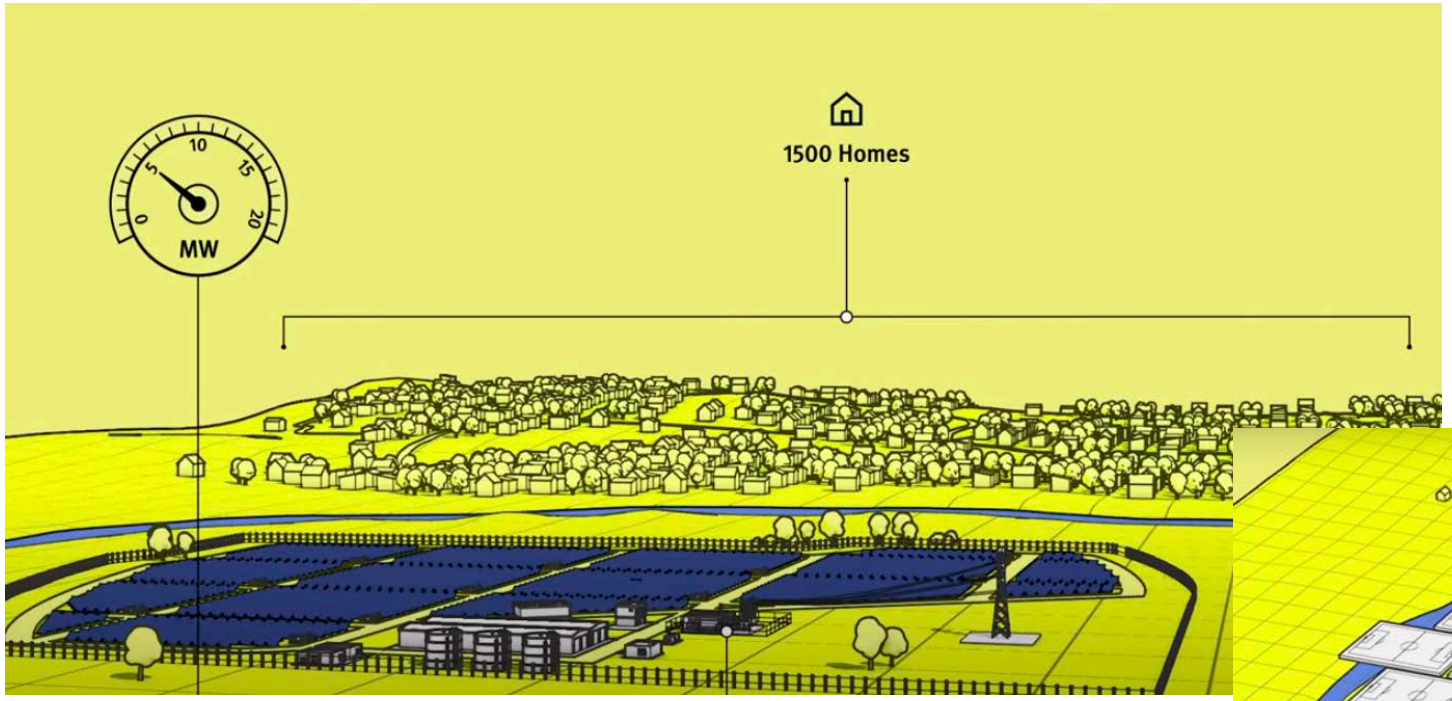
Please come to visit us.

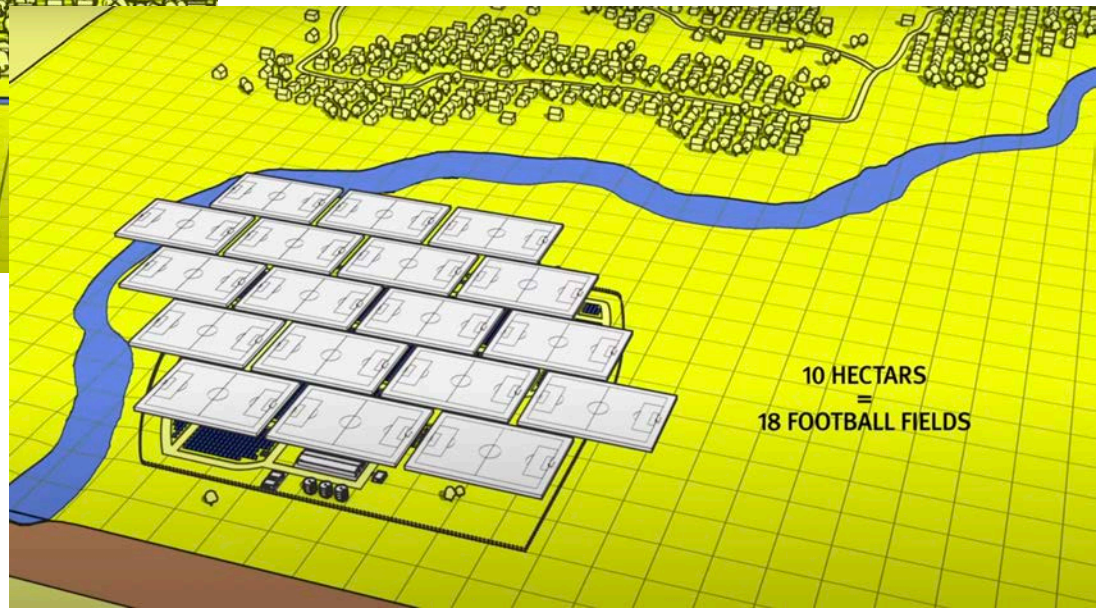
Thank you!

Vilémov Castle

Appendix
Supporting slides

Land size for 5MW or 1500 homes





Permit Process Outline

A. Detailed Steps Involved in Obtaining Permits

- Identify the specific permits required for the implementation of the energy plan.
- Work closely with regulatory authorities to acquire the necessary permits within the designated timeframe.
- Adhere to all local regulations and guidelines related to renewable energy installations.

B. Identification of Risks and Mitigation Strategies

- Conduct a thorough risk assessment to identify potential challenges and obstacles during the permit process.
- Develop mitigation strategies to address these risks and ensure a smooth permit approval process.
- Maintain open communication with relevant stakeholders to resolve any issues promptly.

Find where grid and substations overlay estate property