Submission No 74

INQUIRY INTO BENEFICIAL AND PRODUCTIVE POST-MINING LAND USE

Organisation: Hunter Lakes Corporation

Date Received: 11 August 2024

Hunter Lakes Corporation

Deloitte.

Economic and Environmental Transformation of the Hunter Valley

The Hunter Lakes Scheme

Contents

01 Introduction and Current Status

02 Scheme Fundamentals

03 Environmental Rehabilitation

04 Economic Revival

05 Support

06 Research

07 Funding

Introduction

Concept
Use existing and new open cut coal mine voids in the Upper Hunter Valley for water storage and create interconnected lakes stretching from Muswellbrook in the north to Broke southwest of Singleton to provide Water Security to drought proof a large area of NSW.

The Hunter Lakes Scheme will underpin all economic activity envisaged for the Hunter Valley- hydrogen, renewables, agriculture, tourism.

Execution
As mines reach their end of life (or during operations if agreed) disused voids would be prepared and filled with water according to a Master Plan for the entire Valley. Interconnecting canals could be constructed to create a seamless water expanse of 60 klms.

Advantages to Mining Companies
Avoids the requirement to infill the pits and remediate the land.
Would redeploy existing mining rehabilitation charges and bonds.

Scheme Endorsement

Hunter Lakes Corporation
- Directors
  - Gregory Story
  - Dennis Bluth
- Advisor-John Colvin

Project ,Community and Government Advisory
- Deloitte

Mining Rehabilitation Consultants
The following consultants have been appointed:
- Mibrag LEAG – Lusatia, Germany
- RWE – Ruhr, Germany
- DMT – Leipzig, Germany

Government liaison - wide ranging support from the following:
- NSW State Government – Treasurer and Minister for Energy
- Federal Government – Ministers and National Water Grid Authority
- Local councils – Singleton, Cessnock and Muswellbrook

Community and business
- Communities Organisations in the Hunter Valley
- Business groups in Newcastle and Hunter valley

Mining Companies
- Yancoal
- BHP
- Glencore

Research and Studies
- Proof of Concept by University of Newcastle

The Team

Government Liaison, Project Advisory

Deloitte
- Government support and involvement
- Strategy
- Project advice

Proof of Concept and Technical Studies

University of Newcastle
- Salinity, contamination of aquifer, water balance, hydrology, licencing

German Mine Lake Rehabilitation Consultants

RWE, DMT GmbH & Co. KG, MIBRAG Consulting GmbH.
- Mine lake conversions and water management

German mine lake costs consultants

Supported by:

Federal Ministry for Economic Affairs and Energy

on the basis of a decision by the German Bundestag

Federal Ministry for Economic Affairs and Energy, Competence Centre for Mining Resources, German Mining Network, Deutsche Australische Industrie
- Costs of German mine rehabilitation and lake formation

Public Relations

Wilkinson Butler-Public affairs
- Politicians, Government, Community
- Liaisons, Business Liaison

Legal Advisors

HWLEbsworth Lawyers
- Land leases. Water licences, coal mining rehab bonds

Next Steps

Research Studies
- Complete Water Balance Study

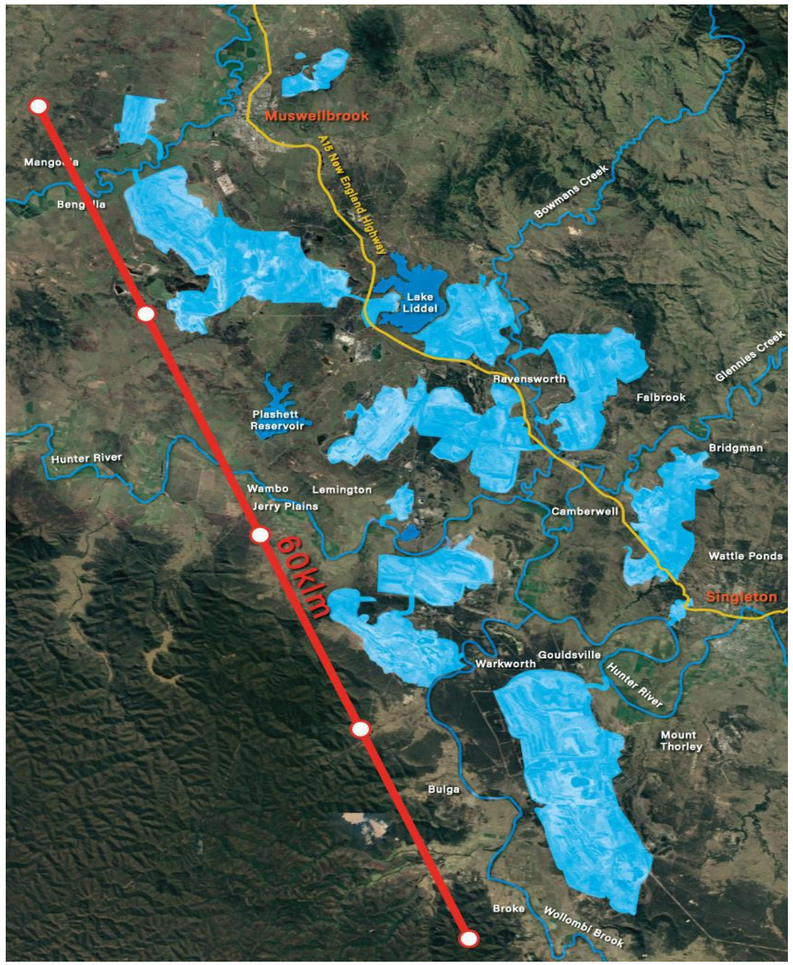
Renewable Energy Projects
Commence development of the solar farm and large-scale battery storage:
- Select suitable land site
- Commence design of solar farm
- Commence specifications for large scale battery storage
- Liaise with grid operator and seek government approvals
- Continue evaluation on Pumped hydro utilising above and below ground water storage opportunities

Feasibility Study
- Finalise Government funding
- Commence feasibility study in conjunction with Federal and State Governments

Master plan
- Prepare high level Master Plan

Liaison with Mining Companies
- Continue liaison and support from mining companies for all aspects of the Scheme

The Fundamentals



- Water is fundamental to all economic activity be it industrial or agricultural.
- Large scale water availability is necessary to support the industrial rejuvenation required in the Hunter valley to support the displaced coal mining workforce
- Complements mining operations
- Provides environmental transformation
- Multiple job sectors
- Encourages community involvement
- Allows for indigenous involvement

The Scheme

Large Scale Water Security for Drought Proofing
The sustainable management of water for the Hunter Region, Northwest, West, Central Coast

Irrigation
Agriculture, viticulture, equine.

Environmental Showpiece
Step change in environmental management

Renewable Energy
Floating solar, hydro, pumped hydro, wind

.

Lake Kepwari, WA
Disused coal mine

Providing a 'Public Good'
Requiring public backing

Supporting mining operations.
Complementary to existing mining processes

Economic renaissance
New industries and many more jobs than the existing

Urban **renewal**
Planned urban landscape to be developed
Residential corridors and recreation

Environmental Features
Bird and wildlife habitats for native species under threat
Equestrian, designated green spaces, national parks and tourism

.

Environmental - Biosphere Reserve

Include specific regions for endangered flora and fauna.

Numerous interconnected ponds to be nestled amongst forests, streams and expanses of farmland.

Provides a wide range of habitats for rare plants and animals.

Safety for endangered species

Natural beauty of this landscape of ponds and heath

Scenic walking and cycling trails

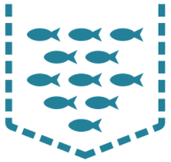
Education for schools and tertiary institutions

Water reserves underpin all proposed industry

Agriculture

Viticulture

Equine



Aquaculture

Forestry

Federal Government - National Water Grid Authority

"Water supply and security are critical to Australia's prosperity, particularly in our regional communities, where agriculture contributes around $60 billion to our economy each year."

A new course for the Valley

Jobs

New industries will absorb workforce from the mining operations as mining phases out on a staged basis

Maintain Communities

Enhance and strengthen existing communities by involvement in a common cause

Environmental Rehabilitation

Create a new open environment utilising the existing mining features

Water Bank

Opportunity to drought proof a large part of the State and provide ample year-round water supplies

The Stakeholders

NSW Planning, Industry & Environment; NSW Department of Primary Industries Water	**NSW State Government**	Ministers and Departments are strongly supportive ✓
Australian Government Department of Agriculture, Water and the Environment; National Water Grid Authority	**Federal Government**	Ministers and Departments are strongly supportive ✓
Peabody; YANCOAL; GLENCORE	**Mining companies**	All willing to cooperate in the investigation phase ✓
SINGLETON COUNCIL; CESSNOCK CITY COUNCIL; muswellbrook shire council	**Local Councils**	All willing to cooperate in the investigation phase ✓
HUNTER VALLEY WINE AND TOURISM ASSOCIATION; HUNTER JOBS ALLIANCE; maitlandbusiness chamber; CESSNOCK chamber of commerce; BUSINESS HUNTER		Community and Business All supportive of the Scheme ✓

The Miners

Peabody

Wambo - United Wambo Joint Venture
Open Cut

GLENCORE

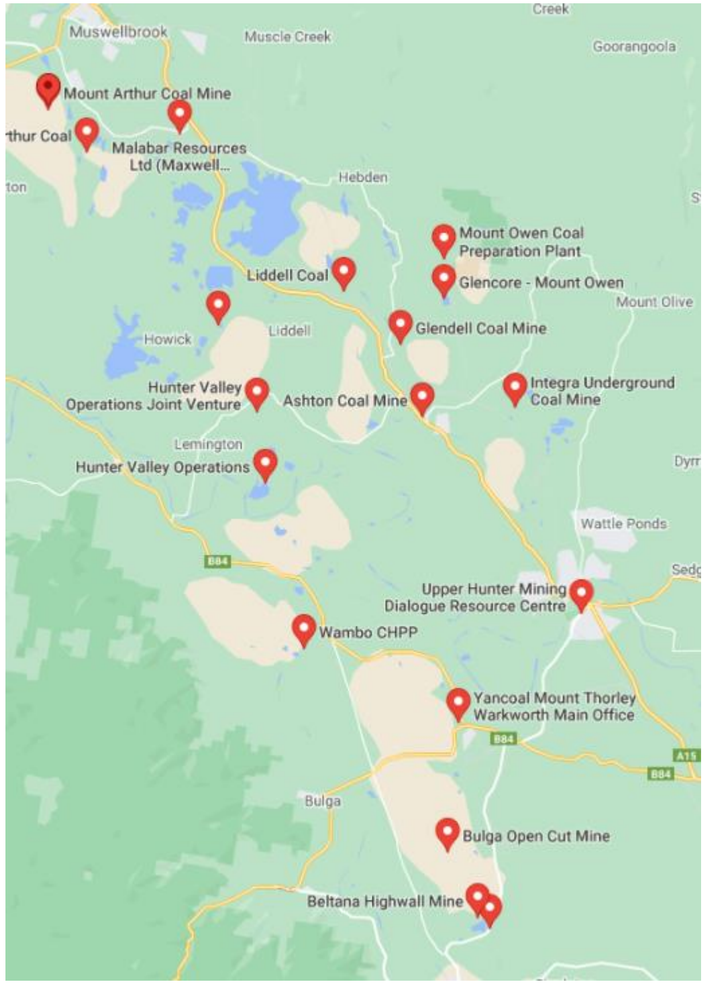
Liddell Coal Operations

Hunter Valley Operations (HVO)

Ravensworth Operations is a joint venture between Glencore 90% and Itochu 10%.

YANCOAL
兖煤澳大利亚有限公司

Donaldson, Ashton, Austar



University of Newcastle Research

Main Undertaking is Water Storage

Water Licences - sale of water

Drought Proofing for:

- Hunter Region
- New England Northwest
- Central West-Liverpool Plains
- Central Coast
- Sydney Metropolitan

Fundamentals

- Salinity
- Contamination of the aquifer
- Water balance

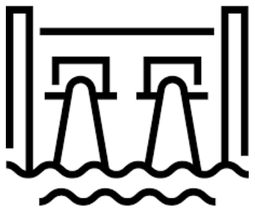
Other

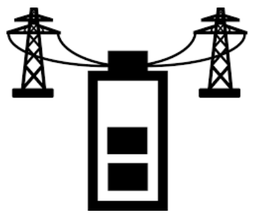
- Community consultation
- Heritage architecture
- Tourist facilities

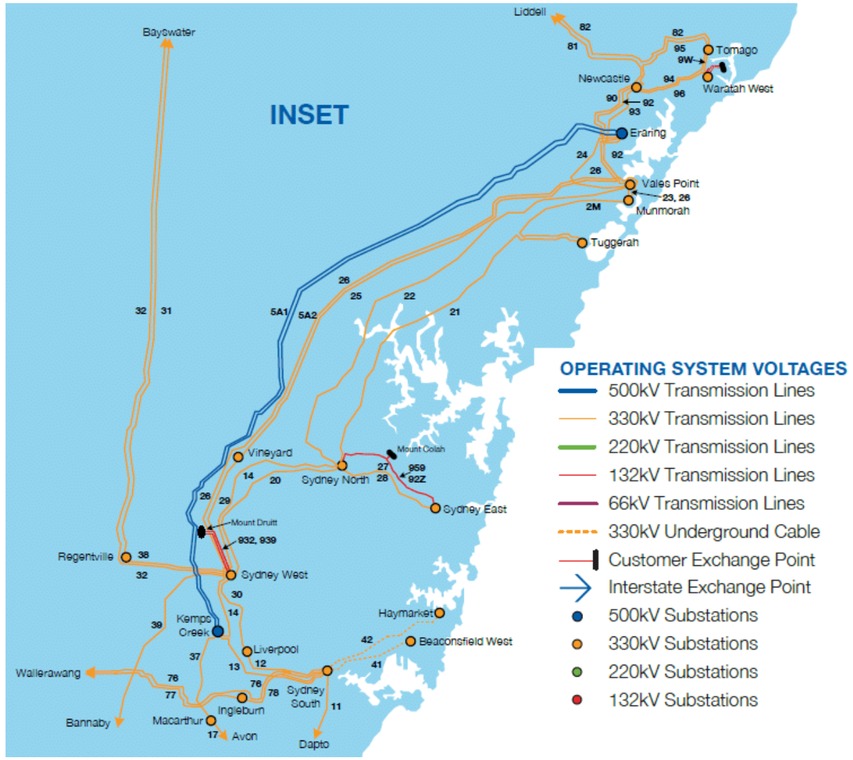
Scope of Work (SOW) for the Proof of Concept:

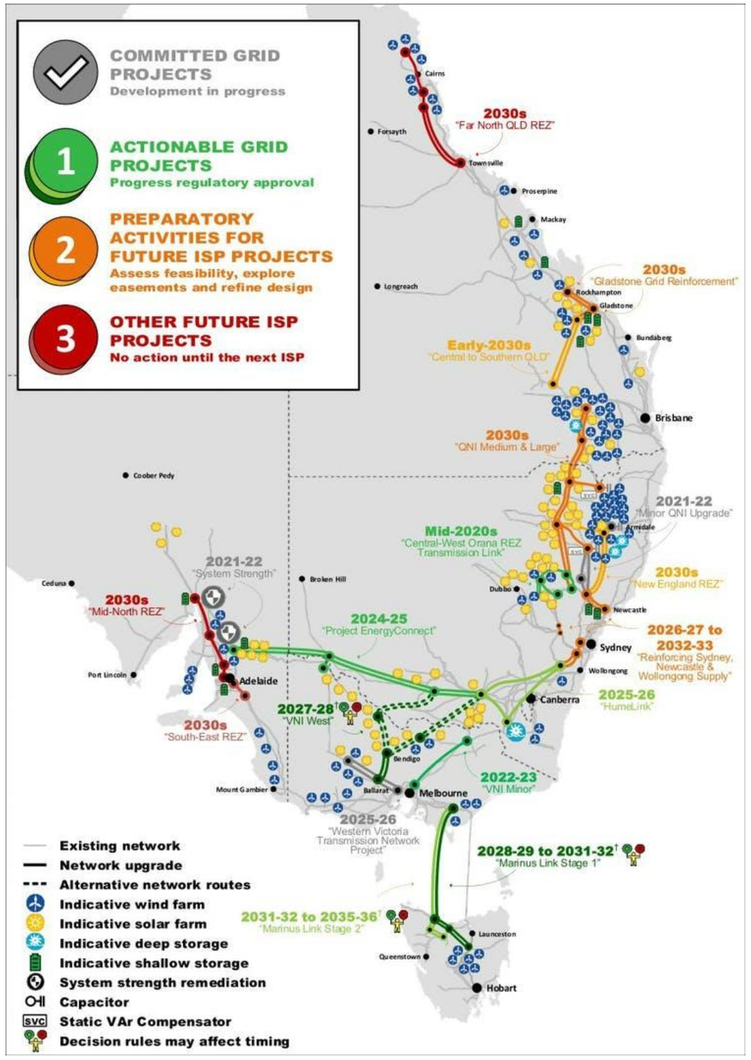
- Critically review the Scheme and the proposed approach to draw on the German experience (in particular, this will involve reviewing the key issues of water balance, salinity, and contamination and their impact on the water table and aquifer and the general interaction with the Hunter River Catchment Area;
- Identify, based upon best current science and practice, solutions (or research required to develop solutions) for any issues that threaten the viability of the Scheme.

Ancillary Projects – Renewable energy and the Grid





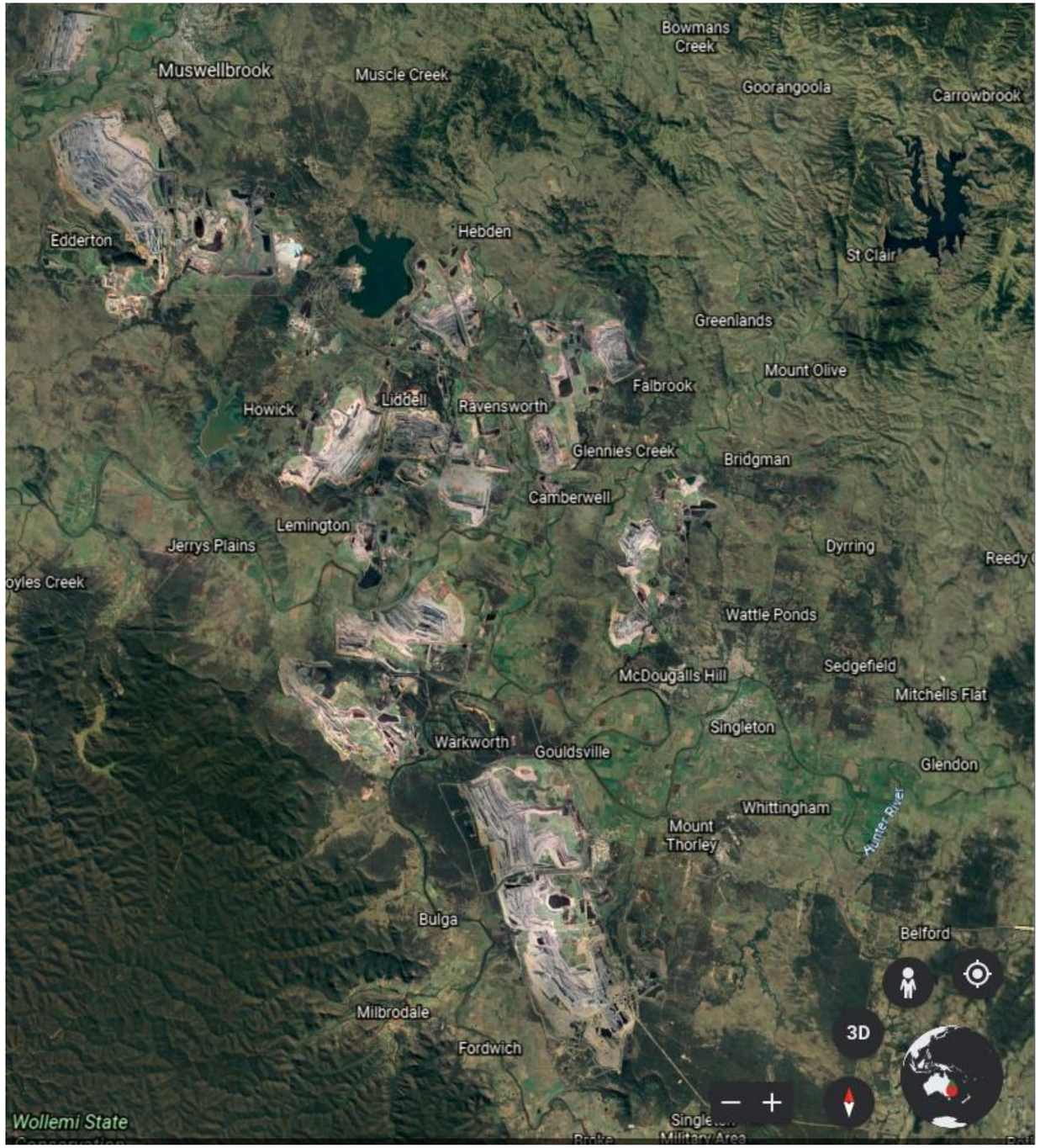




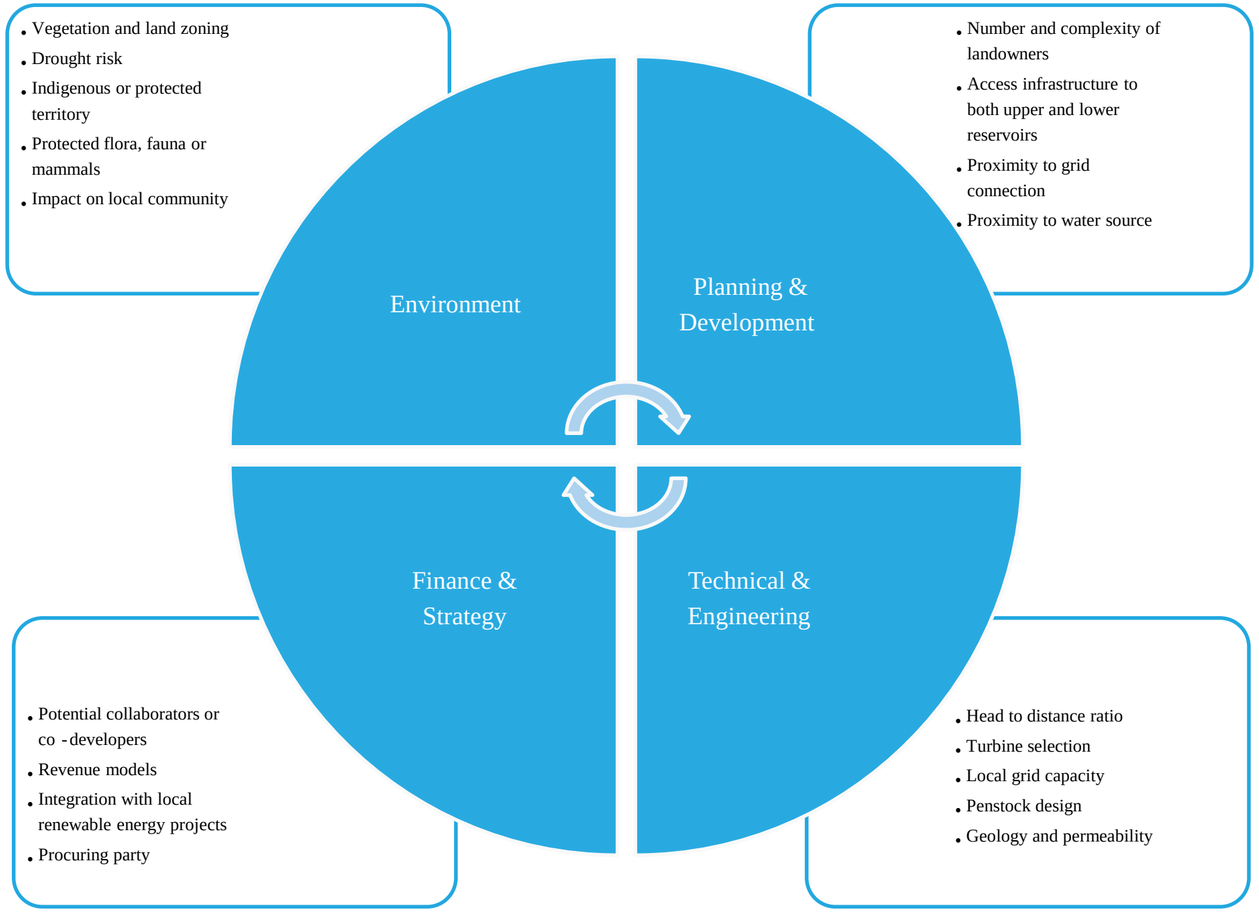
Ancillary Projects – PHES

A number of opportunities are being advanced

- PHES can be developed utilising voids or underground operations as lower reservoirs.
- Other opportunities are in the surrounding topography with existing water reservoirs.



PHES - planning



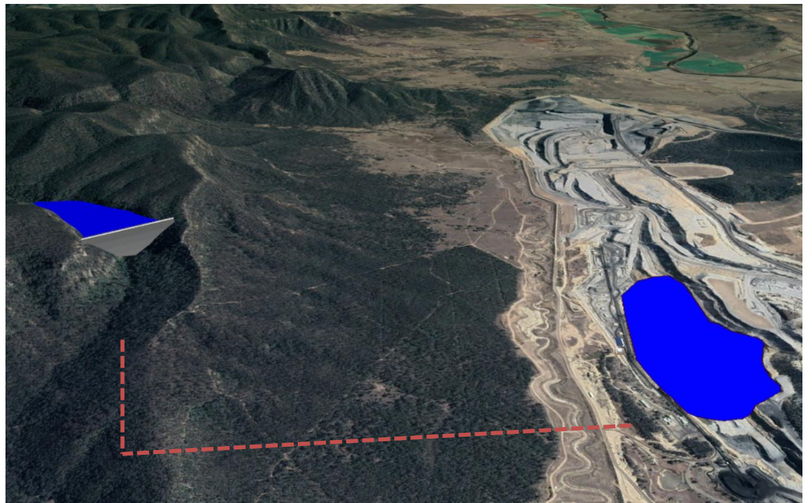
PHES – Valley West

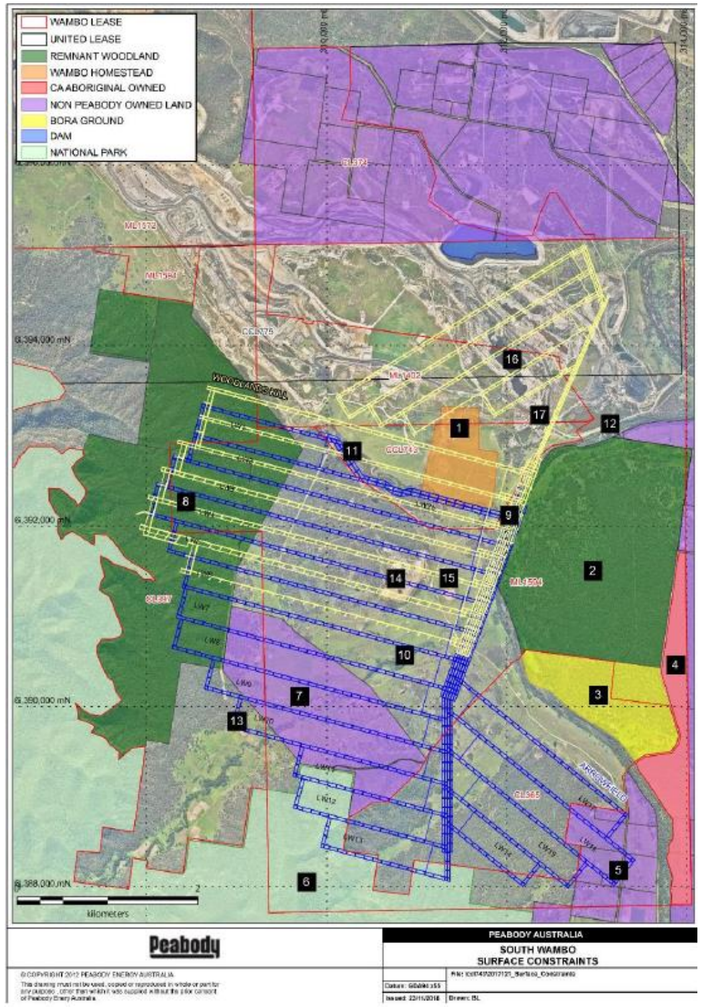
330kV Liddell to Newcastle transmission line

Wambo processing infrastructure

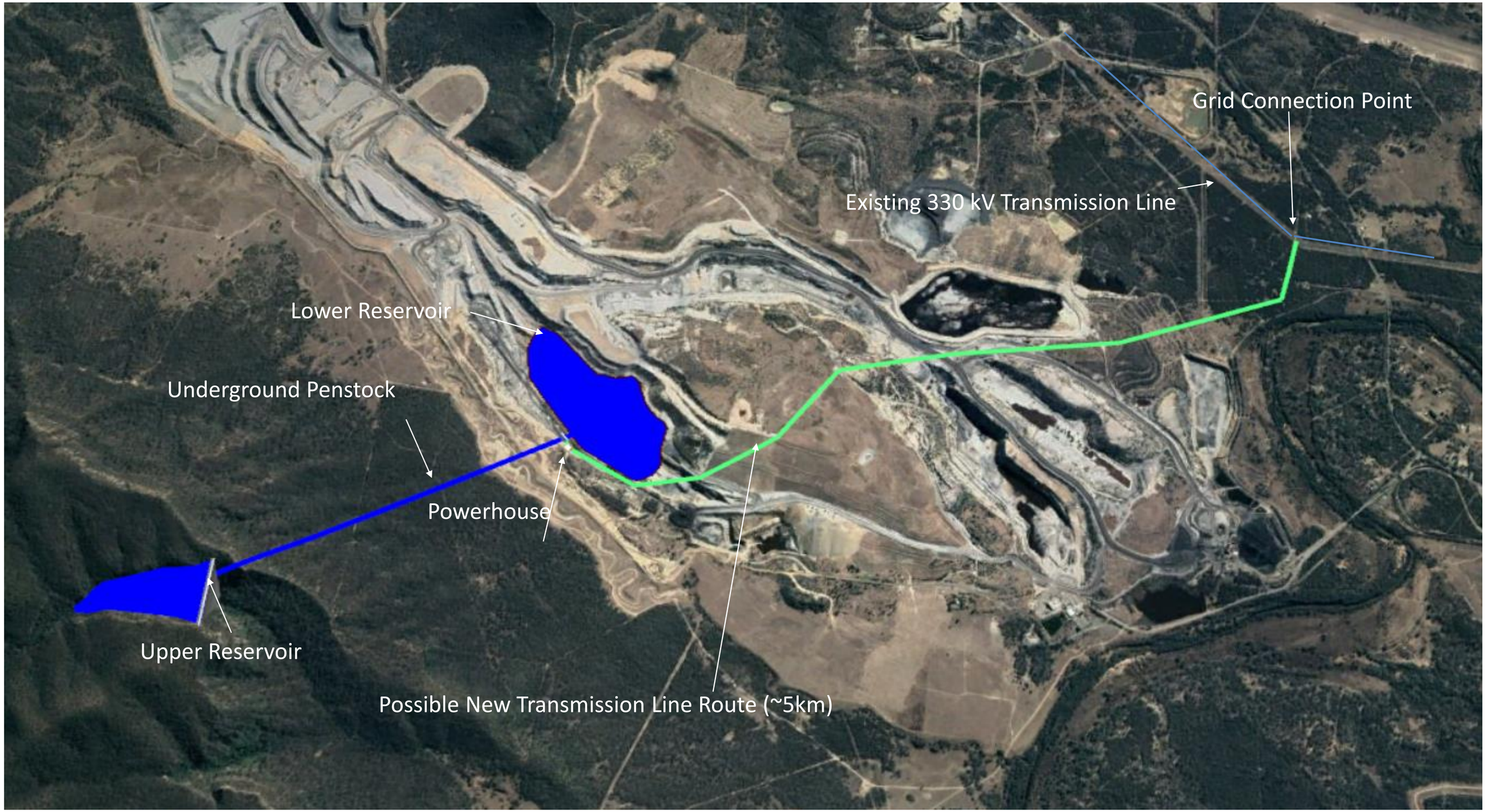
Wambo maintenance & administration area

Upper reservoir (~6-8Gl)	Penstock pipe work (~200-250m elevation difference)	South Bates void – Max water level (~12.6Gl) after SBX complete





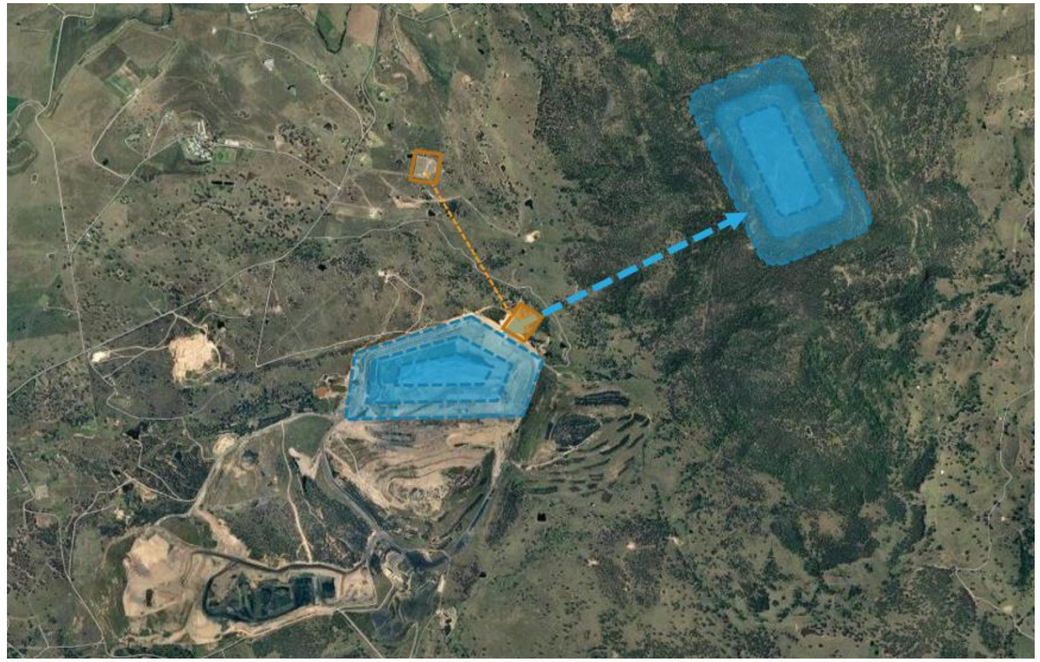
Location - PHES Site



Location - PHES Site

The long term benefit of Pumped Hydro assets is the flexibility and long term revenue options available in a changing energy market.

- Arbitrage
- Ancillary services
- Firming Contracts
- Hedging or Cap Contracts



Political perspective – economy and jobs

Federal Electorates

New South Wales Electorates

Project Cashflow Sources- immediate term

Government

National Water Grid Authority

Australian Government
Department of Agriculture, Water and the Environment

Funding Application $12M - currently being considered

NSW Government | Planning, Industry & Environment

NSW Government | Department of Primary Industries Water

State Government grants for RE and REZs

Australian Government
Department of Agriculture, Water and the Environment

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ARENA

Grants and loans

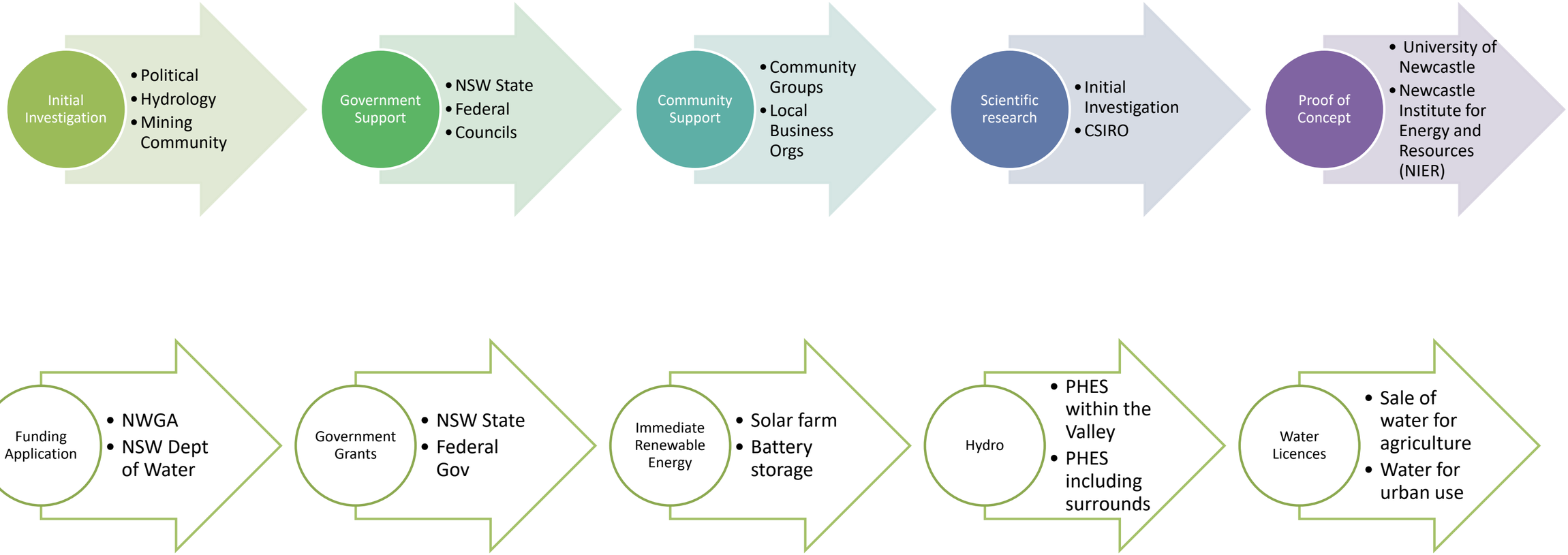
Private

Solar and Battery Storage

Pumped Hydro (PHES)

- utilising Hunter lakes as lower reservoir
- Hunter District – Glennies Dam

Funding timeline

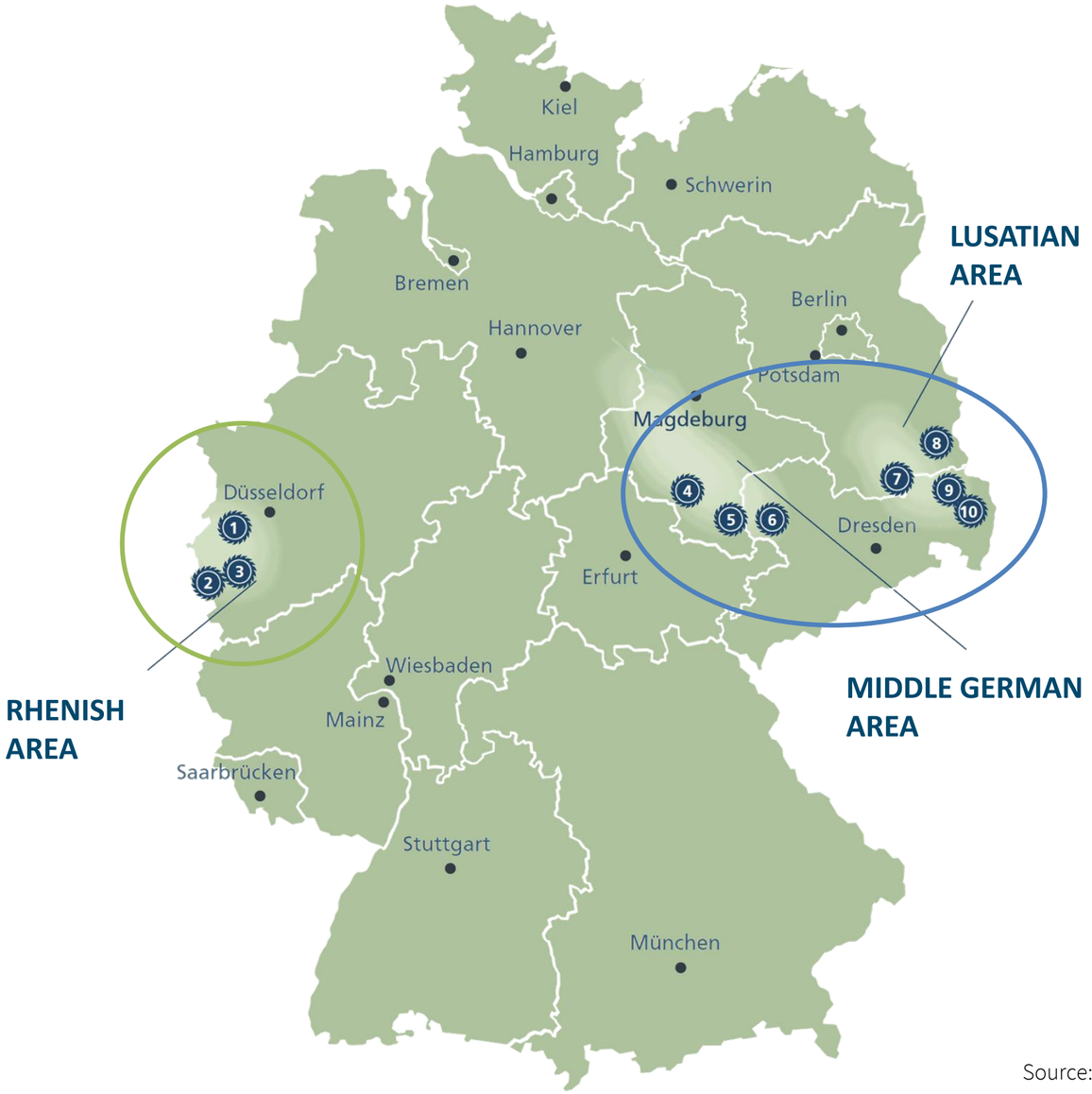


Lignite mining in Eastern & Western Germany

WESTERN GERMANY

OPERATING MINES

RHENISH AREA	
1	Garzweiler
2	Inden
3	Hambach



EASTERN GERMANY

OPERATING MINES

MIDDLE GERMAN AREA	
4	Amsdorf
5	Profen
6	Vereinigtes Schleenhain
LUSATIAN AREA	
7	Welzow-Süd
8	Jänschwalde
9	Nochten
10	Reichwalde

Source: DEBRIV – Deutscher Braunkohlen- Industrie-Verein e.V.

CCMR. Competence Centre for Mining & Resources

Cost overview – mine rehabilitation provisions by RWE

RWE Power AG provisions **in million €** for mining-related rehabilitation (31 December 2016)

Main category	Sub-category	Hambach (operating)	Garzweiler (operating)	Inden (operating)	Fortuna (closed)	Ville (closed)	Bergheim (closed)	Across all mines (not attributable to individual mines)	SUM
Land redevelopment	Backfilling of voids				100*	48*			148
	Creation of lakes	424*	384*	107*					915
	Sealing of dump sites		32*	5*	7*	7*			51
	rehabilitation of open cast areas	124*	85*	25*	8*	5*			247
	Other rehabilitation	9*	8*	2*	2*	1*		7	28
	Water-related measures	97*	84*	25*	12*	10*			229
Total land redevelopment		**654**	**593**	**165**	**128**	**71**		**7**	**1618**
Relocations, resettlements	Resettlements of surrounding villages	16	33						49
	Road relocations	12	83	11			8		114
	Railroad relocations	1							1
	River relocations								-
	Cable/piping relocations	3							3
	Other relocations	1						4	5
Total relocations, resettlements		**33**	**116**	**11**			**8**	**4**	**172**
Mining damage	Subsidence damages							239	239
	Water drainage damages							145	145
Total mining damage								**384**	**384**
TOTAL		**687**	**709**	**176**	**128**	**71**	**8**	**395**	**2174**

* Cost distribution between open cast mines estimated according to size of mines

CCMR. Competence Centre for Mining & Resources

Source: KPMG, Vollständigkeit und Angemessenheit der bilanzierten bergbaubedingten Rückstellungen nach IFRS zum 31. Dezember 2016

Cost overview – mine rehabilitation provisions by RWE

RWE Power AG provisions in million € for mining-related rehabilitation (31 December 2016)

Main category		Open cast mine Hambach	Open cast mine Garzweiler	Open cast mine Inden	Total (Hambach, Garzweiler, Inden)
Lake-related redevelopment	Creation of lakes	€m 424*	€m 384*	€m 107*	€m 915
	Water-related measures	€m 97*	€m 84*	€m 25*	€m 206
Total lake-related redevelopment cost		**€m 521**	**€m 468**	**€m 176**	**€m 1,165**
Current operating area		43 km^2	32 km^2	17 km^2	83 km^2
Future operating area		26 km^2	36 km^2	6 km^2	68 km^2
Total area to be rehabilitated		**69 km^2**	**68 km^2**	**23 km^2**	**160 km^2**
Total lake area		**39 km^2**	**23 km^2**	**12 km^2**	**74 km^2**

Average cost per km^2

(based on total areas to be rehabilitated & total rehabilitation cost)

Hambach: € 10.0 million

Garzweiler: € 10.4 million

Inden: € 7.7 million

Avg. cost per km^2 lake

(based on total lake area & lake-related redevelopment cost)

Hambach: € 13.4 million

Garzweiler: € 20.3 million

Inden: € 14.7 million

* Cost distribution between open cast mines estimated according to size of mines

CCMR. Competence Centre for Mining & Resources

Sources:

- KPMG, Vollständigkeit und Angemessenheit der bilanzierten bergbaubedingten Rückstellungen nach IFRS zum 31. Dezember 2016
- Mining Technology Consulting, Validierung und Prüfung der bergbaubedingten Rückstellungen für die Braunkohletagebaue, Altstandorte und Kraftwerksreststoffdeponien der RWE Power AG

Hunter Lakes Corporation

The Hunter Lakes Scheme

Leveraging the German Mine Closure Experience from Wasteland to Waterworld

Hunter Lakes Corporation

Contents

1. The German Experience

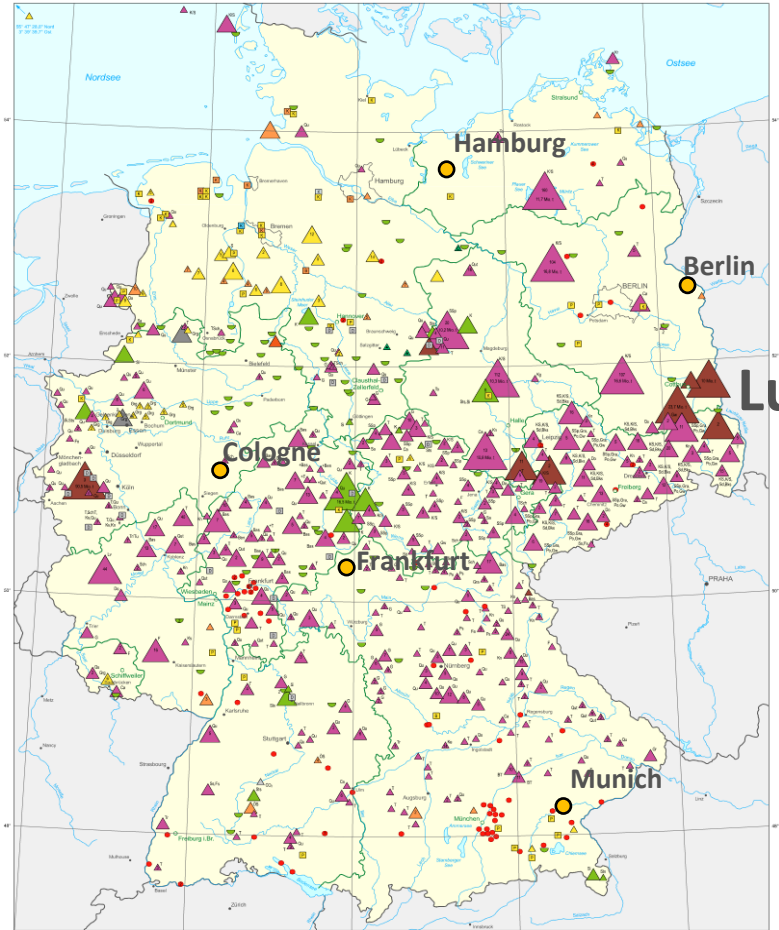
2. Appling the German Experience to the Hunter Valley

The German Experience

Lusatia Coal Mines to Lusatia Lakes District

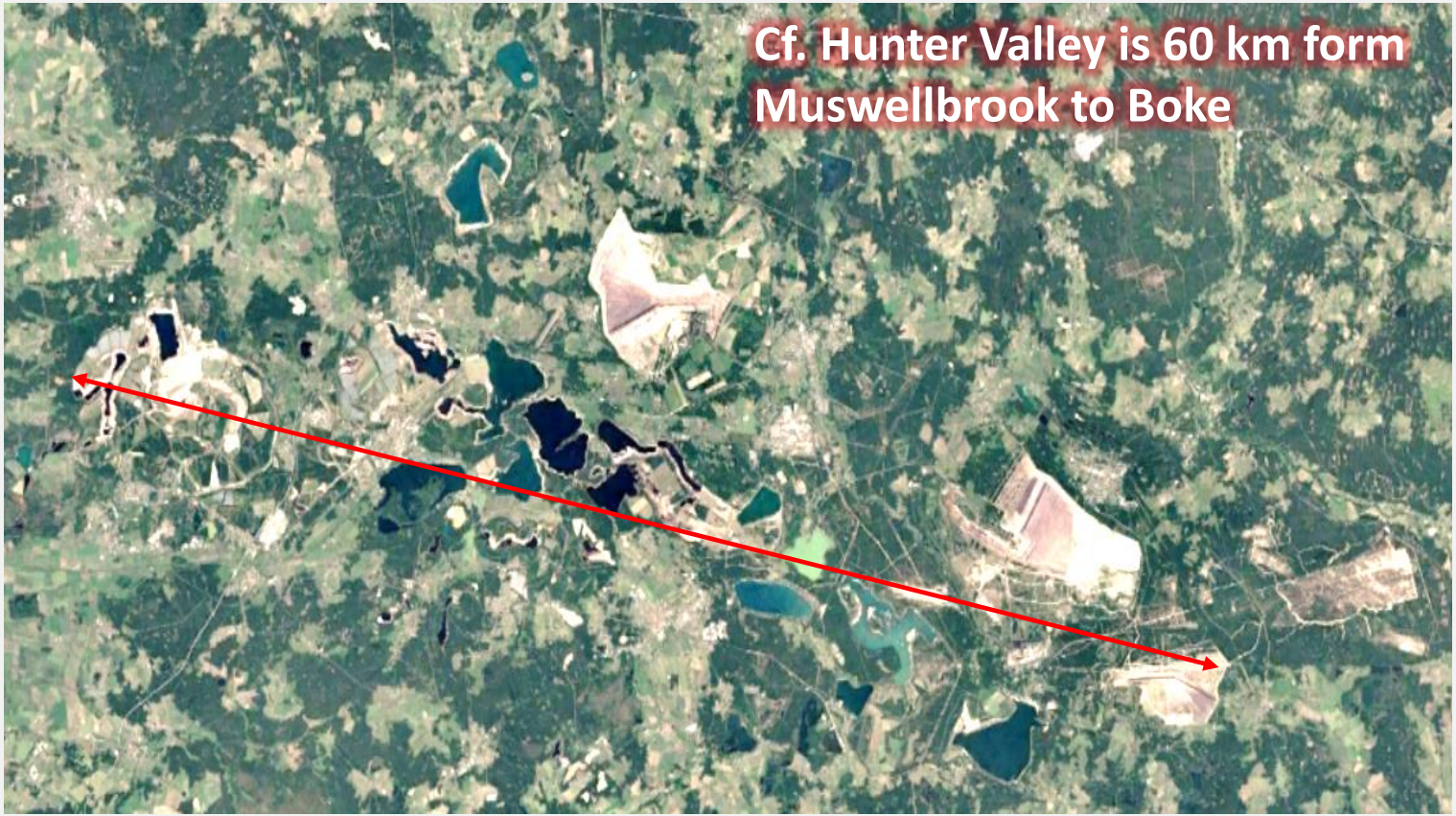
From Wasteland to Water Storage and Recreation

MINING IN GERMANY



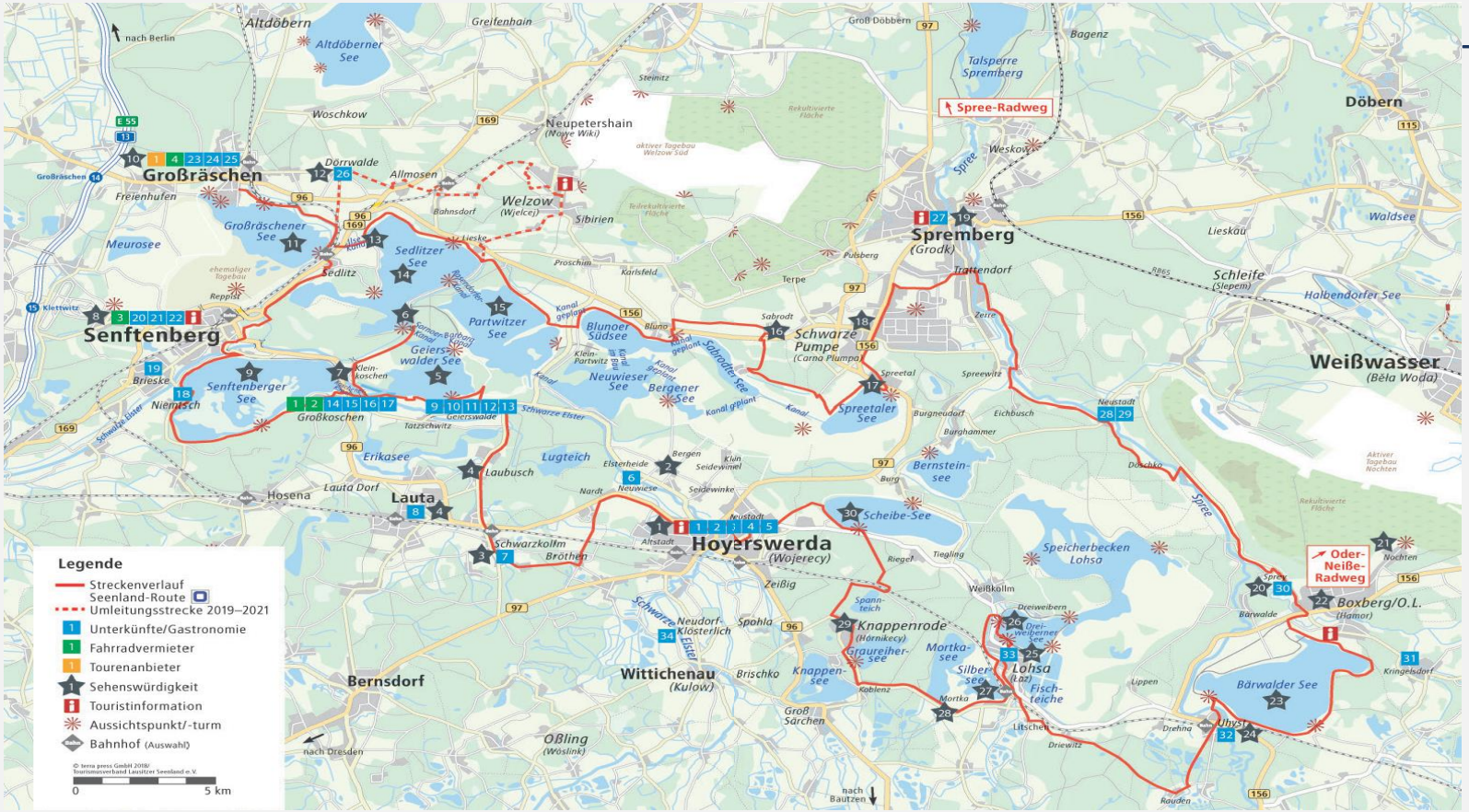
- Black coal
- Brown coal
- Oil
- Natural Gas
- Salts
- Stones & earth

LUSATIA – 74 km Across



Source: Google Earth

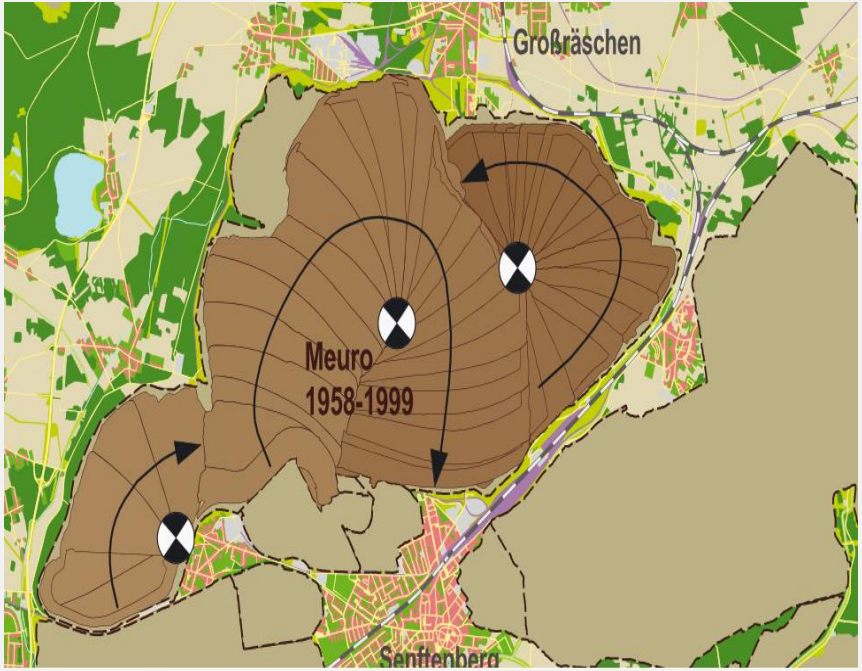
TOURISM IN THE LUSATIAN LAKES DISTRICT

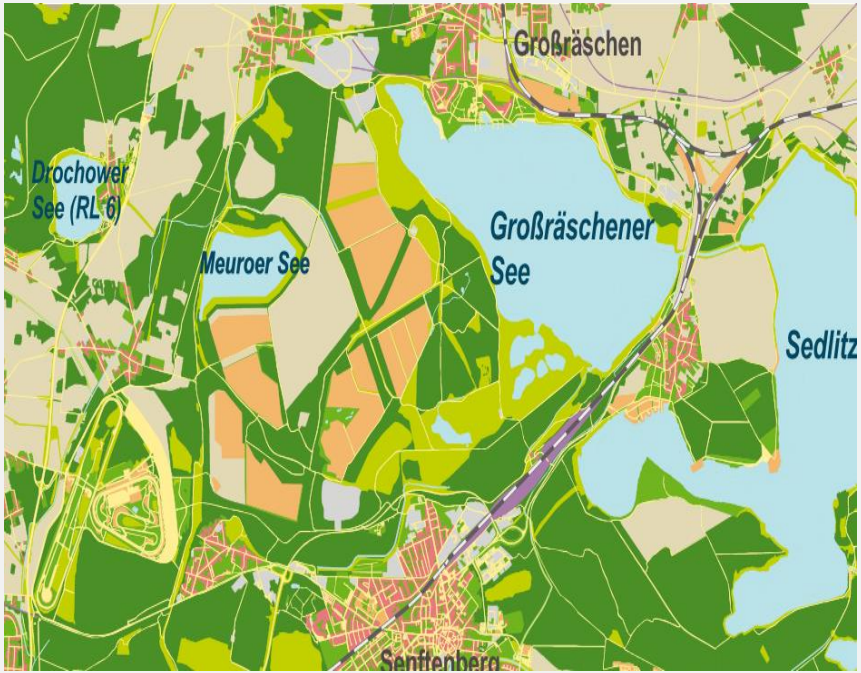


Tourist arrivals: 5.2% CAGR between 2013 and 2018

LUSATIAN HISTORY – East Germany - 1989

LAKE CONVERSION SCHEMATICS





Funding contributions were made from all three levels of Government as well as the mining companies.

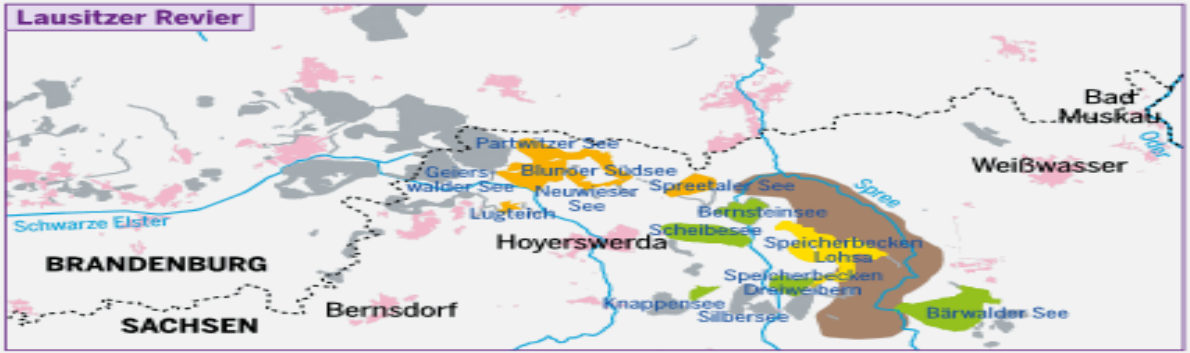
THE LUSATIAN LAKES – BEFORE & AFTER

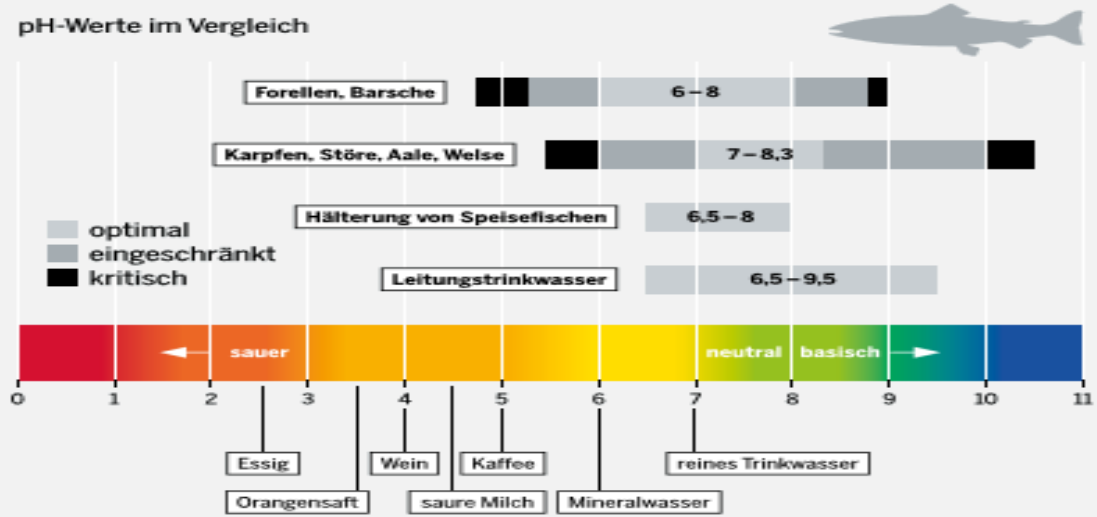
Berzdorf lake

Gräbendorf lake

Spreetal lake

CHALLENGES - Water Quality





WATER QUALITY CHALLENGES & SOLUTIONS

Water quality issues include iron ochre, high acidity and salt contamination

Dilution with river water

Calcination to increase pH

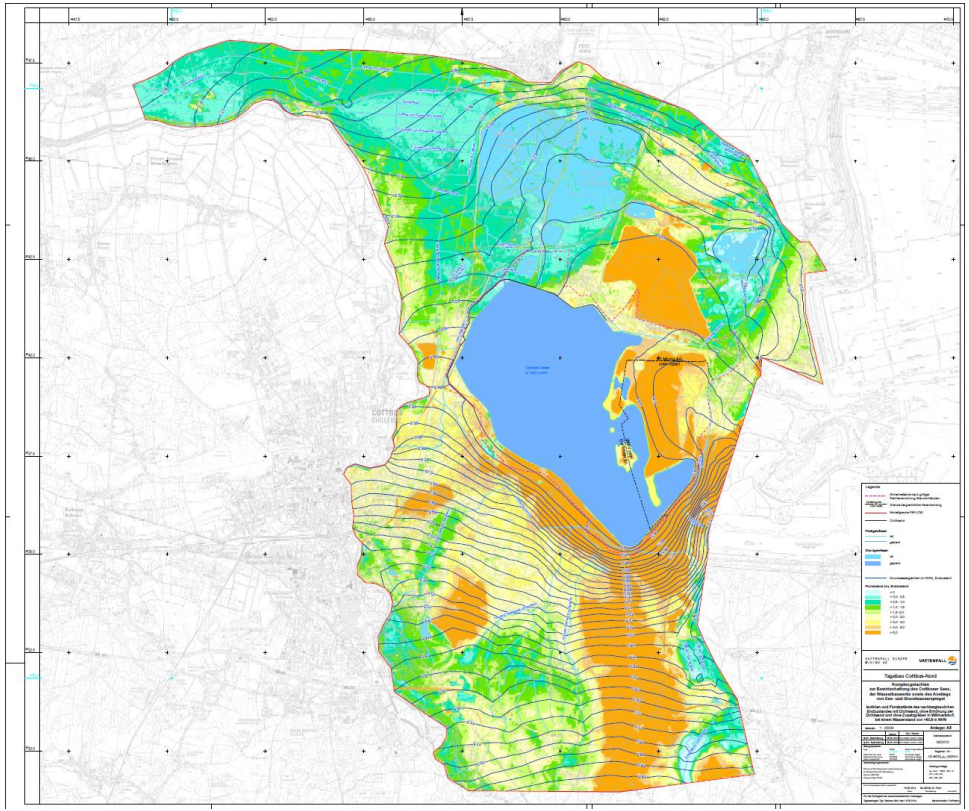
Water treatment plants

FINAL VOID FLOODING

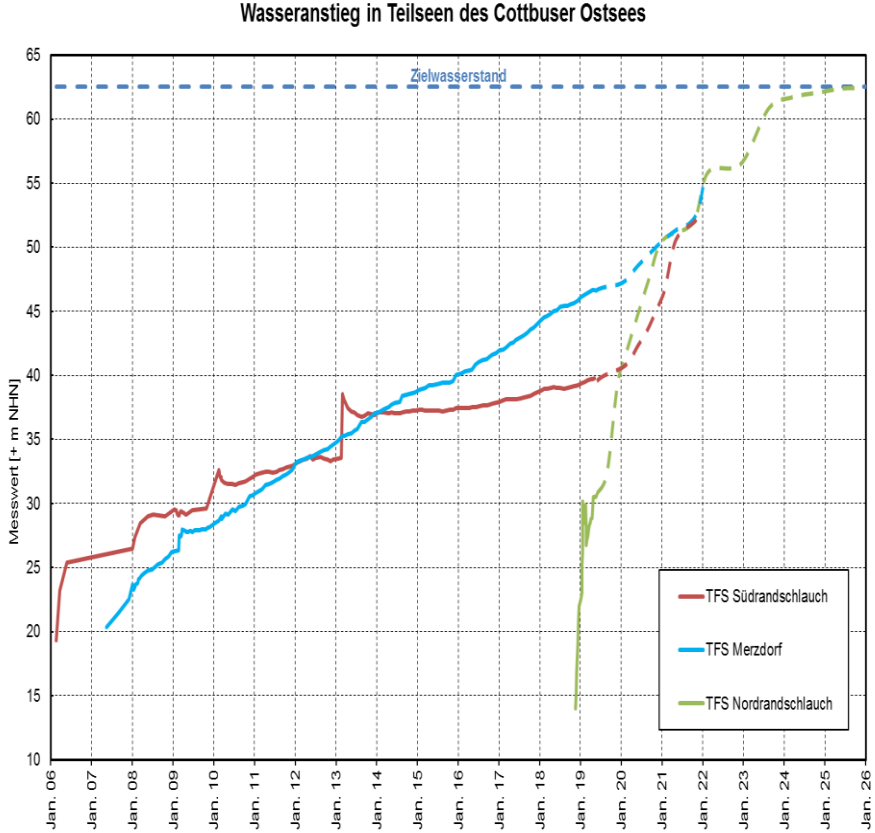
Source: www.ostkohle.de T.A.M.2011 / hyra2003; LMBV; J. Wallstabe

Trial – uncontrolled failure of the batter slope

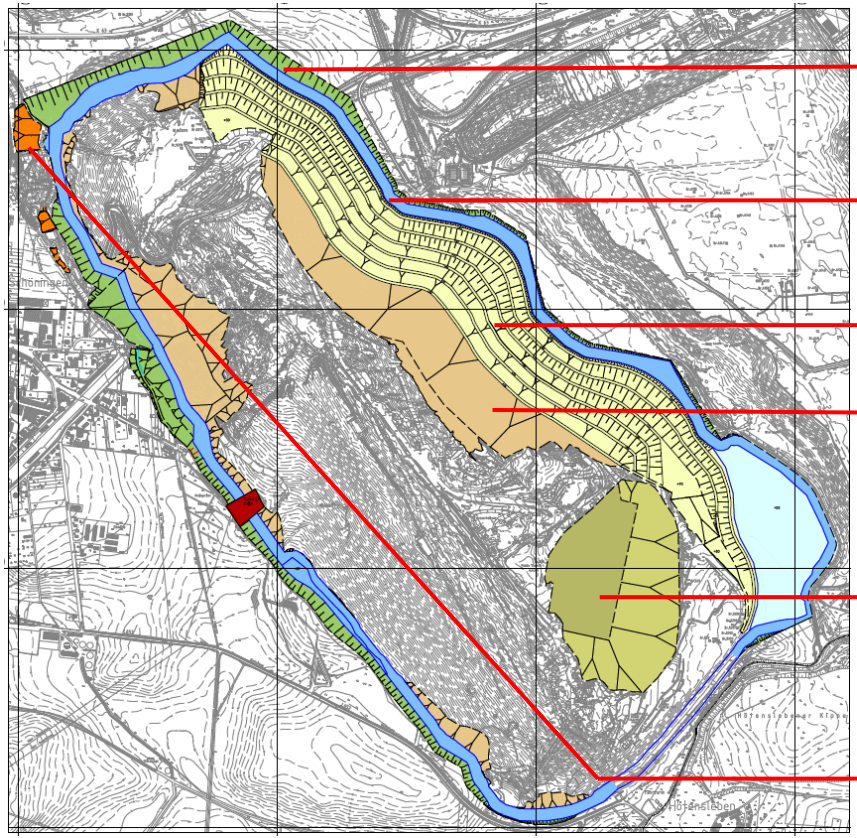
Hydrological model of pit void



Prediction of water level over water filling timeline



Remediation of Mine C Slope configuration



Zone above future shore line

1:5 gradient

Shore line zone

Between +97 RL and +93 RL

Zone below future shore line

1:5 gradient

Connecting slope

1:4 gradient

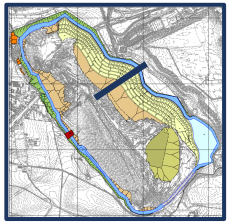
In-pit dump

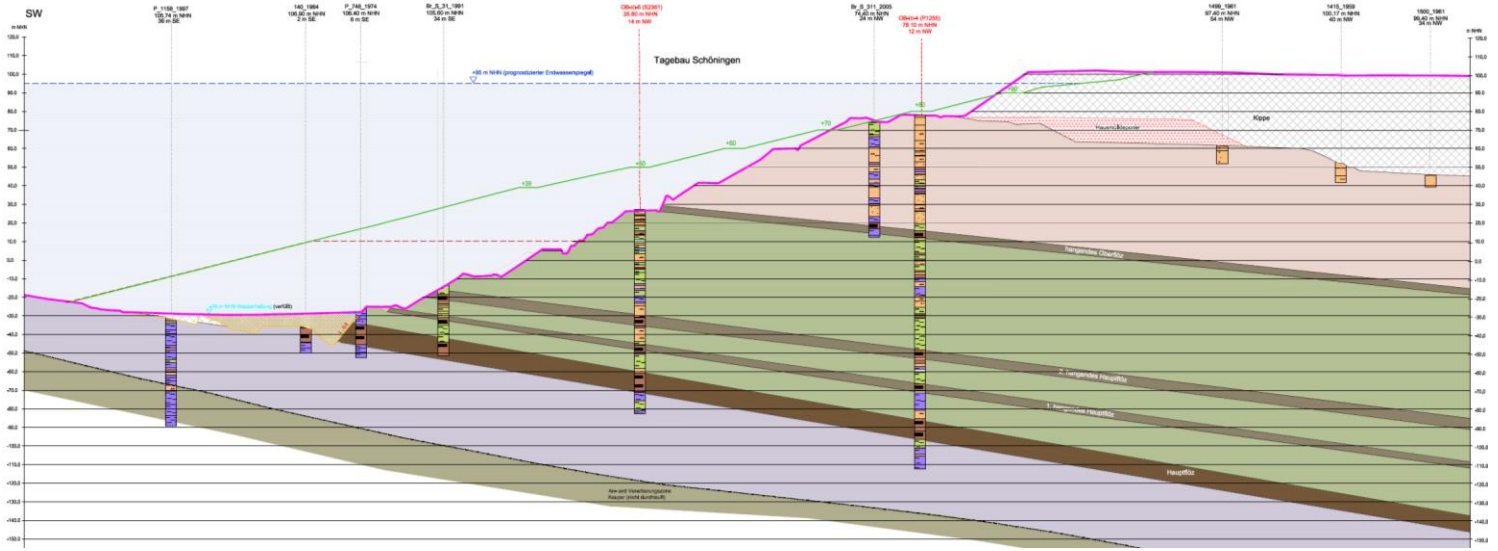
1:5 gradient

Buttress above future shore line

1:3.5 gradient

Remediation of Mine C Slope configuration





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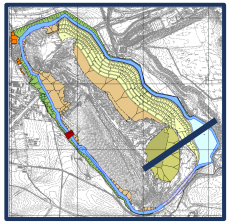
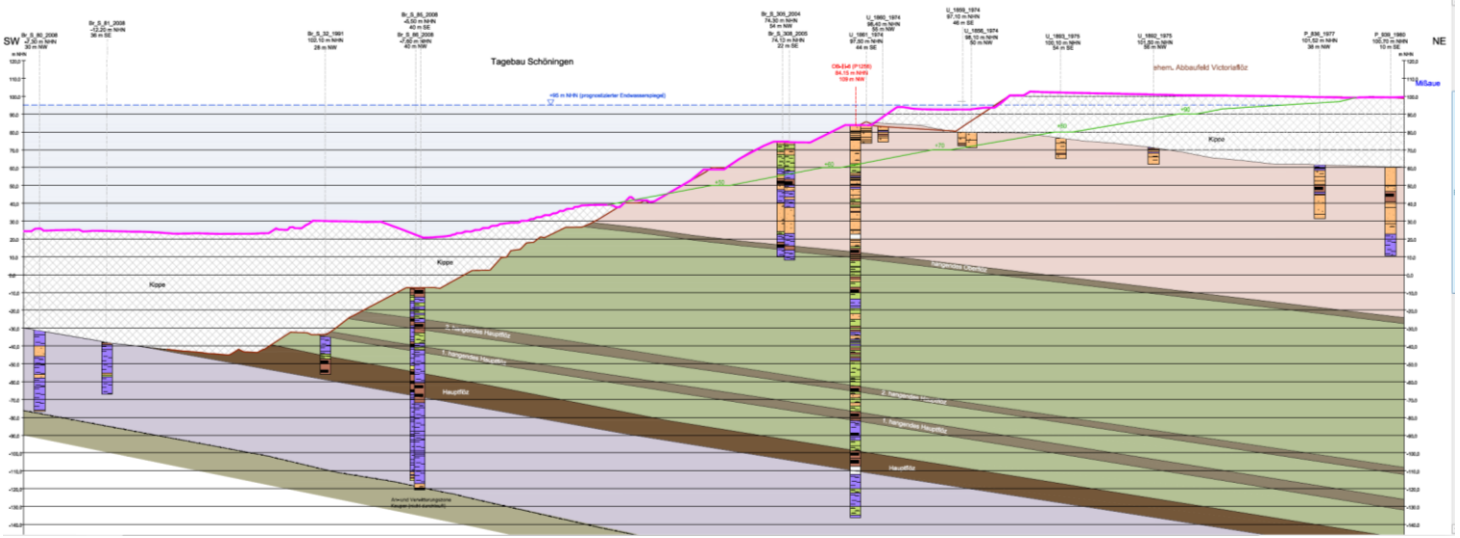
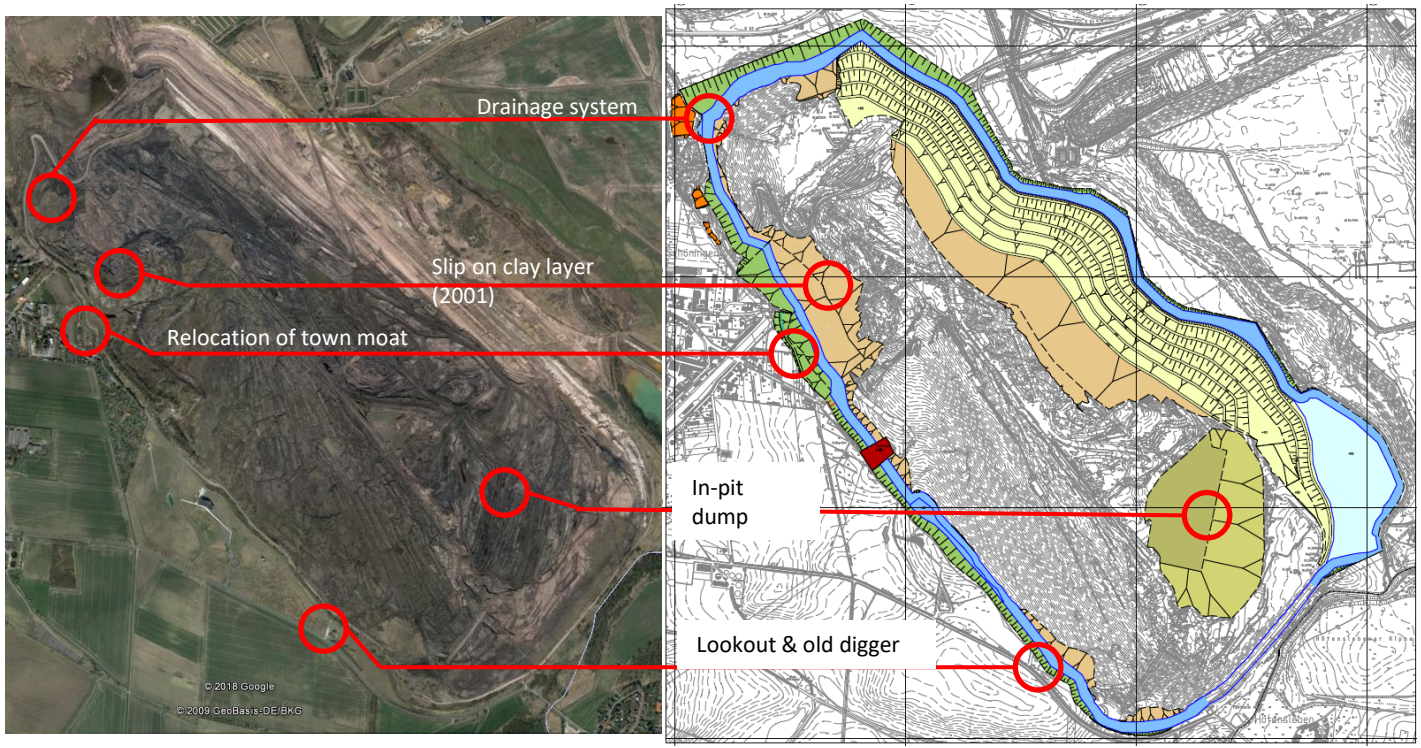
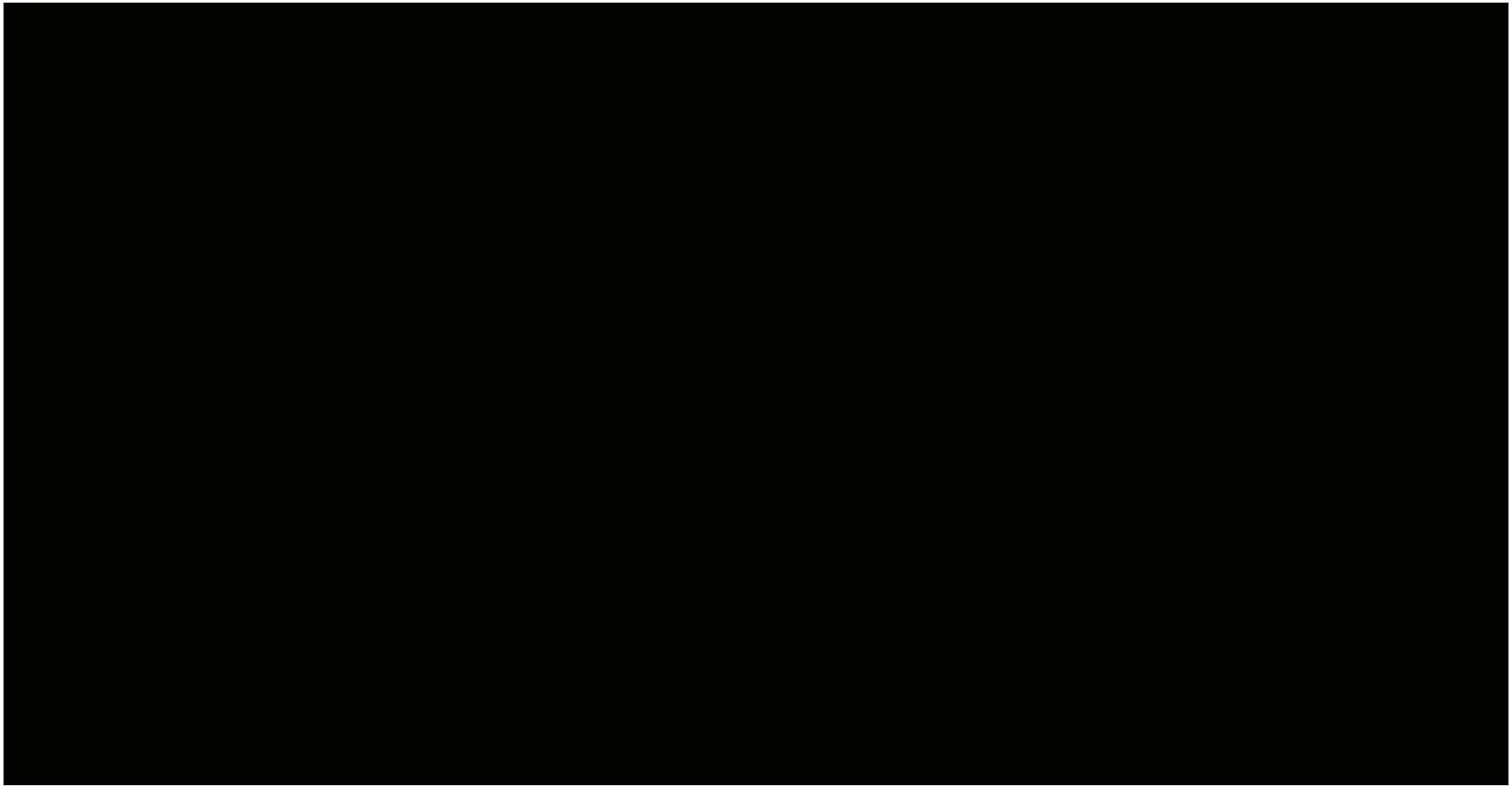




Remediation of Mine





LAKE CREATION PROCESS

Final mine void

Preparation – earth moving

Preparation – compacting

Flooding - groundwater

Flooding - river water

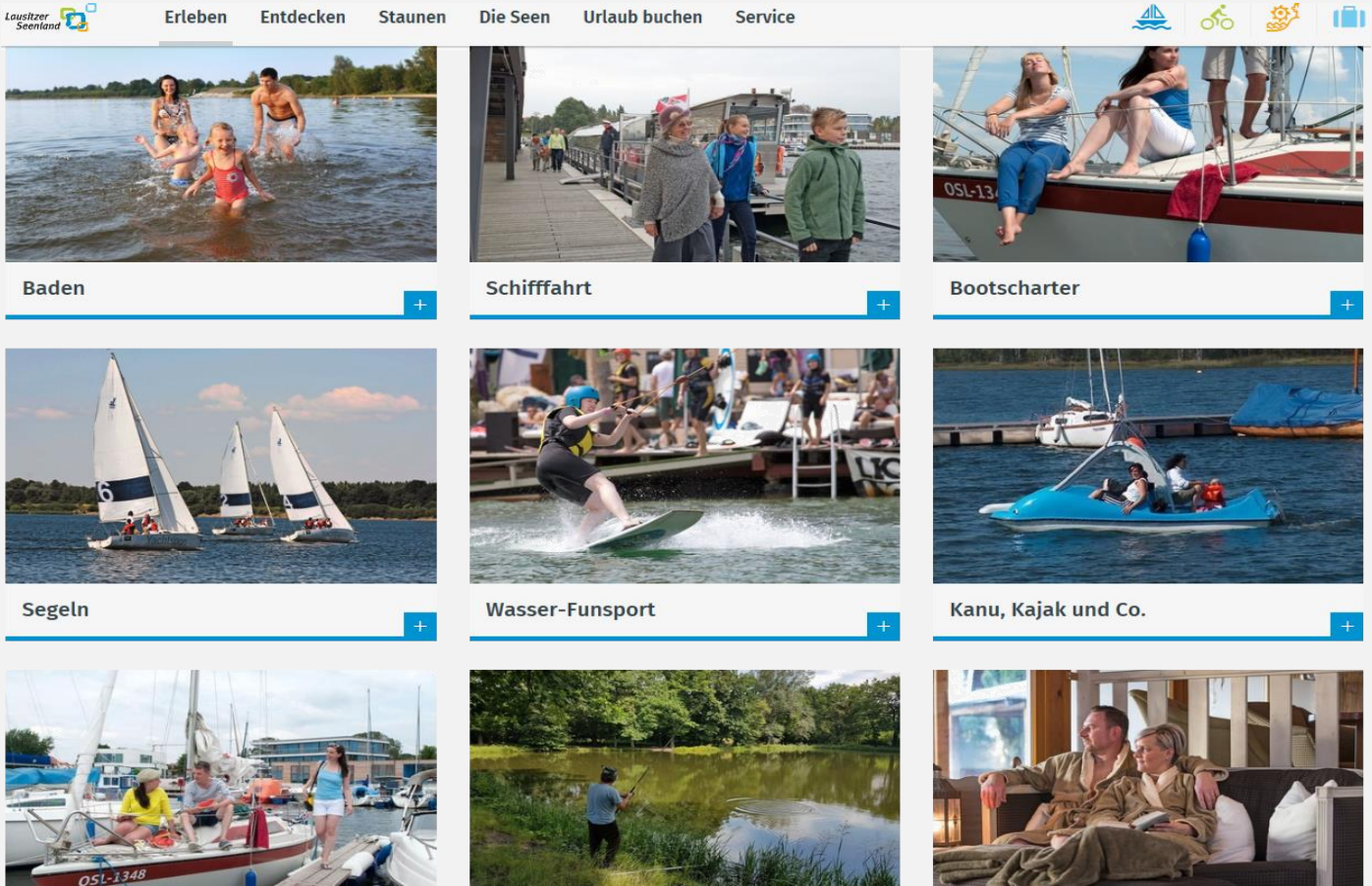
Final lake – water control

Source: LEAG, dpa/Franke

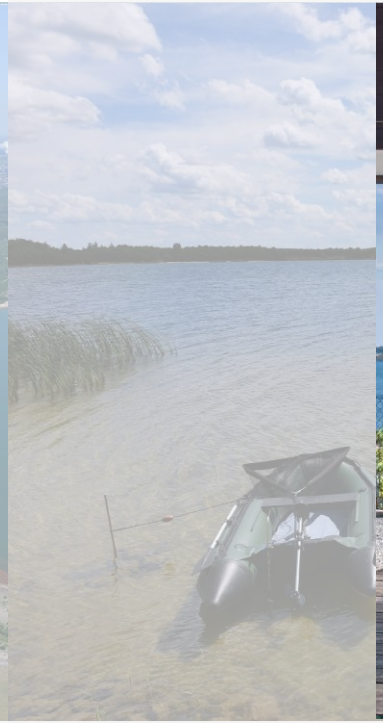
PRESENCE – F60 CONVEYOR BRIDGE

500 metres !

TOURISM IN THE LUSATIAN LAKES DISTRICT

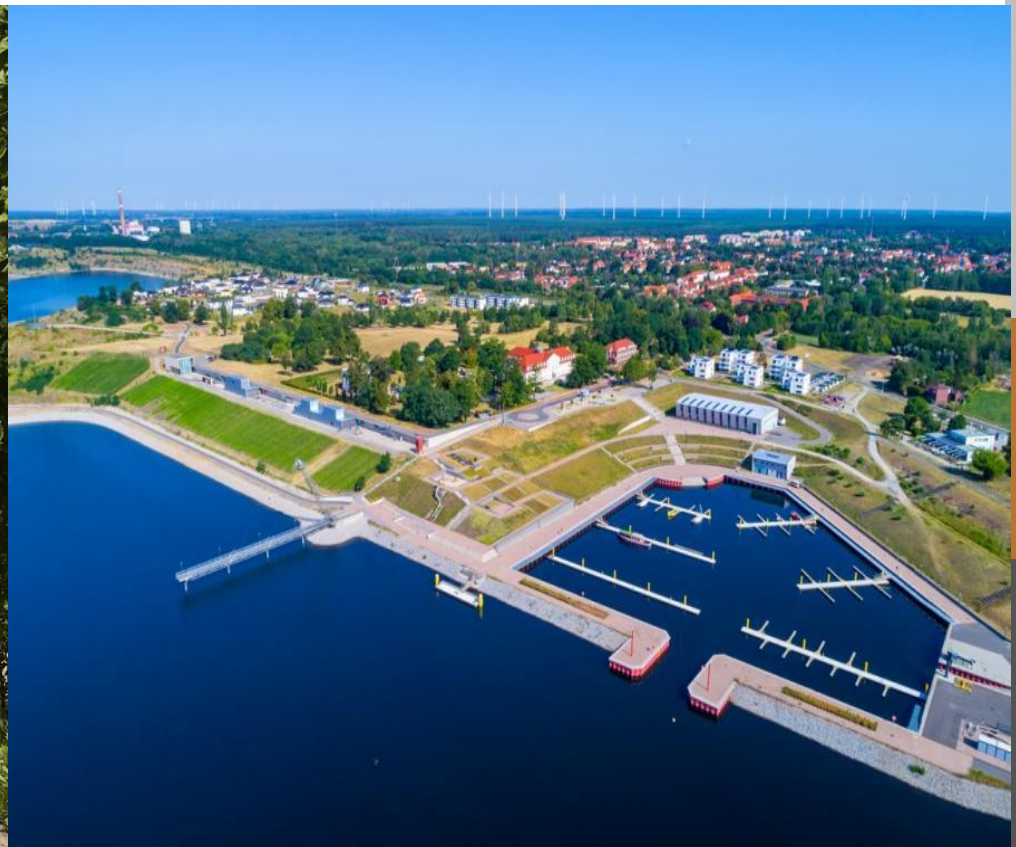


THE LUSATIAN LAKES – BEFORE & AFTER

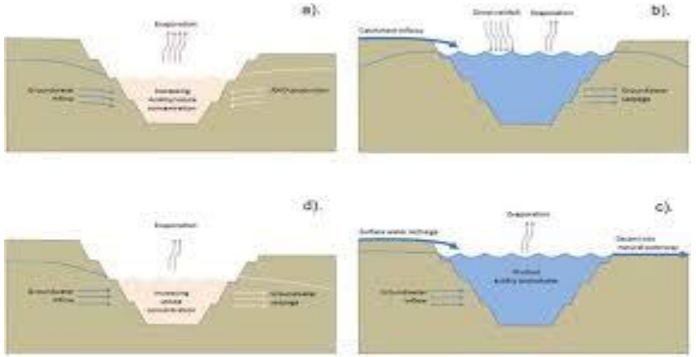


Spreetal Lake Dreiweibern Lake Großräschen Lake

THE LUSATIAN LAKES – Current Operations



THE LUSATIAN LAKES – Current Operations



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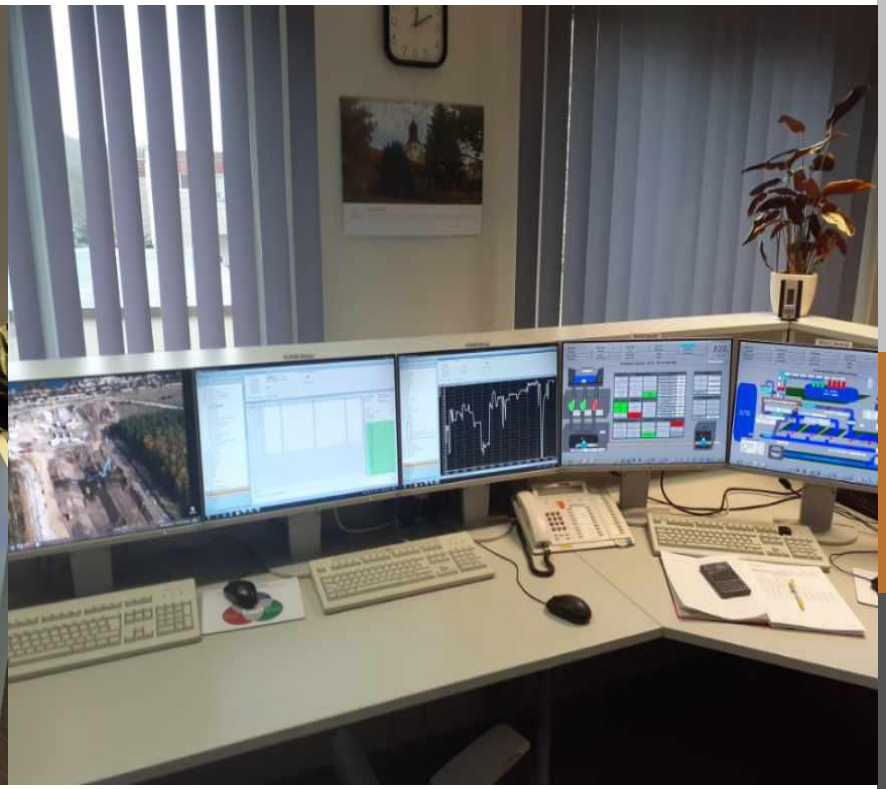


UPPER LUSATIAN BIOSPHERE RESERVE

Over 350 ponds are nestled amongst dune forests, river meadows, heaths and stark expanses of farmland, offering a wide range of habitats for rare plants and animals.

Many species, some of them endangered, thrive here, including the otter, white stork and white-tailed eagle. The natural beauty of this landscape of ponds and heath is best appreciated via a network of scenic walking and cycling trails, which also takes in the local villages.

Hunter Lakes Corporation

Section 2

Applying the German Experience to the Hunter Valley

SUSTAINABLE ENERGIE PARTNERS

CCMR. Competence Centre of Mining and Resources

GERMAN MINING NETWORK
Competence in Mining & Mineral Resources

HWL EBSWORTH LAWYERS


The Hunter Lakes Corporation
has the Team and Expertise to
Re-Purpose the Coal Mine Voids for
• Water Security
• Irrigation
• Jobs
• Drought proofing

HUNTER VALLEY LAKES

Hunter Lakes Corporation

The Proposal

A PROJECT OF STATE SIGNIFICANCE

A GENERATIONAL CHANGE IN ENVIRONMENTAL MANAGEMENT

HUNTER VALLEY LAKES OPPORTUNITY

- Water Security - Jobs - Irrigation
- Drought Proofing-Hunter, Northwest, West, Central Coast
- Providing a ‘Public Good’ and requiring public backing
- Supporting the extension of mining operations
- Step change in environmental management

EXECUTIVE SUMMARY

Concept

Use open cut coal mine voids in the Upper Hunter Valley to create interconnected lakes stretching from Muswellbrook to Broke south west of Singleton to provide **Water Security, Jobs, Irrigation and Drought Proofing the extended district, north and west.**

Execution

As mines reach their end of life (or during operations if agreed) disused voids would be filled with water and incorporated into the scheme. Interconnecting canals could be constructed to create a seamless water expanse of 60 kms.

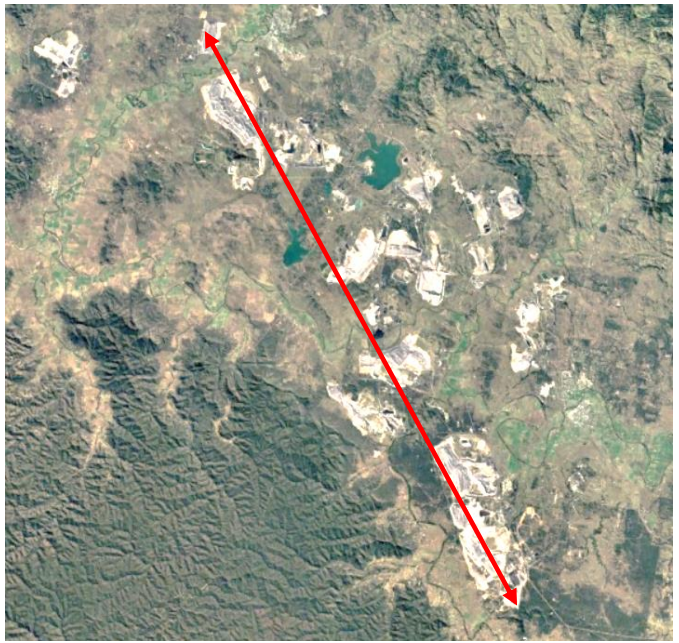
Advantages to Mining Companies

Avoids the requirement to infill the pit and remediate the land.
Possibility of redeploying mining rehabilitation charges.

COSTS

- Initial costs in Germany were contributed by the three tiers of Government.
- Once initial landscape remediation was completed the lakes formation operation has been incorporated into the mine closure procedures at marginal additional cost.
- **The cost now in Germany for additional lake remediation does not exceed charges for conventional rehabilitation.**

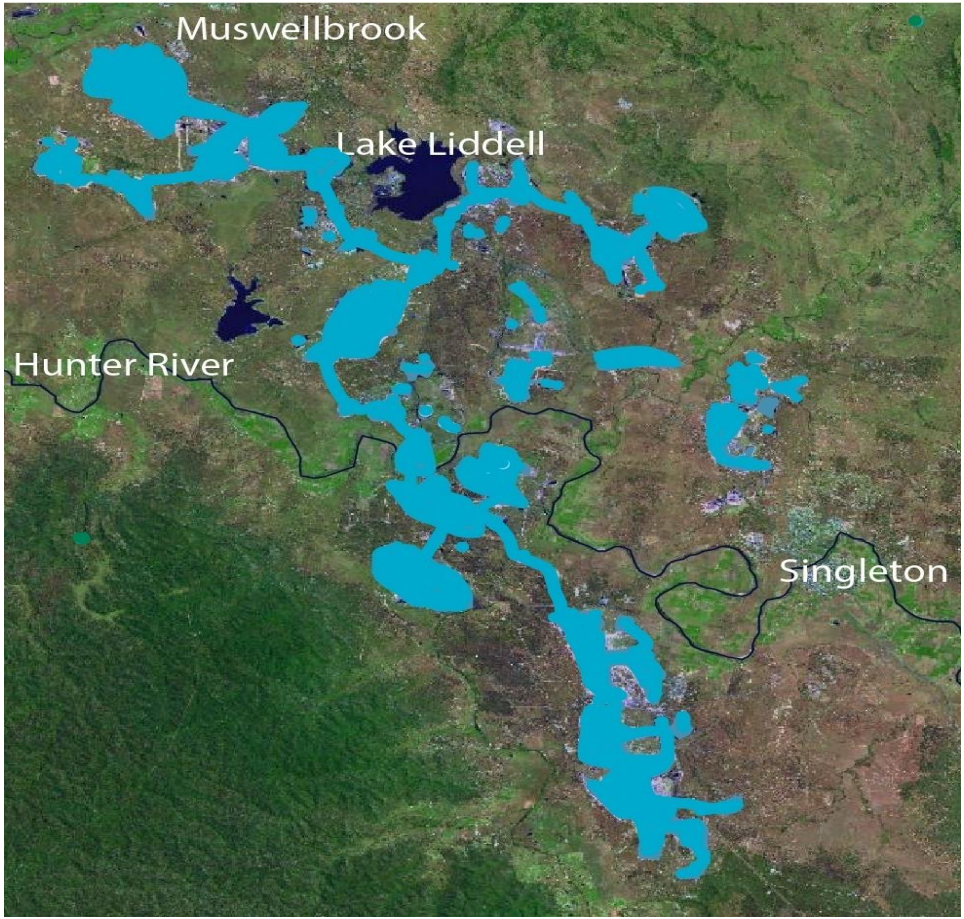
Upper Hunter Valley – 60 klm.
40 mines. Employing 9,000.
Underpinning the economic welfare of the Hunter



ENVIRONMENTAL OUTCOMES

Features
Bird and wildlife habitats for native species under threat
Urban renewal - planned urban landscape to be developed
New industries, agriculture, viticulture
Residential corridors and recreation
Equestrian, designated green spaces, national parks and tourism

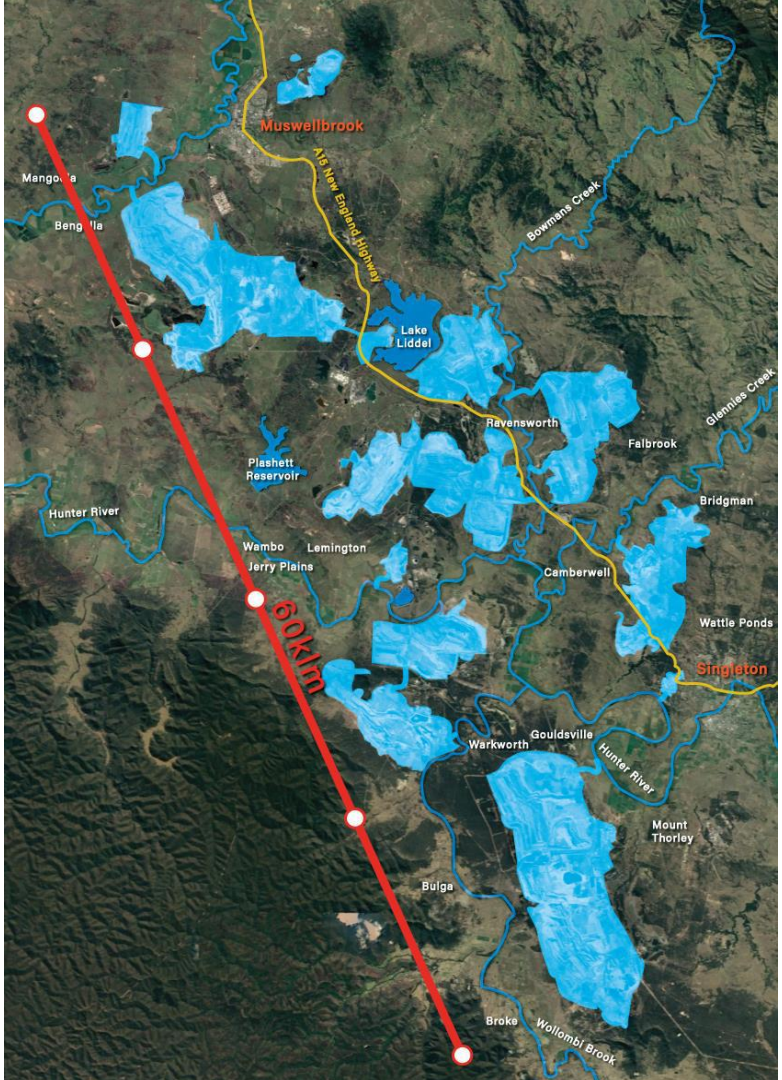
Environmental Showpiece
The sustainable management of water, the environment and deployment of renewable energy.



LAKE CONFIGURATIONS

Features

Indicative schematic prepared to indicate style of lakes structure being interconnected for tourism and energy.



PROJECT SPONSOR - Hunter Lakes Corporation

Progress to date
- Obtained support of Federal, State and Local Governments.
- Local communities and business are in support.

Execution
- HLC has assembled a team of engineers, technology specialists, urban designers, town planners, mining legal advisors to commence studies.

Funding to date
- HLC is providing funding internally. Funding support from all three tiers of Government will be required.

Scoping Study
- Has commenced to address major issues such as salinity, contamination, leaching, water table and Hunter River, evaporation, water licences.

ISSUES - Government and Departmental Advisors

- The issues raised for resolution in the Scoping Study by Governments and Departments are as follows:

  - Salinity
  - Water table contamination
  - Leaching
  - Hunter River impacts
  - Catchment area impacts
  - Rainfall for filling
  - Water licences
  - Evaporation

- All issues have been resolved satisfactorily in Lusatia and the Ruhr.
- Similar or different techniques can be deployed in the Hunter.

RAINFALL and EVAPORATION

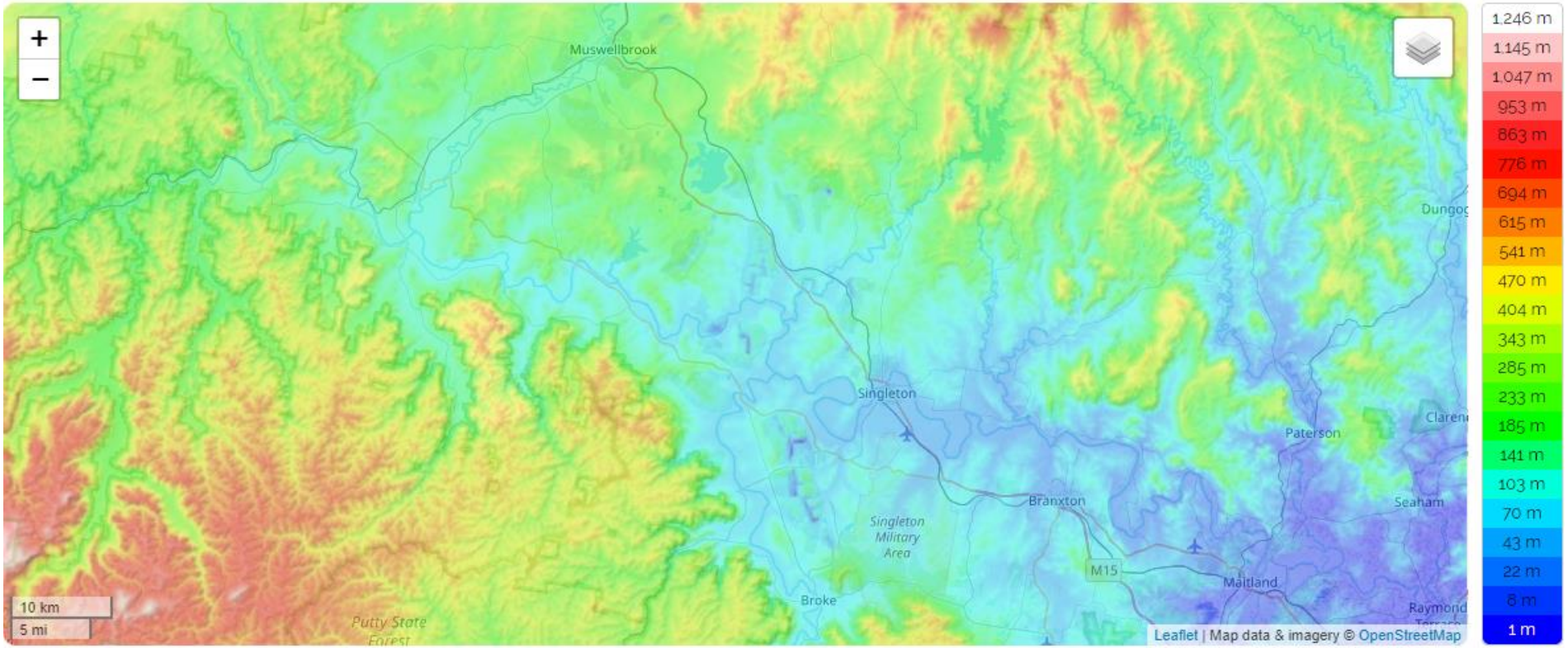
Rainfall

- Maitland/Cessnock (Lower **Hunter**) - 800 to 950 mm (32 - 38 in)
- Singleton (mid **Hunter**) and the surrounding areas - 700 mm (28 in)
- Scone (Upper **Hunter**) - 650 mm (26 in)
- Muswellbrook – 700 mm
- Lusatia, Cottbus – 563 mm
- Ruhr, Dortmund – 800 mm

Evaporation

- Singleton – 1680 mm
- Lusatia and Ruhr – 700 mm

FILLING THE VOIDS – Perfect Catchment Area



Broke, Singleton Council, New South Wales, 2330, Australia (-32.76774 151.09485)

NEXT STEPS for Hunter Lakes Corporation

Complete Current Activities

- Scoping Study including tests for salinity, leaching, contamination.
- Continue the involvement of the Federal, State and Local Governments.
- Continue the involvement of local communities and business groups.

Work Plan – Possible New Initiatives for the Scoping Study

- Include a template Master Plan for the staged roll-out in coordination with mining operations.
- Studies on key issues including water quality, overall project plan, mine closure schedule.
- Design concepts for individual mines to utilise and work towards in their mine strategies to provide for the lakes at mine closure following all approvals.

COAL MINING - Imperatives

Existing operations
- Must not be impacted

Future Mining Operations and Expansions
- Must not be impeded.
- Lakes Scheme would support expansions.

Cost
- Coal mining industry will not be required to fund.
- The cost in Germany does not greatly exceed current charges.

Future Expansion of Mining Operations
- Would be supported to provide additional voids for water storage.
- The added attraction of providing an environmental enhancement.
- Providing a ‘public good’ for the State and local community.
- Ensuring jobs int the future for mine workers.

Stakeholder Engagement

Feedback from the Mining Companies regarding their involvement is being sought

Possibilities:

- **Scoping Study** - template Master Plan for the staged roll-out in coordination with mining operations.
- **Technical Studies –** participate in study of key issues including water quality, salinity, leaching
- **Mine closure –** determine ideal schedule.
- **Indicative Void Filling** – prepare design concepts for a selected individual void as proof of concept.
- **Local communities** – ongoing engagement.
- **Councils –** must be involved
- **Business and Environment -** have been canvassed

CURRENT VIEW

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storage

CURRENT VIEW

CURRENT VIEW

Lusatia Lakes, Germany - Today

Lusatia Lakes, Germany - Today

Lusatia Lakes, Germany - Today

Lusatia Lakes, Germany - Today

Lusatia Lakes, Germany - Today

Lusatia Lakes, Germany - Today

Lusatia Lakes, Germany - Today

THANK YOU

Gregory Story

Director
Hunter Lakes Corporation

Dennis Bluth

Director
Hunter Lakes Corporation