

A landscape photograph showing a green field in the foreground, a line of trees in the middle ground, and a clear blue sky with a bright sun setting on the horizon. Several high-voltage power lines stretch across the sky from a transmission tower on the left towards the right. The sun is low on the horizon, creating a lens flare effect.

**Legal frameworks, criteria and stakeholder perceptions for
undergrounding.**

RGI Cable Workshop 2017

Andrew Carryer

Who did we speak to?



What we wanted to know...

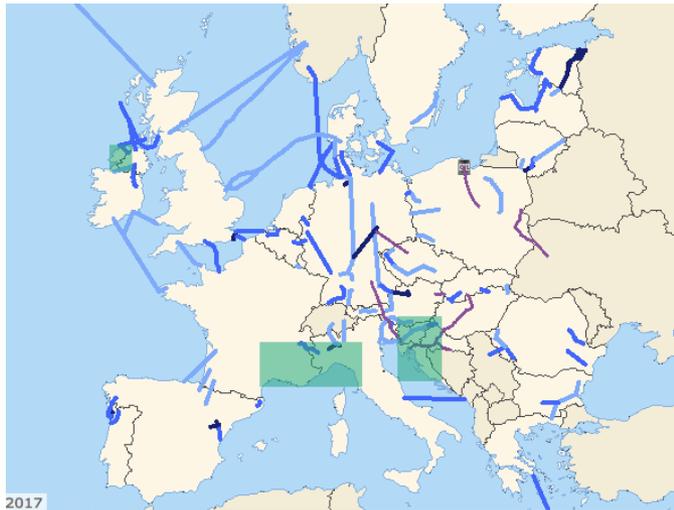
- What underground projects are planned?
- What is the current regulatory framework within which you operate?
- How does undergrounding alter stakeholder dialogue and rates of acceptance in your experience?
- Do you envisage changes to the regulatory framework in the short term?

What is planned for the future?

- **Planned projects can be broken down into two groups:**

Longer distance DC:

- Italy: ~750Km
- Germany: ~1650Km
- Belgium: 50Km
- Often as interconnectors



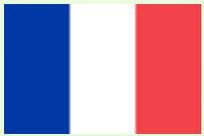
Shorter distance AC:

- Set of pilots in Germany
- 1-3 projects planned in most countries (380kV)
- Often as section of overhead project
- Usually in sections <20Km



Current legal frameworks

“Positive consideration”



“Neutral consideration”

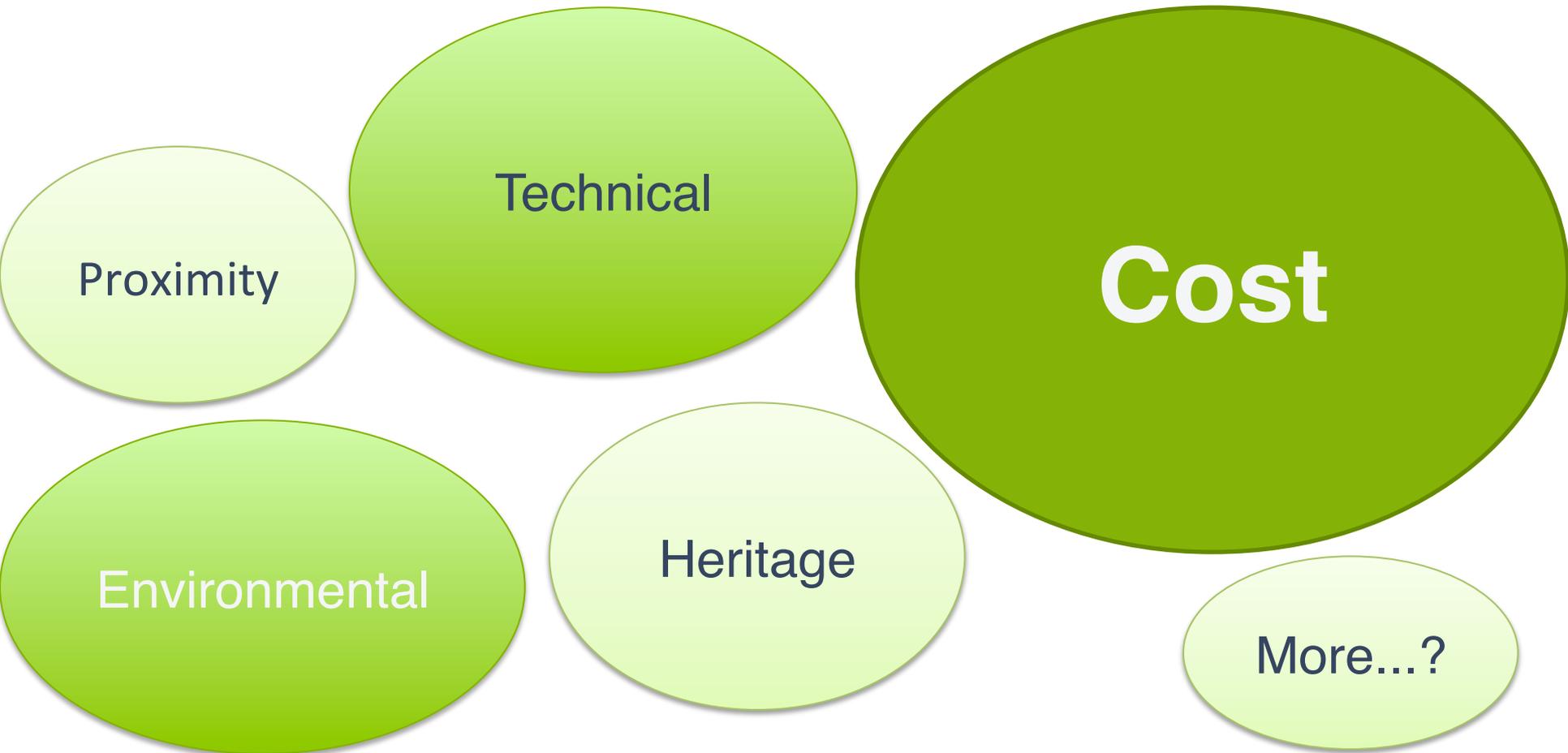


“Negative consideration”



What are the criteria used?

They vary..... some mixture of the following elements....



Does undergrounding alter stakeholder perceptions?

	Pro cable because of	Contra cable because of
Population	<ul style="list-style-type: none">▪ Visual impact▪ Value of real estate▪ EMF	<ul style="list-style-type: none">▪ EMF▪ Energy bill
Farmers	<ul style="list-style-type: none">▪ Visual impact▪ Loss of land	<ul style="list-style-type: none">▪ Impact on crops▪ Soil quality/drainage▪ Pylons "better understood"▪ Loss of land
Foresters	<ul style="list-style-type: none">▪ Need to cut less trees with cable▪ Corridor as woodfire protection▪ Storm damage on OHL in wooden areas can be difficult to repair	<ul style="list-style-type: none">▪ Heavy machinery to build▪ Need to cut less trees with OHL▪ Higher ecological value of OHL
Environmental Groups	<ul style="list-style-type: none">▪ Impact for birds▪ Visual impact = environmental impact	<ul style="list-style-type: none">▪ Danger for sensitive soils
Municipalities	<ul style="list-style-type: none">▪ Visual impact▪ Landscape value▪ Real estate value	<ul style="list-style-type: none">▪ Higher complexity to build cable▪ Loss of pylon tax (France)

Does undergrounding change stakeholder perceptions?

First TSO impressions based on practical experience....**It's complicated....**

“Generally speaking, underground cables seem to benefit from a better acceptance than overhead lines, particularly because they have no major impact on landscapes” - RTE

“The precedent of the 10km undergrounding in the Stevin-project has caused the request for undergrounding to become very frequent.” – Elia

“Land owners are often not in favour of undergrounding, but the population further away is in favour. This can lead to new conflicts” – Amprion

“Even if Terna considers the undergrounding a sort of mitigation compared to overhead lines, local people’s perception is not always positive, since they would prefer to avoid any kind of infrastructure on their territory” – Terna

Expected changes to the regulatory framework...

- ✧ TSOs do not expect the legal framework to change much in the short term
- ✧ BUT two strands of thought did come out of this with regards to the future...

Desire for clarity

- *“A more ready regulatory recognition of costs for undergrounding could provide more flexibility in projects” – Terna*
- *“Legal clarity when undergrounding would be helpful - otherwise, there is a risk we have to do it in every 380kV-project even though there are also clear disadvantages to undergrounding” – Elia*
- *‘More legal clarity would be helpful - today we are forced into discussions on undergrounding also where it does not make sense’ - RTE*

Expectations for additional legal clarity...

Concerns of disruption and uncertainty

- *“The permission process has become more complicated as both technical planning and approval are entering new territory” - Amprion*
- *“This [adaption of the legislation] led to a significant time delay in all affected projects because the planning had to be adjusted.” - TenneT*
- *“New legal regulations involve uncertainty, because there is no experience and thus no official practice and also no jurisdiction about questions of interpretation (e.g.: “technical and economic efficient segment”)” - Amprion*

Concluding thoughts

- In terms of technology and amount of infrastructure deployed **we are still in the early days**, but a steady increase is envisaged.
- **Variation in legal frameworks between countries is large**, this includes both the general approach taken by regulatory authorities and the criteria used to decide upon whether undergrounding is appropriate.
- **Underground cabling is not a “silver bullet” in terms of nature protection and public acceptance** but rather shifts environmental protection priorities and changes the dynamics of stakeholder engagement.
- There exists **both a desire for legal clarity or guidelines** which can assist decision making BUT also **the concern that legal changes significantly impact upon the project planning process.**

Thanks for your attention –
Enjoy the next two days!

220kV cables fairly common – however not in all countries

	Existing				Planned			
	kV	# of projects	km	AC/DC	kV	# of projects	km	AC/DC
Spain								
France								
Ireland								
Italy	≤ 220	many	1581	AC	220		30	AC
	380	some	37	AC				
	200-500	some	146	DC			700 - 800	DC
Germany*	≤ 380		ca. 180	AC	380	6	8,6 + x	AC
			1150	DC		6	ca. 1650	DC
Belgium					380	1	10	AC
	380	1	1	AC	380	1	50	DC
Netherlands	380	1	10	AC	380	1	10	AC
Switzerland	220	1	3	AC	220	1	1,3	AC
	380	1	5	AC	380	1	3,9	AC
Norway	525	1	12	DC	420	2	Σ 10,9	AC

Legal frame partially actively supports undergrounding in specific circumstances...

	Criteria	Cost approach of regulatory agency
France	<p>Mandatory undergrounding in classified heritage site; national natural park; nature reserve; 100m corridor along the coast</p> <p>Public service contract: promote 225kV undergrounding for</p> <ul style="list-style-type: none">- new lines: 50.000+ residential areas- existing corridors: significant increase of environmental impacts	<p>Authorities sign-off extra costs of undergrounding if RTE proposes this as best solution, as far as the total global investment amount remains unchanged</p>
Ireland		
Italy	<p>Terna internal criteria: distance to residential areas, EMF, strength of electrical system, seismic level</p>	<p>Focus: efficiency and security being equal, to choose the lowest investment costs</p>

	Mentioning of cables in legislation	Legal changes/ changes in planning/ permitting procedures	Criteria	Cost approach of regulatory agency
Germany	Adaption of German law in 2015: <ul style="list-style-type: none"> more AC-cable pilots were selected partial cabling within OHL corridors possible based on criteria In DC projects cables are prioritised over OHL 		Proximity (200/400m) to residential area; nature protection	Focus: low investment costs
Belgium	Cabling generally an option	Development of criteria when to consider cables (investigation allowed also without criteria)	Natura 2000 landscape; protected landscapes/momuments, densely habitated area	Regulator will accept undergrounding if spatial plan requests it
Nether-lands	No mentioning of cables	No	No specific criteria that request undergrounding or study of it	Regulator will accept undergrounding if spatial plan requests it
Switzer-land	No mentioning of cables	Basic evaluation scheme - study on cables is part of the sectorial planning procedure For lower voltage levels cables will have priority up to a certain cost factor	Criteria mentioned in the basic evaluation scheme: environmental protection, technology, cost effectiveness and spatial development	According to the evaluation scheme
Norway	Clarifications why cables are NOT to be considered		Keep distance of 100m to residential areas	Focus: low investment costs

Legal changes in Germany

Irgendwelche Zitate von 'Betroffenen' (Bürgerdialog oä), Thomas Wagner

Comments from AMPRION that you might want to use:

- The effect on the concerned projects: back to start
- The effect on projects that do *not* have the option by law for cabling: discussions with politics and the public have become more complicated due to raised expectations (by the way, that is why I support the scheme of acceptance of projects, as we have to bring some value on the ground to the other projects as well, especially as we cannot offer cabling)
- Permission process has become more complicated as both technical planning and approval are entering new territory
- Negotiations with land owners have become more complicated by the fact that an underground cable has more and higher effects on the property especially soil than an overhead line has.

Legal changes in Germany in 2015

Current legal status at the last workshop in **2013**:

- 4 projects nominated as potential pilots
 - authority request needed
- Discussion to legally request an HVDC onshore pilot
- EIA requires additional cabling studies

Adaption of German law in **2015**:

- more AC-cable pilots were selected
- partial cabling within OHL corridors possible based on criteria
- In DC projects cables are prioritised over OHL

New legal regulations involve uncertainty, because there is no experience and thus no official practice and also no jurisdiction about questions of interpretation (e.g.: “technical and economic efficient segment”) (Amprion)

This [adaption of the legislation] led to a significant time delay in all affected projects because the planning had to be adjusted. (TenneT)

Permission process has become more complicated as both technical planning and approval are entering new territory (Amprion)