North Sea Transition Authority

Technology

This section will appear for all Fields that you operate and once at organisational level.

If you think there are any errors with allocation please contact

stewardshipsurvey@nstauthority.co.uk

UKSS 2023 Changes

North Sea Transition Authority

The following changes are being implemented in the Technology section of the survey:

1. ‘Technology category’ now renamed to ‘Technology sub-category'.
2. Additional options added to ‘Deployment status’.
3. You will no longer be able to select ‘Technology Gap’ under ‘Maturity Stage’.
4. The ‘Preparation and Removal’ option under ‘Technology Deployment’ has now been split into two variations. You will be required to select the appropriate version.
5. ‘Carbon Storage’ now added as a ‘Technology sub-category' option.
6. New question added to collect ‘Digital and Data sub-category'.
7. New question added to collect ‘Net Zero sub-category'.
8. All sections have enhanced guidance and explanatory notes.

Organisation Level

Organisational Level

Guidance

Please use actuals for the previous and current year and provide forecast spend/budget for the next 3 years of your company's total technology spend in support of your UKCS business. Entries should be whole numbers with no spaces, commas, or decimal points, e.g. £5m = 5000000

Total Spend
This section refers to your company's total technology spend in support of your UKCS business.
Spend should include R&D activities undertaken by your UK business, corporate charges, as well as R&D activities outsourced to third-parties, memberships and contributions to joint industry projects.
Please provide information on additional spend related to the testing, qualification, and deployment of advanced technologies, whether or not developed by your company, and in support of your UKCS business.
This spend category should include all costs (capex and opex) to undertake technology pilots, qualification work, design and implementation of advanced technologies, including activities outsourced to third-parties, and in collaboration with other companies.

Breakdown Spend
Please provide the breakdown of the Total Technology Spend reported in the previous section (i.e. the total of R&D and Technology Transfer) by the technologies categories indicated below.

- **Seismic & exploration** - For example; to include technology related to Seismic acquisition, Geology, Seismic processing and imaging, Subsurface modelling and interpretation, etc.
- **Well drilling & completions** - For example; to include technology related to Drilling equipment, Well design and planning, Well equipment, Drilling, casing and cementing operations, High-angle and ERD wells, Multilaterals, MWD, LWD and Geosteering, Well coring, logging and testing, Artificial lift, Reservoir stimulation, etc.
- **Reservoir & well management** - For example; to include technology related to Well logging and inspection, Access and intervention equipment, Liquid loading and water production mitigations, Waxing, hydrates and scaling solutions, Sand and solids management, Integrity repairs, Perforating, etc.
- **Subsea** - For example; to include technology related to Pipelines, Risers, Jumpers and Connection Systems, Manifolds, Umbilicals, Control systems and automation, Flow assurance, metering and monitoring, Subsea processing, boosting and storage, Subsea power generation, local chemical and hydraulic storage, Installation and construction methodologies (including lift and shift), Subsea inspection and intervention systems (excluding wells), etc.
- **Installations & Topsides** - For example; to include technology related to Onshore terminals, Manned offshore platforms, Unmanned offshore platforms, FPSOs and FSOs, Production and Offloading Buoys, Fluid separation, treatment and compression, Power and utilities, Fluid injection and reinjection, Metering and monitoring, Control systems and automation, Construction and installation, etc.
- **Facilities management** - For example; to include technology related to Integrity monitoring and inspections, Integrity repairs, Equipment monitoring and reliability, Maintenance and operations, etc.
- **Well plug & abandonment** - For example; to include technology related to Data management, Well inspection and cement condition, Intervention equipment, Casing section removal, Barriers, placement and verification, Conductor removal, Site inspection and monitoring, etc.
- **Facilities Decommissioning** - For example; to include technology related to Late life management and equipment readiness, Survey and planning, Data management, Cleaning and isolation, Preparation and removal, Waste management and recycling, Site inspection and monitoring, etc. but excluding wells P&A.

	Total Spend			Breakdown Spend									
Year	Technology research & development spend (£)	Technology transfer spend (£)	Total (£)	Seismic & exploration (£)	Well drilling & completions (£)	Reservoir & well management (£)	Subsea systems (£)	Installations & topsides (£)	Facilities management (£)	Well plug & abandonment (£)	Facilities decommissioning (£)	Other (£)	Total (£)
2020	1	1	2	1	1	1	1	1	1	1	1	1	9
2021	2	2	4	2	2	2	2	2	2	2	2	2	18
2022	3	3	6	3	3	3	3	3	3	3	3	3	27
2023	4	4	8	4	4	4	4	4	4	4	4	4	36
2024	5	5	10	5	5	5	5	5	5	5	5	5	45
Comments Operator to provide additional information on zero value entries or any additional explanatory information if required	Info	Info	Info	Info	Info	Info	Info	Info	Info	Info	6	6	6

Do you wish to complete an additional spend category? ○ Yes ◉ No

Category name: X, Y and Z

Organisation Level

UK Spend on Technology

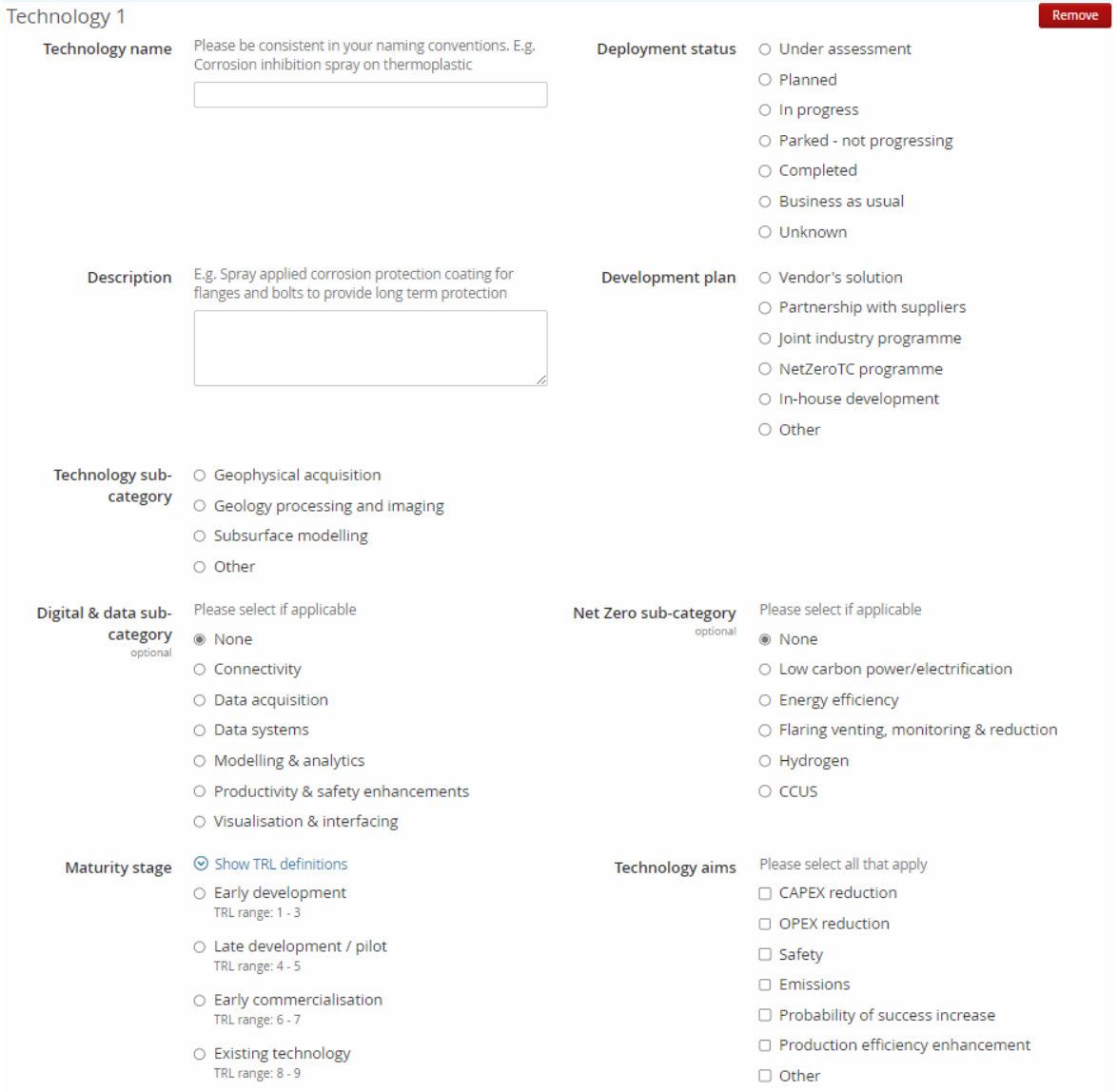
Please use actuals for the previous and current year and provide forecast spend/budget for the next 3 years of your company's total technology spend in support of your UKCS business.
Entries should be whole numbers with no spaces, commas, or decimal points, e.g. £5m = 5000000

Additional categories can be added to the Breakdown Spend.

Validation: you must enter data for all years. If there is no spend, enter 0. (If 0 entered, please provide additional explanatory information in the comments box)
Validation: each years Total Breakdown Spend must be within +/- 10% of the Total Spend. Please provide an explanation. (eg year 2020 Total spend is £5MM and 2020 Breakdown Spend is £14MM. Why?
Validation: each years Total Spends must be within +/- 10% of the Total Spends from the previous survey. Please provide an explanation.

Organisational Level

Licence technology deployment



You will not be able to edit the Technology name and Description from technologies copied from previous surveys.
Please note in the general comments box if you use a different TRL scales and what this scale is.

North Sea Transition Authority

Please provide details about technologies that have been deployed in the seismic and exploration category that are implemented across a licence in the last 12 months.
If these technologies apply to a field, then please add that to the associated field found in the operator matrix.
Only add licences where technologies have been deployed.
Technologies added this year will auto populate into the following years survey.

Maturity Stage

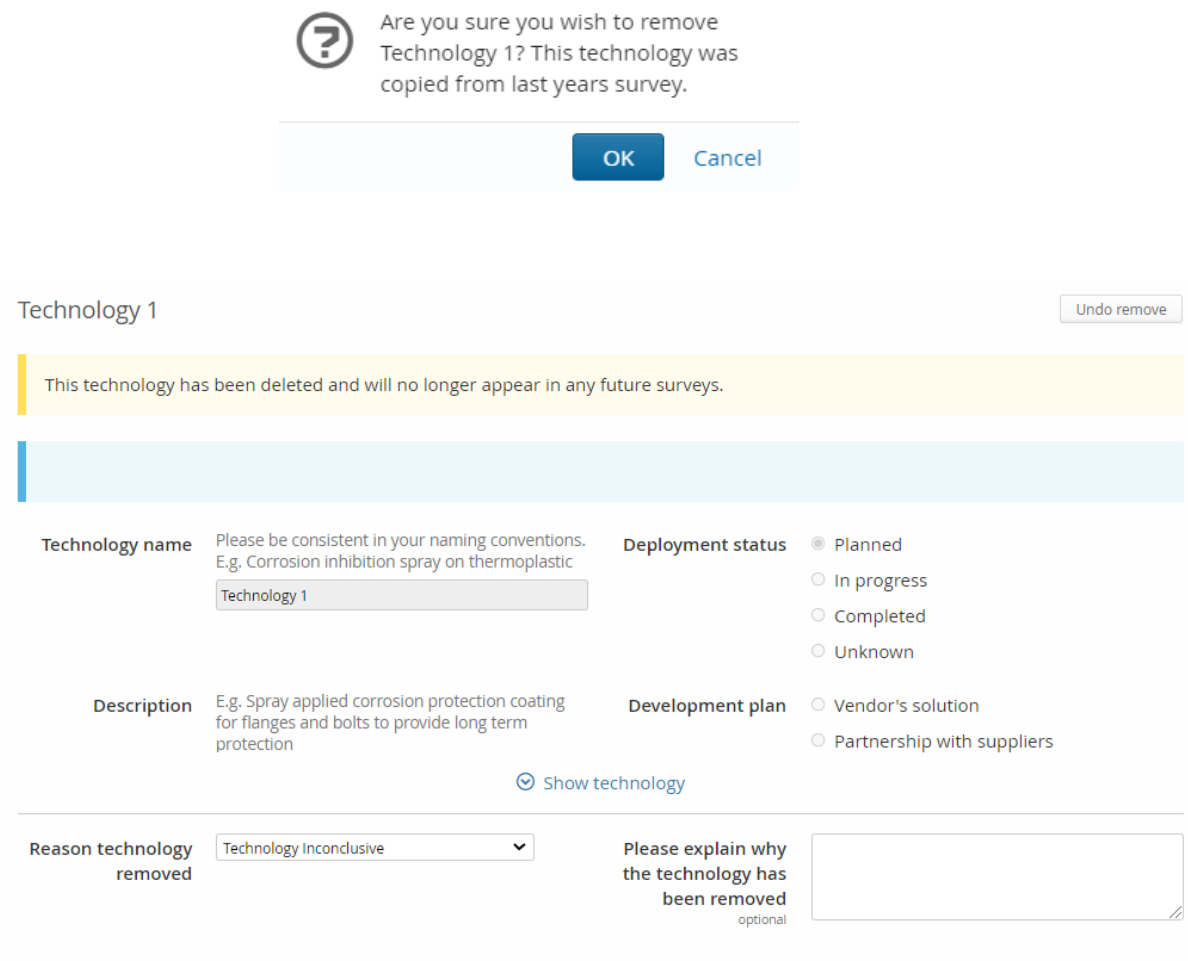
- TRL 1 - Basic principles observed
- TRL 2 - Technology concept formulated
- TRL 3 - Experimental proof of concept
- TRL 4 - Technology validated in lab
- TRL 5 - Technology validated in relevant environment
- TRL 6 - Technology demonstrated in relevant environment
- TRL 7 - System prototype demonstration in operational environment
- TRL 8 - System complete and qualified
- TRL 9 - Actual system proven in operational environment

Deployment Status

- Under Assessment - The technology has not yet been planned to be deployed but is being assessed at this time.
- Planned - Technology is available and is intended for deployment at a future date.
- In Progress - Technology is being developed and/or undergoing trials for future deployment.
- Parked - Not Progressing - The technology is not progressing at this time because it does not make a sufficient business case, or is no longer suitable.
- Completed - Technology is in use on the asset.
- Business As Usual - The technology has been deployed and has become standard practice to use, so it is considered business as usual.
- Unknown - Technology does not fit with the above options (operator to describe).

Development Plan

- Vendor's solution - Technology developed by supply chain.
- Partnership with suppliers - Technology developed in collaboration with supply chain.
- Joint industry programme - Technology developed in collaboration with other operators/institutions/supply chain.
- OGTC/NetZeroTC programme - Technology developed in collaboration with supply chain but with NetZeroTC funding.
- In-house development - Technology developed by operator.
- Other - Does not fit in above options (operator to describe).



Organisational Level

Remove Technology

You can remove a technology by selecting the Remove button.

If the technology was added during the current survey year, the technology will just be removed.

If the technology was added during the previous survey and copied forward, you will be asked to provide reasons why you are removing the technology. The choices are:

- Technology inconclusive
- Finance
- New technology superseded or taken over
- Technology failed to deliver expectation
- Other (please explain in the comments box)

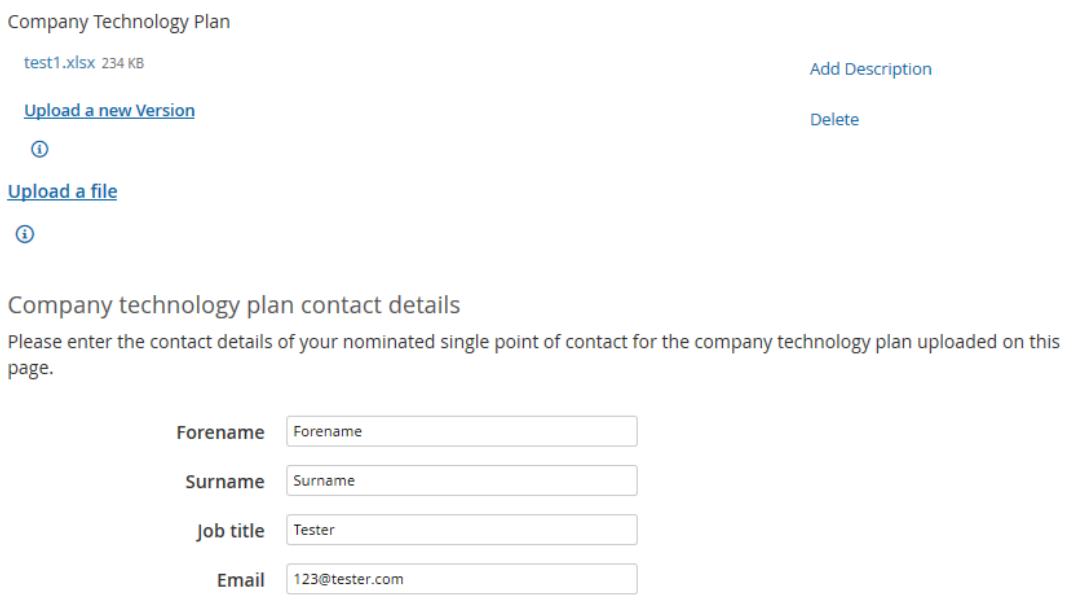
You can undo the removal at any time **before** the section has been fully submitted. Once the section has been submitted, the technology will be deleted and will no longer appear in any future surveys.

Organisational Level

North Sea Transition Authority

Company Technology Plan

For the required content of a Company technology plan, please refer to the Stewardship Expectation SE08 and the Technology section guidance notes using the links below:
Stewardship Expectations SE08
UKSS section guides / Technology plan outline



Multiple Technology plans can be uploaded.

Technology Plan
The Technology Plan expectations are set out in the Asset Stewardship Expectations and are available on the NSTA's website. The link to the expectations is also included in the Technology Plan section of the UKCS Asset Stewardship Survey.

A Technology Plan should indicate to the NSTA that an operator has a strategy for the appropriate development and/or deployment of existing, new and emerging technologies to their optimum effect for the benefit of its assets and in support of its MER UK obligations.

A Technology Plan should help to identify potential technology gaps, providing an operator and the NSTA with visibility of technology needs that, if addressed, would support the MER UK objectives. Therefore, a Technology Plan is also intended for the NSTA to assist an operator to identify technology solutions across its asset base and determine how best to deploy such technologies also collaborating with other companies.
A minimum technology plan template can be found on our website. This should be used as a supplement to any word documentation you normally would provide and acts as a minimum expectation.

Responsible Person
The NSTA requires a single point of contact if the NSTA requires to follow-up on any aspect of an operator's Technology Plan or to engage with regarding technology subjects. Operators should nominate a Responsible Person in the UK as the single point of contact for each Technology Plan submitted. The Responsible Person may be the same individual as the Single Point of Accountability (SPA) for the Stewardship Survey. The following information should be provided:

- Name of Responsible Person
- Job Title
- Email address

North Sea Transition Authority

Company Technology Plan – Further guidance

For the purposes of this Guide, references to:

- 'Operator' means the operator (under a licence) of a UKCS exploration and/or production asset;
- 'Technology' includes technologies covering the whole asset lifecycle comprising the exploration, production, late-life, cessation of production and decommissioning phases.

Required Content

Operators are responsible for preparing and submitting the Technology Plan to the NSTA. Where an operator operates multiple assets in the UKCS, the operator is expected to submit a single Technology Plan covering the operated assets in the UKCS (business unit level consolidated plan).

The Technology Plan should specify:

1. the key technology needs for each operated asset or a group of assets;
2. how the operator proposes to address the technology needs it has identified;
3. the proposed timeline for development and deployment of existing, new and emerging technologies;
4. any potential or recognised technology gaps.

Asset Needs – Technology

Operators should identify the technology need associated with each of its operated assets. Such information should be clearly set-out in the technology needs spreadsheet - using the Spreadsheet Template on right (Image 1: Operators assets needs). Within the input cells highlighted with an asterisk are drop down lists which allow the operator to select the appropriate response, a worksheet with further guidance is provided within this spreadsheet, where operators have multiple assets it may be preferable to add further asset columns to allow a matrix selection of assets and only list the technology need once.

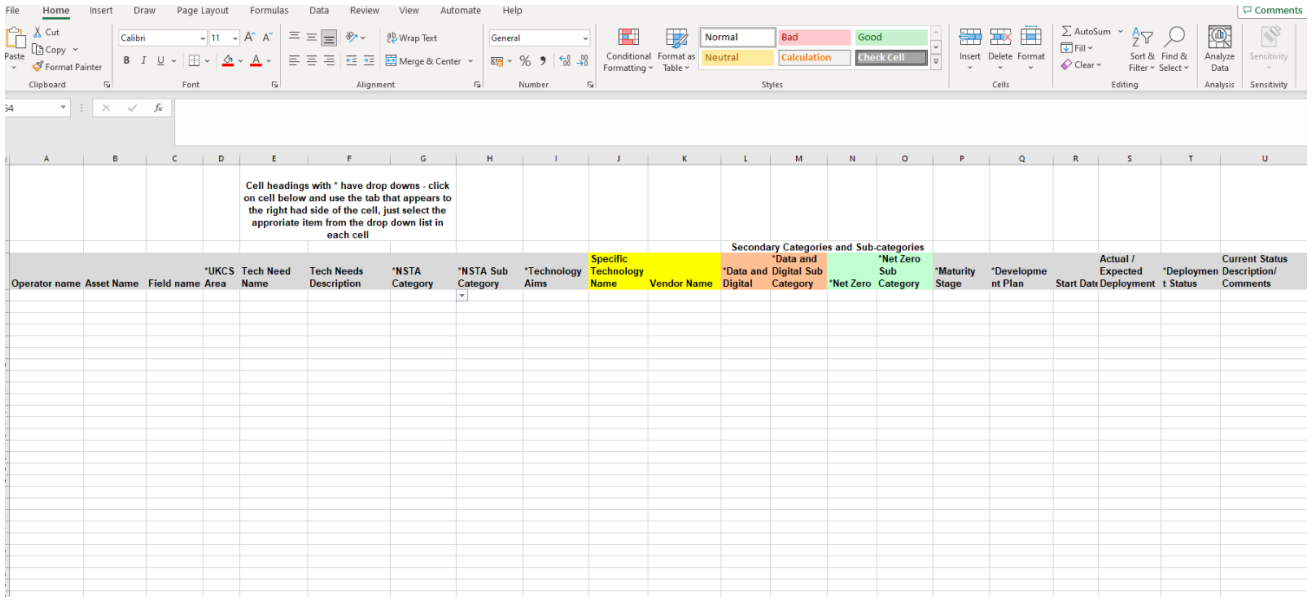


Image 1: Operators' assets needs

Organisational Level

Company Technology Plan – Further guidance

Addressing the Identified Technology needs

Operators should describe the consolidated need/s, associated with each of its operated assets or group of assets and identify potential technologies it proposes to use or develop to address those needs. Such information may be set out in the spreadsheet template in Table 1, however operators may use an alternative reporting format if it includes the requested information. If an operator is not aware of a specific technology opportunity available or under development to address a particular stated challenge, details should be provided, for example in the column titled “Current Status Description/Comments” or at some appropriate point in the Technology Plan.

The number of needs identified will vary per operator and therefore the number of rows in the table should be amended accordingly. Operators should include additional information on the technologies being considered to support the entries as applicable.

A proposed timeline that the technology is expected to be available for development and/or deployment should also be included.

Additional Information

It would be beneficial if an operator could provide details of any technology projects, JIPs, pilots or trials that they are involved in;

- information on any potential areas where the introduction of any future transformational technology would be of significant benefit;
- identification of any particular technologies that are not commonly used in the UKCS;
- identification of any first-time use, trial or piloting.
- This information could be provided by modifying any existing Technology Plan tables or by providing it as stand-alone information.

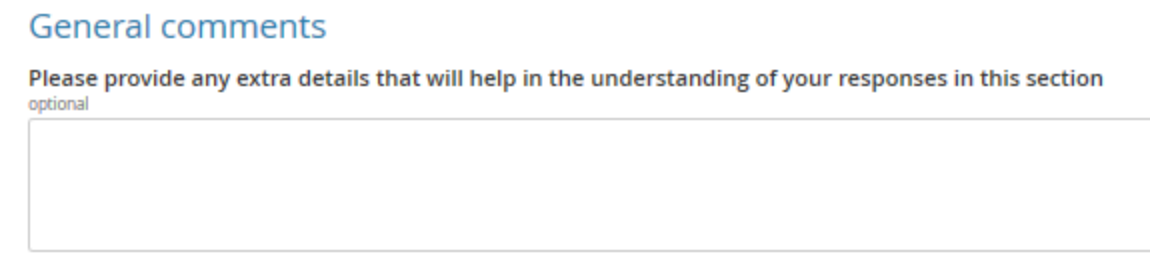
Timeline for Completion of the Technology Plan

The Technology Plan should be submitted in accordance with the UKCS Asset Stewardship Survey timeline.

Delivery of Expectation

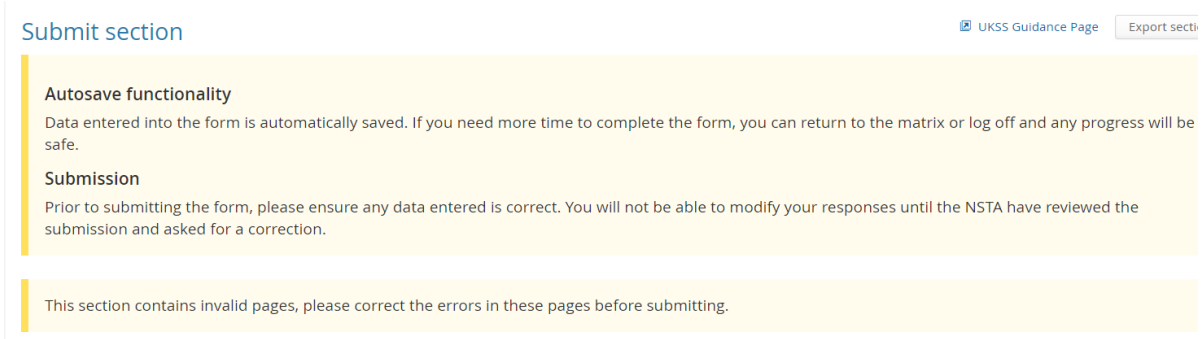
The following indicators will be used by the NSTA when assessing compliance with the Technology Plan Expectations:

1. Technology Plan has been submitted to the NSTA as part of the Annual UKCS Stewardship Survey;
2. the operator has listed the key technology needs faced by each asset, or group of assets, and identified the key challenges for such each asset, or group of assets;
3. the operator has described how it proposes to address the technology needs and identified its timeline for doing so;
4. contact details have been provided for single point of contact for each Technology Plan submitted (see Responsible Person).



General Comments

Please use this area to provide us with any information you think is important, or clarifies any data entered in the rest of the section.



Submit Section

Autosave functionality
Data entered into the form is automatically saved. If you need more time to complete the form, you can return to the matrix or log off and any progress will be safe.

Submission
Prior to submitting the form, please ensure any data entered is correct. You will not be able to modify your responses until the NSTA have reviewed the submission and asked for a correction.

The link '*UKSS Guidance Page'* will take you to the NSTA webpage where all the guidance notes can be found.

The section can be exported either via spreadsheet or PDF at any time during the survey live period.

Field Level

Technology Deployment

By requesting data on Technology Deployment on each field, the NSTA will increase the consistency of data collected across the UKCS. This will create a better understanding of the types and pace at which technologies are being deployed in addition to the detail provided in the Technology Plan.

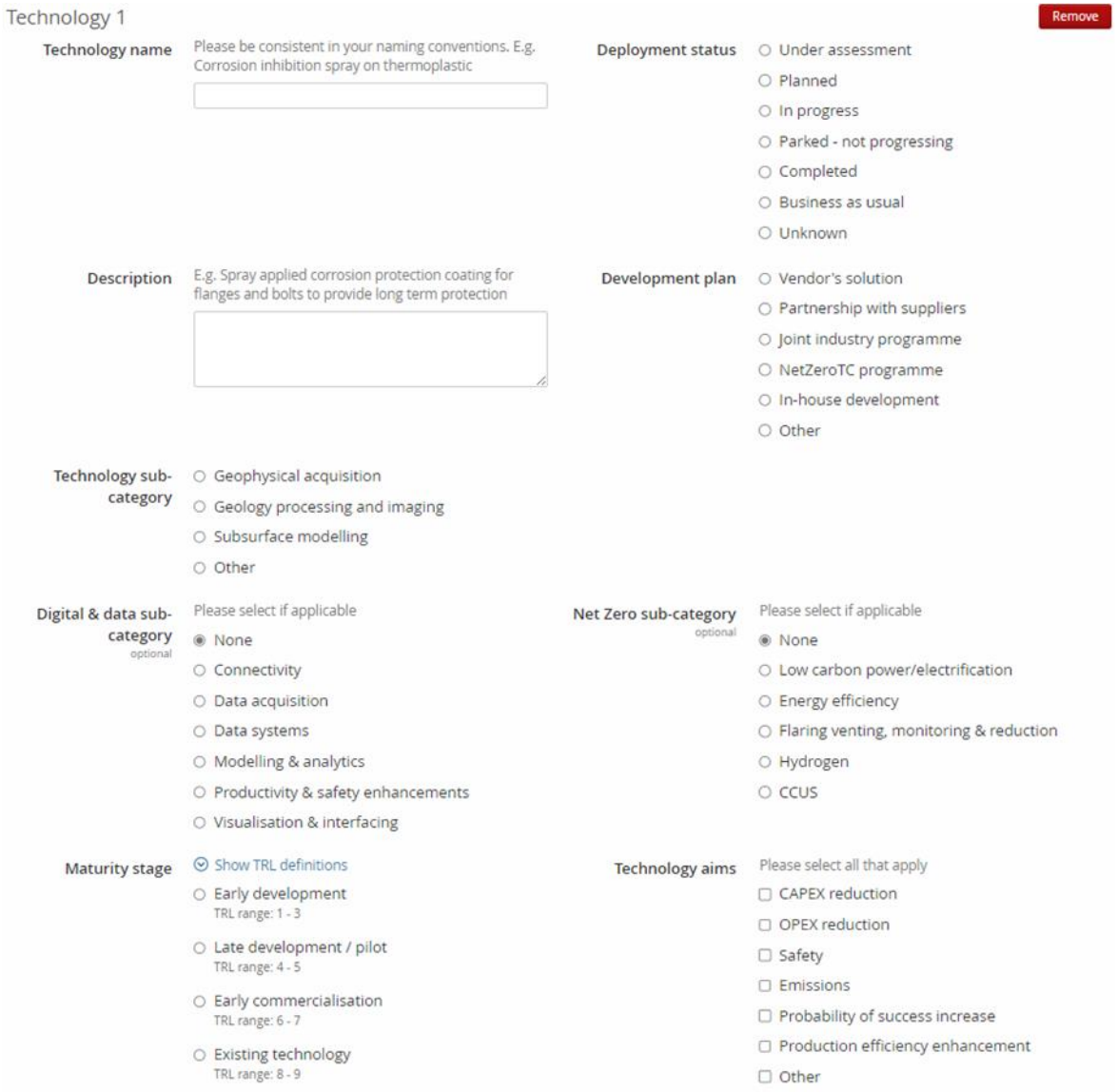
Field Level

Technology Deployment

At the beginning of each Field level Technology section you will now be asked if you have any technologies to report on.

If you don't, and have no technologies copied forward from last year, then you will be taken straight to the submit section page.

A warning will flag if you select no but there are technologies that were added in previous year.



North Sea Transition Authority

Field Level

Add Technology

This section does not replace the Technology Plan.

As part of the Stewardship Expectations, we aim to use this section to demonstrate that technologies are being deployed to optimum effect in maximising the value of economically recoverable petroleum from each field.

Please provide details about technologies that have been deployed in the last 12 months. These technologies should also feature in the Technology Plan along side previous deployment of technologies and emerging technologies.

We want to gather data on where technologies are deployed, therefore if a technology is deployed over several fields, please add individually to each field.

If you have no technology deployments to report in this domain, please continue to the next domain.

Technologies added this year will auto populate into the following years survey.

Please refer to the Stewardship Expectation Number 8 (SE08) and the UKSS section guides for guidance on this section.

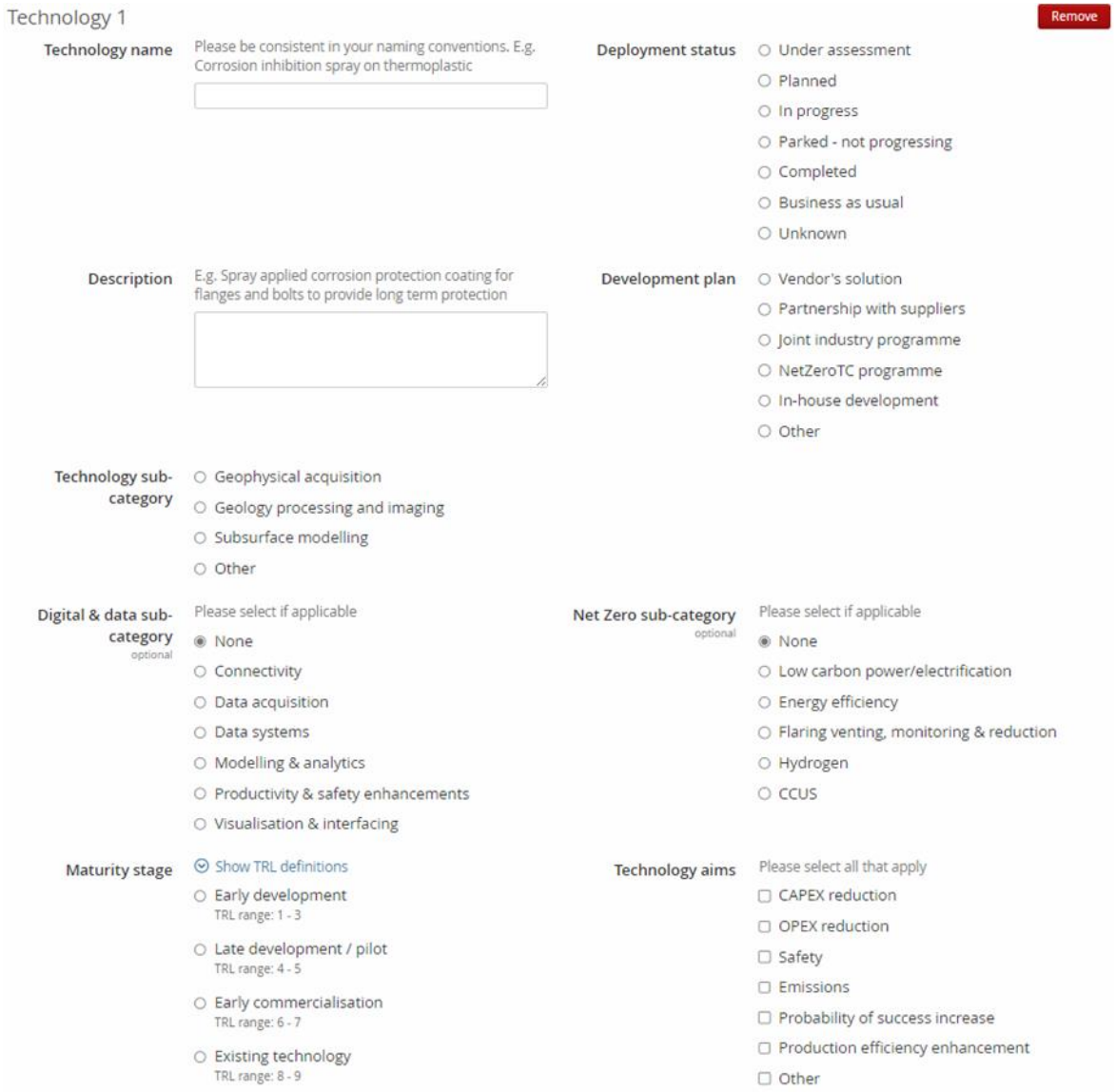
If the technology is more relevant to a Licence level, please include this information within the Operator Level Technology Section.

You will not be able to edit the Technology name and Description from technologies copied from previous surveys.

Please note in the general comments box if you use a different TRL scales and what this scale is.

Field Level

Add Technology



North Sea Transition Authority

Maturity Stage

- TRL 1 - Basic principles observed
- TRL 2 - Technology concept formulated
- TRL 3 - Experimental proof of concept
- TRL 4 - Technology validated in lab
- TRL 5 - Technology validated in relevant environment
- TRL 6 - Technology demonstrated in relevant environment
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- TRL 8 - System complete and qualified
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Deployment Status

- Under Assessment - The technology has not yet been planned to be deployed but is being assessed at this time.
- Planned - Technology is available and is intended for deployment at a future date.
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- Unknown - Technology does not fit with the above options (operator to describe).

Development Plan

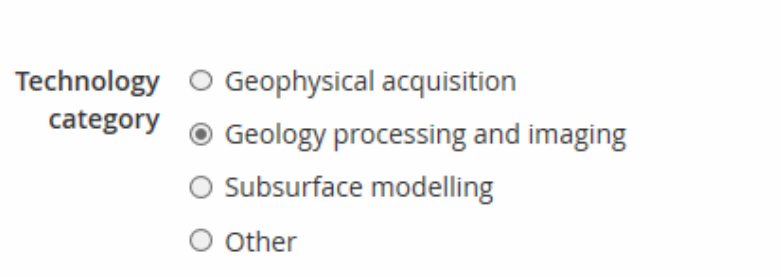
- Vendor's solution - Technology developed by supply chain.
- Partnership with suppliers - Technology developed in collaboration with supply chain.
- Joint industry programme - Technology developed in collaboration with other operators/institutions/supply chain.
- OGTC/NetZeroTC programme - Technology developed in collaboration with supply chain but with NetZeroTC funding.
- In-house development - Technology developed by operator.
- Other - Does not fit in above options (operator to describe).

For each domain, the questions asked are the same. Excluding the options for *'Technology Category'* see next page.

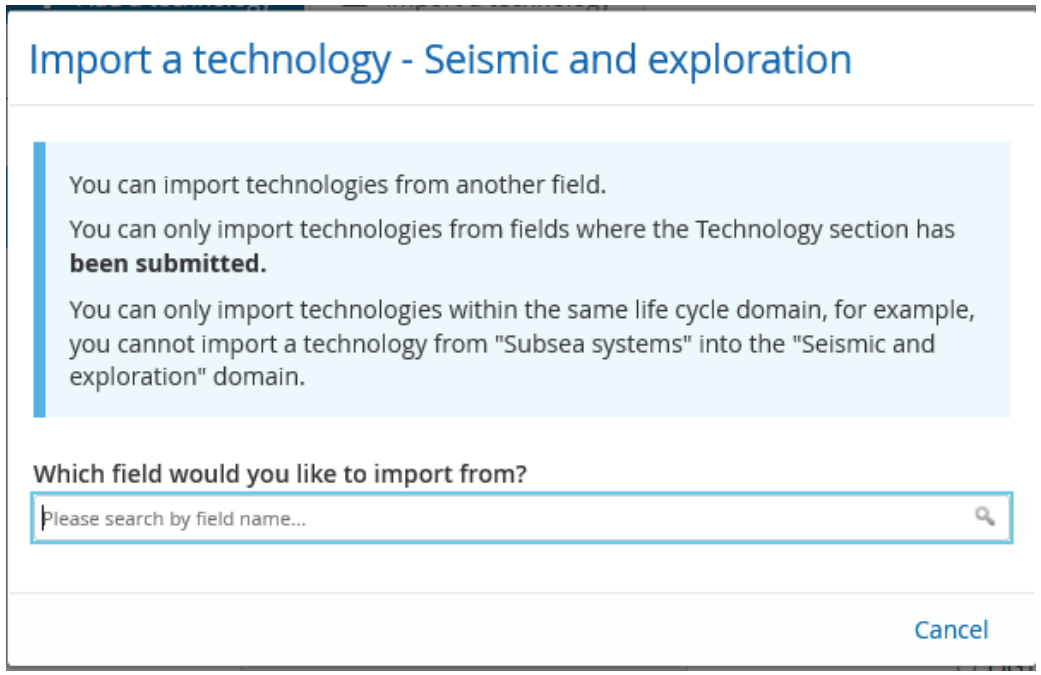
Field Level

Technology category

- Seismic and exploration
- Well drilling and completions
- Subsea systems
- Installations and topsides
- Reservoir and well management
- Facilities management
- Well P&A
- Facilities decommissioning
- General comments



Domain	
Seismic and exploration	Geophysical acquisition; Geology processing and imaging; Subsurface modelling; Other
Well drilling and completions	Well design and planning; High-angle and ERD; Drilling equipment; Drilling, casing and cementing operations; MWD, LWD and geosteering; Well equipment; Multilaterals; Completions and artificial lift; Stimulation; Other
Subsea systems	Subsea concept; Pipelines, risers, jumpers and connections; installations and construction; Manifolds, umbilicals and control systems; Power generation and hydraulic storage; Metering, flow assurance and chemicals; Processing, boosting and storage; Metering, flow assurance and chemicals; Processing, boosting and storage; Inspection and intervention systems; Other
Installations and topsides	Onshore terminals; Manned offshore platforms; Unmanned offshore platforms; Construction and installation; FPSOs and FSOs; Production and offloading buoys; Fluid separation, treatment and compression; Metering and monitoring; Control systems and automation; Fluid injection and reinjection; Power and utilities; Other
Reservoir and well management	Surveillance and inspection; Liquid loading and water production; Waxing, hydrates and scaling solutions; Sand and solids management; Intervention equipment; Well integrity repairs; Improved and enhanced recovery; Other
Facilities management	Maintenance and operations; Equipment monitoring and reliability; Integrity monitoring and inspections; Facility integrity repairs; Other
Well P&A	Data and planning; Well inspection and cement condition; Intervention equipment; Casing section removal; Conductor removal; Barriers, placement and verification; Other
Facilities decommissioning	Survey and planning; Data management; Site inspection and monitoring; Waste management and recycling; Late life management and equipment readiness; Preparation and removal; Cleaning and isolation; Other



Field Level

Seismic and exploration

You can import technologies from another field.

You can only import technologies from fields where the Technology section has been submitted.

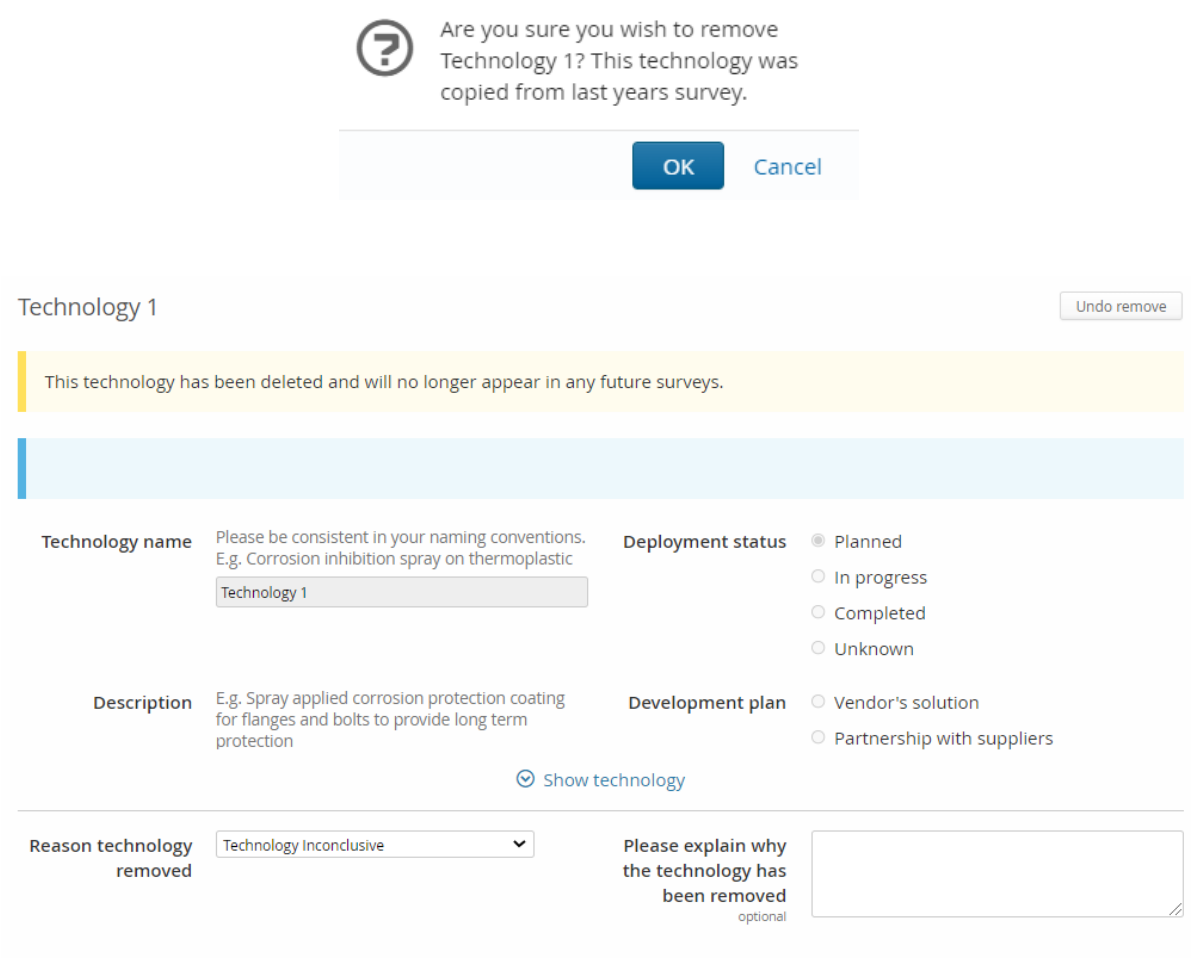
You can only import technologies within the same life cycle domain, for example, you cannot import a technology from "Subsea systems" into the "Seismic and exploration" domain.

Please add technologies to all fields that apply. If the same technology is deployer over multiple fields, please ensure the Field name is consistent. You can use the Import a technology button to achieve this.

Once a technology has been added to a field and the **section has been submitted,** you can copy this Technology to another with the 'Import a technology' button.

If the technology has been imported from another section, the Name, Description and Category cannot be edited.

Please note that updates to the source technology will not be reflected if the technology has been imported. You must remove and re-import if the source technology (name, description, category) has changed.



Field Level

Remove Technology

You can remove a technology by selecting the Remove button.

If the technology was added during the current survey year, the technology will just be removed.

If the technology was added during the previous survey and copied forward, you will be asked to provide reasons why you are removing the technology. The choices are:

- Technology inconclusive
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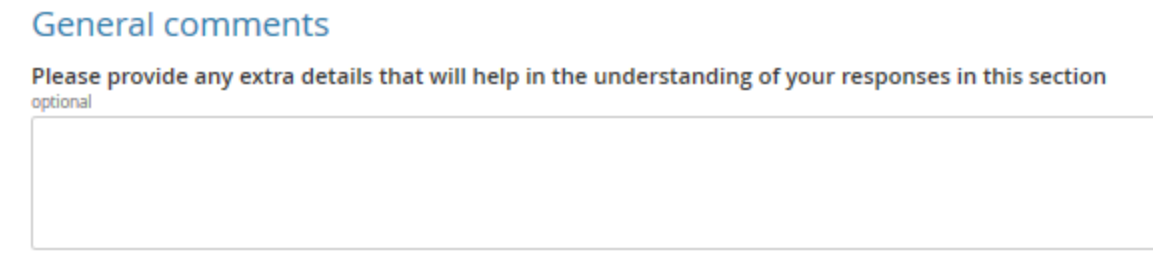

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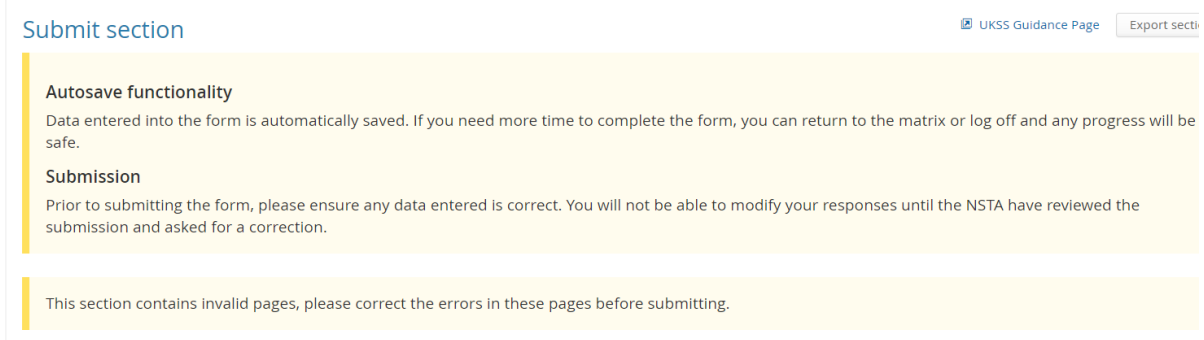

Submit Section

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The section can be exported either via spreadsheet or PDF at any time during the survey live period.

Checklist

Below are the some of the detailed QC steps that each section will go through. If you think your data will not pass these checks, please add as much information in the general comments section as possible to help us understand why.

Technology

- We confirm that the requested spend and budget data has been provided, with any omissions checked for a stated reason.
- We confirm that a Technology Plan submission has been attached.
- We confirm that contact details for a single point of contact for the Technology Plan has been provided.
- We review the Technology Plan submission to ensure its content matches against our expectations as described in the SE08 Implementation Guide.

Technology Deployment

- We can confirm that each operator has added at least 1 technology and that it correlates with the Breakdown Category spend.