



Assessing likely affects and formulating mitigation measures

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Purpose of these steps

- Assessment of likely effects:
 - To identify and evaluate risks, opportunities and/or likely impacts related to the strategic document
 - To evaluate alternatives
 - To summarize how implementing of the strategic document will affect baseline trends
- Mitigation measures: To develop measures to avoid, minimise or compensate likely adverse impacts and to maximise likely positive affects (enhancement)
- Optimally, outputs (i.e. mitigation measures) should be integrated in the document assessed

Assessing likely effects

- Two levels
 - Policy analysis: Evaluation of synergies or conflicts between objectives and priorities of the strategic document and environmental objectives or priorities
 - Analysis of effects: Assessment of effects of the specific development proposals included in the strategic document on the key environmental issues identified in scoping

Policy analysis – example

- Energy policy can address both
 - Energy production (fossil x alternative sources)
 - Energy consumption
- However, often strategic planning on energy emphasises production
- SEA initial policy analysis may recommend also to include priorities regarding energy efficiency, and/or to coordinate alternative energy development with overall energy production goals etc.

Case example: SEA of Enterprise and Innovations Programme Czech Republic

Following initial policy analysis, SEA raised following proposals:

- To include the analysis of linkages between industry/enterprise and the environment/public health, as a necessary source for an objective formulation of the programme's objectives and priority axes in areas concerning the environment.
- To pay attention to energy management and renewable sources utilization as the basic factors of the future enterprise development.
- To add the issue of potential REACH impacts on industrial sectors producing or using chemical substances.

Case example: SEA of Enterprise and Innovations Programme Czech Republic

SEA proposed

- Enhancement of the programme's analytical part regarding linkages between environment and industrial development
- To include specific priority axis, focusing on environmental issues (reducing energy demands, wastes, eco-efficient innovations etc.).
- To include into specific objectives the research and development of eco-technologies, support to eco-efficient innovations, eco-design and cleaner production (especially for SMEs).

Case example: SEA for Krasna Hora Municipal Spatial Plan, Czech Republic

Amendments of existing plan

- Aim is to “examine and modify current functions of certain localities and to identify new areas for urbanization”
- Purpose is to “define new localities for building, for additional service functions in municipality, and other areas for small businesses and manufactures, which will provide new working places in the area. Important is also recreational function”.
- Altogether 11 localities proposed to be modified (i.e. to change their function)

Case example: SEA for Krasna Hora Municipal Spatial Plan, Czech Republic

Mitigation measures proposed by SEA:

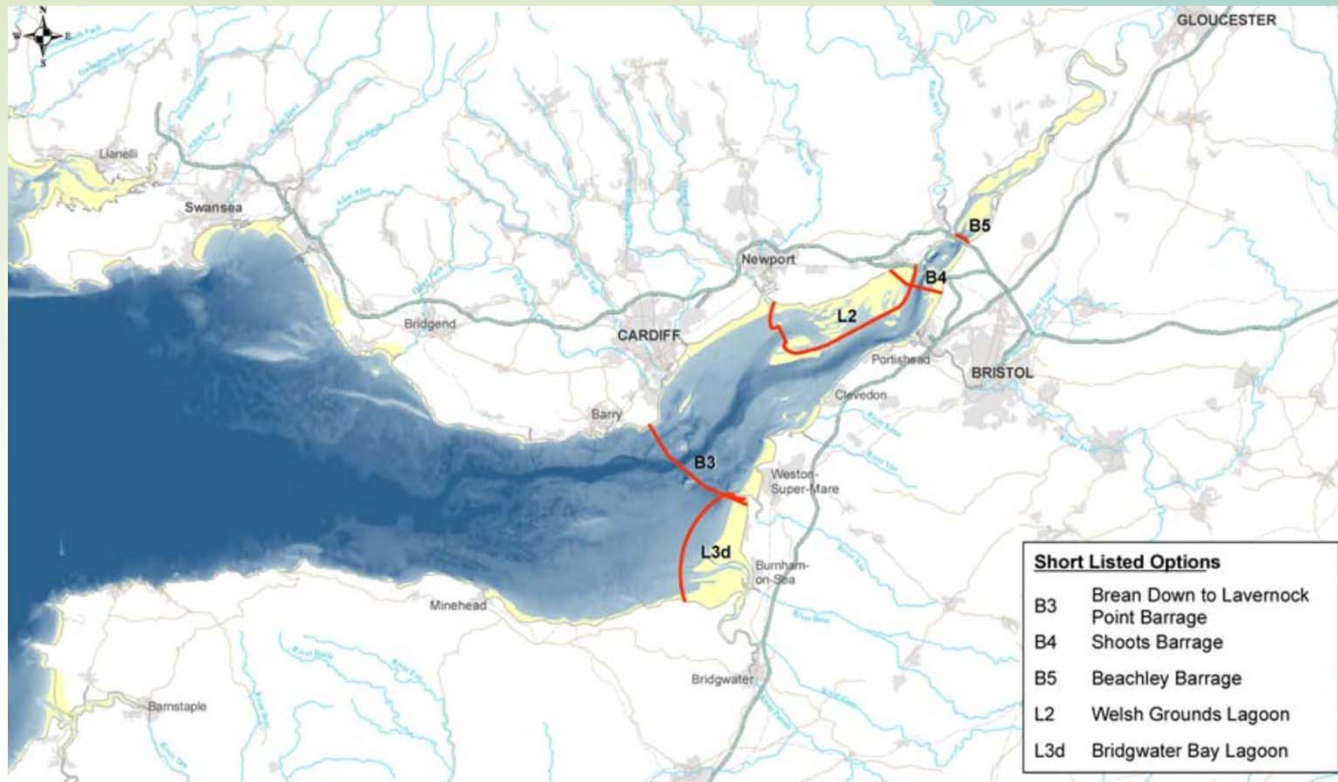
- To exclude of 1 location from the plan
- To modify 3 locations (area reduction, different land-use)
- To modify projects proposed for implementation on selected locations
- To follow conditions for implementation (formulated by SEA)

Case example: SEA for Krasna Hora Municipal Spatial Plan, Czech Republic

Conditions for implementation

- Due to close location to inhabited area, its necessary to conduct detail noise and emission study before the project implementation. Study has to include also assessment of potential cumulative impacts with already existing agriculture production.
- The most noisy parts of the manufacture place as far from the inhabited area as possible
- The separate family houses from the manufacture by “green belt”
- To save trees along the road
- To solve waste water and rain water management before initiation of development of the area

Case Example: SEA for Severn Estuary Tidal Barrage, Engl & Wales



| Short Listed Options | |
|----------------------|---------------------------------------|
| B3 | Brean Down to Lavernock Point Barrage |
| B4 | Shoots Barrage |
| B5 | Beachley Barrage |
| L2 | Welsh Grounds Lagoon |
| L3d | Bridgwater Bay Lagoon |

| | | | | |
|---|--|---|---|---|
| <p>Rev Date Description</p> <p>NOTES © British Crown and SeaZone Solutions Limited. All rights reserved. Product licence No. 082009.005</p> | <p>LEGEND</p> <p>— Scheme Alignments July 2009</p> <p>Background</p> <p>Motorway Foreshore</p> <p>Primary Road Urban Area</p> <p>Watercourse</p> <p><small>THIS DRAWING WAS PRODUCED USING ARGIS AND SHOULD ON NO ACCOUNT BE AMENDED BY HAND</small></p> | <p>PB RV</p> <p>Parsons Brinckerhoff in association with Black & Veatch</p> <p>Parsons Brinckerhoff Queen Victoria House, Redland 168, Bristol, United Kingdom, BS6 6LS Tel 44-(0)117 9330000 Fax 44-(0)117 9339253</p> | <p>DEPARTMENT OF ENERGY & CLIMATE CHANGE</p> <p>SEVERN TIDAL POWER</p> <p>TITLE Severn Tidal Power SEA - Alternative options</p> | <p>DATE 03/02/10 SCALE 1:600,000 A4 GIS REF 121320100108208800</p> <p>DRAWING NUMBER STP-ER-0011</p> <p>©Copyright Parsons Brinckerhoff</p> |
|---|--|---|---|---|

Case Example: SEA for Severn Estuary Tidal Barrage, Engl & Wales

Table 5.9 Predicted changes in waterbird numbers resulting from changes to intertidal area (using Habitat-Association and Individual-Based Models)

| Receptor | B3: Cardiff to Weston Barrage (% change) | | | B4: Shoots Barrage (% change) | | | B5: Beachley Barrage (% change) | | | L2: Welsh Grounds Lagoon (% change) | | | L3d: Bridgwater Bay Lagoon (% change) | | |
|--|--|-----|------------------|-------------------------------|-----|------------------|---------------------------------|-----|------------------|-------------------------------------|-----|------------------|---------------------------------------|-----|------------------|
| | HAM | IBM | Sig ¹ | HAM | IBM | Sig ¹ | HAM | IBM | Sig ¹ | HAM | IBM | Sig ¹ | HAM | IBM | Sig ¹ |
| Mute Swan | -42 ² | - | | -7 | - | | -13 | - | | -26 | - | | -7 | - | |
| Shelduck | -22 | - | Y | -15 | - | Y | -11 | - | Y | -31 | - | Y | -2 | - | |
| Wigeon | -49 ² | - | Y | -20 | - | Y | -20 | - | Y | -35 | - | Y | -3 | - | |
| Gadwall | -20 ² | - | | -2 | - | | -17 | - | | -10 | - | | -17 | - | |
| Teal | -44 ² | - | Y | -23 | - | Y | -24 | - | Y | -31 | - | | -8 | - | |
| Mallard | -41 ² | - | Y | -27 | - | Y | -27 | - | Y | -30 | - | Y | -11 | - | |
| Shoveler | -49 ² | - | Y | 11 | - | Y | 6 | - | | -29 | - | | 3 | - | |
| Pochard | -25 ² | - | Y | -21 | - | Y | -29 | - | Y | -17 | - | | -18 | - | |
| Tufted Duck | -33 ² | - | Y | -11 | - | Y | -19 | - | Y | -21 | - | | -13 | - | |
| Cormorant | -49 ² | - | | -19 | - | | -19 | - | | -34 | - | | -3 | - | |
| Little Egret | -49 ² | - | Y | 13 | - | Y | 8 | - | | -29 | - | Y | 4 | - | |
| Ringed Plover | -49 ² | -6 | Y | -21 | -5 | Y | -21 | -4 | Y | -35 | -4 | Y | -4 | -6 | |
| Golden Plover | -49 ² | -19 | Y | -18 | -15 | Y | -19 | -15 | Y | -34 | -1 | | -3 | -16 | Y |
| Grey Plover | -76 ² | -17 | Y | -40 | -12 | | -37 | -12 | | -44 | -1 | Y | -14 | -17 | Y |
| Lapwing | -48 ² | -20 | Y | -23 | -14 | Y | -22 | -14 | Y | -35 | -4 | | -5 | -18 | Y |
| Knot | -47 ² | -30 | Y | -2 | -9 | | 7 | -8 | | -39 | -8 | | -4 | -8 | |
| Dunlin | -45 | -5 | Y | -25 | -3 | Y | -20 | -3 | | -34 | -3 | Y | -10 | -5 | Y |
| Snipe | -49 ² | -21 | Y | -18 | -4 | | -18 | -3 | | -34 | -9 | | -2 | -14 | |
| Black-tailed Godwit | 59 | -1 | Y | 40 | -11 | | 39 | -4 | | -23 | 0 | Y | 37 | -5 | Y |
| Curlew | -48 ² | - | Y | -24 | - | Y | -22 | - | Y | -35 | - | Y | -5 | - | |
| Greenshank | -49 ² | - | Y | -22 | - | Y | -21 | - | Y | -35 | - | Y | -4 | - | |
| Redshank | -48 ² | -21 | Y | -24 | -8 | Y | -23 | -4 | | -35 | -11 | Y | -5 | -12 | Y |
| Turnstone | -48 ² | -21 | Y | -23 | -9 | | -22 | -4 | | -35 | -12 | | -5 | -14 | |
| No. of modelled species significantly affected by changes to intertidal area | 20 (-) | | | 13 (-) 2 (+) | | | 11 (-) | | | 11 (-) | | | 6 (-) | | |

Case Example: SEA for Severn Estuary Tidal Barrage, Engl & Wales

| Receptor | Compensation needs identified (under the Habitats Directive) | Potential compensation measure (C= conditional) |
|---------------------------------|---|--|
| Migratory birds | Compensate for the effects of loss of habitat within Severn Estuary on SPA bird populations | Managed re-alignment to create saltmarsh adjoining the Severn Estuary (C) |
| | Compensate for the effects of loss of habitat within Severn Estuary on SPA bird populations | Managed re-alignment to create saltmarsh and mudflat at a distance from the Severn Estuary (C) |
| | Compensate for the effects of loss of habitat within Severn Estuary on SPA bird populations | Creation of freshwater wetland habitat close to Severn Estuary |
| Atlantic saltmeadow | Compensating for loss of extent of SAC habitat | Managed re-alignment adjoining the Severn Estuary |
| | Compensating for loss of extent of SAC habitat | Managed re-alignment at a distance the Severn Estuary (C) |
| Intertidal mudflat and sandflat | Compensate for loss of extent of SAC habitat | Managed realignment at distance from the Severn Estuary (C) |
| Sabellaria reef | Compensation for loss or decline of reef | New notification (C) |
| Allis & Twaite shad | Compensating for population declines in the Severn Estuary and its rivers by increasing populations elsewhere | Translocation/introduction of species to new location (C). |
| Allis & Twaite shad | Offsetting population declines in Severn Estuary and its rivers by increasing populations elsewhere | Stocking in rivers outside the Severn Estuary and its tributaries. (C) |
| Atlantic Salmon | Offsetting population declines in Severn Estuary and its rivers by increasing populations elsewhere | Stocking in rivers outside the Severn Estuary and its tributaries. (C) |

Proposals for compensation for impacts upon areas protected under the Habitats Directive

Case Example: SEA for Severn Estuary Tidal Barrage, Engl & Wales

| 1. Topic | 2. Likely significant adverse effect on environment* | 3. Measure envisaged to prevent or reduce effect (followed by a cross-reference to the measure number used within earlier iterations of the ODR prevent/reduce costings table, where applicable) | 4. Alternative options that this measure applies to | 5. High level cost estimate (£ Value and does it take scheme above £170/MWh) | 6. High level estimate of impact on energy output | 7. Effectiveness of measure | 8. Established practice? | 9. Established method? | 10. Development timeframe (measure must be ready by 2020) | 11. Averse biodiversity effect | 12. Averse effect on society & economy | 13. Included in assessments of residual effects, SEA Objective compliance and option costs? |
|----------------|--|---|--|---|--|---|--------------------------|------------------------|---|--------------------------------|--|---|
| Marine Ecology | Reduction in area of intertidal habitat (including : mudflat, sandflat, saltmarsh , intertidal rock and shingle areas) | <p>M1. Operational management of barrage/lagoon regime adoption of ebb & flood generation as primary mode (1)</p> <p>Change water levels to prevent or reduce effect of tidal range reduction with the potential for 50% less reduction in intertidal area</p> <p>See Marine Ecology topic paper.</p> | <p>Applies to B3 and L2</p> <p>Note that L3d is already assumed to be Ebb & Flood.</p> | <p><i>Note: Costings are not provided anywhere in this document. For project costings see the Options Definition Report (PB 2010)</i></p> | <p>B3 – 5% decrease</p> <p>L2 – 15% increase</p> | <p>(GREEN)</p> <p>Would substantially reduce effects on tidal range; thereby reducing adverse effects on intertidal mudflats and sandflats by:</p> <p>B3 – 40% less L2 – 70% less</p> <p>Also reduces adverse effects upon birds.</p> | (RED) | (AMBER) | (GREEN) | (RED) | (RED) | NO |
| | | <p>M2. Operational management of barrage/lagoon regime: sluice management, - sluicing after the generation period, combined with early commencement of turbine generation, in ebb only mode. (2)</p> <p>Change water levels to prevent or reduce effect of tidal range reduction.</p> <p>See Marine Ecology topic paper.</p> | <p>Applies to B3, B4, B5 & L2</p> <p>(L3d is ebb/flood)</p> | <p>Up to 5% reduction in energy yield for ebb generation schemes.</p> | <p>(GREEN)</p> <p>The use of sluicing after generation, combined with early start of turbine generation, has the potential to reduce intertidal habitat loss for all ebb-only alternative options (based on studies using modern turbines). For B3, this could potentially lead to low water levels being lowered by up to 0.5m for B3, thereby potentially reducing intertidal habitat loss by up to 500ha.</p> | (RED) | (AMBER) | (GREEN) | (AMBER) | (GREEN) | YES – for B3, B4, B5 & L2 | Effective and only minor impacts on energy cost. |

Thank you for your attention!