

## National Grid proposals for new overhead lines from Bramford to Twinstead:

### A: Submission by Dedham Vale Society to Suffolk County Council

#### Executive summary

- 1 All of National Grid (NG) options 1 - 4 are objectionable.
- 2 Partial undergrounding is not adequate. Nor is it on offer.
- 3 There is a valid Option 5: 100% underground and in tunnel.
- 4 There is a valid Option 6: undersea.
- 5 Suppression of Options 5 & 6 means the NG consultation is biased.
- 6 The extra cost of Option 5 or 6 is not disproportionate.
- 7 The objective must be to have Options 5 & 6 properly considered by the IPC.
- 8 Favouring any of Options 1 - 4 ensures only that option will be considered.
- 9 Only rejecting all of Options 1 - 4 ensures proper consideration of Options 5 & 6.

#### Introduction:

##### The Dedham Vale Society

The Dedham Vale Society (DVS) exists to protect the peace and tranquillity of the Area of Outstanding Natural Beauty (AONB), known to all as Constable Country. The Dedham Vale stretches through undulating fields and along the water meadows of the River Stour in countryside famous for its great wool churches and picturesque villages like Flatford and Stoke by Nayland.

For seventy years the Society has worked to resist the excesses of developers, the utilities and individuals who would seek to damage the fragile landscape either wilfully, perhaps through ignorance, or just sheer opportunism.

It all began in 1938 when a proposal was made to demolish the coaching-arch at the Sun Inn in Dedham High Street to enable vehicles to have easier access to the car-park at the rear. Opposition was both vehement and widespread and the proposal was subsequently withdrawn. But the lesson had been learned and people realised that the heritage of the Dedham Vale and its villages needed protection and the Society came into being.

The Society's influence has been wide and many campaigns have been fought with much success. Bodies such as the water and electricity-generating companies, building-developers and, most recently, the Civil Aviation Authority have been persuaded – if necessary by legal action - that their proposals have not been in the interest of this tiny and fragile AONB.

##### Extension of the AONB

Since the introduction of the AONB forty years ago, DVS has pressed for its extension up the Stour valley, to Bures and Lamarsh (“Gainsborough Country”) and ideally beyond. This has very recently become a real possibility, following a meeting with the Chief Executive of Natural England, the government body which decides it. At the Dedham Vale AONB & Stour Valley Project Partnership meeting of 10th November a motion was passed *That the Partnership issue a statement of intent to Natural England seeking an extension of the Dedham Vale AONB boundary, including westward toward Sudbury, and to evaluate and provide a substantive case and detail in support of the extension.*

All of Options 1 - 4 go through the proposed extension. It would come into effect in the same timescale as, or earlier than, any new transmission lines.

## **Responding to the National Grid proposals:**

### **1 All of National Grid options 1 - 4 are objectionable**

DVS takes it to be agreed that the proposed 400 kv pylon lines are severely damaging to the environment of South Suffolk and North Essex.

A strong case can be made against either of the northern options, on the grounds of not introducing pylons where there are now none.

A similarly strong case can be made against either of the southern options, on the grounds of not further violating the AONB and of affecting a greater number of people. The evidence from the Dedham Vale AONB & Stour Valley Project gives a detailed professional analysis of this.

It is invidious to attempt to choose “the least worst”. DVS, despite its core mission being to protect the AONB, has consistently refused to do so. To do so is a zero-sum game for Suffolk and Essex. If any of Options 1 - 4 is built, Suffolk and Essex will lose.

### **2 Partial undergrounding is not adequate. Nor is it on offer**

There are those who argue that we should settle for partial undergrounding, associated with the AONB, and therefore along Option 1 or 2. This

- Is liable to have substantial environmental drawbacks of its own
- Involves substantial costs for limited benefits
- Is not on offer.

#### *Environmental drawbacks*

Undergrounding by trench burial requires a 40-metre-wide swath where tree planting is prohibited. The installations where an underground section converts to an above-ground section are more unsightly than the 400 kv pylons themselves.

#### *Limited benefits*

Undergrounding confined to the existing AONB would leave long sections of pylons visible, and hence detracting, from the AONB.

Undergrounding of all sections visible from the existing and prospective AONB would cover about half the distance from Bramford to Twinstead. If this was considered potentially justifiable, 100% undergrounding in tunnel - see Option 5 below - is certainly potentially justifiable.

#### *Not on offer*

NG offer only the 100% above-ground routes. The only hints dropped by NG are for undergrounding by trench burial in the existing AONB. Even that is not on offer: any extent of undergrounding is a departure from the consultation exercise.

### **3 There is a valid Option 5: 100% underground and in tunnel**

The only acceptable new link between Bramford and Twinstead would be

- 100% underground
- In tunnel.

Tunnels have negligible environmental drawbacks. The “end effects” where they reached the surface would be confined to the existing installations at Bramford and Twinstead.

Inherently, this would follow a direct route, being not subject to any of the surface constraints affecting Options 1 - 4 or undergrounding by trench burial.

Hence, it does not correspond to any of Options 1 - 4. It is Option 5.

It would cost more than Options 1 - 4, but the question is whether the extra cost is disproportionate, given the benefits it offers.

### ***The value of phasing***

The generating capacity, for which enhanced transmission will be required, comes in over time. Upgrading the cables on the existing pylons suffices until Sizewell C, which is after 2016 in two phases. Later still, and also no doubt phased, are the Round 3 wind farms.

The capacity increments are not only phased, but their timing is, inevitably, highly uncertain.

There are substantial economic advantages to being able to phase the new transmission capacity with the corresponding generating capacity. Expenditure is postponed, which has a quantifiable economic value. Premature or abortive expenditure is avoided. Advantage can be taken of any advances in technology.

More than one tunnel would be required for all the new capacity envisaged. So initially, only one would be built - when the timing of Sizewell C is known - with the second being held back until the wind farm developments are firm.

### **4 There is a valid Option 6: undersea**

Off-shore wind farms require long distance high-voltage direct current (HVDC) undersea transmission: first to get the electricity to shore; second to enable international supply and demand matching to take account of the intermittent nature of wind power and the time variations of energy demand. This why HVDC links exist, are being constructed or are planned between England and France, Ireland, Holland, Scotland and Norway.

The other component of the new generating capacity that necessitates investment in transmission is nuclear, all of which is on the coast. It is plausible that an HVDC undersea link taking North Sea wind farm and Sizewell (and Bradwell) power to London makes good sense when considered as part of the emerging Europe-wide electricity system. This is Option 6.

Even if Option 6 costs more than Options 1 - 4, the question is whether the extra cost is disproportionate, given the environmental benefits.

### **5 Suppression of Options 5 & 6 means the NG consultation is biased**

Options 1 - 4 are very similar. The material differences between them, in construction costs and environmental detriment, are hard to detect. Options 5 and 6 are clearly different from them, in construction costs and environmental detriment, and in terms of ability to phase investment (Option 5) or play a part in a much wider picture (Option 6). They offer real choice. Consultation which excludes them, excludes real choice.

### **6 The extra cost of Option 5 &/or 6 is not disproportionate**

The question to be addressed with any variation from Options 1 - 4 is whether the extra benefits they offer exceed any extra cost.

This cannot be decided by ratios of cost ("undergrounding costs 12 - 17 times pylons") which take no account of benefits. Nor can it be decided by absolute differences in cost ("£500 - 700 million more") which also take no account of benefits. Appealing to such criteria implies environmental factors are negligible.

Benefits accrue over the whole life of the installation - which is very long - and so are naturally expressed as a figure per year. So the extra cost of an environment-friendly option needs to be expressed as an amount per year.

The attached paper calculates how much Option 5 would cost. It uses NG's costs, and takes no credit for the economic benefits of being able to phase construction. It is expressed in terms of the typical British household. This is appropriate, since

- In practice the cost would be recovered through NG's charges and hence spread throughout the system;
- The benefits accrue to a wide constituency, not just those in the area.

The amount, £1 per year per typical household, direct and indirect costs, is modest.

The paper also indicates the cost, on the same basis, of applying an Option 5 approach to protected landscapes UK-wide. This addresses the argument that Bramford - Twinstead undergrounding does not benefit the whole UK population uniformly. Logically, the cost is higher - but still modest - and the benefits are correspondingly also higher.

There is a further argument that the costs are proportionate, and the distribution of costs and benefits of rural undergrounding would be fair. Undergrounding of electricity transmission is routine in conurbations. The alternative is not even considered. The two case studies on NG's website illustrate this, both being in London (and by tunnel).

We in rural areas are already paying for undergrounding in towns.

#### **7 The objective must be to have Options 5 & 6 properly considered by the IPC**

Options 5 & 6 need to be considered equally with Options 1 - 4. NG will not do this. Therefore it has to be by the Infrastructure Planning Commission (IPC).

The IPC is the only forum with clout in this matter, whether on the particular issue of Bramford - Twinstead or the wider issues.

We must create a situation whereby the IPC are obliged to consider Options 5 & 6 fairly.

#### **8 Favouring any of Options 1 - 4 ensures only that option will be considered**

If the statutory consultees endorse one of Options 1 - 4, even with provisos about partial undergrounding, NG will apply to the IPC for that option. The debate will be confined to mitigations to that option, with the starting point and default position being zero undergrounding. There will be no chance of serious consideration of Options 5 & 6.

#### **9 Only rejecting all of Options 1 - 4 ensures proper consideration of Options 5 & 6**

The IPC is obliged to consider the views of the statutory consultees. If, but only if, the statutory consultees reject all of Options 1 - 4 and press for proper consideration of Options 5 & 6, will there be proper consideration of Options 5 & 6.

DVS therefore asks Suffolk County Council to replace (g) in the proposed response in the officers' paper on this item by

*(g) considers that, if the Infrastructure Planning Commission ultimately accepts the case for transmission capacity in this area, it should be placed wholly underground in a tunnel or tunnels.*

## **Attachment:**

### **How much would it add to electricity bills to put pylons underground?**

Transmission companies are allowed 4.4% after-tax return on capital in real terms by OFGEM<sup>1</sup>. This implies a before-tax return of about 4.8%<sup>2</sup>.

Their transmission lines will have a life of 50 years or so, so an amortisation rate of 2%.

So the additional capital cost of undergrounding represents an extra annual cost to the consumer of  $4.8\% + 2.0\% = 6.8\%$  per year of that additional capital cost<sup>3</sup>.

Assume 100% undergrounding Bramford - Twinstead in tunnel<sup>4</sup> costs £600 million more than pylons (half way between National Grid's 12 - 17 times the cost of pylons).

6.8% of £600 million is £41 million per year.

National Grid's income from electricity transmission in Britain is about £2.6 billion per year<sup>5</sup>. £41 million is 1.6% of £2.6 billion.

So recovering £41 million per year means an increase in their charges to the electricity consumer of 1.6%.

The typical annual household electricity bill is now £500 per year<sup>6</sup>. Transmission costs represent 3% of this<sup>7</sup>, or £15 per year. 1.6% of £15 is 24p.

So 100% undergrounding of the new Bramford - Twinstead link would add to the typical household electricity bill 24p per year<sup>8</sup>, or 2p per month. There is also an indirect effect, via the electricity used in other goods and services, about three times the direct effect. So the total effect is about £1 per year.

Bramford - Twinstead is about 30 kilometres. The total length of existing high-voltage transmission in National Parks is about 180 km<sup>9</sup> ie 6 times the Bramford - Twinstead distance. 6 times £600 million is £3.6 billion. If all existing high-voltage transmission in National Parks was put underground over 12 years, the typical household would pay, directly and indirectly, an extra 50p per year, each year, ie an extra £6 per year by the end of the 12 year period.

Individuals are free to judge whether these figures represent a bargain or the opposite.

What is crucial is that this approach is the only valid way to make a judgement: "What will it cost me? What will I get for the money?"

The National Grid's "It costs 12 to 17 times as much" seems cogent at first glance, but is utterly fallacious as an argument for rejection.

Consider the following: you have the choice between two bottles of wine. One costs £2.50, the other £12.50. Which is the better buy? No-brainer, cry National Grid - it has to be the £2.50 one. But don't we need to know something of the contents to make a decision?

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<sup>1</sup> <http://www.ofgem.gov.uk/NETWORKS/TRANS/PRICECONTROLS/TPCR4/Pages/TPCR4.aspx>

<sup>2</sup> On the basis of RAV gearing of 58% - NGET Annual Report & Accounts, page 19

<sup>3</sup> Strictly, less on average over the 50 years, as amortisation reduces the capital outstanding.

<sup>4</sup> This avoids the additional maintenance costs of trench burial

<sup>5</sup> NGET Annual Report & Accounts, page 17

<sup>6</sup> OFGEM:

<http://www.ofgem.gov.uk/Markets/RetMkts/ensuppro/Documents1/Quarterly%20Wholesale%20Retail%20Price%20Report%20November%202009.pdf>

<sup>7</sup> OFGEM Factsheet 81,

<http://www.ofgem.gov.uk/Media/FactSheets/Documents1/updatedhouseholdbills09.pdf>

<sup>8</sup> Which would be indexed to inflation to maintain its value in real terms

<sup>9</sup> CPRE Press release of 5 November 2009: Note 5, figures from National Grid

**B: Supplementary submission to SCC, 1 February 2010**

This is a supplementary submission on behalf of the Dedham Vale Society in the light of arguments put forward to support the recommendation in the SCC officers' paper to endorse Corridor 2b. The arguments put forward are in italics below, followed in each case by our rebuttal.

*"If SCC do not support one of National Grid's four options, its comments will be ignored".*

No: the Planning Act 2008, which governs the whole process, precludes ignoring SCC comments. See Attachment 1 for details.

*"Corridor 2 is clearly less damaging than Corridors 3 or 4. Only by neglecting the significance of the AONB status of Corridors 1 & 2. It would be short-sighted to do this. AONB status can be a major protection in other contexts. In particular, most of Suffolk's coast is in an AONB. It could well need all the protection it can get, whether from nuclear power, wind power or harbour developments. To be dismissive about AONB status is to give away the county's birthright.*

*"If we lose on the "No new pylons" point, we want the maximum undergrounding".*

Precisely. We shall then be in a negotiating position - not formally, but in practice. In negotiation, one's opening offer is not where one wants or expects to end. If one wants and expects 50, and the other party has offered zero, one asks for 100. "Aim for the stars and hit the moon." So it is irrational to offer 2b with partial undergrounding at this stage.

*"It is absurdly greedy to demand 100% undergrounding in tunnel." No: If it is reasonable to ask for partial undergrounding, it is reasonable to ask for 100% undergrounding.*

The reason is, simply, that undergrounding gets cheaper, per kilometre, the more you do. The capital costs of the transition from above-ground to underground are appreciable (eg shafts if it is in tunnel), and they are fixed, whether the undergrounding is for 3 kilometres or 30. The longer the undergrounding, the cheaper per kilometre.

So, using National Grid figures for the costs of pylons and in-tunnel undergrounding, and on a reasonable assumption on the cost of above-ground to underground transition, it costs £31 million per kilometre to underground just in the existing AONB, £23 million per kilometre to do so for the length visible from existing and prospective AONB, and £22 million per kilometre to do so for 100% Bramford - Twinstead. The relativities do not change if the cost assumption is changed.

As to justifying the costs of undergrounding, see attachment to our earlier submission.

The 100% underground option has other economic and environmental benefits (ability to phase expenditure (by constructing one tunnel at a time, whereas a complete set of pylons has to be built even if only part of the capacity is needed for the first five years), and minimising environmental effects of the end installations). Attachment 2 documents all this.

**Attachment I to supplementary submission to SCC**

**Planning Act 2008**

The Planning Act 2008, which governs the whole IPC process from pre-application to appeal against decision, says that

"The applicant must, when deciding whether the application that the applicant is actually to make should be in the same terms as the proposed application, have regard to any relevant responses." (section 49(2))

And that

the IPC, in deciding whether the applicant has complied with the pre-application procedure,

"must have regard to—

.....

(b) any adequacy of consultation representation received by it from a local authority consultee" (section 55(4))

And that

the IPC, having accepted an application, must invite every relevant local authority to submit a local impact report (section 60)

And that

in deciding the application the decision-maker must have regard to any local impact report (sections 104 and 105).

So there is no way that National Grid can suppress any SCC response, or require it to be in the terms NG lays down, or inhibit subsequent representation direct to the IPC.

Indeed, to attempt to constrain responses to NG's consultation in that way could well constitute grounds for an "adequacy of consultation representation" as per s.55(4).

**Attachment 2 to supplementary submission to SCC**

**If partial undergrounding is valid, then 100% undergrounding is even more so**

<i>Row</i>		<i>Financial costs of undergrounding</i>	<i>Financial benefits of undergrounding</i>	<i>Environmental benefits of undergrounding</i>	<i>Environmental costs of undergrounding</i>
1	All above ground, Corridor 1 ("base case")	Zero	Zero	Zero	Zero
2	U/G in existing AONB only Relative to base case (Row 2 minus Row 1)	U/G - surface transition x 2 3 km U/G £119 m	Zero	3 km U/G Partial respect for AONB <b>£31 m / km</b>	U/G - surface transition x 2
3	U/G wherever visible from existing or prospective AONB ("50% U/G") Relative to base case (Row 3 minus Row 1)	U/G - surface transition x 2 13 km U/G £314 m	Zero	13 km U/G Full respect for AONB <b>£23 m / km</b>	U/G - surface transition x 2
4	50% U/G Relative to U/G in existing AONB only (Row 3 minus Row 2)	10 km U/G £195 m	Zero	10 km U/G More respect for AONB <b>£21 m / km</b>	Zero
5	100% U/G Relative to base case (Row 5 minus Row 1)	U/G - surface transition x 2 23 km U/G £504 m	Ability to phase investment	26 km U/G Full respect for AONB <b>£22 m / km</b>	U/G - surface transition x 2 but at Bramford sub-station & Twinstead Tee
6	100% U/G Relative to U/G in existing AONB only (Row 5 minus Row 2)	20 km U/G £385 m	Ability to phase investment	26 km U/G More respect for AONB Lesser U/G - surface transition <b>£21 m / km</b>	Zero
7	100% U/G Relative to 50% U/G (Row 5 minus Row 3)	10 km U/G £190 m	Ability to phase investment	13 km U/G Lesser U/G - surface transition <b>£21 m / km</b>	Zero
Costing assumptions: Pylons: £1.5m / km; Tunnels: shafts, other end installations and set-up costs: £5m per end; otherwise as per NG Elstree - St John's Wood case study					

**C: Message to local MPs, 1 February 2010**

**Sir Alan, Mr Yeo, Mr Jenkin**

I write on behalf of the Dedham Vale Society about an aspect of the National Grid proposals for a new Bramford - Twinstead transmission line which involves the national and indeed statutory issues of National Grid's obligations and the procedure to be followed by the Infrastructure Planning Commission.

It has emerged that there are major uncertainties surrounding the need for the additional transmission capacity in East Anglia. As you know, the current National Grid proposals are driven by applications for new electricity generating capacity (1) gas-fired, at Kings Lynn and South Holland; (2) nuclear, at Sizewell; and (3) (prospectively) wind, from the Round 3 offshore wind farms.

(1) can be dealt with, so far as Bramford - Twinstead is concerned, by up-rating the cables on the existing pylons. This provides sufficient capacity until 2016.

One uncertainty concerns the total potential new generating capacity. It appears that if both new stations are built at Sizewell and the full Round 3 wind farms are installed, the proposed new Bramford - Twinstead transmission line would be insufficient. Broadly, two Bramford - Twinstead transmission lines, the existing (once up-rated) and the proposed, together have capacity for 6 GW. The total capacity, gas, nuclear old and new, and wind, totals about 11 GW, roughly half wind, half gas and nuclear. Even discounting wind against gas (generally one doesn't want both simultaneously) this is an excess.

So if this all comes about, are we talking about a third new transmission line? Or transmitting the second tranche of new capacity undersea, and regretting not having done so for the first tranche?

There is uncertainty in the other direction: it is understood that the new capacity at Sizewell might be half that envisaged (one reactor etc. rather than two). If that were to be the case, the proposed new Bramford - Twinstead transmission line would provide considerably more capacity than needed until most of the Round 3 wind farms were on stream. When that will be is, at present, anybody's guess.

Recognising these uncertainties, both on timing and on ultimate level, greatly improves the economics of technologies which can be implemented in small units and with short lead times, as opposed to pylons, where capacity comes in units of 3 GW and the environmental opposition makes for long lead times. Both forms of environmentally-friendly undergrounding, by sea or by tunnel, come in smaller units.

So recognising uncertainty improves the economics of environmentally-friendly technologies for electricity transmission.

One reason why the National Grid proposals do not recognise uncertainty, is because of the procedure NG is obliged to follow. If a potential generator applies for transmission capacity, NG have to provide for it. That is, any application is treated as 100% certain. By contrast, a possible future application can be ignored.

Similarly, the procedure to be followed by the IPC under the Planning Act 2008 obliges it to consider each application on its merits. It appears not to provide for, and may even preclude, considering the uncertainties, economic and technical, which beset all these investments, and alternative options which recognition of uncertainties would suggest.

We suggest that these are general issues, which need to be pursued at national level, and we hope it will be possible for you to look into this.

Because this goes to the adequacy of the present consultation, and casts further doubt on the case for a new above-ground transmission line, I am copying this to local interested parties.