Elaboration on evidence presented at the open floor hearing on the 23rd September 2015

Firstly in relation to **routing options**, it is important to highlight that when the original green/blue/red corridors were presented, 18 respondents selected green as their first preference, 88 selected blue and 32 selected the red corridor. Or put another way, 18 preferred green, and 120 preferred another route - yet SP Manweb selected green. The applicant’s lack of consideration of public opinion is a repeating theme. During one of the issue-specific hearings, SP Manweb justified not relying on public opinion for choosing its preferred route, as this, they said, would have been unreliable as it is influenced heavily by population density. However, it is the blue route which passes the most densely populated areas of Denbigh and Trefnant, yet this route was most preferred. In fact all the reasons SP Manweb state as being central to their decision against the north section of the Blue route were known before stage 1 of the pre-application consultation (namely, Denbigh golf club, Sites of Special Scientific Interest, areas of settlement, Denbigh castle, Scheduled Ancient Monuments, Listed Buildings, Conservation Areas and Welsh Historic Landscapes). It must follow, therefore, that a routing decision had already been made, before public consultation; that is, it was *pre-determined*.

The Hafod route is another example. This was outside the route corridor options (see Figure), and was not consulted on. Key questions in stages 1 and 2 of the pre-application consultation process asked respondents to provide their views on potential routes *within* proposed corridors: Stage 1: “*Specifically* the feedback that we are requesting at this stage of our consultation is on three 132kV broad route corridors from Clocaenog Forest to St Asaph substation – Red, Green, Blue”. The question that followed was: “*Within* the Green/Red/Blue broad route corridor, are there areas that we should try and avoid placing the connection?” (Interim Consultation Report pages 156 and 158). Stage 2: “we are asking for your local knowledge and your views on where the route could be located *within* the preferred route corridor” (Interim Consultation Report page 181). At no point were consultees asked to comment or suggest alternative routes outside these corridors; yet in selecting the Hafod route as their preferred route choice, SP Manweb accepted and placed the highest importance on a route which was outside the scope of stages 1 and 2 of their pre-application consultations.
Secondly, in relation to tourism, and the woefully inadequate tourism survey of SP Manweb. Below is a list of self-catering homes, hotels and guest houses which are directly in the vicinity of the proposed pylon route. It would appear that SP Manweb made no attempt to evaluate the impact on these, of reduced tourism due to the unsightly pylons.

**Self catering**

- Bwthyn Bwlch, Prion
- Y Berllan, Denbigh
- Plas Bach Cottages, Brookhouse
- Bodlonddeb Cottage, Bontuchel
- Cleiriach, Llansannan
- Cefn y Gors, Llanfair Talhaiarn
- Dove Cottage, Llanfair Talhaiarn
- Glandwr, Llanfair Talhaiarn
- Plas yn Llan, Llanfair Talhaiarn
- Summer House, St Asaph
- Fir Tree Lodge, Groesffordd Marli
- Stable Barn, Betws-Yn-Rhos
- Smithy Barn, Betws-Yn-Rhos
- The Coach House, Betws-Yn-Rhos
- Tyddyn Y Fron Bach, Betws-Yn-Rhos
- Tan y Bryn Cottage, Rhyd-y-Foel, nr. Abergele
- Cartref, Cyffylliog
- Segrwyd Mill, Nantglyn
- Cefn Berain Uchaf, Cefn Berain
- Bryn Uchaf, Llannefydd
- Smithy Barn, Peniarth Bach Farm in Betws-Yn-Rhos
- The Little Barn, Peniarth Bach Farm in Betws-Yn-Rhos
- Coach House, Peniarth Bach Farm in Betws-Yn-Rhos
- Stable Barn, Peniarth Bach Farm in Betws-Yn-Rhos
- Little Barn, Peniarth Bach Farm in Betws-Yn-Rhos
- The Granary, Rhewl
- Part Of The Farmhouse, Rhewl
- Richmond Hall, St Asaph
- Bach y Graig Farmhouse, Denbigh
- Lyndale Caravans, Abergele
- Castle View Cottage, Llanrhæadr
- Dyffryn Maelor, Prion
- Clwydian House, Denbigh

**Hotels & Guest houses**

- Tan Yr Onnen Guesthouse, St Asaph
- Talardy Hotel, St Asaph
- White House, St Asaph
- Coed Duon B & B, St Asaph
- Summer House, St Asaph
- Bach y Graig, St Asaph
- The Kinmel Arms, Abergele
- The Kinmel & Kinspa, St George
- Guildhall Tavern Hotel & Restaurant, Denbigh
- Castle House, Denbigh
- Ramblers Retreat, Abergele
- Tre Fardre, Abergele
- Y Berllan, Denbigh
Thirdly, in relation to the **use of single poles**, SP Manweb made it very clear at the issue specific hearing that a “Trident” pole would not be possible. Such technology, they claim, is not within SP Manweb’s capability. However, their evidence seems to contradict previous accounts of how SP Manweb approached the North Wales Wind Farm Connection – see slide 28 of this presentation: [http://www.energynetworks.org/modx/assets/files/news/events/LCNF2011/LCNF%20Conference%20Day%201%20Slides.pdf](http://www.energynetworks.org/modx/assets/files/news/events/LCNF2011/LCNF%20Conference%20Day%201%20Slides.pdf)

This reveals some further information, namely:

1. The cost of connection is quoted at £12m (far less than mentioned in SP Manweb’s planning application)
2. The conference at which these slides were presented was in July 2011, suggesting the Clocaenog-St Asaph route (as opposed to routes to other grid connection points) was pre-determined.
Fourthly, in relation to undergrounding, the Pylon the Pressure Group contest SP Manweb’s position that the benefits to landscape and visual amenity of underground cabling does not clearly outweigh the extra economic, social and environmental impacts. SP Manweb’s detailed assessments are subjective, qualitative and open to interpretation. Impacts identified by local residents are dismissed as being insignificant and of minor consequence. To support overhead lines in preference to underground cabling, SP Manweb assert that the benefits do not justify the incremental cost of undergrounding the whole route, which they claim will cost between £24m and £40m, depending on the assets’ lifetime and the cost per km. The Pylon the Pressure Group’s submission to the Examination Authority, has identified serious flaws and inconsistencies in SP Manweb’s estimates of the incremental cost of undergrounding. Pylon the Pressure Group’s own estimates, which are transparent and based on evidence, suggest a cost closer to £12m to £13m (please refer to Pylon the Pressure’s response to ExA’s First Written Questions, submitted for Deadline 1 of 1 September 2015).¹

The question then becomes one of whether the value of maintaining a pylon-free landscape exceeds this additional cost. To answer this, we conducted a contingent valuation experiment to determine how much households would be willing to pay not to have pylons. During August of this year, we advertised the survey on village notice boards, at local events, supermarkets, Golf club and library, and 187 people responded. On average, and over the claimed 40 year lifetime, respondents were willing to pay £2,969 per household (at net present value). We also asked them how much they would be willing to accept, in compensation, to have pylons. This figure was £9,141 (NPV).

There are over 7500 households within 3 miles of the pylons. Scaling up these figures gives the incremental value of undergrounding at £23m based on respondents’ willingness to pay, or £70m based on compensation. This exceeds the additional cost of undergrounding, confirming that the benefits to landscape and visual amenity of underground cabling clearly does outweigh the extra economic, social and environmental impacts.

Contingent valuation experiment to assess the value of undergrounding

1. This evidence is at the request of the Examination Authority who, at the open hearing, asked for an updated analysis of the Pylon the Pressure’s response to ExA’s First Written Questions, submitted for Deadline 1 of 1 September 2015.

2. Context: The National Policy Statement for Electricity Networks Infrastructure (EN-5) states: “The IPC should [...] only refuse consent for overhead line proposals in favour of an underground [...] line if it is satisfied that the benefits from the non-overhead line alternative will clearly outweigh any extra economic, social and environmental impacts and the technical difficulties are surmountable.”

3. Part of the challenge of assessing the impact of overhead lines, and the benefits of undergrounding is in determining the value of preserving the landscape. One accepted approach for non-market goods, is the contingent valuation (CV) method, which determines peoples’ willingness to pay (WTP), (the maximum amount of money an individual is willing to give up) in order to receive the benefits of undergrounding. The UK Treasury guidance refers to the method as an appropriate tool for eliciting values for public goods and a range of ministries have undertaken studies for measuring non market values for environmental change. Ofgem notes that household WTP for transmission options that improve visual amenity could be ‘captured’ in order to finance schemes such as undergrounding.

4. We are aware of a number of published contingent valuation studies on the visual intrusion from overhead transmission lines. Atkinson et al. (2004) used CV to value changes in the visual impact (but not complete removal) of overhead lines in England and Wales. They estimated both positive and negative WTP to replace existing transmission towers with one of four new designs. Positive WTP was elicited in terms of increased electricity bills to get one of the new designs, and negative WTP was elicited in terms of intended actions with regards to signing a petition and making contributions to a group working to preserve the existing towers.

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(The latter payment vehicle has serious biases since payment is not coercive and the link between payment and the provision of the good is uncertain.)

5. We conducted a contingent valuation experiment to determine the WTP of households who would be affected by the pylon route. Between 8th and 30th August 2015, we advertised (see Figure 1) the survey on village notice boards, at local events (Flint & Denbigh agricultural show), supermarkets, Denbigh Golf club and Denbigh library. The content of the survey is presented in Figure 2. Respondents were unable to progress from one question to the next without a response, but were free to exit the survey at any time. The survey was set up online using Kwiksurveys\(^8\) which allowed for cookies to prevent more than one survey to be completed per IP address, otherwise the survey was completely anonymous.

6. The survey consisted of 4 questions. Care was exercised in presenting the context in a neutral way, indicating the disadvantages of undergrounding – using identical wording as per SP Manweb’s documentations (i.e. impact on sensitive habitats, soils and geology, and damage heritage assets, such as archaeological sites), as well as the visual impact of the pylons (using a photograph of a nearby 132kV line near St George). With the assistance of a map, the first question asked how far away respondents lived from the pylon route. The second question asked about their monthly WTP (per household) for the underground option instead of pylons. Question 3 asked about how much compensation respondents would be willing to accept (WTA) (per household) for pylons instead of undergrounded cables. The final question asked whether respondents owned or rented land which would be affected by the proposed development.

7. Based on previous such studies, we assumed a standard deviation of £10 in respondents’ monthly WTP and aimed for a 5% level of significance in determining the sample mean as being within £2 of the true population mean WTP. The sample size calculation indicated that at least 96 responses were required = \([(1.96 x 10)/2]\)^2. This calculation is based on accepted statistical methods, and is the standard approach for CV experiments.\(^9\)

8. We conducted an analysis on the 30th August 2015, in which 148 responded to the questionnaire; 138 responded to questions 1 and 2; 134 responded to questions 1,2 and 3; and 131 completed all four questions. This formed part of Pylon the Pressure’s response to ExA’s First Written Questions, submitted for Deadline 1 of 1 September 2015.\(^10\)

9. We now present an updated analysis (14th October 2015) to assess whether additional responses have had any impact on the estimated WTP and WTA. This is to challenge SP Manweb’s assertion that “the Examining Authority should give little weight to the conclusions of this study because the sample size of 134 participants is not statistically robust having

\(^{8}\) http://www.kwiksurveys.com


regard to the total number of households within the study area” (SP Manweb’s Comments on Responses to First Written Questions).

10. As of 14\textsuperscript{th} October 2015, 187 responded to the questionnaire; 176 responded to questions 1 and 2; 170 responded to questions 1, 2 and 3; and 167 completed all four questions.

11. Among the 176 respondents, 89 (51%) lived within 2km of the pylon route, 41 (23%) lived between 2km and 5km of the route, 17 (10%) lived between 5km and 10km, and 29 (16%) lived further than 10km.

12. We were mindful of the possibility of ‘protest bids’\textsuperscript{11} – respondents indicating a WTP of zero on the basis that they object to the development and didn’t agree that they should pay any amount for someone else’s development. There were 40 responses which indicated a WTP of zero. In order to reduce bias, we discarded 21 WTP responses which indicated a value of zero, but which expressed a desire to be compensated >£2 per month. We did not include a category of zero compensation, but considered that a respondent indicating zero WTP and willing to be compensated less than £2 a month would not be a ‘protest’ responder. Interestingly, 16 of the 21 who were excluded indicated the highest category (>£50 per month) of compensation, lending support to our assumption for protest bids.

13. Thus the final number of valid WTP responses was 155 (an increase from 122 at the 30\textsuperscript{th} August 2015 analysis), who responded as per the table below. In the base-case analysis, we assumed the mid-point WTP for each category >£0. For the category of >£50, we conservatively assumed £55 per month. The mean WTP was £11.49 per month. The median WTP category is £2 to £5 per month.

<table>
<thead>
<tr>
<th>Willingness to pay (per month)</th>
<th>Number of respondents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing</td>
<td>19 (12%)</td>
</tr>
<tr>
<td>Less than £2</td>
<td>28 (18%)</td>
</tr>
<tr>
<td>£2 to £5</td>
<td>36 (23%)</td>
</tr>
<tr>
<td>£5 to £10</td>
<td>27 (17%)</td>
</tr>
<tr>
<td>£10 to £20</td>
<td>17 (11%)</td>
</tr>
<tr>
<td>£20 to £30</td>
<td>8 (5%)</td>
</tr>
<tr>
<td>£30 to £40</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>£40 to £50</td>
<td>7 (5%)</td>
</tr>
<tr>
<td>More than £50</td>
<td>10 (6%)</td>
</tr>
<tr>
<td>Total</td>
<td>155 (100%)</td>
</tr>
</tbody>
</table>

14. The final number of valid responses for assessment of Willingness to Accept (WTA) compensation was 170, who responded as per the table below. In the base-case analysis, we again assumed the mid-point WTP for each category. For the category of >£50, we conservatively assumed £55 per month. The mean WTA was £35.38 per month. The median WTP category is more than £50 per month.

<table>
<thead>
<tr>
<th>Willingness to accept (per month)</th>
<th>Number of respondents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than £2</td>
<td>32 (19%)</td>
</tr>
<tr>
<td>£2 to £5</td>
<td>7 (4%)</td>
</tr>
<tr>
<td>£5 to £10</td>
<td>9 (5%)</td>
</tr>
<tr>
<td>£10 to £20</td>
<td>9 (5%)</td>
</tr>
<tr>
<td>£20 to £30</td>
<td>7 (4%)</td>
</tr>
<tr>
<td>£30 to £40</td>
<td>7 (4%)</td>
</tr>
<tr>
<td>£40 to £50</td>
<td>11 (6%)</td>
</tr>
<tr>
<td>More than £50</td>
<td>88 (52%)</td>
</tr>
<tr>
<td>Total</td>
<td>170 (100%)</td>
</tr>
</tbody>
</table>

15. To test the validity of responses, we assessed the influence of distance from the pylon route on WTP and WTA, and observed a trend towards a decrease in both values as distance increased up to 10km. Respondents who resided further than 10km from the pylon route yield higher WTP and WTA values – we could speculate that these were visitors to the area, but responder details were not captured.

<table>
<thead>
<tr>
<th>Distance from route</th>
<th>Mean WTP</th>
<th>Mean WTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2km</td>
<td>£15.62</td>
<td>£38.98</td>
</tr>
<tr>
<td>2km to 5km</td>
<td>£8.68</td>
<td>£35.24</td>
</tr>
<tr>
<td>5km to 10km</td>
<td>£3.53</td>
<td>£20.76</td>
</tr>
<tr>
<td>More than 10km</td>
<td>£7.89</td>
<td>£33.19</td>
</tr>
</tbody>
</table>

* Note WTP and WTA in the >£50 per month category assigned a value of £55

16. We also assessed the influence of being directly affected by the pylon route (as landowner or renting affected land; n=20) on WTP and WTA, and observed a higher WTP and WTA for those affected directly.

<table>
<thead>
<tr>
<th>Status</th>
<th>Mean WTP</th>
<th>Mean WTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landowner/ renting land</td>
<td>£26.00</td>
<td>£51.30</td>
</tr>
<tr>
<td>Not a landowner/ renting land</td>
<td>£10.22</td>
<td>£33.75</td>
</tr>
</tbody>
</table>

* Note WTP and WTA in the >£50 per month category assigned a value of £55

17. From our analysis of stated preference using contingent valuation, we estimate a mean WTP value of £11.49 per month, and WTA of £35.38 per month. In sensitivity analyses, we: (i) conservatively assigned the lower value of each discrete category (zero for the category “less than £2”), and (ii) assume, anti-conservatively, the higher value of each discrete range (£100 for the category “more than £50”). This defined the lower and upper limits for mean WTP as
£9.07 and £16.49 per month, respectively. The corresponding range for mean WTA is £31.40 and £60.05 per month, respectively.

18. The net present value of monthly payments per household was calculated by applying the Treasury Green Book recommend discount rate of 3.5% per annum. This considers the lifetime of the development, and presented at 25 and 40 years.

<table>
<thead>
<tr>
<th>NPV for:</th>
<th>25 years</th>
<th>40 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>WTP</td>
<td>£2,298 (range £1,814 to £3,298)</td>
<td>£2,969 (range £2,343 to £4,260)</td>
</tr>
<tr>
<td>WTA</td>
<td>£7,075 (range £6,279 to £12,009)</td>
<td>£9,141 (range £8,113 to £15,515)</td>
</tr>
</tbody>
</table>

19. In order to calculate the aggregate total monetary value of benefits of undergrounding versus overhead lines, we identified the number of households in the study area. We used census data\(^{12}\) for 2011 to determine the number of households by post code prefixes within 5km of the pylon route.

<table>
<thead>
<tr>
<th>Postcode</th>
<th>Number of occupied households</th>
</tr>
</thead>
<tbody>
<tr>
<td>LL15 2</td>
<td>920</td>
</tr>
<tr>
<td>LL16 3</td>
<td>892</td>
</tr>
<tr>
<td>LL16 4</td>
<td>351</td>
</tr>
<tr>
<td>LL16 5</td>
<td>585</td>
</tr>
<tr>
<td>LL17 0</td>
<td>1984</td>
</tr>
<tr>
<td>LL18 5</td>
<td>1144</td>
</tr>
<tr>
<td>LL18 6</td>
<td>640</td>
</tr>
<tr>
<td>LL22 8</td>
<td>557</td>
</tr>
<tr>
<td>LL22 9</td>
<td>604</td>
</tr>
<tr>
<td>Total</td>
<td>7677</td>
</tr>
</tbody>
</table>

20. Multiplying mean household value of discounted WTP and WTA by the number of households gives:

<table>
<thead>
<tr>
<th>Incremental value of undergrounding</th>
<th>Mean (range) over 25 years</th>
<th>Mean (range) over 40 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>based on WTP</td>
<td>£17,642,000 (£13,926,000 to £25,319,000)</td>
<td>£22,793,000 (£17,987,000 to £32,704,000)</td>
</tr>
<tr>
<td>based on WTA</td>
<td>£54,315,000 (£48,204,000 to £92,193,000)</td>
<td>£70,175,000 (£62,284,000 to £119,109,000)</td>
</tr>
</tbody>
</table>

\(^{12}\) [http://www.nomisweb.co.uk/census/2011/postcode_headcounts_and_household_estimates](http://www.nomisweb.co.uk/census/2011/postcode_headcounts_and_household_estimates)
21. We therefore conclude:

21.1. The results are remarkably consistent even though the sample size has increased since the analysis on the 30th August 2015. Forty-year WTP has changed from £24.4m to £22.8m; WTA changed from £69.0m to £70.2m. These small differences are well within expected margins of error. With the increased sample size (nearly double the required minimum), there is now improved precision in these estimates, and making statistical inferences of the data.

21.2. That the additional benefits of undergrounding (£22.8m based on WTP, £70.2m based on WTA, over 40 years) exceed the additional cost of development, and therefore the criteria set in EN-5 for refusing consent for overhead line are clearly met.

22. Discussion points: Respondents’ WTP and WTA reflect how they value the landscape, whether this is derived from preserving ecology and biodiversity, visual amenity, historic environment, archaeology, land use and agriculture, socio-economics and tourism, potential health impacts of electric and magnetic fields, or any combination thereof. As such, WTP/WTA estimates are all-encompassing, provided the questions posed are relevant, and the sample representative.

Given that our survey was anonymous, we were unable to guarantee representation from businesses, tourist and visitors, which might have led to an underestimation of the true WTP/WTA. Our scaling up to population WTP/WTA estimates was based exclusively on the number of occupied households within 5km of the route. We neither considered growth in the number of households over the next 40 years (the Bodelwyddan development alone will include 1,715 new dwellings) or the number of visitors / tourists to the area. This also suggests our WTP/WTA is an under-estimation of the true value.

23. Our contingent valuation provides an important evidence-base on the relative strength of public preferences for transmission options for the North Wales Wind Farms Connection Project. Overall, the values generated are highly contextual, depending on both the landscape and the options available (undergrounding versus overhead transmission). This is an important point to note, because it means that a landscape’s “value” as addressed in this study, is not independent of the change that was being considered in the context of SP Manweb’s proposed development. As such it provides a more robust evidence base for rational economic decision-making than the reliance on methods such as Landscape Character Assessment.\(^\text{13}\)

24. In support of our study, an expert report, commissioned by Ofgem noted that: “If the additional costs of, say, undergrounding options are well-known and what is required is primarily an indicative guide to whether, for example, visual impacts “tip the balance” towards these options, then we would only need to know if benefit estimates exceed the ‘threshold’ of cost or estimate how large WTP would have to be to justify any additional cost (in short, at least as much as the costs).”\(^\text{14}\)


http://tinyurl.com/pylonsurvey

How much do you value your countryside?
Faint ydych chi’n gwerthfawrogi eich cefn gwlad?

These / Bydd rhain

Do you want to keep your countryside free from pylons? Please complete this short survey. It is completely anonymous, and will take about 5 minutes of your time. Only one response per household please.

Ydych chi am gadw eich cefn gwlad yn glir o beilonau? Llenwch yr arolwg byr hwn os gwelwch yn dda. Mae’n gwbl ddienw, a bydd yn cymryd tua 5 munud o’ch amser. Dim ond un ymateb i bob cartref os gwelwch yn dda.

http://tinyurl.com/pylonsurvey

Figure 1. Advert.
Background

SP Manweb is proposing to connect the wind farms in the Clocaenog Forest area to the electricity network via a substation at St Asaph. The connection will use 15m-high double wood poles, spaced around 80m apart for 17km (10½ miles). There will be environmental consequences, including effects on the landscape and views, effects on cultural heritage (such as passing close to listed buildings), effects on woodland, agriculture, tourism and recreation.

The alternative would be to place the electricity cables underground. Cables can be laid in ducts in roads or across agricultural fields. The trench for an underground cable is approximately 1.5m wide and a different route would increase the connection length to 24km (15 miles). While undergrounding cables might reduce the visual impact, digging might disturb sensitive habitats, have an impact on soils and geology, and damage heritage assets (such as archaeological sites).

In order to determine whether the underground option is preferred, and if so, by how much, we invite you to complete a short questionnaire. It will take no more than 5 minutes of your time, and is completely anonymous. We will have no way of knowing who has responded, but we respectfully ask that only one questionnaire is completed per household.
Questions

1. How far do you live from the wind farm electricity connection? (less than 2km, between 2km and 5km, between 5km and 10km, more than 10km)
2. **What would be the maximum amount your household would be willing to pay per month, for cables to be placed underground instead of using pylons? (£ per month).** Note: this is hypothetical, but please respond as if it were true.

[nothing], [less than £2], [between £2 and £5], [between £5 and £10], [between £10 and £20], [between £20 and £30], [between £30 and £40], [between £40 and £50], [more than £50]

3. **What minimum amount of monthly compensation would your household be willing to accept, in order to have pylons instead of underground cables? (£ per month).** Note: this is hypothetical, but please respond as if it were true.

[less than £2], [between £2 and £5], [between £5 and £10], [between £10 and £20], [between £20 and £30], [between £30 and £40], [between £40 and £50], [more than £50]

4. **Does the connection route pass through your land (or land that you rent)? (y/n)**

Thank you for completing the questionnaire.

If you have any queries, please e-mail: pylonthepressure@gmail.com


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**Figure 2. Survey questions**