



# Trident, jobs

– and the UK economy



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A Briefing by the Campaign for Nuclear Disarmament

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## Executive summary

A decision to initiate design work on the replacement for Britain's Trident submarine-based nuclear weapons system is due to be taken by the end of this year – 2010. This report examines the employment consequences of this decision. It considers the latest figures on the cost of Trident replacement as well as the running costs of the existing and replacement systems. It does so in the context of the Strategic Defence and Security Review, due to be published in October 2010, that has been tasked to propose cuts in existing defence budgets of up to 20 per cent and, contrary to previous government assumptions, to include within that reduced budget full provision for the cost of Trident replacement.

It concludes:

- Trident replacement, particularly given its dependence for the provision of missiles and missile launch technology on US-based contractors, will cost more jobs than it will generate
- The cost of replacement, in the context of the existing crisis of the defence budget, will mean that a number of defence programmes scheduled for British industry over the coming decade will either be cancelled or significantly reduced
- The most vulnerable programmes, both from the impact of Trident costs and the overall budget reduction, are in the areas of surface ships, jet fighters, helicopters and armoured vehicles as well as the servicing of airbases and dockyards. The cancellation of such programmes will endanger in excess of 10,000 jobs and is likely to result in the closure of major workplaces
- The difficulty of reconciling the cost of Trident replacement with existing capital spending commitments is, as in past years in similar circumstances, likely to result in the Defence budget being overspent and hence impacting adversely on other government expenditure for public and social services
- The vulnerability to employment loss as a result of Trident's non-replacement will be most acute in Barrow-in-Furness and to a lesser extent in AWE Aldermaston and Burghfield.

The report recommends that:

- In line with the TUC's 2009 support for Just Transition towards a fuel-efficient, green economy, government-funded programmes should be adopted now, as operated in the United States under the Base Realignment and Closure programme, which would ensure alternative industrial employment in communities most affected and specifically Barrow. The report highlights the scientific, design and technical skills concentrated in Barrow and the potential,

identified by the International Energy Agency, for the development of new technological niches in the efficient production of marine and sub-sea energy over the next decade and a half.

- A similar programme should be adopted for AWE Aldermaston and Burghfield that would build upon existing government initiatives for arms diversification at the establishment.

## **Introduction**

The Treasury announcement on 29 July that the costs of Trident replacement must come from the Ministry of Defence (MoD) budget has created a quite new situation. While the full consequences will not be known till the publication of the Strategic Defence and Security Review at the end of October, it is clear that a decision to replace Trident will cost many jobs in the defence sector – significantly more than it would protect. This report provides an interim summary of research by CND on the employment consequences of both replacement and cancellation and of the options for alternative employment.

CND's opposition to Trident is to its character as a weapon:

- That its use would cause massive indiscriminate civilian casualties and is therefore contrary to international law<sup>1</sup>
- that a nuclear war would threaten human life itself
- that Britain's replacement of Trident impedes progress towards comprehensive nuclear disarmament and that Britain's past and present possession of nuclear weapons has done nothing to halt the spread of such weapons
- that as signatory to the 28 May 2010 Final Declaration of the United Nation's nuclear Non-Proliferation Treaty Review conference Britain is now committed to 'accelerate concrete progress' towards nuclear disarmament.

At the same time CND is acutely aware of the employment consequences of cancellation and has always demanded that a decision to cancel be accompanied by government action to ensure appropriate alternative employment for those affected. CND's recommendations in 2007 on redeployment for affected employees at the Clyde Naval Base, Faslane, were endorsed by the Scottish Trades Union Congress and later substantiated by the report of the Working Party established by the Scottish Government, *Scotland Without Nuclear Weapons*.<sup>2</sup>

This report will look in turn at:

- The budgetary crisis caused by MoD overspend combined with the coalition government's demand for overall reductions of up to 20 per cent
- Current costings for Trident replacement
- Capital projects that are currently being considered for cancellation as a result of the 29 July decision and the continuing deficit
- The jobs that would be affected by Trident's non-replacement in both main contractors and subcontractors
- The consequences for Barrow and the types of alternative employment that could and must be provided

## The Ministry of Defence's budget crisis

In 2009, prior to any announcement of wider government cuts, it had become clear that commitments made by the MoD for new weapon systems were gravely out of line with its projected capital budget. The report by the government Comptroller General and Auditor in December 2009 estimated that, even on the MoD's own optimistic estimate of a steady 2.7 per cent budget increase over the next ten years, the shortfall would come to £6 billion. If the budget was flat, with no cash increase, 'the gap would rise to £36 billion'.<sup>3</sup> The Major Projects Report published in March 2010 examined the costs of committed capital projects over the next ten years which amounted, excluding Trident replacement, to a total cost of £60 billion. It identified what it described as the 'serious consequences of failings' in the department's management and governance – particularly its previous concealment of annual capital deficits by successively 'slipping' some projects forward into the following year.<sup>4</sup> The House of Commons Defence Select Committee concluded in March 2010 that 'we accept the NAO's [National Audit Office] analysis and wish to record our disappointment that it has taken the MoD so long to admit to the problem. The evidence we have received indicates that the MoD's responses to our questions about the funding gap in our Defence Equipment 2009 inquiry were at best confused and unhelpful and at worst deliberately obstructive'.<sup>5</sup>

The MoD's capital equipment budget for 2010-11 was £8.7 billion – prior to any cuts. At a flat allocation level over the next ten years, and without the inclusion of Trident replacement, it therefore faced an overrun of £36 billion out of an aggregate projected spend of £87 billion. It has now been told that its overall budget is to be cut by up to 20 per cent and that it has to fully fund Trident replacement – a replacement which over the same ten years will cost over £20 billion.<sup>6</sup> While some scope exists for cutting annual running expenditure, this is limited. Even a 35 per cent cut in civil service staffing would save less than £1 billion a year and £7 billion over ten years.<sup>7</sup> A 20 per cent cut in the armed forces personnel would save only £1.1 billion a year and £11 billion over ten. A 20 per cent cut in the MoD's overall annual budget of £37 billion, comes to £7.4 billion – or £74 billion over ten years.

It is also clear that the major part of Trident's capital cost will be required over the next ten years – precisely the period when governments will be seeking to reduce the wider fiscal deficit. The plan to replace Trident was set out in the White Paper "The Future of the United Kingdom's Nuclear Deterrent" in December 2006. Expenditure on this was projected to be £200 million in 2008/09, £300 million in 2009/10 and £400 million in 2010/11.<sup>8</sup> A report by the National Audit Office showed that in 2009/10 £39 million was allocated to concept work on the submarine platform and £64 million for the reactor.<sup>9</sup> Around 150 designers and engineers are currently working at Barrow on the new submarine. Additional staff are employed by Rolls Royce and in the US. A Common Missile Compartment is being developed in America for the proposed British submarine and the US Ohio-replacement. Initial costs were borne entirely by the UK. Further costs over the next few years will be shared.

On 26 November 2009 the Defence Board considered the Future Deterrent. One of three papers submitted to the meeting was on “FSM Platform and NP Extension of Concept Phase – Costs of Options”,<sup>10</sup> [FSM- Future Submarine, NP – Nuclear Propulsion]. The summary of the meeting suggests that the concept phase was extended until around July 2010 (and now likely to be extended to the end of 2010).<sup>11</sup> Details of the option chosen and its cost are not known. The Defence Board also had a report from the Defence Nuclear Safety Regulator giving his advice on the selection of a reactor for the new submarine. It is likely that the MoD plans to spend a considerable sum on the new submarine prior to 2012 and that a substantial proportion of this will be on research and development related to its reactor.

A BAE Systems timeline for the Successor submarine shows that Initial Design work had been scheduled to start in autumn 2009, when the Initial Gate decision had been due to be taken.<sup>12</sup> Detailed design work would start in spring 2012. Production outputs would begin in summer 2013. Build work would commence at the start of 2014. A second BAE timeline indicates that Long Lead items would be ordered from early in 2011.<sup>13</sup> The fuel core for the reactor on the first submarine will be one of these items.

Although detailed annual costs are not available, the picture is one of an increasing workload and therefore of rising costs each year from 2010 until the peak in the second half of the decade. The projected annual expenditure on nuclear weapons of £2.1 billion is likely to rise to £2.5 billion shortly and then to around £3 billion by 2014.<sup>14</sup>

This is the crisis now facing the MoD. Over the next ten years it faces a cut of up to £74 billion, a £36 billion deficit on projected capital programmes and a bill exceeding £20 billion for the capital costs of Trident replacement to be paid over more or less the same period. This is why so many of its pledged weapons programmes are now being reconsidered and why many senior figures in the armed services are questioning Trident replacement.

## **The cost of Trident replacement**

In April 2010 the former Chief of Defence Staff Field Marshall Lord Bramall challenged the wisdom of Trident replacement in a letter to *The Times* headed ‘The UK does not need a nuclear deterrent’:

‘It is of deep concern that the question of the Trident replacement programme is at present excluded from this process [the Strategic Defence Review]. With an estimated lifetime cost of more than £80 billion, replacing Trident will be one of the most expensive weapons programmes this country has seen. Going ahead will clearly have long-term consequences for the military and the defence equipment budget that need to be carefully examined. Given the present economic climate, in which the defence budget faces the prospect of worrying cuts, and that we have already an estimated hole in the defence equipment budget of some £35 billion, it is crucial that a review is fully costed...’<sup>15</sup>

Lord Bramall added that the option of disarmament needed to 'be carefully evaluated'. When the House of Commons debated the issue of Trident replacement in 2007, it did so on the assumption that the capital cost of the new equipment would be no more than £20 billion and that it would not come out of the defence budget. This £20 billion did not include the running costs of either the present or successor system or the disposal costs of nuclear waste and contamination. Their inclusion took the bill to at least the £80 billion cited by Lord Bramall.

It is now becoming clear that the £20 billion capital cost was itself an underestimate.<sup>16</sup> Public Accounts Committee recommendations included in the MoD's 2010 Consolidated Resource Accounts draw attention to the submarine's dependence 'on a number of monopoly suppliers' and the need to take action to prevent an escalation of costs. They also highlight the dependence on 'an American supplied missile compartment' and that the UK programme is running ahead of the United States' programme presenting the danger of costly design problems for other aspects of the submarine.<sup>17</sup>

Congressional hearings in the United States in the early months of 2010 also heard evidence that the cost of the US replacement would be double the original estimate and was likely to result in drastic reductions in the Navy budget for conventional warships.<sup>18</sup> Robert Gates, US Defence Secretary, told a House of Representatives subcommittee in March that 'in the latter part of this decade, it will suck all the air out of the navy's shipbuilding program', and that 'tough choices are going to have to be made, either in terms of more investment, or choices between the size of surface fleets you want and the submarine fleets.'<sup>19</sup> This has led to demands in Congress that the US shipbuilding industry be protected by the reallocation of Trident costs away from the Navy.<sup>20</sup>

Re-costing the UK Trident on this basis would mean its capital cost would be double that in the 2006 White Paper.<sup>21</sup> Running costs for the existing Trident programme have already increased sharply from the £1 billion annual figure to £2.1 billion in 2009. This cost escalation has been explained by the MoD as the result of necessary modernisation of equipment and enhanced safety requirements at AWE Aldermaston – although the scale and character of the new equipment and staffing costs make it far more likely to be in preparation for the design of new nuclear warheads.<sup>22</sup> Nonetheless annual running costs have increased and are now likely to stabilise at at least £1.5 billion a year.

Overall the ultimate capital cost of Trident replacement is therefore likely to be moving towards £30 billion (of which in excess of £2 billion will not be spent in Britain) – as against a lifetime saving of up to £100bn if the whole Trident programme were to be phased out.

The consequences of Trident replacement for the MoD budget will, therefore, be of great significance. Current negotiations with the Treasury may lead to some mitigation – and in these circumstances part of the burden will continue to be passed on to public and social services – but it seems inevitable at the present stage that the major burden will fall on other MoD capital programmes.<sup>23</sup>

## Defence programmes currently at risk

The following programmes have been mentioned as candidates for cuts over the past two months:

### **The aircraft carrier programme**

Since the Treasury announcement on Trident funding, Sir Richard Dannatt, former head of the British Army, has argued that the Trident decision ‘if confirmed by David Cameron, was a most definite game changer’ and that it put the new aircraft carrier programme at risk.<sup>24</sup> In June Professor Malcolm Chalmers, in a working paper for the Royal United Services Institute, had already proposed a cancellation of the second aircraft carrier (the first is in process of completion).<sup>25</sup> Shipyards involved in the construction of the first aircraft carrier are BAE Surface Ships yards on the Clyde and Portsmouth [6,500 direct employees]<sup>26</sup>, Babcock at Appledore [150 jobs sustained] and Rosyth [400 jobs], A&P in Newcastle [250 jobs] and Cammell Laird (flight decks) at Birkenhead.<sup>27</sup> The cost of one ship is approximately £2.5 billion.<sup>28</sup> Cancellation would have serious implications for the continuity of employment at all yards and could lead to the closure of at least one. The first stage of the contract was calculated by the MoD to sustain around 10,000 jobs.

### **The F 35 Lighting II Joint Strike Fighters**

These are the jets scheduled to be based on the aircraft carriers. The cancellation or reduction of this programme was mentioned both by Dannatt and Chalmers. The F35 is a joint programme between the US firm Northrup Gruman and BAE with the British order valued at £2.8 billion by the MoD, scheduled for production at the BAE facilities at Salmesbury and Warton near Preston.<sup>29</sup> Salmesbury currently employs 4,000 and Warton 7,000.

### **The Eurofighter Typhoon**

British orders are currently assembled at Warton. On 8 August the *Sunday Telegraph* published leaked documents from the MoD indicating that the entire remaining third £1 billion tranche of 40 planes would be cancelled as part of the review.

### **Armoured vehicles**

The *Sunday Telegraph* information lists a 40 per cent cut in armoured vehicles. The programme most at risk is the Future Rapid Effect System Specialist Vehicle which has been significantly delayed at the MoD and is described by BAE as potentially sustaining ‘1,000 high quality British jobs’.<sup>30</sup>

### **Military Afloat Reach and Sustainability MARS programme**

A £2.5 billion programme for replacement tanker and supply vessels – already considerably delayed – is listed as among projected cuts by the *Sunday Telegraph*. BAE Surface Ships is a potential builder of an as yet undesignated contract.

### **Chinook and Lynx Wildcat helicopters**

Armed forces Minister Nick Harvey was reported in the *Western Daily News* on 4 August as saying that the previous government's order for 22 Chinook helicopters was now in jeopardy. Chinook helicopters are manufactured by AgustaWestland at Yeovil where there are currently 10,000 employees. *The Herald* reported on 14 August, citing MoD sources, the likely cancellation of the £2 billion order for 60 Lynx Wildcat helicopters also manufactured at Yeovil.

### **Future Surface Combatant vessels: Type 26 frigates**

The design contract with BAE was announced in 2009 and split between the BAE design office Bristol and the Clyde. The £3.5 billion order for successor frigates to the obsolete Type 22 and 23 was to complement the Type 46 by providing anti-submarine cover for the aircraft carriers and would have maintained a continuity of production at BAE shipyards. The Defence Management Journal mentions possible reduction.<sup>31</sup>

Other cuts so far mentioned are the closure of RAF Kinloss, RAF Lossiemouth and RAF Marham with the loss of almost 6,000 jobs and the phasing out of 295 aircraft (including 120 GR4 Tornado jets) and the cancellation of nine Nimrod MR4 reconnaissance aircraft costing £3 billion (BAE Systems Woodford) and 22 A400M transport aircraft (Marshalls Aerospace Cambridge).<sup>32</sup> An impact assessment by the Highlands and Islands Enterprise Board states that Moray's 'economy and population are heavily dependent on the RAF – probably more so than any other region in the UK' with 5,710 jobs estimated as dependent on the Lossiemouth and Kinloss bases, 16 per cent of the total.<sup>33</sup>

Even combined these cuts do not match the £36 billion capital budget overspend or even the £20-30 billion likely capital cost of Trident. On 16 August 2010 former Chair of the Defence Select Committee, David Hamilton MP warned that 'if George Osborne gets his way [on Trident] it will constrict MoD budgets which will result in swingeing frontline cuts that I fear will hit Scotland hard. The coalition must realise that destroying thousands of Scottish defence jobs is not a price worth paying.' These fears are now beginning to be repeated by MPs across Britain.<sup>34</sup>

The impact of these cuts is likely to be felt considerably sooner than any job losses arising from Trident cancellation. Moreover, the impact of Trident replacement costs on other areas of defence contracting will significantly exceed those resulting from its cancellation because of the high cost of the missile components. It is difficult at this stage to indicate which communities and workplaces would be most vulnerable. Order reductions, delays or cancellations would seem likely to have a particularly serious impact on shipbuilding communities, threatening the continuity of employment of 10,000 jobs, and be likely to result in the closure of at least one yard. Jet fighter production concentrated around Preston is also likely to be severely affected and result in job losses running to several thousand. And, as noted earlier, the 'the spill-over' effect of Trident replacement on the Defence budget will almost inevitably result in public service job cuts as well.



## The employment consequences of cancelling Trident

Cancelling Trident replacement would threaten the continued post-Astute employment of 4,700 workers at BAE Barrow and require the redeployment of around 1,000 at Rolls Royce, Derby and up to another a thousand at the ten main subcontracting firms.

On the other hand, if combined with an early phasing out of the existing Trident programme, at least £1 billion a year would be released in terms of running costs (£10 billion for the ten years after 2016). Taking the existing fleet out of service in line with the introduction into service of the new Astute submarine, would ensure that potential job losses at Faslane were reduced to less than 300<sup>35</sup> and at Devonport to not much more (in fact Devonport stands to lose far more from the threatened reduction in the surface fleet).<sup>36</sup> There is, therefore, at least some of the £10-15 billion already allocated in MoD accounts towards the running costs of Trident up to 2021 that could be freed up over this period. This does not take away from the job losses arising from cancellation but it does highlight some potentially balancing employment benefits.

Cancelling the new system would result in job losses as follows:

### **Barrow-in-Furness**

4,700 jobs at BAE Surface Ships will be at risk from the end of the Astute contract and once work on redeveloping the remaining Trafalgar class boats is completed – probably from 2020 if the completion rate of the Astute programme is slowed. Barrow is geographically isolated from other sources of industrial employment and the non-replacement of Trident would require significant intervention to maintain employment – see below.

### **Rolls Royce, Derby**

1,200 are employed on producing the nuclear propulsion units for the Astute programme and would be likely to do so for the Trident replacement. This work includes the provision of heavy pressure vessels, nuclear cores and steam raising capacity. The technology is similar to that used in civil nuclear power production but more specialised. Rolls Royce is currently investing heavily in preparation for civil nuclear power contracts. It is likely that a majority of these skills could be absorbed.<sup>37</sup>

Key potential subcontractors:

**McTaggart Scott** is the subcontractor most dependent on MoD submarine orders and produces ‘non-hull-penetrating masts’, which are ‘high-strength, low-weight, non-pressure-hull penetrating, capable of carrying a variety of payloads from the optronics to communications’. It is based near Edinburgh and employs 250 workers. 95 per cent of its work is described as being for defence and, although it has been recently exporting up to 60 per cent, it describes itself as highly dependent on MoD submarine orders, currently Astute but in future potentially for Trident replacement.

**Weir, Strachan and Henshaw** employs 500 workers in Bristol. Two-thirds of its work is for defence and it has supplied ‘weapons-handling and launch systems for all the conventional weapons’ on Astute and predecessor submarines. In 2007 it also had significant export orders. Its work for Trident replacement, where the missile system is US supplied, would be significantly less.

**Sheffield Forgemasters**, based in Sheffield, supplies high precision heavy castings required for reactors and submarine structural work. It currently employs 700 workers. It has supplied castings for Astute but is currently heavily involved in producing high strength structural castings for subsea oil work in the North Sea and elsewhere. It is also seeking to supply castings to the civil nuclear industry.

**Alstom** supplies the turbines for nuclear-powered submarines including Astute. A Swiss-based multinational, it has workshops in Rugby and Stafford but its main manufacturing facilities are in France and China. Its Unit Managing Director noted in 2007 that manufacturing submarine turbines was ‘not our core business’ and that the company was highly diversified.

**L-3 Communications** supplies communication systems. It is a diversified US multinational with British plants at Tewkesbury and Bracknell. The supply of systems to Trident replacement would only represent a small fraction of its business.

**Wellman International** is a diversified US multinational, with its British base at Oldbury, that supplies air purification systems for submarines. Again Trident would represent only a small fraction of its business.

**York – Heating, Ventilation, Air Conditioning and Refrigeration**, a subsidiary of the US multinational Johnson Controls, is widely involved in the construction industry. It has depots across Britain and Trident work would represent a very small proportion of its turn-over.

**Thales**, the French defence multinational, supplies optronics and provides parallel equipment for aircraft and surface vessels. It employs a thousand at its optronics plant in Glasgow – mainly for non-submarine work. It is a major MoD contractor.

### **Clyde Naval Base, Faslane**

Faslane is the administrative headquarters for Royal Navy Scotland, Northern England and Northern Ireland. It is the base for eight Sandown class mine hunters and for all Royal Navy submarines including Swiftsure, Trafalgar and from 2011 Astute as well as the four Vanguard Trident submarines. The majority of MoD and civilian staff at the base are not therefore related to Trident work. In 2008 a statement from Defence Secretary, Des Browne, said that at that point only 589 jobs at the Clyde Naval base were directly dependent on Trident and of these 541 were in

Coulport.<sup>38</sup> It is likely that many of these are in the MoD Police. This indicates that most of the jobs at Faslane are not unique to Trident and could be sustained so long as there are other vessels, such as conventionally-armed submarines, operating from the base.

The 2007 STUC-Scottish CND study concluded that the non-replacement of Trident would, from 2023, leave these jobs surplus to requirements. Including indirect and induced employment and using the 2009 figure for direct employment at the base, the number of civilian jobs at risk across Scotland would be around 1,100.

However, the report also noted that the build up of Astute submarines to a total of six by 2017-18 would increase the total of nuclear powered submarines from the current six to ten and require an increase in civilian personnel for services work. A phasing out of the Vanguard class starting in 2012-13 would stabilise the number at six and minimise the number of redundancies among servicing trades. This would limit redundancies principally to staff involved in moving and securing the nuclear warheads at Coulport – approximately 550 (of whom the largest element would be MoD police).

The 2007 STUC-CND study made proposals for the use of a proportionate segment of the funds released by Trident cancellation for the creation of new employment opportunities in the area through a local development partnership overseen by the Scottish government and relevant local authorities.

### **AWE Aldermaston and Burghfield**

4,350 are currently employed – an increase of several hundred over the 2005 figure but also less than the 2008 peak of 4,500.<sup>39</sup> The MoD told the Defence Select Committee in 2006 that the post-2005 increase was not related to Trident replacement but to update systems and meet more demanding health and safety requirements – although, as noted earlier, this seems unlikely given the character of the skills and equipment. Many of these skills are in engineering project management, IT, applied mathematics and physics and have remained in short supply even during the recession. Most of the current jobs at Aldermaston would be required till the end of the current Trident programme in 2024. Even if this programme was suspended early, at least some would be required for the continuing work of warhead monitoring and disposal.<sup>40</sup>

There would also be a continuing need for a number of the skills for use internationally in nuclear inspection and verification work. The UK has already been involved in developing methods and procedures for verifying nuclear disarmament. One focus has been on how to verify nuclear disarmament without compromising security considerations and the development of radiation monitoring techniques to detect the presence of nuclear weapons. The UK and Norway conducted a series of joint exercises between 2008 and 2009 to develop ways of verifying nuclear disarmament with the UK inspecting a mock nuclear weapon facility in Norway.<sup>41</sup> AWE has developed capabilities to detect nuclear tests including radionuclide detection stations on four British dependent territories around the world and a seismology team at Blacknest. This work supports the implementation of

the Comprehensive Test Ban Treaty. There is scope for the UK's work on verification and non-proliferation initiatives to be increased: the US Department of Energy budget request for non-proliferation work in FY 2010 was \$2.1 billion.

There have also been important initiatives at AWE on defence diversification which have indicated the potential for employment generation on this front.<sup>42</sup> In June 2008 Ploughshares Innovations, an offshoot of the Defence Science and Technology Laboratory, were asked to develop technology transfer at AWE. A press release issued at the start of this project showed that AWE has had little experience of transferring their technologies to the outside world. However, there is an acknowledged potential for diversification at AWE. Although little has been done at home, the UK has assisted projects to find alternative work for scientists and technicians in the closed nuclear cities in Russia. In the United States there has been growing interest in changing the focus of Los Alamos, Lawrence Livermore and Sandia Laboratories. The suggestion is that they could function, as their titles suggest, as National Laboratories with a wide security remit rather than just nuclear weapon facilities. Currently the proportion of their budgets dedicated to nuclear weapons' work ranges from 43 per cent at Sandia to 60 per cent at Lawrence Livermore. Most of the additional work is on non-nuclear defence projects.

In order to ease the problems resulting from ending nuclear work at AWE there would need to be a detailed study of skills, including within engineering, of suitable opportunities and an assessment of the retraining that would be required. As argued below, the US Federal Base Realignment and Closure programme provides a model for such intervention and places a premium on early planning with five years being the legal minimum prior to the closure of a base. In the case of Aldermaston clear potential exists for the long-term retention of core skills in nuclear safety, verification and protection and the maintenance of a science-based research unit committed to the industrial application of current research. Assistance would, however, be required for local authorities to plan alternative employment for staff with more routine skills in logistics, maintenance and security.

Non-replacement of Trident can therefore be seen to create areas of employment vulnerability as follows:

- Among potential builders a critical level of vulnerability at Barrow from 2020, significant vulnerability in one subcontractor (McTaggart Scott), less significant at Weir, Strachan and Henshaw and a requirement for planned redeployment at Rolls Royce from 2018.
- At the Faslane/Coulport naval base there would be vulnerability for a segment of employment from 2018-2024 which could, however, be minimised by careful management.
- At AWE Aldermaston and Burghfield there would be very significant vulnerability from 2018-24 but with realistic prospects of some continuing employment and major opportunities for work on industrial application.

## **The necessity of an arms diversification programme for Barrow-in-Furness**

The biggest concentration of production jobs associated with the replacement of Britain's Trident nuclear submarine system is the shipyard at Barrow-in-Furness. Situated at the south western tip of the Furness peninsula in Cumbria, Barrow is a town with a population of almost 60,000. The shipyard is by far the biggest employer and in 1990 employed over 13,000 workers building mainly naval ships. In the past decade its workforce has sunk to less than 3,000 before rising again to just over 5,000 in 2009. Today the number of jobs in the naval shipyard is approximately 4,700.

The shipyard has largely become specialised as Britain's only submarine manufacturing yard, and has many skill sets that reflect that specialisation. Submarine production involves construction skills such as steelworking, welding, and ship fitting early in the construction process when the hull cylinders are fabricated. Outfitting skills are used later in the process when the various electrical, piping, heating, ventilation, air conditioning, crew accommodations, and other systems are placed either in the hull cylinders or into the complete submarine structure. Just as important is the design team of naval architects, engineers and draughtsmen who have the challenging task of designing the submarines and modifying design work in the light of building experience and new technological developments. Specific submarine design and construction skills include scientific and technical advice on hydrodynamics, manoeuvring and control, propulsor technology, atmosphere control and structural and acoustic engineering design. Many of these skills are not readily available from the broader market place. The core skills base at Barrow (out of a workforce in 2006 of 3,310) included 1,275 management and support staff, 1,302 trades people and 600 designers.<sup>43</sup>

Barrow also carries out design, build and conversion of surface ships for the Royal Navy (recently HMS Albion, Bulwark, Ocean). It accounts for 60 per cent of the UK's naval design capability. The submarine design team are most involved in the ten years run up to the production phase in the case of a new class of nuclear powered, conventionally armed, submarine and up to 15 years in a nuclear armed submarine. According to former Vickers Chairman Lord Chalfont, the design and construction of nuclear-powered submarines carrying ballistic missiles presents technological problems as complex and demanding as those involved in putting a man on the Moon.<sup>44</sup> Thus between the end of the design process for the Astute Class submarine and the replacement of Trident, the design team numbers at Barrow fell to a core of less than 200 who retain specialised submarine-specific skills. In addition to ongoing 'spiral' development work on Astute, many of these designers will be collaborating on behalf of BAE Systems with personnel from the MoD, Rolls Royce and Babcock Marine on a concept design for a successor to Trident. From the date of the Initial Gate (now expected in late 2010) the detailed design process will begin and the numbers of the design team are expected to rise to a peak of around 800 within six years and continue at that level for a few years until after construction begins, then declining rapidly. At that stage, many of the less

specialised members of the design team would be sent back to the general shipbuilding design pool. Sustaining this core design team during long gaps between submarines can be difficult. The Astute Class design was delayed and required help from the US Electric Boat Company because of loss of vital skills. If Trident replacement goes ahead, it is likely that the services of Electric Boat will again be required.

At the time of writing the submarine design team remains at core level, while there is a boom in shipbuilding construction employment at the yard. The first of the Astute boats is currently undergoing sea trials and the second is due to be launched later in 2010. Work is well advanced on boats three and four, and the go-ahead for boats five and six was agreed by the government in March 2010. However, Prime Minister David Cameron has since announced that boats five and six will be considered in the Strategic Defence and Security Review later in 2010 which must place considerable doubt on the immediate future of the building programme. A total number of seven submarines was expected, but now the order for the seventh boat seems unlikely.

It has been argued that a 'drumbeat' of 18-24 months per submarine (at least 36 months for SSBN submarines) is necessary to keep the Barrow yard functioning at more or less optimal level and to preserve the core design and building skills. Many of these skills are specific to submarine design and building. In the past few months of 2010 the yard has shed 230 jobs in order to slow down the rate of submarine building and optimise the size of the workforce. This is intended to minimise a predicted gap in production between the Astute Class submarines and the successor SSBN programme. In fact this may be less than predicted because the Astute programme is at least 4 years behind schedule (and almost 50 per cent over budget). There is also the possibility of a much greater slow down on the Astute work in the event of a postponement in the Trident replacement. This would enable core submarine building skills to be retained at the most basic level for the future and could extend the Astute building programme up to 2020. But, as the Commons Defence Select Committee report stated in December 2006, the paramount issue is the strategic defence needs of the nation, not the question of maintaining the ideal drumbeat for new submarines and preserving key skills in submarine manufacture irrespective of the costs.

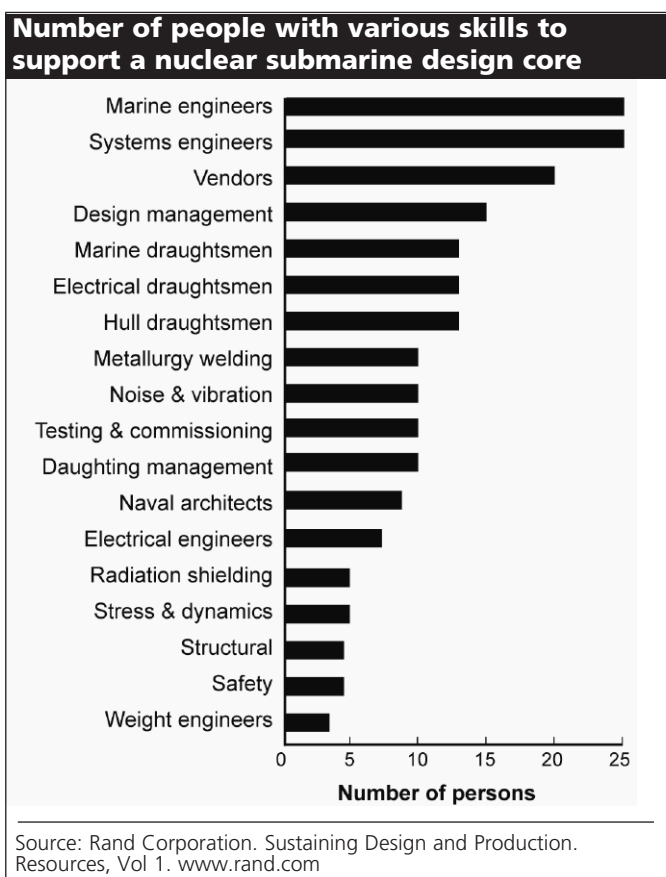
### **Jobs depending on Trident replacement**

If, therefore, the Astute Class programme is cut to four or five boats as a result of the Strategic Defence and Security Review and/or the follow-on SSBN order is cancelled or postponed for several years, what would be the short and long term effects at Barrow? Even if the number of Astute Class boats is cut there is probably enough work to keep most construction workers busy for four years. Beyond that the yard would probably not have a future as a specialist submarine building yard. It has, however, already demonstrated a capacity to build other types of vessels and in the last few years has delivered two Wave-class auxiliary tankers and two Albion class landing platform docks (LPDs). These four surface ships helped fill the production gap at the shipyard between the end of the construction of the Vanguard Class SSBNs and the start of the current Astute Class SSNs. It was recently scheduled to build

a section of the hull (lower megablock 3) of the two new aircraft carriers which would have created 400 jobs, but lack of capacity due to the Astute building programme caused that work to be moved to one of the Clyde yards.

The UK shipbuilding industrial base is currently enjoying a growth in demand from the Queen Elizabeth Class aircraft carrier and Type 45 Destroyer programmes. There is some concern as to whether there is adequate capacity in the industrial base to meet these demands. According to the Rand Report (2005): ‘Barrow remains an untapped source of production capability and could... play a significant role in the coming shipbuilding programme’.<sup>45</sup>

Thus the Barrow shipyard could survive by diversifying into building and repairing surface ships, designing and building unmanned undersea vehicles (UUVs) and designing diesel powered submarines for export (It has recently completed orders for submarine pressure domes for the Spanish Navy). There would also be the possibility of developing collaborative submarine work with other countries such as the United States and France. In view of the current global collapse in commercial shipbuilding demand and the prospect of severe cuts in the future naval shipbuilding programme, the best option for maintaining some shipbuilding capacity would be to target the high technology niche markets identified by OECD: ultra fuel-efficient, low-emission ships to transport freight and deep water drilling ships, especially those designed for arctic conditions.<sup>46</sup>



### Submarine design team

If Trident replacement were cancelled, a switch to building surface ships and conventionally powered undersea vehicles would probably not be enough to sustain the specialised submarine design team. On past experience this design team would largely disperse and it would be difficult and prohibitively expensive to re-create it. This in itself is not a good reason why such a workforce should be kept together – just in case the nation decides to build more nuclear powered submarines at some stage in the future. As the Commons Defence Select Committee stated ‘The fact that this inquiry has focused on the submarine manufacturing and skills base should not be taken as an endorsement of the existing submarine-based nuclear deterrent...nor should it be taken to mean that we think industrial and employment factors should be decisive in the debate on the future of the deterrent. Any decisions on the future of the UK’s deterrent should be taken on the strategic defence needs of the country.’<sup>47</sup>

### **Jobs at any cost? The question of nuclear safety**

There is another reason why diversification of the type of work done at the Barrow shipyard should be seriously considered. It is the safety issue around building nuclear powered submarines in the middle of a town of 60,000 people. The BAE yard at Barrow failed a safety exercise on 13th July 2010.<sup>48</sup> The exercise was to test arrangements to deal with an accidental radioactive leak from a reactor on board a submarine. The exercise revealed so many problems that inspectors from the Health and Safety Executive (HSE) judged the test a failure and ordered it to be repeated in 6 months. In other words, under the current arrangements the health and safety of thousands of people are at risk in the event of a serious incident at the Barrow shipyard. BAE Systems may be providing jobs for some people in the town of Barrow but it is putting the health of many more at risk. This is another powerful reason why diversifying the shipyard away from nuclear submarines towards non-nuclear ships and undersea vehicles should be the preferred option.

### **Skills shortage**

Most of those employed in submarine building have design and construction skills that are in very short supply in Britain today. In 2009 Engineering UK identified a need for 587,000 new skilled workers to meet increased demand in areas such as green energy, aerospace and transport. The National Skills Academy estimates there will be a minimum requirement for 80,000 manufacturing workers over the next decade, which includes 30,000 skilled operatives, 15,000 managers and 15,000 technical staff. In other words there will be a rising demand for skilled manufacturing workers in the UK. The UK figure is higher than many countries because of a number of factors: our energy infrastructure is ageing, the average age of the engineering workforce is rising and we have ambitious carbon reduction targets. In fact, despite the current high levels of unemployment, the British economy suffers from a long term skills shortage – a problem demonstrated during the 2008-9 recession by the strong tendency of manufacturing firms to maintain their skilled workforce through the use of part-time employment.<sup>49</sup> A survey of 400 managers in the UK manufacturing sector by Russam GMS revealed that 86 per cent believe there was an industry-wide skills gap. Not enough young people are entering manufacturing industry and the workforce is an ageing one, with around half of those in the industry above the age of 45.

This skill shortage is particularly prevalent in the North West of England. The North West Regional Priorities Statement (Jan 2010) highlighted the need to ‘capitalise on the opportunities for moving to a low carbon economy’ and identified the needs of the nuclear energy industry and expansion of renewable energy as creating over the next 20 years 15,000 new jobs in design, manufacture, operations and maintenance for wind and tidal projects, 10,000 new jobs requiring skills in the installation, operation and maintenance of new technologies and 6,000 new jobs in renewable energy manufacture. While these figures should be treated with caution as they do not always reflect the experience of real people on the ground, they do suggest that most skilled workers made redundant from the Barrow shipyard would be able find other jobs at a comparable skill level if they were willing to travel or relocate.



**Barrow Skill Set 2006**

Minimum numbers necessary in each specialist area of production and engineering to support a 22 month drumbeat

**Production**

Skill	Number
Steelworkers	298
Pipe Mechanical	397
Electrical	174
Sheet Metal Workers	51
Joiners	17
Painters	21
Ancillaries	150
Direct Support	200

**Production support**

Skill	Number
Weapons Systems Engineers	60
Test and Commissioning	60
Supervision/Management	160

**Engineering**

Skill	Number
Professional Engineers	148
Detail Designers	220
Technical Support	60

**Engineering support**

Skill	Number
Combat Systems Engineers	150
Systems Engineers	140
Nuclear Safety Engineers (site and submarine)	50

Source: Supplementary memorandum from BAE Systems. Evidence to Commons Defence Committee. The Future of the UK's Strategic Nuclear Deterrent: the Manufacturing and Skills Base, 2006

**Defence dependency**

Barrow is, however, a hotspot of defence dependency. Indeed, the labour market is one of the most defence dependent and isolated in the UK. The Government's 2007 Deprivation Indices rank Barrow as the 29th most deprived local authority area out of 354 in England and it is the only district in Cumbria among the 50 most deprived districts in the country. In July 2007 the unemployment rate in Barrow (2.6 per cent) was a full percentage point above the Cumbrian average (1.6 per cent) and over a quarter percentage point above the UK average (2.3 per cent). Long-term unemployment also persists in the town. The numbers of long-term unemployed (claiming benefits for over one year) fell across Cumbria over the two years to July 2007, with the exception of Barrow where almost 13 per cent of the workforce has been out of work for over 12 months. In addition, Barrow has the third highest percentage of working age population claiming Incapacity Benefit in England (13.4 per cent, 5,650 people). Research by Sheffield Hallam University

(2007) into Barrow's Incapacity Benefit claimants identified that almost half of all claimants had been out-of-work for more than 10 years, and more than half had no formal qualifications. GlaxoSmithKline, the next biggest employer in the region after the shipyard, has shed 330 of the 537 jobs at its pharmaceuticals factory in Ulverston, Cumbria, over the past two years.

A government-supported plan for defence diversification is therefore essential. The town's geographical isolation and level of deprivation fully justify government intervention. Experience from base closure and restructuring plans from Britain and the United States has revealed some important lessons. To be effective in mitigating the effects of closure or restructuring on local jobs and services, the development of a plan for the re-use of facilities and redevelopment of the local economy and new industries and jobs must be started early and involve local community organisations, workers and firms. Above all they need the intervention of Government and significant resources to be made available to ensure there is adequate funding to absorb redundant workers into alternative jobs in the private and public economy.

In the United States, the Base Realignment and Closure initiative (BRAC) has been applied to 530 base closures and realignments since 1998. Almost all have achieved most of their objectives and a number have generated more employment than that lost through closure.<sup>50</sup> BRAC is governed by legislation detailing key processes which ensure that redevelopment plans must come from the local community. A Local Redevelopment Authority is formed which must include all major groups and communities affected. Central government has a clear role in

facilitating this process. It can ensure fast-track environmental clean-up, funds to provide transitional support for displaced workers and economic planning grants. It can ensure that property changes hands below market value if it is for job creating purposes.

If a programme such as this were implemented in Barrow, alternative employment could be provided and very few job losses need occur. Spending a fraction of the £20 billion procurement costs for Trident would enable local employers and local authorities to absorb many of those made redundant. As Steven Schofield argued in 2007, had there been government support for the defence diversification plans advanced by the Barrow shop stewards in 1987, the town would have been spared the very high unemployment of the following years when the shipyard labour force contracted from 12,000 to 3,000.<sup>51</sup>

### **Local regeneration plan**

The town of Barrow already has a multi-million pound regeneration programme chaired by Murray Easton CBE, former BAE Systems Submarines Managing Director. Its primary function is to ensure projects identified in the Cumbria Sub Regional Action Plan designed to create sustainable jobs, attract private sector investment and boost tourism, become a reality. These include a waterfront development with a new marina berthing 400 boats, a marina village with leisure, recreational facilities and 650 new homes, a new business park, a multi-million pound Housing Market Renewal programme and a new Academy for the town. It will also play a role in supporting the development of Barrow's shipyard. The Cumbria Sub Regional Action Plan includes 20 priority projects which could create 11,000 new jobs and was endorsed as a "market leader" for the United Kingdom by Business Secretary Lord Mandelson at the recent Cumbria Economic Summit 2009. These are significant numbers of new jobs, predominantly in construction and allied trades. Finishing trade workers made redundant from the Barrow shipyard would be likely to find new work.

There are, therefore, many possible solutions to the problem of Barrow and its defence dependency. Lack of nuclear submarine work after 2016-20 could require the Barrow shipyard to adapt to surface ship design and construction, especially in new niche markets, the design and manufacture of unmanned undersea vehicles and the manufacture of turbines to harness marine and wind energy. Some of this may require new investment. Thousands of new jobs in the Barrow area can be created through the existing regeneration plan, the new waterfront development and extensive house building programme. Lastly, a government-led defence diversification plan with real resources, early planning and trade union and community involvement could ensure that few if any jobs were lost in the event of nuclear submarine construction at Barrow coming to an end in the course of the next decade.<sup>52</sup>

## Arms conversion and the TUC's call for an activist industrial policy

The 2009 Trades Union Congress's main economic resolution stressed three things. One was the need to rebalance the economy away from an unsustainable reliance on financial services. The second was the need for a radical enhancement of an activist industrial policy to provide investment in new manufacturing jobs and sustain the research and development required to create such employment. The third was the importance of developing the technologies required for the green economy, for minimising carbon emissions and for alternative sources of energy.

‘...there must be a focus on those high value, high skill industries where the UK can compete with the best in the world. Furthermore, as the UK strives to meet its climate change targets, there is a strong case for government intervention both to develop green industries such as the building of wind turbines and the greening of more traditional industries such as motor manufacture... New Industry, New Jobs highlighted a number of sectors where the UK could remain successful in the future. These included low carbon industries, ultra-low carbon vehicles, digital industries, life sciences and pharmaceuticals, and advanced manufacturing. The Budget made available £750m for a strategic investment fund, to support this new policy. The TUC strongly welcomed these developments. We argued that every penny of this £750m must be directed towards industries with the potential to be jobs-rich... Industrial policy must target other sectors that can provide economic growth, export potential, high research and development, and high quality jobs. In some cases, this will entail short term interventions to support strategically important companies that have a long term future but are struggling in the economic downturn... It is also vital that the Government's recent and welcome efforts to take a more activist approach to shifting the UK towards a low carbon economy are maintained. Work to create the right legislative, regulatory, investment and skills framework to reduce carbon emissions in key sectors is already underway and the TUC welcomes the fact that trade unions are now playing a key role in the development of policy in this area. It is particularly important that such policy is shaped and implemented in the spirit of a ‘just transition’ which ensures that the move to a low carbon economy does not damage livelihoods and working lives but actually enhances them.’

This need for a ‘just transition’ applies with equal force to the defence industry which now faces a period of major contraction. So does the demand for planned, targeted government intervention in particular areas - as demonstrated by the success of the BRAC programme in the US.

Such an activist approach also matches other priorities which have to be met if Britain's industrial economy is to be redeveloped. The July 2010 OECD report on investment in R&D highlighted the fall in Britain's investment as a percentage of GDP from 2.2 per cent in 1980 to 1.7 per cent in 2008 – at a time when the US is investing 2.7 per cent and Germany 2.5 per cent. The very high level scientific, design and technical skills held within the workforce at Barrow, and also the scientific skills at AWE, are precisely those required for at least some of the technologies required for a transition to

a green economy. This is perhaps particularly so for marine energy technologies where considerable developmental work is, according to the International Energy Agency, still required to develop fully efficient systems and where Britain therefore has an opportunity to secure niche markets.<sup>53</sup> The following section presents the case for such investment.

## **New employment and marine energy**

The geographical location of our island nation jutting out into the Atlantic gives Britain its unique and unpredictable weather system. Atlantic waves pound our shores. Our inlets, bays and estuaries have some of the biggest tidal surges and strongest currents in the world. There is scarcely a day when the wind is not blowing strongly over part of our land or coastal waters. All this represents a huge source of untapped potential for us to exploit in the drive to reduce our production of climate damaging gases. It is estimated that Scotland alone has 25 per cent of the EU's potential tidal power and around 10 per cent of its wave potential. Britain is uniquely placed to harness this wind, wave and tidal energy, to utilise our engineering expertise and our know-how from oil and gas extraction in the North Sea, and to provide new jobs for thousands of workers at the same time. If our shipyards are likely to see hard times from the collapse of merchant shipbuilding demand and the severe curtailment of military ship building programmes over the next decade, there are huge opportunities emerging in the next few years to develop manufacturing of the equipment and platforms for tapping into offshore wind and marine power.

In the first few months of 2010 the Government announced a series of measures designed to meet its 2020 target to source 15 per cent of its energy from renewable sources – a target that only looks ambitious because of our very low starting point by comparison with other European countries. In February 2010, the government announced a further expansion of its renewable energy programme – a £75bn plan to develop at least 25GW of wind power at nine sites around the British Isles. Despite the closure in 2009 of Vestas, Britain's only wind turbine blade manufacturer, the sheer scale of new offshore renewable energy projects under construction or at the planning stage in UK waters will test the capacity of existing manufacturers worldwide. It will also stimulate a race to design new, larger and more innovative wind turbines which can operate in the challenging environment of Britain's offshore continental shelf. Britain is a late comer to this industry and until now the leading role in wind turbine manufacture has come from Denmark, Germany and Spain. Even if that continues to be the case, the manufacture in the UK under license, the installation and the infrastructure development work to ports and harbours and the power connections to the national grid will create work for thousands of people in Britain over the next 10 years.

But it is in marine energy that the greatest potential lies for the UK economy. Here the UK retains the leading role in design and development and the race to develop that potential is so important, not just for meeting Britain's carbon reduction targets but also for becoming a market leader for the rest of the world. Britain has more businesses developing tidal stream

and wave power technologies than any other country. But the technology, unlike wind and solar energy, is not yet fully mature. The difficulties of trying to get funding for emerging technologies in the current financial situation were highlighted for the Edinburgh-based company Pelamis Marine Power when the project to install three of its 'sea-snake' machines in Portugal collapsed when its partner company Babcock & Brown went bankrupt. In February 2010, the UK carbon trust announced it was investing £22 million in the six most promising technologies for developing new wave and tidal stream power. And the following month the crown estate and the Scottish Government unveiled a £4bn project to build ten wave and tidal power sites around the Orkney Islands and the Pentland Firth capable of producing more energy than the Dungeness B nuclear power station in Kent. The projects are evenly divided between wave and tidal stream projects and are in partnership with three of the UK's largest energy companies – E.on, Scottish & Southern Energy and Scottish Power Renewables. These are the world's first commercial wave and tidal power projects. The Pentland Firth has some of the most powerful currents and tidal surges in the world and gets some of the biggest waves in the UK. Carbon Trust Chief Executive Tom Delay said: 'Marine energy could over time provide up to 20 per cent of the UK's electricity...wave alone presents a £2bn economic opportunity for the UK.'

And the timing of this is important. Marine power is roughly ten years behind offshore wind development. The smaller scale wave and tidal stream arrays currently being established in the Pentland Firth and off the coast of Orkney will be followed by much larger arrays of second and third generation systems from 2015 and truly large scale deployment in the period from 2020. And that is when the boom in construction, installation and maintenance will occur and the boost to upstream supply industries. The construction work on the Astute Class submarines will be tailing off at the shipyard in Barrow from 2015. Other naval projects such as the Type 45 Destroyer programme and the Queen Elizabeth Class aircraft carriers will be nearing completion around that time. In the absence of further naval shipbuilding orders, these yards could be adapted, with some investment, to build equipment to harness wind and marine power. A similar transformation took place in shipyards all over Britain in the 1970s and 80s with the boom in building platforms for the North Sea oil and gas industry. Indeed, in their 2010 election manifesto the Liberal Democrats argued for a 'green stimulus' plan which would create 100,000 jobs and include investing up to £400 million in refurbishing shipyards in the North of England and Scotland so that they can manufacture offshore wind turbines and other marine renewable energy equipment.<sup>54</sup> On a visit to Newcastle on 11th February Nick Clegg said that it was a 'scandal' that Britain did not have the capacity to produce the giant turbines needed for the offshore wind farms being planned for the North and Irish seas. He said that disused shipyards should be upgraded to allow them to produce the new equipment.<sup>55</sup> The Coalition Agreement included the statement 'We will introduce measures to encourage marine energy'.<sup>56</sup> It remains to be seen how much of the Liberal Democrats' bold plans will survive in the current atmosphere of deep cuts in public spending.

One thing is clear. We cannot rely on market forces to deliver. Marine renewable technologies are costly, and returns on investments can take several years. Venture or private equity capital in Britain typically looks for short term returns. Only the big energy companies have a commercial need to invest in renewables as part of the UK government incentive scheme. At UK level they can get two Renewables Obligation Certificates (ROCs) per megawatt for offshore wind and the same for wave and tidal. Yet marine renewables are currently more expensive and the technology less proven than offshore wind, so without government support, the investment community is unlikely to jump on board.

This is recognised in the Marine Energy Action Plan when it calls for ensuring ‘appropriate levels of targeted funding’...‘to bridge the technology market failures that exist in this developing sector, subject to the budget in the next public spending round.’<sup>57</sup> The shipyard at Barrow could become, with appropriate investment, a major centre for the design and manufacture of wave and tidal turbines. The skills that are needed for complex submarine and shipbuilding, such as steel working and engineering and marine design expertise are similar to those required for marine energy developments. Britain also has a wealth of experience in offshore oil and gas exploration and production. They would require external investment, and require infrastructure developments such as the ability to make rapid grid connections, positive feed-in tariffs for all sizes of suppliers and modifications to ports and harbour areas and upgrading transport networks. If we invest the money saved by cancelling Trident, we could make the UK a world leader in wave and tidal power technology and create hundreds of thousands of new jobs in Britain, more than compensating for the jobs lost by cancelling Trident replacement.

## Conclusion

**T**he issue of defence jobs is important for the lives of thousands of families in Britain and for the trade unions which represent them. But it is not more important than the lives of people in other lands. The Trident nuclear submarine missile system is a weapon of indiscriminate mass slaughter. It threatens innocent people in other lands and it makes the people of Britain a potential target. We now have an opportunity to stop the production of weapons of war, change to socially useful work and tackle the real enemy – climate change – at the same time.

This report has considered the employment consequences across Britain. It concludes that more defence jobs would be lost than gained through Trident replacement – and that the likelihood of cost over-runs in the Defence budget would at the same time impact on public service jobs. This is likely to be the case even if there is no modification of the current Treasury position. Any consequential move in the Treasury position to increase the Defence budget will be directly at the expense of public sector employment.

Given the stage of the SDSR it is not possible to make any precise estimate of the scale and geographical distribution of employment losses arising from Trident replacement – although shipbuilding and jet fighter production are clearly in the frontline. A more precise estimate has been possible for Trident cancellation and this highlights the need for early government intervention, along the lines of the US BRAC programme, in Barrow and AWE. The report stresses the importance of a Just Transition and the need to implement the industrial perspective outlined by the TUC in its 2009 resolution on the economy. It highlights in particular investment in areas that would give Britain a market lead in new technologies and instances that of marine energy.

The renewed nuclear Non-Proliferation Treaty, signed by the British government in May 2010, committed signatories to ‘accomplish the total elimination of their nuclear arsenals’ and to ‘accelerate progress towards disarmament rapidly moving towards an overall reduction in the global stockpile of nuclear weapons.’ Six months before at the Copenhagen Climate Change summit in December 2009 the closing Accord stated ‘we recognize the critical impact of climate change...and stress the need to establish a comprehensive adaptation programme including international support’. The non-replacement of Trident would provide the opportunity for Britain to make a major international contribution to both these objectives and at the same time contribute effectively to the well-being of communities affected.

This report has been compiled for CND by John Ainslie, John Foster and Alan Mackinnon.

- 1 The International Court of Justice ruled in 1996 that the threat or use of nuclear weapons would “generally be contrary to the rules of international law applicable in armed conflict, and in particular the principles and rules of humanitarian law” cited in the House of Commons Research Paper, *Progress towards nuclear disarmament?*, 15 June 2010, paper 10/42.
- 2 Scottish CND and the Scottish Trades Union Congress, *Cancelling Trident: the Economic and Employment Consequences for Scotland*, Glasgow, March 2007; 2009 Working Party Report available at [www.scotland.gov.uk/Resource/Doc/288148/0088043.pdf](http://www.scotland.gov.uk/Resource/Doc/288148/0088043.pdf)
- 3 Report by the Comptroller and Auditor General HC 85-I Session 2009–2010, 15 December 2009.
- 4 HC 338, 23 March 2010.
- 5 Defence Equipment 2010, Sixth Report of Session 2009–10 Report, HC 99, 10 March 2010.
- 6 Professor Trevor Taylor of the Defence Academy, Cranfield University, writing in *Defence Management* 19 August 2010, indicates that the MoD had been asked to prepare plans for two eventualities, real cuts of up to ten per cent and real cuts of up to 20 per cent.
- 7 Consolidated Department Resource Accounts 2009-10 HC 258, 26 July 2010 estimates for administrative costs p.117.
- 8 Hansard Written Answer by Des Browne 30 October 2007.
- 9 Ministry of Defence, *The United Kingdom's Future Nuclear Deterrent Capability*, National Audit Office, HC 1115 Session 2007-08, 5 November 2008, page 18.
- 10 MoD response to a Scottish CND request under FOIA for Defence Board Report (09)62.
- 11 Summary of meetings of the Defence Board in November and December 2009 obtained by Rob Edwards, robedwards.com
- 12 *Industrial Infrastructure – How do we deliver?* Murray Easton, Managing Director, Submarine Solutions, BAE Systems, RUSI conference on Delivering the Underwater Battlespace, 14 January 2008.
- 13 CIPS Regional Event, Gary Vibert, Head of Supply Chain – Future Submarines, BAE systems.
- 14 These figures are derived from adding the core costs of £1 billion, AWE modernisation costs rising to £1 billion and successor submarine costs rising from £400 million to £1 billion per year.
- 15 Cited in the House of Commons Research Paper, ‘Progress towards nuclear disarmament?’, 15 June 2010, paper 10/42.
- 16 Our conclusions on cost escalation are broadly similar to those of Dr Nick Ritchie, *Continuity/Change: Rethinking Options for Trident Replacement*, Bradford Disarmament Research Centre, University of Bradford, June 2010, funded by the Joseph Rowntree Foundation.
- 17 *Consolidated Departmental Resource Accounts*, HC 259, 26 July 2010, Pp. 131 and 133.
- 18 The US Navy has plans to replace its Trident submarines, the Ohio class. In 2006 they estimated that each of the new vessels would cost \$3.4 bn (in FY2008 prices). On 20 January 2010 three experts told the Seapower subcommittee of the House Armed Services committee that the revised cost had doubled to \$6-7 bn. Seapower subcommittee of the House Armed Services Committee, 20 January 2010. [http://armedservices.house.gov/hearing\\_information.shtml](http://armedservices.house.gov/hearing_information.shtml). Statement and evidence from Rear Admiral Johnson, Director SSP before the Sub Committee on Strategic Forces of the Senate Armed Services Committee 17 March 2010. [http://armed-services.senate.gov/e\\_witnesslist.cfm?id=4467](http://armed-services.senate.gov/e_witnesslist.cfm?id=4467). Loren Thompson, Chief Executive of the Lexington Institute, told the committee that the Navy’s calculations were that R&D would be \$15 bn, the lead ship \$10 bn and each subsequent ship \$5 bn. If the 4-boat British fleet were costed on the same basis the total would be \$40 billion (£24.7 bn). This is almost double the £11-14 bn estimate for the new submarine in the 2006 White Paper. This difference cannot be explained by the smaller number of missile tubes (12 rather than 16). The total cost of 12 new US submarines is projected to be \$80 billion. Taking this amount from the navy’s shipbuilding programme would drastically reduce their plans to build other warships.
- 19 Testimony from Robert Gates, Defence Secretary, to House Armed Services Committee 24 March 2010.
- 20 Gene Taylor, chair of the Seapower committee, and others have advocated that the Ohio replacement should be funded from outwith the shipbuilding budget. They also want the US Navy to look at cheaper alternatives. The House of Representatives are insisting that the Navy release their study into options for replacing the Ohio class. This demand is included in the Defence Authorisation Act for 2011. This withholds half of the money allocated to the programme until this study is handed to Congress.
- 21 In addition the Senate Armed Services Committee was told on 17 March 2010 that the Navy is “facing significant cost challenges” over the Trident missile. The cost of building new rocket motors has increased by 10-20% and is expected to continue to rise by up to 50% because of limited orders from NASA. While the UK claims that it can build nuclear submarines for less than the US, the latest figures suggest that Trident replacement could cost more than originally projected. The desire to build a new reactor, PWR3, and the safety requirements imposed by the Defence Nuclear Safety Regulator are likely to increase the cost of the British programme. Missile costs are also likely to rise in line with the increase in the US.



- 22 HC 2006-07, Defence Committee, Manufacturing and Skills Base, Evidence from Lord Drayson, 21 November 2006, Q 268 and Memorandum from the Nuclear Information Service EV 87.
- 23 On 27 August 2010, the chair of UK Aerospace, Defence and Security, the UK defence manufacturers association, Ian Godden sent a letter to the PM indicating ‘great concern’ at the recent statements by senior ministers and claiming ‘the uncertainty caused by these statements will be as unsettling for investors as it must surely be for our allies.’ *Herald*, 27 August 2010.
- 24 *Sunday Telegraph*, 1 August, 2010.
- 25 Malcolm Chalmers, ‘A question of balance: The deficit and defence priorities’, RUSI Working Paper 7, June 2010.
- 26 Research by the Fraser of Allander Institute for SBAC in 2009 estimated the 3,400 jobs in the Glasgow yards to sustain another 4,600 jobs across the UK economy and the 3,000 jobs at Portsmouth to sustain another 3,200.
- 27 [navy.mod.uk/operations-and-support/surface-fleet/aircraft-carriers/hms-illustrious/lusty-update/aircraft-carrier-arrives-in-scotland,-providing-work-for-300-at-rosyth+Babcock+Rosyth+employment+aircraft+carrier+jobs&cd=8&chl=en&ct=clnk&gl=uk](http://navy.mod.uk/operations-and-support/surface-fleet/aircraft-carriers/hms-illustrious/lusty-update/aircraft-carrier-arrives-in-scotland,-providing-work-for-300-at-rosyth+Babcock+Rosyth+employment+aircraft+carrier+jobs&cd=8&chl=en&ct=clnk&gl=uk)
- 28 HC 99 Defence Committee: Equipment (published 4 March 2010) Memorandum from the Ministry of Defence. Item 9.
- 29 Ibid.
- 30 [www.baesystems.com/fresandwarrior](http://www.baesystems.com/fresandwarrior)
- 31 David Mugridge, *Defence Management Journal*, August 2010.
- 32 *Sunday Telegraph*, 8 August 2010 and statement of Angus Robertson MP, Press and Journal 20 August 2010.
- 33 The Economic Impact Moray RAF Bases, Draft August 2010:  
[http://www.hie.co.uk/Downloads/2010/MorayEIA/RAF\\_Economic\\_Impact\\_Assesment\\_Exec\\_Summary.pdf](http://www.hie.co.uk/Downloads/2010/MorayEIA/RAF_Economic_Impact_Assesment_Exec_Summary.pdf)
- 34 *The Herald* announced on 25 August that the Scottish Government had placed the issue of defence cuts on the agenda of the next joint governmental meeting of the devolved administrations of Scotland, Wales and Northern Ireland with UK government.
- 35 Scottish CND and the Scottish Trades Union Congress, *Cancelling Trident: the Economic and Employment Consequences for Scotland*, Glasgow, March 2007, p.19.
- 36 Devonport dockyard’s role in supporting the nuclear submarine programme is changing. The dockyard has been carrying out refueling as well as refit work. Refueling is a particularly complex process involving handling of radioactive material, both used fuel and new fuel. The last refueling that is scheduled to be carried out is on the fourth Vanguard class submarine, HMS Vengeance, from 2011 to 2014. Thereafter Devonport would only be carrying out refit work on submarines and defueling vessels which have been retired. The new workload will mean that there is not a steady stream of submarine work. It is likely to fluctuate by a factor of 4:1 on a 3 year cycle.
- The earlier Vanguard class submarines may be scheduled for some refit work in the dockyard from 2014 onwards. The extent of work required on each vessel is probably currently under discussion. If the decision on a replacement is delayed there may be more refit work on the Vanguard class to extend their life. Astute class submarines will be due for refit, but not refueling, some time after 2020. Any Trident replacement would not be due for refit at Devonport until after 2035. In 2006 Devonport dockyard employed 5,200 staff of whom 4,700 were permanent staff. The dockyard carries out work on both submarines and surface vessels. The proportion employed on submarines at a particular time is not known. Many of the staff can be moved between submarine and surface ship work as required. Peter Whitehouse of DML told the Defence Committee that they have a nuclear and non-nuclear maintenance workload and an industrial workforce of 2,200-2,300 that they move between nuclear and conventional work. He explained that for DML the critical factor wasn’t the Trident replacement decision but the need for surface refit work to compensate for the downturn in nuclear work after 2014. Defence Committee report on the Future of the Strategic Deterrent: The Manufacturing and Skills Base.  
<http://www.publications.parliament.uk/pa/cm200607/cmselect/cmdfence/59/5907.htm#a14> page 27.
- 37 In 2006 Rolls Royce told the Defence Committee that it was having problems recruiting suitably qualified personnel. The decrease in the number of students studying mathematics and physics had an impact. This was compounded by the high proportion of post-graduates from overseas. Many key positions within the nuclear submarine programme are restricted to UK citizens for security reasons. Rolls Royce also has a problem with an ageing workforce. In 2006 29% of its submarine engineering workforce were over 50 with a further 31% in the 40 to 50 age bracket. Currently Rolls Royce submarine work is R&D intensive. If there was a decision not to replace Trident then they would probably ‘freeze the level of knowledge that we have’. Defence Committee report on the Future of the Strategic Deterrent: The Manufacturing and Skills Base  
<http://www.publications.parliament.uk/pa/cm200607/cmselect/cmdfence/59/5907.htm#a14> Ev 6.
- 38 Hansard 21 July 2008, col. 846W
- 39 <http://www.ukwirednews.com/news.php/58308-More-jobs-go-at-AWE-Aldermaston-weapons-factory>

- <sup>40</sup> The experience of Dounreay shows that there can be a substantial transition period of decommissioning. In the case of AWE there would be a period when the facility was dismantling the stockpile of warheads. This could take several years. Beyond this the decommissioning of buildings which would no longer be required would take many more years. In the case of Dounreay the operator, Dounreay Site Restoration, currently employs around 1,000 people on decommissioning work and a similar number are employed by contractors. <http://www.dounreay.com/>
- <sup>41</sup> *Verifying Nuclear Disarmament: A Role for AWE Aldermaston*, T Milne and H Wilson, British Pugwash Group 1999; *Road to 2010: Addressing the nuclear question in the twenty first century*, Cabinet Office, July 2009, Cm 7675, page 40; A summary report by the Ministry of Defence on the study conducted by the Atomic Weapons Establishment Aldermaston into the United Kingdom's capabilities to verify the reduction and elimination of nuclear weapons. <http://www.mod.uk/NR/rdonlyres/3B3D7417-EAE1-487F-A0BB-891E841FA973/0/nuclearweaponsverification.pdf>; Presentation on the UK-Norway Initiative on Nuclear Warhead Dismantlement Verification to the NPT PrepCom May 2009. <http://www.vertic.org/assets/Events/090509%20UK-Norway%20Initiative%20Presentation.pdf>
- There has been some similar research conducted by the US Laboratories, Technical Approaches and Information Security, AD Dougan, Lawrence Livermore National Laboratory. <http://www.carnegieendowment.org/static/npp/pdf/20090409-dougan.pdf>
- <sup>42</sup> There is currently a Work For Others (WFO) programme at the US laboratories. This gives government agencies and other organisations access to the facilities and expertise of the laboratories. WFO is also intended to encourage technology transfer from the laboratories to industry. A key motive behind WFO is that this additional work will help the laboratories to retain key skills within their workforce. A report on technology transfer at Los Alamos Laboratory shows the potential for researchers at the laboratories to support projects other than the production of nuclear weapons. Examples include: nanotechnology with potential applications in solar energy and energy storage; climate modeling of the oceans and sea ice; developing alternatives to oil-based materials; research into AIDS; and satellite imagery analysis following natural disasters. Areas where the skills required at AWE merge with those required in the wider economy include science, engineering and Information Technology. There are particular overlaps with the civil nuclear industry and with conventional military research and production.
- <sup>43</sup> Written evidence to the House of Commons Defence Committee from Keep Our Future Afloat Campaign Ev 69, *The Future of the UK's Strategic Nuclear Deterrent: the Manufacturing and Skills Base*. Fourth Report of Session 2006–07.
- <sup>44</sup> Letter to the *Daily Telegraph*, 14 March 2007.
- <sup>45</sup> Number of People with Various Skills to Support a Nuclear Submarine Design Core Source: Rand Corporation. Sustaining Design and Production Resources, Vol 1. [www.rand.com](http://www.rand.com)
- <sup>46</sup> The Development of World Shipbuilding Markets since 2005, OECD Workshop Series, 3 March 2009.
- <sup>47</sup> House of Commons Defence Committee. *The Future of the UK's Strategic Nuclear Deterrent: the Manufacturing and Skills Base* Fourth Report of Session 2006–07.
- <sup>48</sup> Rob Edwards, *Sunday Herald*, 25 July 2010.
- <sup>49</sup> Bank of England, Inflation Report, November 2009, pp. 26–31.
- <sup>50</sup> Congressional Budget Office (1996). *Closing Military Bases: An Interim Assessment*. CBO; Dardia, M., McCarthy, K., Schoeni, R., and Vernez, G. (1996). *Defense Cutbacks: Effects on California's Communities, Firms and Workers*. RAND National Defense Research Institute; Defence Analytical Services Agency (2006). *Defence Statistics 2006*. DASA; George, P. (2006). *Assessing the Economic Impact of Ellsworth Air Force Base on Local Communities*. Black Hills Vision; Hellman, C. (2001). *New Beginnings: How Base Closures Can Improve Local Economies and Transform America's Military*. Taxpayers for Common Sense and Centre for Defense Information; White House (1999). *Economic Renewal: Community Re-use of Former Military Bases*. White House.
- <sup>51</sup> Dr Steven Schofield, *Oceans of Work: Arms Conversion Revisited*, British American Security Information Council, 2007.
- <sup>52</sup> Rand, *The UK's Naval Shipbuilding Industrial Base (2005)*, Report to UK MoD, p. 153.
- <sup>53</sup> International Energy Agency, Energy Technology Network Technology Brief E13, May 2010.
- <sup>54</sup> Liberal Democrat Manifesto 2010, 14 April 2010.
- <sup>55</sup> *The Guardian*, 11 February 2010.
- <sup>56</sup> The Coalition: Our programme for Government, p 16, [www.cabinetoffice.gov.uk/media/409088/pfg\\_coalition.pdf](http://www.cabinetoffice.gov.uk/media/409088/pfg_coalition.pdf).
- <sup>57</sup> Marine Energy Action Plan 2010, p 28.

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