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Written evidence submitted by BP plc (GAP0044)

1. Executive summary

- 1.1. We believe that the concept of 'science capital', a science-related form of cultural capital, provides the best current model for understanding and influencing the choices made by young people – ultimately the UK will close the STEM skills gap by increasing the talent pool of young people who see STEM careers as 'for them'.
- 1.2. We are investing significantly in developing practical approaches that build science capital and are taking them to scale through our range of national partnerships and collaborations.
- 1.3. Whilst BP continues to be able to attract the graduates and apprentices needed for our own UK operations, we depend on and support a wider supply chain^[1] that is much more challenged in accessing sufficient numbers of skilled employees.
- 1.4. We invest in, and work collaboratively with others, on large scale educational and training programmes in order to grow the numbers of young people able to access STEM careers.
- 1.5. Clear evidence exists showing when it is best to focus interventions to influence the choices made by young people about their future careers, which is now known to happen much earlier than previously thought. This implies that investment in promoting STEM after a certain point in the development of a young person has little or no impact on the size of the available STEM talent pool.
- 1.6. BP's activities therefore concentrate on the primary/secondary school transition, consistent with the research evidence about how and when young people decide what is 'for them'.

2. Context

- 2.1. BP is one of the world's leading integrated oil and gas companies. We provide customers with fuel for transportation, energy for heat and light, lubricants to keep engines moving and the petrochemicals products used to make everyday items as diverse as paints, clothes and packaging. BP has been based in the UK for more than 100 years and operates in 70 countries around the world.
- 2.2. BP supports an estimated £8.7 billion gross value added contribution to the UK's gross domestic product (GDP) and 125,900 UK jobs in 2015.
- 2.3. Of this total, BP's direct UK operations - such as oil and gas fields, petrochemical plants, fuels retailing facilities and major offices - created a £2.7 billion gross value added contribution to UK GDP and employed 17,780 people.
- 2.4. The success of BP depends on talented engineers and scientists working for us and our partners. We know from the ESRC-funded 'ASPIRES' research^[2] by King's College London that 70% of young people like science and maths but only 17% think that STEM careers are 'for them'.
- 2.5. In addition, around 40% of young people in the UK do not achieve grade C in English and Maths (or equivalent). This proportion increases when science is included (based on data prior to the introduction of Progress 8 measure). Less engagement with science, and STEM more generally, reduces the range of career paths open to young people. International research (*Against the odds*, OECD, 2011) also shows that taking more science at school benefits disadvantaged students even more than their advantaged peers, so STEM engagement can be a specific approach to increasing social mobility.

3. BP's approach

- 3.1. BP aims to build up what has been termed 'science capital' in young people. We do this by helping young people to form a strong self-identity around the STEM subjects and see themselves as future scientists and engineers. Science capital is a science-related form of cultural capital, and has been shown to be a powerful predictor of a young person's future aspirations.
- 3.2. Developing capability, particularly in the STEM subjects of Science, Technology, Engineering and Mathematics, is one of the three strands of the 'BP in the Community' strategy in the UK. We invest in a focused set of activities that illustrate the industrial context for STEM subjects. We aim to engage and inspire young people to continue studying the STEM subjects and to consider careers made possible by these subjects.
- 3.3. Responding to the research evidence about factors influencing young people's aspirations and choices, we focus our efforts and investment on the transition from primary to secondary education between ages 7 and 14.

3.4. Project ENTHUSE

- 3.4.1. BP is a founding supporter of Project ENTHUSE at the National STEM Learning Centre and Network. This began in 2008. We are a co-funder alongside other industrial partners, learned societies and professional institutions, the Wellcome Trust and the Department for Education.
- 3.4.2. Project ENTHUSE provides bursaries for high quality continuing professional development (CPD) training for teachers in the STEM subjects. BP has extended its support for Project ENTHUSE for the period 2013-18.
- 3.4.3. According to the National Audit Office, which has independently verified the impact on attainment, Project ENTHUSE has made a measurable and positive impact^[3] on the attainment of young people in the STEM subjects and on increased talent retention in the teaching community.
- 3.4.4. The National STEM Learning Centre and Network has trained teachers from over 95% of all state funded secondary schools and over 18% primary schools in the UK since it opened. Several thousand teachers and technicians per year attend courses.

3.5. Enterprising Science

- 3.5.1. Enterprising Science is a major collaborative research and development programme for science education. BP is the principal funder at £4.3m over 5 years. We are working in partnership with the Science Museum Group and King's College London.
- 3.5.2. The research^[4] has found a clear relationship between a student's level of science capital and their future aspirations in the STEM subjects. Girls and those with low cultural capital (non-financial social assets that promote social mobility beyond economic means, first described by Pierre Bourdieu in 1977) are particularly likely to be over-represented among those students with low science capital.
- 3.5.3. We want to raise the overall level of science capital to improve post-16 STEM participation rates and tackle gender inequality. This requires action in late primary and early secondary school years.
- 3.5.4. The project is developing tools and techniques for teachers and museum educators to engage all young people with science. These are being shared through the Science Museum's Learning programme (including Talk Science professional development courses) and through Project ENTHUSE.
- 3.5.5. The content is being developed over a five-year period with young people and their families, teachers and museum educators. The Talk Science training is reaching over 2,200 teacher and museum educators over the same period. These research insights are informing all of BP's work with schools, from employee volunteering to the production of teaching resources.
- 3.5.6. We have seconded two staff from the National STEM Learning Centre and Network into the Enterprising Science project team in order to accelerate use of the research in teacher professional development across the UK.

3.6. BP Educational Service

- 3.6.1. We established the BP Educational Service (BPES) in 1968. It creates high quality teaching resources for STEM teachers to demonstrate real world contexts for learning. The resources are for UK primary and secondary schools but are available and used around the world.
- 3.6.2. Over 50% of secondary schools and 25% of primary schools have downloaded resources in the last year. This is around 8,675 schools in total. Over 75,000 users have registered with BPES, with hundreds of new users joining each month.
- 3.6.3. We produce careers information for schools, sharing it widely through the 'plotr'^[1] website, originally created with the support of the Cabinet Office. We link students with BP scientists and engineers through a series of webchats and face-to-face interactions.

3.7. Schools Link

- 3.7.1. Schools Link is our employee volunteering programme in schools. The purpose is to inspire young people about STEM subjects and business through face-to-face engagement with BP employees.
- 3.7.2. We support around 175 schools (primary and secondary) close to our major sites. We offer approximately 300 work experience placements and provide business/technical mentors for individual students and groups of students. We also work with Career Ready to provide mentoring and paid internships for 16-18 year olds at our sites in Canary Wharf, Sunbury and Aberdeen. Career Ready is a UK wide charity linking employers with schools and colleges to open up the world of work to young people.
- 3.7.3. We support mentoring and coaching related to STEM subjects. This includes support for the Engineering Development Trust's^[6] 'Go4SET' and 'Engineering Education Scheme' programmes and we accredit student projects with 'CREST' awards from the British Science Association.

3.8. Business Class

- 3.8.1. Business Class is the flagship education programme of Business in the Community and BP is their National Champion for STEM education.
- 3.8.2. Business Class brings together a cluster of schools and businesses in a local area, providing a systematic and proven framework for developing these partnerships, rooted in long-term, strategic support and collaborative action.
- 3.8.3. We are embedding the Business Class methodology in selected schools to enhance our existing Schools Link relationship – we call this Schools Link Plus.

3.9. Ultimate STEM Challenge

- 3.9.1. BP is delivering the Ultimate STEM Challenge in partnership with the Science Museum Group and the National STEM Learning Centre and Network. We want to engage 11-14 year olds around the UK with STEM, mainly through extra-curricular STEM clubs.
- 3.9.2. Using insights from Enterprising Science, we want to build a sense of self-identity and self-confidence with STEM subjects amongst young people. We are targeting the formative years before they make subject choices for GCSE and Scottish National qualifications.
- 3.9.3. The majority of UK secondary schools run STEM clubs. They draw on support from STEM Ambassadors across the UK. This creates a potential reach of many thousands of young people per year.
- 3.9.4. The teams entering the Ultimate STEM Challenge are able to accredit their work using CREST awards from the British Science Association.

3.10. Queen Elizabeth Prize for Engineering (QEP)

- 3.10.1. BP is a founder donor to the QEP, contributing £2m over 5 years.
- 3.10.2. The QEP is a biannual global prize recognising and celebrating outstanding advances in engineering that have changed the world. The inaugural prize in 2013 was awarded jointly to the inventors of the internet and the worldwide web.
- 3.10.3. The purpose of the prize is to discover and celebrate the untold stories of engineering success and the people behind them, inspiring a new generation of engineers to take up the challenges of the future.

4. Continuum of BP STEM support in the UK

Age group	Activity	Desired outcome
5-11	<ul style="list-style-type: none">BP Educational Service teaching resourcesSchools Link workshopsProject ENTHUSE teacher CPD training	<ul style="list-style-type: none">Supporting primary school teachers (often without science degree) in enthusing pupils with STEM subjects
11-16	<ul style="list-style-type: none">BP Educational Service teaching resourcesSchools Link workshops (local schools)Ultimate STEM ChallengeEnterprising Science work with schools and museumsEngineering Development Trust programmesBritish Science Association CREST awardsProject ENTHUSE teacher CPD training	<ul style="list-style-type: none">Supporting secondary school teachers in enthusing pupils with STEM subjectsProviding pupils with industrial and BP context for their learningProviding careers information through subject-specific resources
16-19	<ul style="list-style-type: none">BP Educational Service teaching resourcesSchools Link workshopsWork experience placements at BP sitesEnterprising Science work with schools and museumsProject ENTHUSE teacher CPD training	<ul style="list-style-type: none">Supporting secondary school teachers in enthusing pupils with STEM subjectsProviding school pupils and further education (FE) students with industrial and BP context for their learningProviding careers information through subject-specific resources
Early years engagement at university	<ul style="list-style-type: none">Scholarships and awards	<ul style="list-style-type: none">Attracting talented students to BP at the start of their undergraduate studiesAttracting talented students and engaging them with BP
World experts	<ul style="list-style-type: none">Queen Elizabeth Prize for Engineering	<ul style="list-style-type: none">Increasing the reputation and perception of engineering

5. References

[1] <http://www.bp.com/uk/economicimpact>

[2] <http://www.kcl.ac.uk/sspp/departments/education/research/aspires/ASPIRES-final-report-December-2013.pdf>

[3] https://www.stem.org.uk/sites/default/files/pages/downloads/STEM%20Impact%2010%20years%20report_Master_online.pdf

[4] <http://www.kcl.ac.uk/sspp/departments/education/research/Research-Centres/cppr/Research/currentpro/Enterprising-Science/03Research-Outputs.aspx>

[5] <http://www.plotr.co.uk/employers/bp>

[6] <http://www.etrust.org.uk>

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