

A strategy for women in science, engineering and technology

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**GOVERNMENT RESPONSE TO
SET FAIR, A REPORT FROM
BARONESS GREENFIELD CBE TO
THE SECRETARY OF STATE FOR
TRADE AND INDUSTRY**

Office of Science
and Technology

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Foreword

Last year I asked Baroness Susan Greenfield to advise me on what more we in Government should be doing to break down the remaining barriers to women studying and working in science, engineering, and technology. I am extremely grateful to Baroness Greenfield and her team for their work.

Her report *SET Fair* published in November 2002 laid out women's perceptions and experiences, and identified barriers to progress in their education and career development.

It contained a wide-ranging set of helpful recommendations. Since then, we have been considering how best to take these forward as an integral, coherent part of our broader equality work.



In this document, I am setting out our strategy for addressing the issues that Baroness Greenfield identified. It takes particular account of the many developments that have taken place regarding gender equality, and recent achievements in science, engineering and technology. It sets out a comprehensive strategy, organised around the different key levers that are at the disposal of the Government.

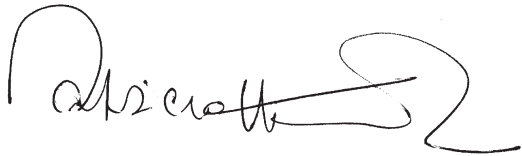
- Government has a major influence on the world of work as a major employer of scientists and engineers, and with other employers as legislator and through supporting change;
- Government funds primary, secondary, further, and higher education, as well as life long learning; and
- Government is a significant investor in research and researchers.

As the Cabinet Minister with particular responsibilities for both science and women, I am encouraged by the progress made since 1997, and especially with regard to women's educational achievements in science, engineering and technology subjects. The reforms we are now making will support further progress at all levels within schools, colleges and higher education institutions. However, we can and must do more to overcome the cultural and other barriers that still exist, especially in employment in both the public and private sectors.

This new strategy is based firmly on the principles of partnership and mainstreaming and is intended to support the present generation of senior

scientists, mainly men, who want to help create a more equitable future. We must work closely with employers, and with the education sector to identify, promulgate and embed best practice. Equally important, we must ensure that our work on this issue is genuinely joined up with our policy framework for achieving gender equality.

Finally, this strategy aims to build on the existing work of the many dedicated women and women's groups, who have tirelessly worked to improve the position of women in science, to mainstream these issues and bring about real and lasting change. The impact of this change will go beyond those women working in science, or aspiring to work in science, to help create a more inclusive science, for the benefit of the economy and society as a whole.

A handwritten signature in black ink, appearing to read 'Patricia Hewitt', with a large, stylized flourish at the end.

Patricia Hewitt
Secretary of State for Trade and Industry

Executive summary

At the request of the Secretary of State for Trade and Industry, Baroness Susan Greenfield produced a report on the position of women in science, engineering and technology (SET), which laid out the barriers to their career development and the business case for securing improvement. The report *SET Fair*¹ was published in November 2002 and it made a number of recommendations for improving the situation. This document is the Government's reply to that report and lays out a new strategy, which meets many of the recommendations and in many respects takes them further.

The new approach builds on mainstream policies with a series of action points in employment, education, and science and it draws support from recent measures to secure gender equality, particularly the Government's new Gender Equality Action Plan which is to be published shortly. It is aimed at academia, industry and public service equally.

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The main new initiatives laid out now are:

1. A new resource centre aimed at supporting, advising and working with SET employers and professional bodies; raising the profile of women in SET; running an expert women's database; producing good practice guides; and developing a means of recognising good SET employers. The centre will draw on the experience of women and women in science organisations to do this, and co-ordinate their activity to achieve critical mass.
2. Pump-priming funds held by the centre to support innovative pilot schemes, for example, for mentoring and networking, or to help with mobility needs. The centre will be expected to draw in private sector funds for such projects.
3. Funds for returners to be held by the centre.
4. Using cross-Government machinery to ensure that all Government Departments, as employers, contractors for research and agency managers, are good SET employers.
5. A new independent implementation group to oversee the strategy's progress and impact during the next two years.
6. A new role for the Office of Science and Technology Promoting SET for Women Unit.
7. Improved statistical monitoring, to enable the position of women's participation in SET to be accurately monitored and tracked.

The Government believes that, taken together, the measures in this strategy will contribute significantly to improving the position of women in SET.

¹ *SET Fair* is available for download at the following web address:
http://www2.set4women.gov.uk/set4women/research/the_greenfield_rev.htm

1 Recent achievements

- 1.1 Many of the issues faced by women participating in the SET sector,² in both education and employment, are also shared by women in other sectors. However, in some parts of the SET sector, for example ITEC³ and engineering, they are more acute because the few women that work in these sectors are necessarily somewhat isolated. Also, the fact that knowledge moves on so quickly in SET makes it particularly difficult for women to return after an extended career break.
- 1.2 For these reasons, the new strategy aims to ensure that mainstream policies reach the SET sector and the women who want to be and are part of it, to the benefit of the community as a whole. It is equally right that the special and acute issues affecting women in SET receive particular attention.
- 1.3 *SET Fair*, the report from Baroness Greenfield to the Secretary of State for Trade and Industry, recommended: a working science centre; initiatives on returners; good practice guides for human resources issues; specific training activities; amendments to the R&D scoreboard; two new advisory groups; and research and survey activity. Many of these recommendations are taken up in this strategy document.
- 1.4 The publication of Baroness Greenfield's report was timely because it coincided with considerable on-going government activity helpful to women in SET. Government policy has evolved considerably since its publication, both in relation to women and to science.
- 1.5 This Government is pushing the gender equality agenda across the economy and society. It is working to help narrow the gender pay gap and has introduced the Equal Pay questionnaire to encourage employers to pay fairly. The Government has also recently increased the funding available to trade unions, for training representatives in equal pay issues in the workplace. It is taking action to tackle the complex underlying factors behind the gender pay gap, including promoting voluntary pay reviews and good practice on equal pay through the *Fair Pay Champions*⁴ and *Castle Awards*.⁵ It has undertaken a series of case studies, one of them in the engineering sector, about how employers have tackled the gender pay gap.⁶

² By SET, we mean science, engineering and technology as carried out in the private and public sectors. Education at all levels and academia are important parts of the sector, both in their own right and because they shape the attitudes of future generations of scientists, engineers and technologists. However, this strategy is intended also to apply to the wider public sector and the private sector.

³ Information Technology, Electronics and Communications.

⁴ *Fair Pay Champions* are a group of people from business and trade unions to help drive towards achieving equal pay through the promotion and sharing of good practice in their sectors.

⁵ Launched in 2002, the *Castle Awards* encourage, identify and reward good practice in reviewing pay systems and structures within organisations.

⁶ *Towards a Closing of the Gender Pay Gap United Kingdom Country Report* (WEU February 2003).

- 1.6 The recent Employment Act delivered a balanced package of support for working parents including improved maternity rights, new rights for fathers and more access to flexible working. It has introduced the *Work-life Balance Campaign*, supporting more childcare, and widening working options. The Government recognises that legislation is rarely enough on its own, and building on this revamped legal framework, this document sets out concrete measures to meet the big challenge: changing workplace culture.
- 1.7 In 2002, the Government announced a PSA target on gender equality, which will be underpinned by a Gender Equality Action Plan (GEAP) that is currently being prepared by the DTI's Women and Equality Unit (WEU) and a cross-departmental steering group.
- 1.8 The WEU is responsible for driving and monitoring the gender equality target and has been working via development and research projects to offer advice, support and guidance to all those involved in related work. Recent issues addressed have included management policies relevant to women in the workplace. Its recent *Advancing Women in the Workplace Conference* brought together major organisations including Ford, Transco, BT and IBM (Ireland) to focus on tackling the barriers to women's progression in their organisations. Also, early findings from the *Women Returners'* project highlights that basic IT skills are a barrier for women returning to the labour market. It also reports that finding suitable and affordable childcare facilities and work-life balance issues are barriers for women returning to work – issues that are common with women in SET.
- 1.9 The Office of Science and Technology (OST)'s Promoting SET for Women (PSETW) Unit was set up in 1995, in response to *The Rising Tide*⁷ report. The Unit's work has evolved since then. It maintains a website which is a significant resource of information, both detailing the Unit's activities and those of women's organisations and networks, and laying out up-to-date statistics on women's participation in SET in education and employment. It has worked with DTI and other major government departments to ensure that their policies and initiatives do not create unintended barriers to women in SET. It is funding a special initiative on SET returners and a pilot 3-year national mentoring scheme. It has also supported initiatives for schools, marketing SET as interesting and fun for girls as well as boys, through developing role model materials and through *SPARK*, a magazine for 11-14 year olds.
- 1.10 The Unit is supporting the dissemination of *A Guide to Good Practice* for higher education institutions (HEIs) developed by the Athena Project.⁸ It is also seeking to raise the profile of women working in SET by, for example, funding the Royal Society to run the annual Rosalind Franklin Award, the first winner of which was announced in March.

⁷ *The Rising Tide: Women in Science, Engineering and Technology* (HMSO 1994).

⁸ The Athena Project is a UK-wide initiative established in 1999. Its aim is the advancement of women in SET in higher education through collaboration with HEIs to develop, share and disseminate good practice. See <http://www.etechnology.co.uk/campaigns/athena.asp>

- 1.11 OST will now work to move forward on the new strategy laid out in this document. In doing this it will draw on the support of the WEU who will be driving the implementation of the Gender Equality Action Plan across Government. The Government intends to augment this strategy in the future with a new approach to wider diversity issues in science.
- 1.12 This strategy also aims to address the needs of all women in SET including, those from ethnic minority communities; those with disabilities; and those in other disadvantaging circumstances.
- 1.13 The new strategy is a UK-wide one and OST will work closely with the Devolved Administrations on implementation. The Devolved Administrations will be considering the need for any separate activities under devolved powers as appropriate.

2 The world of work

- 2.1 In general, gender segregation in the labour market continues and SET in particular remains a male dominated sector. For example, women account for 25% or less of the workforce in some SET-related industry sectors compared to 80% in health and social work and 45% for all sectors.⁹ The numbers of female SET graduates within SET occupations ran at just over 80,000 in 2002, compared with around 400,000 male SET graduates in SET occupations. These numbers have increased over the past ten years for both sexes but most dramatically for women. Of SET graduates entering employment in 2001, more women went into scientific technician occupations and IT, while the fastest growth for men has been in IT. Women are moving into the associate professional and technical classes but men are moving in greater numbers into professional occupations.
- 2.2 The business case for a diverse workforce is laid out in the Greenfield report. It cites evidence on the link between share price and being an “employer of choice”; it points to the recruitment and training costs, and to the expertise and knowledge, which are saved by retaining staff; and to the potential for missed markets and skills when women are not a part of SET businesses. The Government agrees with the Greenfield report that the management culture of many SET employers needs considerable refinement if they are to reap the financial benefits of recruiting and retaining women in their organisations. To this end, it will fund a new resource centre to drive change amongst SET employers and lead by example as a substantial employer and funder of SET itself.

A new resource centre

- 2.3 One of Baroness Greenfield’s key recommendations to tackle this was a new “Working Science Centre”, to act as a focus for the work of the numerous organisations seeking to help women in SET. The Government accepts this, and intends to set up a resource centre, the main objective of which is to support and advise employers on how to effect change, and which will also put into place some of the initiatives recommended in *SET Fair*. The centre can best be set up speedily, and move to develop all its tasks and have a lasting impact if it is part of an existing organisation.
- 2.4 The resource centre will work with employers to improve the position of women in SET. Its main mode of working will be to provide advice and share

⁹ Source: EOC (2002) based on EOC analysis of the Labour Force Survey Spring 2001, Office for National Statistics. The sector breakdowns do not align easily with SET disciplines, but those where women are less than 25% of the workforce are transport, storage and communication; construction; manufacturing; energy and work; and agriculture and fishing.

best practice amongst employers to help them achieve this end. It will support employers mainly in their use of mainstream policies, resources and budgets, but it will also have a pump-priming capacity (see below) at its disposal to co-fund projects to help employers break down the particular barriers that women may encounter in SET jobs. It will be imperative for the centre to be embedded in the science and engineering community, to engage top management, particularly men, as well as drawing on the expertise of women's groups in SET organisations and women themselves. It will need to work with employers in the private sector, academia and the public services.

2.5 The Government will look to the new centre to carry out specific tasks in support of its overarching objective to work with employers to improve the position of women in SET:

- a. recognition for good SET employers;
- b. the sharing of good employment practice for women in SET;
- c. disseminating and sharing information;
- d. setting up and maintaining an expert women's database;
- e. maintaining and disseminating statistics;
- f. raising the profile of women in SET;
- g. pump-priming innovation through developing, with others, support for initiatives such as, mentoring, networking, speaker's bursaries and mobility issues;
- h. supporting returners; and
- i. co-ordinating the work of women in science organisations.

Recognition for good SET employers

2.6 One way of indicating to women that an employer welcomes their participation in the organisation is by publicly recognising a good SET employer in some way. This was recommended by the Greenfield report and the Government will discuss with employers, and then expect the new resource centre to explore the possible options with those who run relevant existing schemes. *Investors in People, Opportunity Now, An Equal Opportunities Employer* and the *Sunday Times 100 Best Firms to Work For* are some of the best-known existing schemes. For such a scheme to be successful it must be respected by all parties and be capable of demonstrating positive results for the employing organisations and for women. It will need to cover both the public and private sectors.

2.7 The scheme will need to cover items relevant to both women and men, with a particular focus on women in SET, and reflect good human resource policies generally. It is expected that a good SET employer would have:

- open and fair recruitment policies using sources likely to attract women and including women on recruitment panels;
- training for all staff especially top management in diversity and equality issues;
- opportunity for flexible working i.e. part-time, job share, working from home, flexible hours etc;
- use of work-life balance policies;
- equal pay policies and job evaluation;
- open and fair appraisal and career development plans;
- open and fair promotion procedures with women represented on promotion boards;
- participation by women equally with men in training, continuing professional development (CPD), transferable management and top leadership/high-flyer skills; and
- protection from harassment and bullying.

2.8 In addition to the above, which affect all women, there are special factors that affect women in SET that would add other items to the requirements above. SET employers are generally male dominated, particularly at management levels. The ways of working are understood by men but put women at a disadvantage. It is essential therefore that this is tackled at senior levels in the workplace, by both men and women, to bring about appropriate culture change at the top. Change at senior levels will drive change at more junior levels.

2.9 The Government would therefore expect a good SET employer also to have:

- a culture at the top of the organisation which provides an attractive working milieu for both women and men;
- opportunities for women to network with other women in SET, both inside and outside the organisation, and encouragement to join their relevant professional association;
- a mentorship scheme;

- appropriate policies in place for keeping women in touch while they are out of the labour force e.g. paying for key journals, attendance at workplace seminars etc; and
- schemes to encourage the return of skilled and expert scientists, engineers and technologists after a career break.

The sharing of good employment practice for women in SET

- 2.10 The Government believes it will be essential for the new resource centre to work alongside SET employers, to share experience and good practice by developing with them good practice guides focussing on how best to promote careers for women in SET. This work will need both to promote the Government's overall policies on gender equality and flexible working (see chapter 1) and to tackle the special issues that affect women in SET. For example, the Greenfield report drew attention to the Equal Opportunities Commission (EOC)'s model framework on equal pay. It might be helpful to apply this within several SET organisations, and then develop guidance on how to apply the general framework to the specific circumstances of SET. Another example is that the centre might take the good practice guidance developed by the Athena Project for the higher education sector, and adapt and apply it to other sectors where there is a need.

Disseminating and sharing information

- 2.11 A key role for the new centre will be promulgation and information sharing. Clearly for key occasions and building relationships with other organisations face-to-face means of information sharing will be vital. However, it is the Government's intention that this should be backed up by good web facilities offering:
- a resource database of information about supportive mainstream policies, initiatives and budgets that can be drawn on by employers and women's groups;
 - texts of advice and guidance and a database of good practice examples;
 - statistical and research information;
 - details of relevant women's organisations and their current activities; and
 - links to other sites e.g. relevant Government departments, professional SET organisations and relevant employers.

Expert women's database

- 2.12 As Baroness Greenfield points out it is important that women play a proper role in key national strategic and policy making committees and other bodies. Building on the *SET Fair* recommendations the Government will provide finance for the new centre to set up a database of expert women in SET. This must be respected, be broadly based in terms of skills cover and be well used. It must also be widely promulgated; comply with data protection law; be consistently updated; and consider appropriate screening mechanisms. Once set up, relevant public bodies will be required to consult it. It is more likely to be successful if it builds on the experience of previous similar initiatives and is operated in partnership with those that have such experience. It must include women from industry, business and the public sector, including higher education. It will be made widely and easily accessible. A high quality database would be greatly valued by all those seeking to make appointments. A web-based initiative may be the way forward, following the example of the Public Appointments Unit in the Cabinet Office, which now maintains an online database of vacancies. The WEU has already produced a resource pack for those wanting to appoint women to public bodies.

Keeping up-to-date statistics

- 2.13 The Government has a contract with the University of Warwick's Institute for Employment Research (IER) to revise and update UK statistics on the participation of women in SET, which are made available in the public domain via the PSETW Unit's website. This will continue under the aegis of the new centre and, when the data allows, provide improved gender breakdowns and interpretation. The centre should also work with professional SET organisations to encourage them to gather statistical data on gender related matters.

Raising the profile of women in SET

- 2.14 The Greenfield report was rightly concerned to see a higher profile for successful women in SET. The new centre will be tasked to do this and will need to explore how it can be done most effectively perhaps through media and marketing campaigns. There are a number of existing awards and prizes that both recognise achievement and attract attention within the relevant fields of SET and beyond. In early 2003 the Government supported the Athena Project's inaugural Athena Awards and contributed funding towards the Royal Society's annual Rosalind Franklin Award. These are examples of ways in which the new centre might meet this part of its remit.

Pump-priming innovation: returners, mentoring and networking

- 2.15 The Government will make allowance in the budget of the new resource centre to pump-prime innovation that meets the main objective of the centre. However, there will be a requirement to write up and share lessons from the innovation, and to bed it into mainstream activity after the initial phase. Such innovations could include developments for returners, and to support mentoring, networking and mobility. These are discussed more fully below.

Returners

- 2.16 A further difficulty confronted by those in SET employment, and as recognised in the Greenfield report, is that in SET disciplines knowledge moves on very quickly and there is considerable disadvantage in being out of the workforce for any substantial period of time. This problem impacts disproportionately on women, and the Greenfield report sees it as one of the main barriers for women wanting to return to SET careers. This barrier can be lowered in two main ways, encouraging employers to maintain pro-active contact with employees during a career break so as to reduce its impact, or supporting returners who are not linked to a particular employer by enhancing their attractiveness to a potential employer and easing their transition back into work.
- 2.17 There has been much encouragement of employers to adopt strategies that will keep a woman in touch with an organisation over her career break. Many employers now recognise that retaining such women is more cost-effective than new recruitment and there are good examples in place such as Kings College Hospital. The resource centre will need to look to organisations in the private and public sector to consider these policies, build on the good examples and consider pump-priming innovative pilot projects.
- 2.18 Several initiatives have also tackled the issue of those who have no such employer links but want to return to a SET occupation. In the higher education sector the Daphne Jackson Trust has been exemplary in funding fellowships for women returning to SET careers. In the case of one DTI funded scheme, known as TCS, and soon to be re-launched as Knowledge Transfer Partnerships, recently qualified graduates undertake a two year long project in a business as TCS Associates with additional support and input from academics. It is being extended on a pilot basis in the West Midlands to enable SET returners to become TCS Associates in place of recently qualified people. There are also examples of returners' schemes in the private sector.
- 2.19 The Government will be funding the resource centre to co-ordinate all these initiatives by providing finance for returners. The resource centre will build on successful existing work using this dedicated public funding to lever in private

sector resources to expand the options available to returners. It is also important to maximise the skills of those women who have studied science and technology subjects at A-Level but may not have pursued a related career for a period of time. OST will work with the Department for Education and Skills (DfES) to explore whether the Learning and Skills Councils could help potential returners in this situation: mainly women who have taken career breaks, as well as men.

- 2.20 A related problem for women's career development, mentioned in *SET Fair*, is the issue of mobility. The Government has recently increased funding to the Royal Society to, among other things, introduce a new scheme to support scientists who have to relocate their research to follow a career move by their partner/spouse in order that they can continue their research career with the minimum of disruption in a new location, and has continued to support the Dorothy Hodgkin Fellowship Scheme. Both schemes are aimed at keeping younger postdoctoral researchers active in science who might otherwise leave e.g. for family reasons.

Mentoring and networking

- 2.21 As many women work in some isolation in SET occupations and in organisations where most of the workforce is made up of men, mentoring and networking are very helpful mechanisms, as recommended in Baroness Greenfield's report. Networks range from professional bodies that often have only a low women's membership, to web based networks, to active groups who arrange face-to-face meetings and events. For example, the Athena Project has worked to establish regionally based networks of women working in SET in higher education, research establishments or in related industry and the professions. These Local Academic Women's Networks work to raise the profile of women within these institutions and to improve women's career development. Each network has its own agenda – some are based around speaker programmes, others focus on mentoring and networking. The strengthening of these networks, and an increase in women's participation in professional bodies, is something that might be addressed with innovative grants.
- 2.22 Progress has already been made with mentoring. The Government is funding a national pilot mentoring project delivered by a collaboration between WES/AWiSE,¹⁰ and so far over 40 mentors and mentees have been matched. Several large employers in the private sector already have such schemes. The resource centre might support innovative mentoring projects or the pump-priming of them.

¹⁰ Women's Engineering Society and Association of Women in Science and Engineering respectively.

Co-ordinating the work of women in science organisations

- 2.23 *SET Fair* pointed out that the organisations that aimed to promote women in SET were often fragile and fragmented. There is an important role for the new centre to strengthen such organisations, to consolidate their expertise and experience, to draw lessons from it, to share this learning across organisations, and where appropriate facilitate the co-ordination of activity. Close involvement of women in science organisations in the centre's work will be vital.

Setting up the centre

- 2.24 The centre will need to work in accordance with Government policies and add value to make a lasting impact. As mentioned in section 2.3, the Government will be looking for bids to run the centre from organisations which are already active in the fields of science and employment. Whoever hosts the centre, it will be important for the centre to work in partnership with professional SET bodies and others in the SET community, with organisations from the world of work such as the CBI, the TUC, large and small employers, and the Sector Skills Councils (SSCs). The new centre will be expected to raise funds from other sources both private and public. It is expected that organisations that want partnership with and support from the resource centre will contribute resources, both to specific projects and to allow the centre to operate more widely, to maximise the leverage of the initial public funding to the centre.
- 2.25 The new centre will be run under contract to OST. The Government will develop this outline as a specification and proposals for the new centre will be invited via a competitive tender exercise. The Government will look favourably on proposals that are able to start operating quickly and will take into account the amount of co-funding that bidders can draw on. It will be encouraging bids from organisations that are already active in the fields of science and employment, and would hope to see collaborative and partnership bids.

Influencing employment practice from the centre in the public and private sectors

- 2.26 Many Government departments have relevant responsibilities that could have a major impact on women in SET. Alongside policy responsibilities, they are large employers themselves and they also manage scientific bodies and let a large number of research contracts. Ensuring equal opportunities policies are required in these contracts, and in the forward plans of a range of science bodies and agencies could have a far-reaching effect. There is already much good practice in place. One example is the Department of Health. It sponsors the pharmaceutical industry, it manages a number of agencies all of which are

science based, and it lets a large number of scientific research contracts. All this activity relies on expert scientists. Other Government departments have a similar range of science responsibilities e.g. the Department for Environment, Food and Rural Affairs (DEFRA).

- 2.27 OST is part of DTI which interfaces with almost half the business and industrial sector in England. Through this route encouragement can be given to improve the situation of female scientists, engineers and technologists in particular sectors. The Government will work with the new Skills for Business Network to promote women's representation in SET. The network of Sector Skills Councils (SSCs) has been charged to lead the skills and productivity drive in industry or business sectors recognised by employers. They bring together employers, trade unions and professional bodies working with Government to develop the skills that UK business needs. Amongst the first fully licensed SSCs are SEMTA, covering engineering manufacture and science-based occupations such as a biotechnology, and e-Skills UK, covering IT, telecommunications and the call centre sectors. Both organisations have worked with Government Departments and other partners to address the under-representation of women in SET-based occupations and will have key roles in the future as SSCs.
- 2.28 Work to improve the position of women in the IT sector has been running for some time, but women still represent only 1 in 5 of the IT workforce. New research from IT employers suggests women are leaving IT jobs in greater numbers than they are recruited. In the White Paper *Opportunity for All in a World of Change* (February 2001), the DTI and the Department for Education and Skills (DfES) set out their intention to work with business and other partners to reverse the under-representation of women in IT. The aim was to match the best of the UK's competitors with regard to the proportion of women in IT, including a number of major programmes:
- working to change young people's perceptions of careers in IT, using role models and mentors, school workshops about IT and the launch of the Computer Clubs for Girls initiative, now supported by the South East of England Development Agency;
 - providing web-based resources, through IT Compass and Equalitec, to help women into and remain in IT and related SET occupations; and
 - promoting work-life balance programmes in IT and related sectors as part of the DTI's *Work-Life Balance Campaign*.
- 2.29 Business culture and organisation need to change if more women are to remain in IT. DTI is working with the trade association Intellect and the new SSC to push for a transformation that is more supportive of women in the IT workforce.

2.30 Parallel types of projects have been undertaken with the construction sector and several leading companies in other high tech sectors are addressing the issue. The Chemicals Innovation and Growth Team report highlighted the need for greater diversity within the chemicals industry and made recommendations on how this might be tackled. The Chemistry Leadership Council together with the Skills Network Group will be addressing these matters and the recommendations addressed to senior management within the companies themselves. The DTI Chemicals Unit will be playing its part in encouraging the industry to greater diversity.

Action points from this chapter

- *OST will call for proposals for the new resource centre urgently with a view to awarding a contract by Autumn 2003.*
- *OST will work with the resource centre to develop more co-ordinated support for returners by the end of 2003.*
- *OST will work with DTI colleagues to implement the Gender Equality Action Plan and to roll out the good work done with the IT and chemical sectors, to other sectors.*
- *OST will work through cross-government machinery to ensure that Government Departments as employers, contractors and agency managers involving large numbers of women from SET disciplines, are good SET employers. As set out in chapter 4, OST will lead by example through its own work in sponsoring the Research Councils and their Institutes.*

3 Using mainstream educational policies to improve the position of women in science

- 3.1 This Government has put in train a major reform agenda across all sectors of education and training:
- a. The reform programme for secondary education set out in the *Schools – Achieving Success* White Paper,¹¹ will raise achievement and expand opportunities for high-quality vocational learning in secondary education.
 - b. The proposals in *14-19: Opportunity and Excellence*¹² will strengthen the vocational options for young people, including Modern Apprenticeships, and address the tendency for early specialisation in academic subjects.
 - c. *Skills for Life*,¹³ the national strategy for improving adult literacy and numeracy, aims to help create a society where adults have the basic skills they need to find and keep work and participate fully in society, thereby increasing the economic performance of the country.
 - d. *Success for All*¹⁴ set out a vision and commitment from the Government to reform further education and training, backed by substantial new investment. Its key elements are:
 - i. action to improve the pattern, responsiveness and quality of provision in each area to meet learner, employer and community needs;
 - ii. improving the quality and effectiveness of post-16 teaching, training and learning, through the work of the new Standards Unit, to identify and disseminate good practice material in key curriculum areas;
 - iii. action to establish a professional and fully qualified post-16 workforce with world class leaders and managers; and
 - iv. developing a framework for quality and success through new 3-year planning, funding and accountability systems.

¹¹ *Schools – Achieving Success* (White Paper, DfES 2001).

¹² *14-19: Opportunity and Excellence* (DfES 2003).

¹³ *Skills for Life – the National Strategy for Improving Adult Literacy and Numeracy* (DfES 2001).

¹⁴ *Success for All: Reforming Further Education and Training – Our Vision for the Future* (DfES 2002).

- e. The White Paper on the *Future of Higher Education*¹⁵ set an ambitious agenda for reforming higher education. It includes expansion of foundation degrees in vocational areas, and closer contacts between Higher Education Institutions (HEIs) and employers.
- f. The Regional Development Agencies, in collaboration with the Learning Skills Councils (LSCs) and other partners, have developed Frameworks for Regional Employment and Skills Action. These identify regional skill needs. In four regions, the RDAs and local LSCs are piloting the pooling of funds for adult skills and business support to deliver a common skills agenda.
- g. The Employer Training Pilots are testing out different approaches for supporting employers to release staff for training as an integral part of business development. Pilots are underway in six local LSC areas. The programme is being extended from September to cover around a quarter of LSC areas.

These reforms will continue with the publication of the National Skills Strategy and Delivery Plan next June.

- 3.2 The Government is keenly aware that a huge potential talent pool will be missed if girls are not attracted to study science, engineering and technology subjects post-16. As part of its overall strategy to increase the number of young people studying science, maths and technology subjects post-16, the Government has a number of measures in place to ensure that the science, maths and technology that is taught in schools is relevant and engaging for all students, and gives them sufficient knowledge and skills to pursue further study.

Better science teaching in schools

- 3.3 *Investing in Innovation*¹⁶ indicated a number of steps to improve science teaching in schools including:
- £51 million partnership with the Wellcome Trust to create a national network of science learning centres to provide CPD to science teachers and science technicians;
 - targeted pay incentives to recruit and retain more science and mathematics school teachers;

¹⁵ *The Future of Higher Education* (White Paper, DfES 2003).

¹⁶ *Investing in Innovation: A Strategy for Science, Engineering & Technology* (July 2002).

- a programme to pay undergraduates and postgraduates to support teachers in the classroom, with ring-fenced places for science, technology and mathematics students that will be piloted from September 2003;
 - additional funding for school laboratories, with £60 million ring-fenced for LEAs to spend on school labs in 2000-2001 and 2001-2002 and an overall increase in capital funding for schools from £683 million in 1996-97 to £3 billion for 2002-03, £3.8 billion in 2003-04, and a further increase to over £5 billion by 2005-06; and
 - more specialist science and technology colleges – there are currently 24 specialist science colleges, with 40 more due to open in September 2003.
- 3.4 Curriculum development continues with the focus on making educational content more relevant to the everyday world, to business and industry and the school population. A key aim is to provide a stimulating science education for all students whether they become consumers, users or producers of science.

Better careers advice and more role models

- 3.5 At the beginning of April there were some 2,000 official Science and Engineering Ambassadors (SEAs) with more coming through almost daily. Of these about one-third were female. Virtually all ethnic minorities were represented in the proportions that reflect the local population. The Government is keen to increase the number of women in this role and the desire is to work towards 50% female Ambassadors over time.
- 3.6 The Government has also taken several new steps to improve careers advice and information in schools. The Connexions Service is the new co-ordinated support service for all young people in England aged 13-19 helping them make a smooth transition to adult and working life. One of its eight key principles is to extend equality of opportunity. The service is delivered through a network of personal advisers who will provide information, advice and guidance to young people, including challenging stereotypical and traditional choices in career options. It has recently published a new national framework for the delivery of careers education and guidance. One of the expectations of an effective careers education programme is that it should challenge gender stereotyping, support inclusion, and promote equality of opportunity. The framework includes a learning outcome for young people to: "recognise stereotyped and misrepresented images of people, careers and work and how their own views of these issues affect their decision making." The Connexions Service worked with the Equal Opportunities Commission (EOC) on this framework and a range of other projects to tackle gender stereotyping. There is now a need to share all this good practice and Connexions will continue to work with partners to improve the accuracy, targeting, and presentation of its services.

- 3.7 The Connexions Service also publishes a range of careers information products. The key reference document for practitioners is *Occupations*,¹⁷ which is currently being reviewed by DfES to ensure that it is up-to-date, relevant and gender proof. Planet Science are co-ordinating a working group with Connexions, the Engineering and Technology Board (ETB), the Science Council, the Royal Society of Chemistry and the Science, Engineering and Manufacturing Technologies Alliance specifically to update the science careers content of *Occupations*. As a result of their findings, new articles on science careers have been commissioned for the *Occupations* 2004 book and CD-ROM. The science section of the Connexions Resource Careers Index has also been updated. All career publications and databases like *Occupations*, the 'Working in...' series, *Job File*, and *Athena*, cover the major SET occupations. Professional bodies, Sector Skills Councils and technical and training bodies that cover SET are involved in the checking and targeting of material.

Modern Apprenticeships

- 3.8 The Greenfield report recommended that the age limits for this scheme be opened up to make women eligible after having their families. The Government is considering this and will decide on the way ahead in the light of early operating experience of arrangements in Wales and Scotland, together with evaluation of current pilots in England, and the availability of resources.

Supporting undergraduate women in SET

- 3.9 Of all UK domiciled SET graduates with a first degree in the 1999/2000 cohort more women had degrees in medicine, biological sciences and subjects allied to medicine, while far more men had degrees in physical, mathematical and computer sciences and engineering and technology. Although much careers advice aims to encourage women to consider studying SET subjects as a first degree, HEIs need to do their part. The Scottish Higher Education Funding Council (SHEFC) has put out a good practice guide on this and on how best to support women through their undergraduate years in SET subjects.

Higher Education

- 3.10 The Greenfield report had a particular focus on higher education (HE). A high number of SET women are or aspire to be employed in the HE sector, and it is this sector which plays a major part in shaping the attitudes of future generations

¹⁷ *Occupations* is a well-established careers information reference book which has been published for almost 20 years. It is widely used by Connexions/careers advisers, guidance workers and teachers and is a key resource for school and college careers libraries.

of SET employees. It is, therefore, important that mainstream management policies across all disciplines, particularly SET subjects, chime with the needs of women. In higher education at professorial level in 2000/2001 there were very few women in SET subjects, the highest percentage of women professors being in nursing, health and community studies.

- 3.11 Since the end of 2000 there has been a special emphasis on improving human resources policies in the HE sector for staff at all levels, including women in SET posts. The 2000 Spending Review made available extra funding rising to £170m in 2003-04 to underpin the human resources strategies that HEIs in England have laid out. The Higher Education Funding Council for England (HEFCE) allocates the extra funding to institutions on receipt of clear and detailed plans of how they will recruit, retain and develop their staff and ensure that equal opportunities, including equal pay for work of equal value, are central to their staff management.
- 3.12 The £170m will be consolidated into institutions' core grants from 2004-05 and an extra £50m in 2004-05 and £117m in 2005-06 will be made available so that institutions can continue to develop and implement their human resources strategies, including securing improvements in equal opportunities for higher education staff. Once institutions have satisfied HEFCE that their strategies are sound and are being implemented properly, the additional funding will be consolidated into their core grant. HEIs are also implementing the Fixed-Term Regulations discussed in chapter 4 of this report. HEIs have been supported in this work on a one to one basis, via seminars, and by the production of the *Good Practice in Setting HR Strategies*.¹⁸
- 3.13 Furthermore the Government has worked in partnership with the funding councils, with Universities UK (UUK) and with the Standing Conference of Principals to: support the Athena Project; set up the Equality Challenge Unit (ECU); and fund research on equal opportunities in universities.
- 3.14 The Athena Project has been influential in working with a number of universities on women in SET issues. Over its lifetime it has produced 24 reports including three good practice guides, the last of which was published in March. It distils good practice from the direct experience of a dozen or so university projects. It describes new career development approaches for women and arrangements that make SET employers more attractive to them. It shows how to bring about cultural change and how to embed it.

¹⁸ *Good Practice in Setting HR Strategies* document available on the HEFCE website (http://www.hefce.ac.uk/pubs/hefce/2002/02_14.htm).

3.15 The ECU aims:

- to provide specific advice to HEIs to help them secure improvements in equal opportunities;
- to help specify appropriate data to institutions to support equal opportunities monitoring;
- to monitor performance at sector level;
- to support institutions directly in developing appropriate institutional benchmarks and standards that will help measure progress;
- to develop and disseminate good practice, looking to experience from within and outside the sector, in this country and abroad; and
- to commission research to underpin policy and practice developments.

3.16 The ECU, with universities and unions has launched *Partnership for Equality*,¹⁹ which offers guidelines promoting equal opportunities in universities. SHEFC has very recently put out two good practice guides on women in SET disciplines to help secure their participation and progress through their HE careers.

3.17 The Higher Education Funding Councils for England, Scotland and Wales have recently established a jointly funded programme of research into the barriers to recruitment and career progression for women and minority groups working in the higher education sector. This new programme, costing around £250,000, is aimed at gathering evidence from which to develop a reliable way of monitoring the effectiveness of equal opportunities actions in this sector, to learn more about the experience of women and minority groups, and to develop policy recommendations for the funding councils and the sector.

3.18 The Government recognises that all this is only a good start. All the steps taken should work to the benefit of women in SET but there is much progress to be made before the impact of these steps will produce results. It will continue to be closely monitored.

¹⁹ *Partnership for Equality: Action for Higher Education* (February 2003).

Action points from this chapter

- *The teaching of science in schools will be continually improved, to make it relevant to the needs of the community, and attractive to pupils including girls.*
- *The DfES will monitor the level of women taking SET subjects in school and DTI will monitor the effectiveness of the women Ambassadors in SEAs.*
- *DfES will actively consider further the opening up of the Modern Apprenticeship Scheme.*
- *Connexions will continue to forge partnerships to improve the accuracy, targeting and effectiveness of its services.*
- *OST will work with DfES, Higher Education Funding Council for England, UUK and others to ensure that the recruitment and promotion of women working in HE improves.*
- *OST has recently announced additional funding to the Athena Project to enable the dissemination of their Guide to Good Practice²⁰ to all SET departments.*

4 Ensuring science initiatives reach women

- 4.1 This Government has already taken a number of steps that demonstrate its commitment to science and engineering as well as to equal opportunities. The strategy seeks to ensure that women in SET benefit from them.

The Government's commitment to science, engineering and technology

- 4.2 The Government's plans for the Science Budget 2003-4 to 2005-06, will underpin and develop the science and engineering base through: sustainable renewal and growth; building up the nation's innovation capabilities; and increasing exploitation.
- 4.3 The Government strongly believes that invention and innovation are critical to Britain's long-term competitiveness. *Investing in Innovation: a Strategy for Science, Engineering and Technology*, published in July 2002, set out initiatives designed to ensure that Britain's science and engineering base grows and flourishes and makes an increasing contribution to national prosperity. Initiatives were taken to:
- establish a substantial and dedicated stream of capital for universities;
 - provide substantial new resources to the Research Councils to boost the volume of basic research;
 - increase the money available to HEFCE for the research component of university block grants;
 - expand the Higher Education Innovation Fund, to stimulate enterprise from research; and
 - invest an additional £50 million per year by 2005-06 to support collaborative research and development on key emerging and pervasive technologies such as nanotechnology.
- 4.4 The same strategy also set out steps to improve the pay and training of scientific postgraduate researchers, and enhance technology, mathematics and science education in our schools, colleges and universities.

The supply of people with science, technology, engineering and mathematical skills

- 4.5 The Government set up a review under Sir Gareth Roberts in 2001 to address the concern about the supply of high quality skills in the whole sector, for R&D and other relevant employers. The report of the review was published in July 2002 under the title *SET for Success*,²¹ and subsequent action laid out as part of *Investing in Innovation*, summarised above. But one action from this was the announcement of 1000 new academic fellowships to provide more stable and attractive routes into academia. OST will ensure in implementing these that every opportunity will be taken to reach women and ethnic minorities to promote diversity. Sir Gareth Roberts also chairs the Research Careers Initiative (RCI), which has monitored progress in implementing the Concordat²² on Contract Research Staff Career Management. *SET Fair* cited issues around the career development and conditions of contract research workers as being a particular problem for women. In addition to the positive measures taken by the Government already mentioned, legislation will improve the position for contract research workers.
- 4.6 The implementation of the EU *Fixed-Term Employees (Prevention of Less Favourable Treatment) Regulations 2002* has two main aims: to protect employees engaged on fixed term contracts from being treated less favourably than employees on indefinite contracts; and to prevent the potential abuse of the continuous use of fixed-term contracts. The numbers of researchers on short-term contracts is expected to fall considerably. This, coupled with the drive to ensure universities receive the full economic cost of research projects, will encourage forward planning and the recruitment of proportionally more permanent staff than currently. The number of short-term contracts will be monitored and further action taken where needed.

Research Councils

- 4.7 OST has sponsorship responsibility for the Research Councils and it has already used its leverage to ensure that they need to comply with equality legislation. It has set up a Cross-Council Round Table Forum with membership from all

²¹ *SET for Success: the Report of Sir Gareth Roberts' Review* (April 2002).

²² In 1996, the Committee of Vice-Chancellors and Principals (now Universities UK), the Research Councils, the British Academy and the Royal Society recognised that as the number of Contract research staff had grown, so had the problems and tensions relating to their employment and career development. These bodies therefore agreed a Concordat on Contract Research Staff Career Management: a framework for the career management of contract research staff.

the Councils. It is working with the Councils towards the target of 40% women membership on SET related public bodies. The Councils are implementing the concordat on the Research Careers Initiative (RCI). The Councils recognise that there is still more work to do but all have equal opportunities policies in place, have introduced flexible working policies, report on gender statistics, comply with directives on fixed term contracts, give a high profile to their women scientists, and have examined the gender impact of their pay and funding decisions. Many have special mentoring and returners' schemes, special training schemes and have ensured that their awards offer no barriers to women.

- 4.8 The WEU and OST are working together with the Research Councils on two projects: one aimed at good practice guidance for equality proofing; and the other aimed at providing baseline information about the extent to which equality issues are integrated into research. This work should be completed shortly and the findings will be implemented. OST is also amending the management statements, which set out the broad framework within which the Councils operate, to include a common objective to work together and with others as appropriate, to promote mobility, gender equality and ethnic diversity within the research community. This will be completed in the current year.

Targeting committee membership

- 4.9 Baroness Greenfield made a number of recommendations about female representation on policy committees. The Government has emphasised its commitment to women in SET by meeting its 25% target for women's membership of SET related public bodies. It has therefore set a more challenging target of 40% by 2005. There is demonstrable progress towards this target. The expert women's database will help ensure further progress. The Government also proposes to set an example at the most senior level by aiming to increase women's membership of the Council for Science and Technology (CST). The Government will also consider asking CST to take a strategic overview of progress on women in SET in the longer term once initial implementation is complete. The CST is subject to a Quinquennial Review and this will be taken forward when the Government responds to that review later in 2003.

Action points from this chapter

- *OST will continue to work to ensure women benefit from the new budgets and policies in science, and in particular that the new academic fellowships announced in 2002 are sufficiently attractive to women. Progress in achieving this will be reported.*
- *OST will work to implement the recommendations arising from the equality mainstreaming projects being carried out with the Research Councils later in the year.*
- *OST will continue to work with the Cross-Council Round Table Forum to share and implement good practice on equality issues.*
- *OST and the Councils will monitor the use of fixed term contracts and take further action where needed.*
- *OST will monitor progress towards the target of women's membership of SET related bodies.*
- *A substantive response to the Quinquennial Review of the CST will be published later in 2003.*

5 Making it happen

An independent implementation group

- 5.1 The Government considers it very important that the overarching progress on the position of women in SET is subject to open and strategic review. It is vital that the impacts of the measures in this document are examined, so that activity can be strengthened if needed. An independent implementation group will be set up for these purposes. Its main aim will be to ensure that urgent progress is made on this strategy over the course of the next two years. It will have oversight of the work of the new centre, of the implementation of the strategy and monitor the impact. Where necessary it will offer advice on how the strategy can be fine-tuned.

A new role for OST's Promoting SET for Women Unit

- 5.2 The OST Promoting SET for Women (PSETW) Unit will have a key new role in driving the implementation of this strategy, as well as carrying out its policy role. In future, its tasks will include:
- setting up and managing the new resource centre, including working with the resource centre on the development of the good SET employer recognition scheme;
 - working (with WEU in support) across government departments to ensure that they and their SET agencies and contractors follow good practice in their employment of women scientists; working through cross-government machinery to enable this;
 - working with DfES to ensure mainstream policies on science in schools, on careers advice and information, and on higher education take account of women in SET;
 - ensuring all aspects of mainstream science policy do not disadvantage SET women;
 - working with those sections of DTI which interface with relevant SET companies to ensure good management practice for women;
 - setting up and supporting the new implementation group so that it can exercise oversight of the strategy's progress and impact;
 - ensuring that statistical monitoring improves so that the position of women in SET can be monitored;

- ensuring the other action points in the strategy are delivered; and
- carrying out policy advice and relevant parliamentary work.

Monitoring

- 5.3 The participation of women in SET overall is monitored by the PSETW Unit through a database, which draws on a wide range of sources. With the assistance of the University of Warwick's Institute of Employment Research (IER), this database will be revised and updated shortly with the latest statistical information and an analysis of current trends in SET employment. Once established, the new resource centre will continue to develop the scope, quality and relevance of this database, working closely with stakeholders and the various organisations with responsibilities for these sources.
- 5.4 There are a number of developments that provide the opportunity to improve the data. The Higher Education Statistics Agency (HESA) is working with its higher education partners to expand its individualised staff record, the first results of which should be available in late 2004. This new record system will extend not only to those involved in teaching and research but cover all staff, including, for example: technicians; those working less than 25% time; and post doctoral and other staff who are engaged on short-term contracts. As a member of EUROSTAT, the Office for National Statistics is working to develop its annual survey of business expenditure on research and development (BERD) in order to capture gender data about the population of researchers and associated staff employed by companies and other private sector organisations. Finally, OST is working with the Research Councils to improve cross council working on gender and related diversity issues involving staff employed in the Councils' research institutes, units and centres. This work includes the production and use of common categories to assist cross council analysis and reporting.
- 5.5 Together with the PSETW Unit, the centre will draw on the above information to ensure that all interested parties are aware of the changing picture and address the issues raised. The Chief Scientific Adviser's Committee, comprising the chief scientists and other senior officials of UK Government Departments, will monitor progress in relation to their scientifically qualified employees, and especially research staff in their research establishments. The Science and Engineering Base Co-ordinating Committee, chaired by the Chief Scientific Adviser and comprising the chief executives of the Research and Funding Councils, along with senior officials of the education departments, will monitor progress in relation to research staff employed by universities and other UK-based science and engineering institutions.

Action points from this chapter

- *An independent implementation group will be set up to exercise oversight of the strategy's progress and impact.*
- *The PSETW Unit in OST will build on its excellent past work and be given new impetus to drive the strategy forward.*
- *OST, DTI and other relevant departments will continue to improve their statistical monitoring of the position of women in SET.*

6 Conclusion

- 6.1 Much has already been done that will help women improve their position in SET. Gender equality has been and remains high on this Government's agenda. Parental rights have been extended. All the mainstream policies, innovations and funding laid out in this strategy will benefit women in SET. More relevant and high quality teaching and careers advice in schools; more opportunities and higher financial rewards at postdoctoral and fellowship level in HE; and better recruitment and retention policies in the public and private sectors, will help all those working or aspiring to work in SET, men as well as women.
- 6.2 But there is more to be done to ensure that all these measures impact effectively to improve women's position in SET. The resource centre outlined in the new strategy is the key to this, alongside the other new initiatives here:
- the good practice work;
 - the recognition of good SET employers;
 - pump-priming of returners and other schemes;
 - the expert women's database;
 - the cross-government work as SET employer and funder;
 - the new role for OST; and
 - better statistical monitoring.
- 6.3 The tailoring of mainstream policies to ensure they are gender proof is also a significant part of the strategy. Many mainstreaming action points are laid out here, but this is a task not only for central government and its agencies but through them also for those with responsibility in key organisations such as schools, hospitals, universities and other employers in the public and private sectors.
- 6.4 The new independent implementation group with its oversight task aims to ensure that the strategy is put in place speedily. It will continue to monitor the position of women in SET and advise on how to fine-tune the strategy if necessary.
- 6.5 This strategy delivers effectively on Baroness Greenfield's report. The Government believes that taken together, the measures in this document will contribute significantly to improving women's position and participation in science, engineering and technology, for the benefit of science, the economy and society as a whole.



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