

# BIGGER AND SIMPLER

A short guide to the EU's €80 billion  
Horizon 2020 programme



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# BIGGER AND SIMPLER: EU UNVEILS €80 BILLION RESEARCH PLAN

A two-year political fight formally began in Brussels on 30 November with the publication of the European Commission's plan for Horizon 2020, its omnibus R&D programme. It promises less red tape, broader benefits, and more jobs and economic growth – but is it too expensive?



EU Commissioners Tajani, Geoghegan-Quinn and Vassiliou unveil Horizon 2020 to the press in Brussels 30 November

The European Commission proposed a simpler, more economically productive system for funding research and innovation over the coming decade, as it formally launched what promises to be an 18- to 24-month political battle to raise its budget to €80 billion.

“A break from the past and an investment in our future” is what Máire Geoghegan-Quinn, Commissioner for Research, Innovation and Science, called Horizon 2020, the European Union's next seven-year plan, for 2014 to 2020, for research and innovation funding. The Commission's intention, she said, is to “support the best research ideas and provide major business opportunities that improve people's lives.” And in case that isn't enough, “we're slashing red tape,” she said.

The proposed €80 billion budget, if approved in 2012 or 2013 by the European Council and Parliament, would represent a major rise from the current €55 billion programme – and has already hit static from Britain, Germany, France, the Netherlands and other budget-conscious states. But the Commission is betting that its emphasis on simplifying the system, broadening the benefits and focusing more on economic return will by the end of the tortuous EU legislative process win support from all the member-states. The proposal is “part of an exit strategy from the (economic) crisis,” said Androulla Vassiliou, Commissioner for Education, Culture, Multilingualism, Sport, Media and Youth.

The series of EU announcements of 30 November filled in many – but not all – of the details expected since the Commission first announced its broad, economy-driven ‘Innovation Union’ strategy in October last year. The new plan includes big sums for the most politically appealing programmes:

- A 77 per cent jump to €13.2 billion for the basic-science European Research Council. The agency, modelled on the US National Science Foundation's no-politics method of awarding research grants based on scientific peer-review panels, has

won wide praise for funding ‘excellence’ in science since it began in 2007. But even with the increase, annual grants by the ERC would be only about a third as much as at the NSF. And there has been some political backlash in eastern and southern Europe because most of the ERC grants to date have gone to science-rich northwestern Europe. The Commission's responses include several measures to reverse the brain drain from the poorer countries, including creation of ‘ERA Chairs’, funding special professorships to recruit “outstanding academics to institutions with a clear potential for research excellence.”

- €5.75 billion for the Marie Curie Actions that provide study-abroad grants for hundreds of thousands of young students – all of them, and their parents, politically active and potential future supporters of the EU generally. In a further, typical Brussels act of political outreach, the Commission added the great scientist's Polish maiden name to the programme's title, rather than her French surname alone: Marie Skłodowska Curie. (Similarly, in a nod to Italy, EU Vice President Antonio Tajani said a set of small-company support programmes is to be named COSME, after the Renaissance merchant-prince, Cosimo de Medici, whom he somewhat anachronistically called an “entrepreneur.”)
- A Small Business Innovation Research programme – modelled partly on established UK and US initiatives – becomes part of a drive to mobilize more small and medium-sized companies to participate in the EU programmes. In all, Tajani said, up to 15 per cent of the budget is earmarked for SMEs. The plan includes providing SBIR seed funding, which SMEs can apply for singly rather than in the usual EU coalitions, and then helping connect them to the European Investment Bank and other public and private funders for expansion capital. A set of company-support efforts presently in the Competitiveness and Innovation Programme gets a new name (COSME) and a bigger budget (€2.5 billion). The expected impact: 39,000 firms a year assisted, creating 29,500 jobs and 900 new business products or services.

- An eye-popping rise, from €309 million to €2.8 billion, for the European Institute of Innovation and Technology. This Budapest-based organisation is a new EU model for getting industrialists, researchers and educators working together in specific sectors – so far, energy, climate change and ICT. The plan, though less than the €4 billion originally sought by the agency, would permit it to add six more sectoral groups by 2020, in healthcare, food, raw materials, advanced manufacturing, security and urban mobility. The full expansion would be contingent on a mid-term review confirming the EIT is working properly. The objectives include 600 new companies started, and 25,000 masters and 10,000 PhD students trained by 2020.
- The biggest chunk of the budget, or €31.7 billion, will go to ‘Societal Challenges’ – a set of hot-button social and environmental issues that have risen high on the political agenda across Europe over the past five years. These are healthcare for an ageing population, food security, clean and secure energy, smart and green transport, climate action and resource efficiency, and inclusive and secure societies. The Commission left some details of these efforts to be filled in by the member-states and groups that want to propose solutions. Indeed, the Commission claims that the whole Horizon 2020 programme will be more flexible than its past research plans – which could not adapt quickly to changing political priorities.

The Horizon 2020 announcements were Brussels political theatre at its best, and worst. Not one, but three commissioners (Geoghegan-Quinn, Tajani and Vassiliou) vied to claim credit with the press – reflecting the months of internal argument among their respective directorates over who does what in the new plan. A barrage of interest groups, from university to corporate lobbyists, fired off pre-written press statements based on leaked versions of the plan that had been circulating,

in numerous drafts, around Brussels for many months. A set of 11th-hour changes, ordered by the Commission, delayed the release of all the documentation.

But there’s more. A further political issue appears likely to involve human embryonic stem-cell research, which heavily Catholic Poland in particular has opposed; on that point, Geoghegan-Quinn said the Commission won’t fund any research in a country if the project’s subject or ethics are contrary to the laws in that country. Also, the future of ITER, a major international fusion-energy plant in Cadarache, France, will be in play; ITER, which long ago sailed past its original budget estimates, may end up competing with the separate Horizon 2020 budget.

And the plan – as it works its way through the legislative process into 2013 - may also prompt a collision among many of the EU’s major constituencies. In the same time-frame, the EU will be arguing over reform of its most expensive programme, the Common Agricultural Policy: the Commission included in Horizon 2020 a big rise in food and soil research to buy support from France, Hungary and other CAP supporters – but a budget clash appears likely, anyway. Likewise, the Commission is proposing more-active channelling towards innovation of Structural Funds – a type of regional-development funding that most member-states jealously guard as their own prerogative to control, not the Commission’s.

The final word on Horizon 2020 will probably be given by bond investors around the world. The Horizon 2020 plan is big and bold, and has many backers in the European Parliament. But the Eurozone crisis is setting the political tone in Brussels – and if the crisis worsens next year, the more-conservative Council of member-state ministers is unlikely to allow much of any increase in overall research and innovation spending.

## HORIZON 2020: THE VIEWS IN BRUSSELS

### A roundup of first reactions from the European capital.

Yesterday (30 November), the European Commission released its official proposal for the EU’s new €80 billion R&D funding programme: Horizon 2020. It promises less red tape, broader benefits, and more jobs and economic growth. But before the proposal becomes reality, it will have to pass through the EU’s legislature. Science|Business presents a roundup of the first reactions from the European Parliament, and some of the interest groups that will be influencing the process.

#### More Jobs, less Einstein

Lambert van Nistelrooij, the European People’s Party’s (EPP) coordinator for regional development in the European Parliament and advocate of using structural funds for innovation, is pleased to see the significant budget increase. Van Nistelrooij told Science|Business he believes this will give a powerful sign that Europe is “willing to invest and work hard to become a world leader in knowledge.” He also welcomed the simplification measures: “The bureaucratic burden has been much too heavy for researchers in recent years, and with this new programme it really is time to make significant changes.”



Maria da Graca Carvalho, an EPP member of the European Parliament who has been in the forefront of the campaign for simplification of the EU research funding programmes, believes the proposal forms a good basis, but says the Commission should be wary of oversimplification. “It should not be simpler than necessary. We don’t need any unnecessary red tape, but sometimes reality is complex. We have different institutions and different member states, and that has to be translated

somewhere in the rules,” Carvalho told Science|Business with regard to the new simplified rules for funding applications.

The Liberals and Democrats group (ALDE) in Parliament also welcomed the steep budget increase: “In times of budget cuts, we should not forget about our future growth needs. Investing in R&D is money well spent,” said Jens Rohde, ALDE coordinator in the ITRE committee. Rohde supports a shift in focus towards the commercialisation of research results: “If we are to truly improve European competitiveness we must eliminate the research to retail gap.”

Judith Merkies, a member of the Socialist and Democrats group in the European Parliament (S&D) and the ITRE committee’s Innovation Union rapporteur believes the Commission’s Horizon 2020 proposal lacks an emphasis on job creation. Merkies said that even though Europe wants sustainable growth and jobs, the new proposal mainly focusses on research: “The EU is already good in Einstein, but not yet in Jobs,” she said.

## Reimbursement of costs

The League of European Research Universities (LERU), an association of leading research-intensive universities released a statement saying the new scheme could boost employment at universities: “A reimbursement of a 100% of direct costs will mean a true simplification for the participants [...] The new rules should enable universities to recruit staff specifically to work on Horizon 2020 projects and thus enhance and build up the next generation of researchers in Europe.”

John H. Smith, Deputy Secretary General of the European University Association (EUA) told Science|Business that although happy with the Commission’s continued commitment, he is strongly critical of one particular last minute change which would see indirect costs reimbursed at only twenty per cent. “[The] proposal in earlier drafts of Horizon 2020 of a 75%/75% reimbursement rate with the retaining of the possibility for real indirect costs would have constituted a further step forward [...] The new proposal, on the contrary, will be seen as a step

backwards and inconsistent with the European policy agenda concerning the modernization of universities,” Smith said.

## Industry participation

In a statement, BusinessEurope says it welcomes “the streamlining of the EU research and innovation funding instruments introduced with Horizon 2020 and the substantial increase in funding proposed”. But BusinessEurope, which represents small, medium sized and large businesses at a European level, believes that ultimately Horizon 2020’s success will depend on whether it will be able to attract more industrial stakeholders in EU research and innovation projects: “Continued simplification of the procedural rules for participation is needed in order to increase industry’s participation rate.”

The pharmaceutical industry federation EFPIA praised the plan’s emphasis on public-private partnerships (PPPs), and said it wants to build on its existing PPP with the Commission in healthcare research, the Innovative Medicines Initiative. “The European Commission should be commended for their intention to further develop public-private partnerships (PPP). There is shared understanding that private companies and public bodies must collaborate more and to think about new business models which allow us to work much more quickly to meet unmet needs”, said Richard Bergström, Director General of EFPIA.

Nathalie Moll, Secretary General of the European Association for Bioindustries (EuropaBio) is content the Commission has listed biotechnology as one of the six key areas that research and innovation funding should focus on: “Research and innovation coupled with coherent and workable legislation will ensure Europe and its innovative industries such as biotechnology strive for the enhancement of quality of life, knowledge, innovation, job creation and productivity that we so clearly need. We hope that the European Parliament and the European Council will back the Commission’s proposal so as to help Europe realise its potential as a world leader in excellence in science and innovation.”

# COMMISSION VOWS TO CUT THE RED TAPE

## The EU’s new funding plan promises a big drop in paperwork and bureaucracy for grant applicants and recipients - but the details will matter

Let’s say you run a small technology company, and want to apply for a European Commission research grant specifically designed to help companies like yours. Get ready for some paperwork.

First, you have to prove to the Commission that your company really is small. And guess what? Its lawyers have written a precise definition for that, and created a series of forms you have to fill out to prove you meet the definition. Time for each small company to fill out the form: Easily, hours and hours. Time for the Commission to read and process the forms: Easily, hours and hours. In fact, handling these forms is the job of about 100 Commission staffers. And all this paperwork is just to prove you are legally eligible to apply for the grant; whether you get it is an entirely different review.

Bureaucratic madness? That’s exactly what the majority of

European Union leaders have been saying over the past few years - and in their new, seven-year, €80 billion Horizon 2020 research and innovation plans announced 30 November, they have made simplification of the bureaucracy a centrepiece. “We’re slashing red tape,” promised Máire Geoghegan-Quinn, Commissioner for Research, Innovation and Science. “We want our scientists and researchers to spend more time in the laboratory, and less time filling out forms.”

Indeed, this top-level willingness to reform the EU research bureaucracy was immediately hailed as a step forward by university and industry groups. But the €80 billion question for them all is whether this top-level desire will in fact translate into lower-level action. And the first hints to that are scattered through the roughly 600 pages of detailed regulations and explanations that the Commission dumped on the research

and innovation world 30 November as it submitted its formal legislative proposal for Horizon 2020 to the European Parliament and Council.

Before reading all that, a little history might help. The EU research programmes have gradually evolved and grown - first, from the 1957 Euratom Treaty that began funding nuclear-power research, and then from the early 1980s when the Commission began funding computer and telecommunications research. That gradually grew into the economy-wide Framework Programme which, already at an aggregate cost of €55 billion from 2007-2013, is the world's second largest civilian research programme, after the US National Institutes of Health. The next edition, renamed as Horizon 2020, runs from 2014 to 2020 and, if the Commission gets its way, grows to €80 billion.

But as it has grown, so has the bureaucracy to administer it - and so have the scandals that go with big money. The most traumatising of them all was the Cresson Affair in the late 1990s, when former French Prime Minister Edith Cresson, in a new job as EU Research Commissioner, was accused of hiring her dental surgeon as a 'visiting scientist' with EU funds. As more problems emerged in Brussels, the affair led to the 1999 resignation of the entire Commission - and since then, the Brussels vow has been 'never again.' The result was a rapid rise in audits, paperwork, review committees, monitoring reports, evaluations and - most controversial of all - so-called time sheets to document that scientists in a lab were really working on EU-funded projects when they said they were. Indeed, until recently, the Commission had placed in charge of the bureaucracy one of its audit experts, who had been (and is again now) in charge of its massive farm subsidies.

Pressure for change began rising a few years ago - in part because of a confrontation between the Commission and the main French research agency, the Centre National de la Recherche Scientifique. The Commission tried to claw back about €20 million in research grants - not because of any proven fraud, but because the CNRS hadn't been doing the paperwork the way the Commission auditors wanted. At the same time, universities in northwestern Europe - the scientific core of the EU - began agitating against all the money they had to spend on staff to understand and comply with the EU grant rules. The



European Parliament joined the no-red-tape bandwagon about 2010. The result was announced 30 November, with a proposed new set of financial regulations for Horizon 2020. Some of the main promises:

- A simpler structure overall - with the sub-programmes grouped into three main goals (promoting excellent science, industrial competitiveness, and solutions to society's biggest challenges) with one common set of funding rules.
- Simpler and standardised rules for reimbursement of direct and indirect costs of research. This, the Commission promises, entails reimbursing research expenses at one rate, instead of three at present, for all types of participants regardless of whether they are companies (big or small), universities, government labs or other entities. It also entails reimbursing 'direct' costs at up to 100 percent for most grants, and 70 percent for prototyping, demonstration and other closer-to-market work. Indirect costs (for instance, the electricity bill at a synchrotron) get a flat 20 per cent reimbursement rate - still leaving researchers to scramble for local funding for the rest.
- Time sheets go - for some. The new rules would let a grant recipient simply certify that the researchers on a project actually worked the time they claimed, rather than keep a time sheet for each one. But that only applies to full-time staff. Part-time and occasional workers on a project are still stuck with time sheets. Grant applicants can use average personnel costs in their forms, rather than individual rates for each type of worker.
- A greater move to online, simplified forms. The Commission has been struggling for years to bring its research paperwork into the Internet Age, but has already started letting repeat applicants re-use their old forms rather than fill out new ones for each grant. That 'paperless' approach will apply to the entire Horizon 2020 system. And the dreaded small-company forms will go.

But does the Commission really mean it? That's the question on the minds of most university and company grant administrators. The Commission promises to cut by 100 days the 'average time to grant'; that's about 350 days now. And it further vows that only 7 percent of grant recipients will get a post-grant audit - a paperwork nightmare, especially for small companies.



# SMALL IS BEAUTIFUL, ACCORDING TO HORIZON 2020

## Small companies attract special attention - and at least €6.8 billion

*Wanted: Young, technically educated entrepreneur, with a yen to start a cutting-edge technology-based business that could one day grow into a multinational Google or Facebook. A plus: A passion for using the business to solve society's grandest environmental or social challenges. A necessity: Patience with bureaucracy.*

If you fit that job description, you may be in luck. The European Commission's new, €80 billion, seven-year plan for research and innovation is stuffed with new initiatives for research, finance, and networking at small and medium-sized enterprises (SMEs.) Indeed, support for SMEs is supposed to hit at least €6.8 billion - and it underpins a dominant theme of the plan, called Horizon 2020: Using research and innovation funding to create economic growth and jobs.

Horizon 2020 aims to make Europe "a better place to do business and create jobs," said Máire Geoghegan-Quinn, EU Commissioner for Research, Innovation and Science. And "SMEs are the backbone of the European economy."

According to the Commission, SMEs number about 99 per cent of all companies in Europe, provide 67 per cent of jobs, and generate 58 per cent of total company turnover in the European Union. They are also politically popular: In contrast to the early days of EU research programmes, when mammoth 'national champions' like Philips, Siemens and Alcatel were viewed as the most important beneficiaries, today most European politicians would rather be photographed visiting a scrappy garage start-up that hopes to be the next Apple.

In truth, big companies will still get a big share of the EU research and innovation budget under Horizon 2020. The Commission said €17.9 billion of the total €80 billion budget would go to 'industrial leadership' - a phrase covering all kinds of participants, but likely to be disproportionately important to Europe's leading technology, pharmaceutical, energy and transport companies. Of that category, €13.78 billion goes to a new set of 'key enabling technologies' such as microelectronics, nanotechnology, photonics, advanced materials, advanced manufacturing, biotechnology and aerospace. The Commission also plans many 'demonstration' projects, which usually involve big budgets and big corporate co-investors. And as in past years, the main beneficiaries from the programme overall will be universities and government labs, which in 2009 received 76 per cent of the Commission's R&D spending.

But SMEs are in. The R&D plan follows passage in 2008 of the first EU Small Business Act. And the Commission likens some of its Horizon 2020 proposals to the Small Business Innovation Research programmes in the UK and US - though when you read the fine print in the approximately 600 pages of documentation released by the Commission, you find the main similarity appears to be in the kind of companies targeted, rather than in the programme details of how they get the money.

Among the initiatives announced by the Commission 30 November:

- A new 'SME instrument' to finance innovative companies. The idea is to let SMEs in all fields of science, technology and innovation apply for funding singly, or in groups. The support is to "cover the whole innovation cycle" from research to market. It begins with funding for technical feasibility and proof of concept studies, and continues to a second phase of funding for development, prototyping and other demonstration work. In the final, commercialisation, phase the Commission won't directly fund work, but will help connect the SMEs to other programmes that might.
- New equity and loans for innovation at the European Investment Bank. While not exclusively for SMEs, these finance mechanisms are intended to help remedy the lack of venture and growth capital from private investors in Europe. The bank and its European Investment Fund will have two programmes for investing indirectly in companies, funding early-stage VCs and mezzanine capital that would, in turn, go to individual SMEs. Also, the bank is to set up an 'SME window' to loan money directly to research-driven SMEs and small mid-cap companies. And it will also continue a loan-guarantee programme that has been widely praised among EU policy makers.
- A collection of initiatives, totalling €2.5 billion, to help SMEs find funding, network, and grow. The Programme for Competitiveness of Enterprises and SMEs, or COSME in Euro-speak, will have a €2.5 billion budget and complement the new bank facilities, continue operating a network of offices throughout Europe that are intended to be one-stop-shops for assistance, and promote entrepreneurship training and entrepreneurial attitudes. A major problem, the Commission says, is that EU surveys show just 45 per cent of Europeans want to be self-employed, compared to 55 per cent in the US. The COSME programme will also include service industries, such as tourism.





## FOR THE EIT, MORE IS BETTER

### The EC's research plan projects a tripling of the new agency's innovation networks

One of the biggest beneficiaries of the European Commission's new research plan is everywhere and nowhere at once: The widely distributed networks of the European Institute of Innovation and Technology. The EIT's seven-year budget is to rise to €2.8 billion, from €309 million presently.

The EIT is an EU experiment in trying to get universities, companies and policy makers working together to promote more innovation and enterprise. It has a small headquarters staff in Budapest, from which it supports three scattered clusters of partners - so-called Knowledge and Innovation Communities - in technologies for climate change, energy and ICT. Each KIC has about 30 core partners led by five or six 'co-location centres' - in essence, hubs for the lab work, teaching and marketing of innovations that the KICs were formed to do. But beyond these centres, there is no single place that the EIT lives - and that distributed structure is set to grow.

The 2014-2020 plan for the EIT proposed by the Commission 30 November envisions the number of KICs growing from three to nine, adding six new themes: healthy living, raw materials, food security, added-value manufacturing, online security, and urban mobility. Partners for the first three would be selected in 2014, and the last three in 2018 - provided that a mid-term review of the EIT is favourable. Indeed, the way the Commission has structured the plan, the review promises to be more than the usual bureaucratic benediction: The EIT's budget is coming out of other EU programmes that have a stake in the review, and the final tranche of funding will have to be voted separately by the European Parliament when the time comes.

That reflects the EIT's painful birth. It began in a 2006 speech by EC President José Manuel Barroso that there should be a 'European MIT' - which promptly got the hackles up of leading European universities that already felt there were several: them. A few years of political manoeuvring followed to win allies, and the distributed no-bricks-and-mortar approach appeared, involving the universities as part of the system rather than competitors to it. In 2010 the first three KICs were begun, after prolonged negotiations among the partners about how they would work and fund it (about 25 per cent of the money comes from the EIT; the rest is from other government or private funders.)

The results have started to appear. In a year, the Commission says, 700 masters students have begun or completed KIC-branded courses, six start-up companies have been formed, and 50 more are planned. Scaled up, the Commission expects by 2020 that the EIT will have fostered 600 start-ups and provided training for 10,000 PhDs and 25,000 other students.

But with the growth is supposed to come tighter management, according to a Commission submission to the European Parliament and Council. The difficulty of setting up the first KICs was "underestimated by all parties," it said, and "involved a substantial 'learning by doing.'" It calls for "clearer guidance" for future KICs, more coordination and cross-fertilisation among the KICs, regular evaluation of the KICs' progress, a "true EIT 'corporate identity' around a set of shared values," and a shrinking of the EIT's 22-member Governing Board to 10.

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# DOLING OUT THE MONEY: HOW THE HORIZON 2020 BUDGET IS SPLIT

## I Excellent science, €27,818

*(In millions of euros)*

1. The European Research Council €15,008
2. Future and Emerging Technologies €3,505
3. Marie Curie actions on skills, training and career development €6,503
4. European research infrastructures (including eInfrastructures) €2,802

## II Industrial leadership, €20,280

1. Leadership in enabling and industrial technologies\* €15,580 of which €500 for EIT
2. Access to risk finance\*\* €4,000
3. Innovation in SMEs €700

## III Societal challenges, €35,888

1. Health, demographic change and wellbeing; €9,077 of which €292 for EIT
2. Food security, sustainable agriculture, marine and maritime research and the bio- economy; €4,694 of which €150 for EIT
3. Secure, clean and efficient energy €6,537 of which €210 for EIT
4. Smart, green and integrated transport €7,690 of which €247 for EIT
5. Climate action, resource efficiency and raw materials €3,573 of which €115 for EIT
6. Inclusive, innovative and secure societies €4,317 of which €138 for EIT

European Institute of Innovation and Technology (EIT) €1,542 + €1,652\*\*\*

Non-nuclear direct actions of the Joint Research Centre €2,212

## TOTAL €87,740

*(Total takes account of estimated inflation through 2020. In current terms, the total is about €80 billion.)*

\* Including €8,975 million for Information and Communication Technologies (ICT) of which €1,795 million for photonics and micro-and nano electronics, €4,293 million for nanotechnologies, advanced materials and advanced manufacturing and processing, €575 million for biotechnology and €1,737 million for space. As a result, €6,663 million will be available to support Key Enabling Technologies.

\*\* Around €1,131 million of this amount may go towards the implementation of Strategic Energy Technology Plan (SET Plan) projects. Around one third of this may go to SMEs.

\*\*\* The total amount will be made available through allocations as foreseen in Article 6(3). The second allocation of €1,652 million shall be made available pro-rata from the budgets of the Societal challenges and Leadership in enabling and industrial technologies, on an indicative basis and subject to the review set out in Article 26(1).

**Source:** European Commission, Proposal for a Regulation of the European Parliament and of the Council establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)

**Official documents:** [http://ec.europa.eu/research/horizon2020/index\\_en.cfm?pg=h2020-documents](http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=h2020-documents)