

1. Introduction

Rapid economic growth in countries like China and India has resulted in an increased demand for energy. Concerns about the reliability of energy supply from international markets have generated a focus on 'energy security' among policy-makers. Furthermore, a 'sense of urgency' to cut greenhouse gases is driving a search for 'clean' energy sources. In this context, demand for nuclear power as an integral part of any country's energy mix is growing all over the world (Nikitin *et alia*, 2008) and this renaissance will primarily take place in countries that do not have established nuclear power industries. The projections are that nuclear power capacity will likely increase, which will create "a major new demand for nuclear energy inputs, both in terms of reactors, but also in terms of fuel supply" (Rauf & Vovchok, 2008). In turn, this will lead to higher prices for uranium and enrichment services. While uranium supply is spread across the world, uranium conversion, enrichment and nuclear fuel fabrication is concentrated in a handful of countries, which makes most reactors around the world reliant on a foreign sources of nuclear fuel services and a degree of vulnerability of supply (Nikitin *et alia*, 2008, 9 and 20). This has renewed many governments' interest in nuclear technology for civilian purposes, in particular the acquisition of a national fuel cycle. This development is referred to as a form of "latent proliferation", given the dual-use nature of nuclear technologies such as uranium enrichment and plutonium reprocessing (Neff, 2004).

Nuclear energy is also part of the Iranian government's pursuit of energy security, which, according to Iranian officials, is aimed at lessening the exclusive reliance of the Iranian economy on oil and gas for energy production. To achieve a high level of energy independency, Iran is developing an indigenous nuclear fuel cycle, which includes enrichment and reprocessing facilities. Given that Iran "holds the world's third-largest proven oil reserves and the world's second-largest natural gas reserves" (EIA, 2009), the world community has been suspicious of Iran's claim that its nuclear programme exclusively pursues civilian purposes (i.e. energy production). In particular, the European Union (EU) has been at the forefront of efforts to clarify the exact nature of Iran's nuclear programme. While the United States (US) under President George W. Bush has insisted that 'all options, including a military attack, are on the table', the EU has tried to engage Iran diplomatically since 2003. While there were clear differences in the US and the EU approaches, both insisted that an immediate cessation of enrichment activities by Iran was a necessary first step to restore confidence about the civilian nature or Iran's activities. Iran voluntarily suspended enrichment activities between 2003 and 2005, but resumed these activities shortly after.

These suspicions about the civilian nature of the Iranian programme have not been helped by Iran's difficult cooperation with IAEA inspection missions. The concern has focused mainly on Iran's enrichment technology.¹ Despite the intensive IAEA inspections, "Iran's use of centrifuge enrichment technology makes detection of clandestine enrichment very difficult" and "[the] construction [of two enrichment plants at Natanz] partly underground raises concerns about Iran's intentions" (Squassoni, 2006, 2-3).² The existing verification mechanisms under the Non-Proliferation Treaty (NPT)

¹ The question remains whether Iran's enrichment programme only produces low-enriched uranium for civilian purposes (2-3%) or does it enrich uranium until it is weapons-grade (90%) highly-enriched uranium? What does Iran do with a by-product of the spent nuclear fuel, which includes 1% plutonium, which can also serve as fissile material for nuclear weapons.

² The fact that Iran uses large-scale enrichment or reprocessing routes to produce fissile material

that are used by the International Atomic Energy Agency (IAEA) have not given the world community the required reassurance about the non-military nature of Iran's nuclear activities.³ Gaps remain in the Agency's knowledge with respect to the scope and content of Iran's centrifuge programme, including the role of the military in Iran's nuclear programme (IAEA, 2006b, 7-8).⁴

Iran has currently – May 2009 – about 4000 gas centrifuges at work. So far, Iran has been able to produce about 1000 kilograms of Low Enriched Uranium (LEU), a quantity that theoretically enables Iran to acquire a 'break-out capability' and produce a nuclear weapon (Borger, 2009). However, technical difficulties with operating the centrifuges and Iran's limited experience with enrichment most likely delay Iran's acquisition of sufficient weapons-grade material for a bomb by a year, and possibly several years.

However, after six years of threats of military actions, diplomatic sanctions, counter-proliferation interdiction efforts and stringent export controls, Iran is still enriching uranium. Clearly, Iranian leadership is very motivated to acquire its own nuclear fuel cycle, as, since the 1979 Islamic revolution, Iran's nuclear programme has frequently been denied access to commercial markets for a steady supply of nuclear fuel.⁵ Moreover, Iranian public opinion overwhelmingly supports Iran's sovereign right to acquire the necessary know-how for nuclear technology and views this technology as "an important factor in becoming an advanced player in the modern world" (Herzog, 2006, 3). Neither does pushing for more a more intrusive verification regime by the IAEA offer any guarantees, as there is always the possibility of a hidden enrichment facility that operates with diverted low-enriched uranium. Last but not least, the Iranian ambassador to the UN, Mohammad Javad Zarif, and other high-level Iranian politicians made it clear that nuclear weapons and Weapons of Mass Destruction (WMD) have no place in Iranian defence strategy and that WMD more generally are not compatible with Islamic law (RAND Corporation, 2007, 41).⁶

could actually be interpreted as a sign of its peaceful intentions. Green (2006) points out that there are alternatives to large-scale reprocessing technologies, which are harder to detect: For example, Iran could use research reactors in conjunction with small reprocessing facilities (hot cells).

³ The US National Intelligence Estimate (NIC, 2007) assessed "with high confidence that until fall 2003, Iranian military entities were working under government direction to develop nuclear weapons" and "judge with high confidence that the halt lasted at least several years", while assessing "with moderate confidence that Tehran had not restarted its nuclear programme as of mid-2007 [...]".

⁴ Iran has not been fully cooperating with the IAEA inspection and has admitted – after the fact – to having experimented with uranium enrichment by introducing uranium hexafluoride in gas centrifuges at its facility in Natanz. In response, the US has leaned on Russia not to supply Iran with uranium enrichment facilities and to insist that Iran returns the spent fuel supplied by Russia back to Russia for disposal (Bowen & Kidd, 2004, 259-261).

⁵ Iran's representative to the IAEA Ali Asqar Soltanieh (2007) reminded critics about several instances where the Islamic republic of Iran has been denied access to nuclear technology and equipment. For example, Siemens Company did not finish its contract to help build a nuclear power plant in Bushehr. The Iranian ambassador to the UN, Mohammad Javad Zarif, also referred to Iran's hesitation "to fully trust promises for receiving exported items (such as nuclear fuel). Iran already has agreements in place with several countries but has been unable to get nuclear fuel" (RAND, 2007, 42).

⁶ In line with the fatwa against WMD, Iran submitted a report for discussion at the 2010 Review Conference of the Parties to the NPT that proposes to establish a nuclear-weapons-free zone in

The advent of US President Barak Obama and his promise to seek engagement based on mutual respect can bring a renewed impetus to the diplomatic negotiations between Iran and the EU since 2003. In 2009, American and European diplomats contemplated allowing Iran “to continue enriching uranium for some period during the talks”, while gradually opening up its nuclear program to wide-ranging inspection (Sanger, 2009). Even if Iran would not be called upon to suspend enrichment activities immediately, this ‘new’ approach looks very similar to the diplomatic approach that was taken between 2003 and today, as it continues to insist on ultimately turning back the clock on Iran’s enrichment and reprocessing infrastructure. This raises the question whether there are any other alternatives available.

2. The concept of a ‘structural foreign policy’

Keukeleire and MacNaughtan (2008, 25) would categorise the above-mentioned approaches pursued by the US and the EU as conventional foreign policy, orientated towards states, their elite policy-makers, military security, military threats and a focus on confrontation. Many of the existing accounts of the EU’s foreign policy towards Iran focus on its conventional aspects, usually drawing a rather negative picture of the EU’s effectiveness in dealing with a global security threat such as the proliferation of WMD and leaving a wide range of actors such as international organisations and Non-Governmental Organisations (NGOs) undiscussed.⁷ For example, Sauer’s (2007) article on the EU’s attempts at coercive diplomacy acknowledges that coercive diplomacy, a combination of demands, threats and specific time pressure, is rarely successful, especially if the state in question considers demands to be illegitimate and is very motivated to achieve its goal.

To take into account the challenges posed by globalisation and post-Cold War instability, Keukeleire and MacNaughtan (2008, 25-26) developed the concepts of ‘structural foreign policy’ defined as “a foreign policy which, conducted over the longer-term, seeks to influence or shape sustainable political, legal, socio-economic, security and mental structures”, while insisting that conventional and structural foreign policies are “not mutually contradictory and can even be complementary and mutually dependent”. There are four key features to a structural foreign policy: “the focus on structures, sustainability, comprehensiveness and the importance of mental structures”.

This paper seeks to explore how ‘structural’ the EU’s approach to Iran’s nuclear programme has been. It will do so by exploring whether the EU’s approach to the security challenge of latent proliferation, as exemplified by Iran, fulfils the four features of a structural foreign policy. This paper will mainly focus on the EU’s efforts to develop a ‘structural’ response to Iranian uranium enrichment and two diplomatic initiatives in particular: First of all, the 2004 Paris Agreement negotiated between the EU3/EU and Iran⁸ and, secondly, the EU’s proposal to develop multilateral fuel cycle arrangements

the Middle East. This proposal identifies Israel’s ‘ambiguous’ nuclear deterrence as a major obstacle (Iran, 2008, 1-2). This use of double standards on nuclear proliferation severely undercuts any calls for limits to Iran’s nuclear programme in the eyes of public opinion in Iran and the Middle East more widely.

⁷ Other conventional analyses include Portela (2004), Denza (2005), Meier & Quille (2005) and Alvarez-Verdugo (2006).

⁸ The ‘E3/EU’ means that France, Germany and the United Kingdom with support of the High representative of the European Union conduct negotiations with Iran on behalf of the EU. This

(i.e. “multinational alternatives to national operations of uranium-enrichment and plutonium separation technologies and to storage of spent nuclear fuel” (Rauf & Simpson, 2004)).⁹ I trace the developments over the last five years (2004-2009) regarding the multilateralisation of the nuclear fuel cycle as an answer to the challenge of a proliferation-proof and secure supply of nuclear fuel.

3. The EU’s multilateralist approach to Iran’s enrichment programme

3.1. Comprehensiveness

The *comprehensiveness* the EU’s approach to the perceived threat of Iran’s nuclear programme is beyond doubt, going far beyond an exclusive focus on non-proliferation issues. The Paris agreement between the EU and Iran should be seen as a “package”, combining a number of ‘carrots’. This is reflected in the Preamble’s insistence “that a final agreement on long-term arrangements providing objective guarantees that Iran’s nuclear programme is exclusively for peaceful purposes would lead immediately to a higher state of relations based on a process of collaboration in different areas [...]” (IAEA, 2005a, 3).

The Paris agreement identifies a wide range of “areas of cooperation of special interest”. For example, the EU clearly recognizes “a number of specific security concerns and interests with Iran and the important role Iran can potentially play in ensuring regional security and stability”. The EU also seeks common ground with Iran in “stemming the flow of opiates to Europe and therefore commit to developing co-operation on issues related to illicit drug production, drug trafficking, [etc.]”. In that context, the EU will “take steps with Iran to implement joint projects in close consultation with Afghanistan and Iraq to establish border police structures, training of police officers and border management” (IAEA, 2005a, 11).

The Preamble also clarifies that discussions between the EU and Iran on non-proliferation issues are “complimentary and mutually reinforcing” with the negotiations between the EU and Iran on a Political Dialogue Agreement and a Trade & Cooperation Agreement (IAEA, 2005a, 2 & 23-30). For example, the EU seeks to reinforce energy cooperation with Iran, recognizing Iran “as a long-term source of fossil energy for the EU”, which would entail the establishment of an “EU-Iran Management and Technology Centre with a view to commissioning joint studies on areas in which the EU and Iran can develop co-operation in the energy sector [...]”, i.e. the oil and gas sector. The Trade & Cooperation Agreement would also provide greater market access for Iranian companies

text of the Paris Agreement can be found as an annex to the IAEA document (INFCIRC/651). Its full title is “Framework for a long-term agreement between the Islamic Republic of Iran and France, Germany and the United Kingdom, with the support of the High Representative of the European Union” (IAEA, 2005a).

⁹ Another form of structural foreign policy to address the security issues related to an Iranian fuel cycle is the EU’s ‘multilateralist’ support for a Fissile Material Cut-Off Treaty (FMCOT), which aims “to negotiate a non-discriminatory, multilateral and internationally and effectively verifiable treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices”. The EU has submitted such a proposal for the 2010 NPT review conference. Last but not least, addressing the tense political situation in the Middle East – in particular since the 2003 American invasion of Iraq – is also part and parcel of the EU’s structural foreign policy towards Iran. While relevant to the research topic at hand, these other initiatives lie beyond the scope of this paper.

to the EU's Internal Market. The EU also committed to supporting Iran's application to join the World Trade Organisation and to developing long-term scientific and technological cooperation with Iran. Other areas of cooperation identified in the Paris agreement are air transport safety, railway and maritime transport, agriculture and tourism.

While a wide range of possible areas of cooperation is identified, cooperation on non-proliferation remains the centrepiece of the Paris Agreement. Both the EU and Iran commit to "more consistent monitoring, effective implementation and, where necessary, firmer enforcement of such treaties", as the NPT. They also stress "the importance of universal adherence to and full implementation of and compliance with disarmament and non-proliferation treaties and the full implementation of the IAEA safeguards agreements and additional protocols" (IAEA, 2005a, 7-8).

While recognising Iran's rights under the NPT, the EU also made more conventional non-proliferation demands to help rebuild confidence about Iran's peaceful intentions. This includes compliance with UNSC resolutions, which includes the suspension, on a voluntary basis, of further uranium conversion at the Esfahan facility, uranium enrichment at Natanz and the construction of a Heavy Water Research reactor in Arak. Moreover, the EU convinced Iran to sign and adhere to the Additional Protocol – on a voluntary basis – in 2003 (Bowen & Kidd, 2004, 257) and submit to an intensive inspection regime while moving towards the ratification of the Additional Protocol.¹⁰ In return, the EU endorsed a number of principles in the Paris Agreement that would give long-term support for Iran's civil nuclear programme, declaring "[...] their willingness to support Iran to develop a safe, economically viable and *proliferation-proof* civil nuclear power generation and research programme that conforms with its energy needs". The EU committed itself not to interfere with Iran's initiatives in "other fields of peaceful use of nuclear energy [other than research reactors], *excluding fuel-cycle related activity* [my emphasis]" (IAEA, 2005a, 13-22).

3.2. Structures

This continued focus in the Paris Agreement on "proliferation-proof civil nuclear power" and "fuel-cycle related activity" (i.e. uranium enrichment) brings me to the second feature of a structural foreign policy, namely *structures*. For Keulekeire and MacNaughtan (2008, 27), "[s]tructures consist of relatively permanent organising principles and rules of the game that shape and order the political, legal, socio-economic and security fields".

This fits well with the EU's support for the establishment and improvement of multilateral structures that can help defuse tension over Iran's nuclear programme. At the end of 2003, EU Member States agreed on a European Security Strategy that sets "an international order based on effective multilateralism" as its strategic objective (European Union, 2003b). This broad strategy was accompanied by a more focused EU strategy against the proliferation of WMD. This strategy will be guided by "our conviction that a multilateralist approach to security, including disarmament and non-proliferation, provides the best way to maintain international order and hence our commitment to

¹⁰ Albright and Shire (2007) point out that Iran is the only country with an active nuclear programme that insists on "adhering to an outdated, 1976 safeguards measure that permits such inspections [of enrichment-related construction projects] only six months before the introduction of nuclear material in a facility". Six years since signing, Iran has still not ratified the Additional Protocol.

uphold, implement and strengthen the multilateral disarmament and non-proliferation treaties and agreements” and “our determination to support the multilateral institutions charged respectively with verification and upholding of compliance with these treaties” (EU, 2003a, 5).

Apart from reinforcing the existing verification and monitoring of NPT members’ nuclear programmes, a recent report of the Congressional Research Service (2008, 2) hits the nail on the head when it points out that the Iranian enrichment programme is a critical case for the future of the non-proliferation regime, particularly in the context of future increases in demand for nuclear energy: “how can access to sensitive fuel cycle activities (which could be used to produce fissile material for weapons) be circumscribed without further alienating non-nuclear weapon states in the NPT?”. One of the proposals to balance the rights to nuclear free trade for peaceful purposes under the NPT with curbing the risks of a ‘latent proliferation’ of sensitive (i.e. dual-use) nuclear technologies is the multilateralisation of the nuclear fuel cycle. Such proposals seek to give NPT members a secure supply of nuclear fuel in order to avoid that more countries develop sensitive, dual-use enrichment and reprocessing technologies.

This promise of a secure supply of nuclear fuel was also part of the Paris Agreement. Of particular importance for this paper is the following: “The E3/EU recognise that Iran should have sustained access to nuclear fuel for the Light Water Reactors forming Iran’s civil nuclear industry”, based on its bilateral agreement with Russia. “In order to provide Iran with additional assurances that external supplies of fuel could be relied upon in the long term, the E3/EU would propose to develop with Iran a framework which would provide such assurance [...]”. This supply of fuel would however be “subject to proliferation proof arrangements being agreed for safety, transport and security of the fuel, including the return of all spent fuel” (IAEA, 2005a, 17).

In order to guarantee this, the EU and Iran agreed to establish an ad-hoc mechanism that could help resolve when a supplier is not:

“in a position to provide the fuel pursuant to its agreements with Iran for noncommercial reasons not connected with proliferation or safeguards related concerns and Iran faced serious difficulty in procuring the nuclear fuel necessary for the safe and sustained functioning of its Light Water reactors”.

Secondly, the EU committed “to assisting in the establishment of a buffer store of fuel, sufficient to maintain supplies at the contracted rate for a period of 5 years”, which would be located in a mutually acceptable third country.

In return, Iran needs to commit to “a binding commitment not to pursue fuel cycle activities other than the construction and operation of light water power and research reactors”. Moreover, Iran would need to “agree arrangements for the supply of fresh fuel from outside Iran and commit to returning all spent fuel elements of Iranian reactors to the original supplier immediately [...]” and “[i]n line with IAEA Board Resolutions, the E3/EU would also expect Iran to stop construction of its Heavy Water Research Reactor at Arak, which gives rise to proliferation concerns”.

However, the EU’s insistence that Iran should stop enriching uranium as a preliminary confidence-building measure proved to be a deal-breaker, as Iran can and will not accept any limited interpretation of its ‘inalienable’ right to develop nuclear energy, which for them includes the right to develop a nuclear fuel cycle. It rejects outright the

argument that the potential dual-use nature of its uranium enrichment programme gives the international community any say over which specific technologies are off-limits.¹¹ After Iran had been referred to the UNSC for sanctions in 2006, the EU's bilateral contacts with Iran continued, but efforts to provide fuel assurances to Iran were pursued in a different context: One of the paragraphs in the Paris Agreement committed both the EU and Iran to support efforts to implement the ideas in the IAEA's 2005 report on 'Multilateral Nuclear Approaches'.

To address this increased risk of proliferation in the context of a nuclear renaissance in June 2004, Director-General of the IAEA, Mohamed El-Baradei, appointed an international group of experts to consider the feasibility of different multilateral approaches to the civilian fuel cycle. In their assessments of various policy options, two primary factors dominate: Any proposal needs to fulfil the twin objective of both providing an "assurance of non-proliferation" as well as an "assurance of supply and services".

Most of the proposals for a multilateralisation of the fuel cycle recognize the 'inalienable' right to develop nuclear technology, but seek to dissociate energy security from sensitive dual-use enrichment and reprocessing technologies, e.g. by providing fuel assurances and economic incentives. Since international concern about the nature of Iran's nuclear activities spiked in 2003, a number of countries (Russia, Austria, Germany, UK) have made proposals for providing such fuel assurances.¹²

However, since 2004, an initiative, launched by an NGO, the Nuclear Threat Initiative, has attracted considerable support for the establishment of a Nuclear Fuel Bank to be administered by the IAEA. Such an IAEA backed fuel reserve would guarantee "a back-up supply for power reactors throughout the world on a non-discriminatory, non-political basis reducing the need for countries to develop their own uranium enrichment technologies at a time when concerns about nuclear proliferation are growing" (IAEA, 2006a).

'Responsible' states, fulfilling all imaginable criteria, could most likely buy uranium with no restrictions from the commercial market without the need for new complex arrangements. In order to attract less 'virtuous' countries, the bar for access to the Nuclear Fuel Bank should be set lower. These release criteria will have to be

¹¹ Legally, the interpretation of the 'inalienable right' to nuclear free trade under article IV of the NPT-treaty is complicated by the phrase "in conformity with articles I and II of this Treaty". The scope of application of this right "in conformity with article and I and II" has never been clarified. By studying the *travaux préparatoires* of the NPT, Zhang points out that "ambiguity was intentionally designed" by the negotiators. As a result, a 'clear' interpretation of what it means to "manufacture" nuclear weapons is impossible. It remains an open question whether Article IV includes the enrichment of uranium and the extraction of plutonium from nuclear fuels (Zhang, 2006, 653-658).

¹² For an overview, see Simpson (2008) and UNIDIR (2008). Under President George W. Bush, the US also made a proposal, the Global Nuclear Energy Partnership (GNEP). However, "President Bush's 2004 proposal is the only one that calls for countries to explicitly "renounce" pursuit of enrichment or reprocessing technologies in exchange for reliable access to nuclear fuel. [...] There has been little agreement on President Bush's proposals. Many non-nuclear weapon states see this as an attempt to limit their inalienable right to the use of peaceful nuclear energy under Article IV of the NPT and are not willing to consider limits on peaceful nuclear technologies until more progress on nuclear disarmament has been made" (Nikitin *et alia*, 2008, 21).

pre established and be the same for all states wanting to avail themselves of this mechanism. Dr. El-Baradei (2009) stressed the importance of three principles for the operation of a nuclear fuel bank under IAEA auspices:

- “Any such mechanism should be non-political, non-discriminatory and available to all States in compliance with their safeguards obligations;
- Any release of material should be determined by non-political criteria established in advance and applied objectively and consistently; and
- No State should be required to give up its rights under the Non-Proliferation Treaty regarding any parts of the nuclear fuel cycle”.

The IAEA Board of Governors could evaluate these criteria each time a request for fuel is received or it could delegate this task to the IAEA Secretariat and its Director General. The clear benefit of the latter approach is that it allows for a more factual consideration of the criteria established by the IAEA statute and the Board, thereby avoiding the risk of bringing political considerations into play.

In December 2008, the EU took the decision in principle to support the establishment of a nuclear fuel bank under the control of the IAEA, to which the EU committed 25 million Euros. Following this decision, Nuclear Treat Initiative chairman Sam Nunn made the following statement:

“The European Union joins the United States (\$50 million), the United Arab Emirates (\$10 million), and Norway (\$5 million) in making contributions to the IAEA fuel bank, which was announced by NTI and Warren Buffett in September 2006. NTI’s \$50 million contribution, backed by Mr. Buffett, is contingent on the IAEA receiving an additional \$100 million in funding to jump-start the reserve and the IAEA taking the necessary actions to approve establishment of the reserve. This action by the EU is an expression of confidence by 27 IAEA member states [i.e. the Member States of the EU] in the IAEA fuel bank concept. I hope that the IAEA Board of Governors will move swiftly to define and approve the details of the fuel bank’s operation” (NTI, 2008).

The IAEA announced in March 2009 that a \$ 10 million contribution by Kuwait helped it to achieve the \$ 100 million threshold by bringing the total contributions to \$ 157 million.

However, the financial support of the EU depends on the conditions and modalities for the Nuclear Fuel Bank that will be defined and approved by the Board of Governors of the IAEA. A working paper submitted by the EU for the 2010 NPT review Conference of Parties puts forward the following criteria for a multilateralisation of the fuel cycle (European Union, 2007a):

- Proliferation resistance, i.e. minimization of the risk of unintended transfer of sensitive nuclear technology
- Assurance of supply, including a predetermined and transparent decision-making mechanism and reliable guarantees for long-term delivery.
- Consistency with the equal rights and obligations paradigm, i.e. obligations of private companies, supplier states, consumer states and the IAEA
- Market neutrality, both in the sense of not interfering with a functioning market and in maintaining a level playing field between various sources of energy.

The EU provided substantial input to the report of an Expert Group on ‘Multilateral Approaches to the Nuclear Fuel Cycle’. The EU also made sure that an Iranian expert sat on the IAEA Expert Group (IAEA, 2004, 2).

The Member States of the EU view the European Commission as ideally placed to contribute to this project through relevant Community instruments, such as EURATOM as well as other Community instruments such as the Instrument for Stability and the Instrument for Nuclear Safety.¹³ EURATOM was established in 1957 to help European countries to achieve energy independence by investing in nuclear energy. Given the considerable costs and risks involved in developing nuclear energy, Member States opted to pool the required knowledge, infrastructure and technology in a multilateral organization in order to guarantee the security and safety of nuclear energy. This approach proved successful and, in the Paris Agreement, the EU had already suggested negotiations on an agreement between EURATOM and Iran (IAEA, 2005a, 16).

As a result of its experiences with EURATOM, the EU has long-standing expertise with multilateral fuel banks since the establishment of the European Supply Agency in 1960 under the EURATOM umbrella. This Agency fulfils one of the objectives of the EURATOM Treaty, namely “to ensure that all users in the EU enjoy a regular and equitable supply of ores and nuclear fuels (source materials and special fissile materials)” (EURATOM, 2009). According to the European Commission, the EURATOM Supply Agency should become a key actor in the development of an international system of guaranteed supply of nuclear fuel for countries willing to develop nuclear energy without having their own nuclear fuel cycle facilities. The report of the International Group of Experts also cited the Anglo-Dutch-German company URENCO and the French EUODIF as successful examples of multinational control over a civilian nuclear fuel cycle (IAEA, 2005b, 23).

Now that the total amount of \$ 150 million has been raised, the IAEA can meet the second condition and take the steps necessary to establish the fuel reserve. The IAEA Director General now needs the Board of Governors to decide to start the complicated discussion about the terms and conditions for its use and release criteria for LEU.

3.3. Mental structures

The effectiveness of the EU’s promotion of its version of a multilateralisation of the nuclear fuel cycle in dealing with the perceived threat of Iran’s nuclear programme depends on “the extent to which [changes to structures] are seen as legitimate and are (or are becoming) part of the mindset, belief systems or *mental structure* of the people concerned (population as well as elites) [emphasis in original]” (Keukeleire & MacNaughtan, 2008, 28). In other words, structures promoted by a structural foreign policy “are embedded within endogenous traditions or processes in the target country, society or region”. This helps their internalisation of the values behind the EU’s foreign policy.

The Iranian ambassador to the UN, Mohammad Javad Zarif, stressed that three principles must be respected in any attempt to resolve the Iranian nuclear crisis: “Iran has a right to this technology and [...] Iran should not develop nuclear weapons. Additionally, any solution needs to accept the reality that Iran has the technical know-how and suspension [of uranium enrichment] will not suspend knowledge”. In other

¹³ Given the centrality of Community instruments, the Commission suggests to be given a mandate to negotiate the conditions and modalities for establishing the fuel bank in order to speed up the decision making process (European Commission, 2009, 11).

words, the West's illusion of a 'zero-enrichment for Iran' policy needs to be abandoned, as the presence of technical know-how in Iran cannot be reversed (RAND, 2007, 42 and 47). With this in mind, Iran's envoy to the IAEA, Ali Asghar Soltanieh, clarified that Iran is ready to reconsider its position on the details of its uranium enrichment capacity, if there would be a "legally binding internationally recognised instrument for assurance of supply" (Borger, 2008). For example, both Iranian President Ahmadinejad and the Iranian ambassador to the UN Zarif have expressed interest in a multilateral consortium to enrich uranium and manufacture nuclear fuel that would be located on Iranian soil, which would include monitoring (RAND, 2007, 43; Fathi, 2009).

The EU will need to keep in mind these parameters set out by senior Iranian officials in the negotiations within the IAEA Board of Governors on the terms of the proposed Nuclear Fuel Bank. The first condition for the EU to support the IAEA's Nuclear Fuel Bank is that fuel assurances need to be 'proliferation resistant'. This term refers to "the adoption of reactor and fuel cycle concepts that would make more difficult, time-consuming, and transparent the diversion by states or sub-national groups of civilian nuclear fuel cycles to weapons purposes" (Feiveson, 2001, 1).

This raises the question: How stringent will the conditions be for giving a right to draw on this reserve fuel bank to a specific country that cannot meet its need for nuclear fuel on the commercial markets? Whether Iran is willing to give up complete control over its nuclear programme and its enrichment and reprocessing capabilities will depend on the technical specification of the multilateral arrangement in question. Rauf and Simpson (2004) stress that "[...] if all sensitive technology is available to all participants in a multilateral arrangement, then there is no benefit to be gained. To guard against this, multilateral efforts must come with some restrictions in order to avoid the risks of sensitive technology transfer".

Apart from extrinsic proliferation resistance, such as e.g. improved safeguards by the IAEA, there is also the issue of intrinsic proliferation resistance, i.e. technological innovations that make e.g. the nuclear fuel cycle more proliferation-resistant. An official in the General Secretariat of the Council of the EU, contacted for the purpose of this paper, stated that "the term 'proliferation resistance' should be interpreted to mean that Light Water Reactor technology is clearly favoured because it presents a very much reduced proliferation risk" (email exchange, April 23, 2009). Beyond that, the EU does not give a lot of detail about how to interpret the term 'proliferation resistance'.

In a report for the US Congress, the term 'proliferation resistance' is referred to as a "holy grail". While there is some optimism that the latest development in nuclear technology may offer more proliferation-resistant systems, there is also considerable disagreement about whether or not certain technologies are actually useful in addressing proliferation concerns (Nikitin *et alia*, 2008, 3 & 23).

Feiveson (2001) identifies Radkowsky Thorium Fuel for light water reactors as the most advanced variant of proliferation-resistant nuclear fuels, because it breeds "significantly less plutonium than current uranium fuel cycles and where any bred U233 is denatured

with U-238”.¹⁴ The higher concentration of Pu-238 in the spent fuel would make it more difficult to use the material for weapons. However, “while the proliferation-resistance advantages derive in part from the very high burn-up, the reactors do not have to be operated to full burn-up; removing the fuel early can make the weapons-quality of plutonium produced quite high. Moreover, thorium-based fuels “use uranium that is more highly enriched than typical today [8-20% compared to natural or 4% low-enriched uranium today]” (Feiveson, 2001, 5).

The US Department of Energy has invested in its Advanced Fuel Cycle Initiative “to develop and demonstrate spent fuel reprocessing/recycling technology”. The research has focused on “a separations technology called UREX+, in which uranium and other elements are chemically removed from dissolved spent fuel”. This results in up to 90% of separated plutonium and other highly radioactive elements. Further purification would be necessary to make the plutonium into weapons-grade plutonium and its high radioactivity makes it hard to work with. Critics of UREX+ point out that the high concentration of plutonium in the spent fuel would make it more attractive for e.g. terrorists to divert than current spent fuel, which contains only 1% plutonium (Nikitin *et alia*, 2008, 30-31).

No fuel cycle seems to be completely proliferation-resistant, because, while both examples may have some advantages in terms of proliferation resistance, there are other alternatives available that can produce weapons-grade nuclear materials. Green (2006) points out that “research reactors might be used in conjunction with small reprocessing facilities (hot cells) if the enrichment or (large-scale reprocessing routes to fissile material are not available”.

Clearly, this is a very technical discussion that requires extensive technical expertise on reactor design and nuclear physics. Nonetheless, I think it is safe to say that the jury is still out as to whether new, proliferation-resistant nuclear technologies will be a technological fix to the challenge of the dual-use nature of nuclear technology. Many of these techniques are still in the research stage and cannot address the immediate concerns at play in the crisis around Iran’s nuclear programme. In other words, it is highly unlikely that the EU will be able to change the ‘mental structure’ of Iranian officials by offering them proliferation-resistant nuclear fuels that provide the energy security they seek in nuclear power.

3.4. Sustainability

Clearly, the EU’s insistence that a multilateral fuel bank needs to be proliferation-resistant is unlikely to address Iran’s capability to produce weapons-grade material in the short or medium-term. Such proliferation-resistant technology is still in the development stage and the potential threat of Iran’s nuclear programme requires a short-term answer, rather than technological solution that may be operational in the long term, if ever.

For Keukeleire and MacNaughtan (2008, 27), any structural foreign policy must aim to “influence, shape or create structures that are not only viable in the short term, but that are equally *sustainable* in the long term, including when external pressure has disappeared [emphasis in original]”. Changing structures in the long term might be more

¹⁴ Other alternatives such as pebble-bed modular reactors, high-temperature gas-cooled reactors, breeder reactors and Small Innovative Reactors (SIRs) are at least a decade or longer away from being operational.

difficult, but can have a more lasting impact. In the context of this paper, I think sustainability of the EU's structural foreign policy on non-proliferation must be analysed in terms of the EU's ability to influence not only Iranian nuclear policies, but its national energy policy more generally. A structural foreign that is also sustainable would recognize the dual-use nature of nuclear technology and the problems of making such technologies proliferation-resistant¹⁵

Iran has always emphasized that its nuclear programme is for peaceful purposes, i.e. energy production. Given the problematic dual-use nature of nuclear technology, a 'sustainable' structural foreign policy of the EU vis-à-vis Iran would seek to influence the overall energy mix in Iran's energy policy, and in particular decrease the relative importance of nuclear energy in the eyes of Iranian decision-makers. The EU has so far failed to make the link between the ever-increasing energy demands of the Iranian economy and Iran's development of nuclear power. Given the experience of EU Member States in promoting energy efficiency, an EU structural foreign policy could try to persuade Iran of the wisdom of an energy policy that aims at decreasing energy demand through energy efficiency measures instead of trying to supply continuously increasing demand. However, neither the Paris Agreement nor any other EU policy documents on Iran have made this 'sustainable' connection.

Neither has the EU expressed any support for developing renewable energy in Iran. Apart from its environmental benefits, renewable energy sources do not exhibit the dual-use challenges of nuclear power. A Member of the European Parliament in the Green fraction, Caroline Lucas, (2007) has suggested "to help [Iran] leapfrog damaging nuclear technology". Iran has abundant sources of renewable energy. A report (Ingram and Spagnuolo, 2008) on "Changing the frame of the International Debate over Iran's Nuclear Programme" points out that "Iran is just outside the tropic of Capricorn and much of the country experiences high levels of solar radiation, a daily average between 5.0 and 5.4 kW per square metre in the south of the country". According to the same report, Iran also has considerable potential for hydro, biogas and wind energy, but the abundance of fossil fuels in Iran and its focus on nuclear energy have left this option largely unexplored. An ambitious technology transfer programme for Iran – sponsored by the EU – in the field of energy efficiency and renewable energy would not only help to make the EU's structural foreign policy more sustainable over the long term; it also has the potential to make the EU's efforts vis-à-vis Iran more comprehensive. Moreover, developing Iran's renewable energy sources also fits well with the preoccupation of Iranian political elites with energy security.

Conclusion

This paper allows me to draw two sets of conclusions: First, policy-relevant conclusions and, secondly, conclusions about the utility of Keukeleire and MacNaughtan's theoretical framework for evaluating EU foreign policy.

An analysis of the four features of a 'structural' foreign policy leads me to the conclusion that the EU's multilateralist approach to Iran is strong on comprehensiveness and

¹⁵ The sustainability concept has, in origin, a 'green' connotation and has been defined in the 1989 Brundtland Report on the link between environment and development as the ability "[to meet] the needs of present without compromising the ability of future generations to meet their own needs" (World Commission on the Environment and Development, 1987).

structures, but lacks a focus on mental structures and sustainability. The EU has shown a great ability to not focus exclusively on Iran's enrichment and reprocessing plans, and has tried to set its discussions in a broad, comprehensive framework that includes trade, scientific cooperation, agriculture, etc. The EU has also been instrumental in furthering the cause of the NTI-sponsored Nuclear Fuel Bank by making both financial as well substantive contributions.

However, the EU's insistence that this Nuclear Fuel Bank should be 'proliferation resistant' shows that the EU's engagement with Iran remains firmly rooted in a conventional foreign policy. The concept of 'proliferation resistance' is rightly referred to in a report of the Congressional Research Service as a 'holy grail': Everybody talks about proliferation resistance, but nobody has actually demonstrated how it could be made available now, in 2009, to resolve the controversy over Iran's enrichment and reprocessing technologies. The EU has not given many details about how a proliferation-resistant multilateral fuel cycle could be made a reality in the near future and inadequately addresses Iran's insistence that it has a right to enrichment and reprocessing technology under Article IV of the NPT. This approach is unlikely to significantly alter the mental structure of the Iranian political elite or population.

As to sustainability, latent nuclear proliferation will always remain an issue of many 'unknown unknowns' due to the 'dual-use' nature of nuclear technology. Recent optimism about possibly proliferation-resistant technologies may offer some hope, but is unlikely to offer answers to the ongoing diplomatic wrangling between the EU and Iran. Offering alternatives to continuously supplying increased energy demand in Iran (e.g. boosting energy efficiency and developing renewable energy) may be more sustainable in the long term. This route would address both Iranian anxieties about energy security as well as address European concerns about proliferation.

As to theoretical conclusions, Keukeleire and MacNaughtan's framework for analysing the EU's attempts at a structural foreign policy have produced a number of interesting findings: It shows that the EU has played to its strengths as an international actor by using a comprehensive set of instruments and by exploring a multilateralist solution to security challenges. The twin focus on mental structures and sustainability, however, demonstrates that the conventional aspects of the EU's foreign policy towards Iran. Their framework allows important actors such as the Expert Group on Multilateral Approaches to the Fuel Cycle and the NGO, NTI to be included, whereas few conventional analyses would have 'discovered' these actors.

One critique of the framework as developed by Keukeleire and MacNaughtan is that it does not specify how the interplay between conventional and structural foreign policies influences outcomes. They believe that these two forms can be complimentary, but my analysis has shown that conventional demands by the EU vis-à-vis Iran actually undermine attempts at a more structural engagement. Secondly, the four features of a structural foreign policy leave a lot of flexibility to any researcher to evaluate how 'structural' a given policy may be. I am not sure that my 'green' operationalisation of the term 'sustainability' fits with the authors' intentions. Nevertheless, I believe that the dual-use nature of nuclear technology is an important caveat to keep in mind, one of the lessons that was also emphasized at the dawn of the nuclear era, in the 1946 Report of Acheson and Lilienthal (1946, 6) on the international control of atomic energy:

“So long as intrinsically dangerous activities may be carried on by nations, rivalries are inevitable and fears are engendered that place so

great a pressure upon a system of international enforcement by police methods that no degree of ingenuity or technical competence could possibly hope to cope with them”.

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May 13, 2009

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