



**POLSKO-AMERYKAŃSKI**

SZCZYT GOSPODARCZY **WARSZAWA 2012**

**U.S.-POLAND**

BUSINESS SUMMIT **WARSAW 2012**

# THE NEXT LEVEL:

Polish – American Economic Cooperation  
2012 and beyond





#### **AMERICAN CHAMBER OF COMMERCE IN POLAND**

Established in 1990 the American Chamber of Commerce in Poland (AmCham) seeks to be the leading voice for international investors in Poland, representing its member companies, the investor community at large and demonstrating the positive role that business and commerce play in the development of the country and society. Currently, AmCham boasts as many as 360 members who were the largest foreign investors in Poland in 2010.

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Polish Confederation of Private Employers Lewiatan was established in January 1999 as a nationwide representation of employers to the state and trade unions. Today it is an organization of 62 sector and regional associations of private employers and 22 individual members. Thus in total there are about 3,750 companies employing over 750,000 workers. Each association is an autonomous organization that associates individual enterprises, each possessing its own statute and management.

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#### **US-POLAND BUSINESS COUNCIL**

Based in Washington, DC, the USPBC comprises 25 U.S.-based multinational companies with business interests in Poland. As the leading business association in the USA focused on Poland, the Council ensures that American executives and key Polish and U.S. government decision makers have a forum to advocate for further trade and investment opportunities in Poland and amicably resolve issues that might prevent future economic growth in commercial relationship between the two countries.

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# **THE NEXT LEVEL:**

Polish – American Economic Cooperation  
2012 and beyond



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Joseph Wancer is an accomplished international veteran in banking, having served as Vice President of Citibank, N.A. in the USA, Japan, Austria and France.

In Poland since 1991, Wancer actively participated in the transformation process of the banking sector. He co-founded the Citibank subsidiary in Warsaw and, on behalf of EBRD and the American Enterprise Fund, Bank Rolno-Przemysłowy (today: Rabo Bank), followed by executive positions as President and CEO held at Raiffeisen Bank and Bank BPH. In 2010 became Advisor to the Management Board of Deloitte, Poland. In 2011 elected Chairman of the Board of Directors of the American Chamber of Commerce, Poland. He is also on Boards of the Business Center Club and the Auschwitz-Birkenau Foundation.

Joseph Wancer has received numerous awards, including two from Presidents of the Polish Republic of Poland.



### **HENRYKA BOCHNIARZ**

**President, Polish Confederation of Private Employers Lewiatan**

**Vice President, BUSINESSEUROPE**

**Deputy Chair, Tripartite Committee for Social and Economic Affairs**

**President, Boeing Central and Eastern Europe**

Henryka Bochniarz heads the Polish Confederation of Private Employers Lewiatan, the largest organization of private sector employers in Poland. She is Vice President of BUSINESSEUROPE, the largest confederation of employers in the European Union, and a member of the Enterprise Policy Group, a consultative committee advising the European Commission. Since 2002, she has served as Deputy Chair of the Polish Tripartite Commission for Social and Economic Affairs and has played an active role in the dialogue between the government, employers' and trade unions organizations. In 2006, she was appointed by Boeing, as President for Central and Eastern Europe.

She is a member of the European Council on Foreign Relations. She co-founded the Congress of Women in Poland and was one of the originators of the parity legislation. Since 2011, she has served as Deputy Prime Minister and Minister for Development, Enterprise and Innovation in the Congress of Women's Shadow Cabinet.



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Prior to joining Williams & Jensen and the US Chamber, Mr. Stewart served as the Deputy Assistant Secretary for Europe at the U.S. Department of Commerce. Mr. Stewart directed the Department's activities on trade, commerce, compliance and investment policies for more than 50 countries (including European Commission and 25 EU countries, Turkey, Russia and the Independent States) in the region. During his tenure at Commerce he was also tapped as a surrogate for the U.S. President on issues ranging from Social Security reform to energy policy. Mr. Stewart served as the Acting Assistant Secretary and was granted top secret security clearance.

In 2006, Mr. Stewart was awarded the Officer's Cross of the Order of Merit of the Republic of Hungary by the President of Hungary for his outstanding contributions to fostering Hungarian-American economic relations. In 2002, Mr. Stewart also received The Ohio University 2002 Outstanding Recent Graduate Award.

## PREFACE

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On behalf of the Polish and American companies that comprise the American Chamber of Commerce in Poland, the Polish Confederation of Private Employers Lewiatan, and the U.S.-Poland Business Council, we would like to express our gratitude to Poland Prime Minister Donald Tusk and U.S. President Barack Obama for their support to convene this high level initiative aimed at fostering greater commercial cooperation between the United States and Poland. Their commitment to an increased economic dialogue demonstrates the recognition at the highest levels of leadership in both countries of the importance of enhancing the commercial relationship between the United States and Poland.

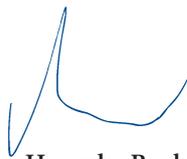
Recent years have seen a plethora of new opportunities for, and a few new challenges to, increasing bilateral trade between Poland and the U.S. Now is the perfect time for the two governments to set a new, forward-leaning agenda for commercial cooperation. In the past two years, Poland has demonstrated the strength of its leadership in Europe, both political and economic, and the United States and its brand have long enjoyed favor among Poles, but neither country can afford to rest on its laurels. In times as financially uncertain as today, it is more important than ever that such close allies chart and implement an ambitious plan for economic cooperation and innovation in sectors of mutually beneficial and strategic interests.

To this end, our three business organizations are honored to have been asked by the Polish and U.S. governments to provide input from the private sector about how the two countries can increase bilateral commercial relations. As requested by Prime Minister Tusk and President Obama, this white paper seeks to identify and prioritize business opportunities and constraints. We hope that this summary of the current economic relationship between Poland and the U.S. and overview of the key opportunities for business expansion will provide a foundation and roadmap for all participants in the summit.

Poland and the United States could benefit greatly from the synergies of combining the experience and technology of American companies and universities, and unleashed entrepreneurial spirit shared by Polish businesspeople eager to expand their reach. The member companies of our organizations, from both sides of the Atlantic, are grateful to be included in this economic dialogue and are excited to see our two great countries build on their past successes to secure a more promising future for both.



**Joseph Wancer**  
Chairman  
American Chamber of  
Commerce in Poland



**Henryka Bochniarz**  
President  
PKPP Lewiatan



**Eric Stewart**  
President  
US-Poland Business  
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## EXECUTIVE SUMMARY

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The last 20 years have been greatly successful for Poland with foreign direct investment being a key driver of economic growth. American companies have been the pioneers of Polish economic transformation and continue to be important players on this market. Whereas Poland benefited from 4.3% GDP in 2011, a large domestic economy and healthy export levels, the country should actively look for opportunities and measures guaranteeing stable growth despite the deepening crisis in Europe and across the Atlantic. Today's focus, therefore, is on business and trade opportunities between Poland and the United States which can be enhanced not just through classical business contacts, but through academic and governmental cooperation as well.

One area of particular relevance is the energy sector where, not only do both countries' national priorities align, but so do our unique experiences and needs in terms of nuclear plant construction, shale gas extraction, and renewable energy resource technology. Both countries' expertise is highly valuable to share and the business opportunities are great.

Information and communication technology is another area that provides vast opportunities for business relations and exchange of know-how as Poland has become a regional powerhouse in software development and business outsourcing. To the extent that Poland seeks to promote innovation in the economy, the government needs to demonstrate its own commitment to innovative solutions and modern technology. Improvements in aligning e-government across agencies and developing the government's own IT know-how are increasingly priorities as they have been at the U.S. state and federal levels.

It is crucial to enhance cooperation when it comes to R&D, academic, and student exchanges. The U.S. is a world leader in innovation and technology transfer, and Poland has an impressive scientific capacity that would benefit from U.S. entrepreneurial and commercialization skills and conditions. The level of academic cooperation to date is far too low. Greater commitment and government support is needed to create and incentivize knowledge exchange programs. Select U.S. universities are bastions of educational excellence and should be used to build relations and to share the best the U.S. has to offer. In this regard, Polish universities need to learn about educating according to market needs – a particular concern for the business processing sector which would like to see an enhancement in selected skill levels to provide ever more advanced services in the future.

Finally, sectors like aviation, defense, biotechnology, and software development would benefit from greater dialogue with the government regarding sharing information and supporting policies that would meet needs and enhance growth, improvements and business opportunities. The need for policies regarding the support of R&D, innovation and sharing of best practices between Poland and the U.S. is the key message of this paper.



# I. INTRODUCTION

Poland's track record of over 20 years without an economic recession makes it the stand-out success story of Europe, if not the entire developed world. The nation's political transition from communist rule to democracy and from command to free market economy is a historic case study in itself. The lessons learned during this transformation are still applicable today, especially in the current global economic environment. As the sixth largest member of the European Union and, having successfully completed its first Presidency of the EU in 2011, Poland's stature and influence have been elevated to a new plain in the international community.

Notwithstanding its strong ties to the EU, Poland has been a staunch supporter and committed ally of the United States of America, evidenced in notable military alliances in the past decade. More importantly, renewed business and trade opportunities can play a role in bringing our countries even closer together. The U.S. continues to be a key foreign investor in Poland. Traditional green-field investments have been complemented in recent years by a boom in software development and business processing centers and now excitement is building around significant opportunities in the energy sector.

Poland's attractiveness as a destination for Foreign Direct Investment (FDI) is bolstered by a large, robust domestic economy and a large, well-educated workforce with much sought-after language skills and work ethic which are cited by foreign investors as important factors in choosing Poland over other central European countries. The flow of service centers to Poland is a testimony to these advantages. Poland is no longer a low-cost investment destination, as compared to India or China, but competes with these giants on quality and key success factors. What Poland still needs to work on, however, is the link between R&D centers and business. Turning innovation into global products is the pathway to success. U.S. experience in this field is beyond doubt invaluable.

For over twenty years, FDI has been the main driver of Polish-American economic relations with over 20 bn USD invested in Poland by U.S. companies. Trade figures between Poland and the US, however, are low and incongruent with the depth of the overall relationship and opportunities between these two countries. Thankfully, there are many things both countries can do to support and improve trade in both directions. Two of the most important transatlantic issues for both the U.S. and Poland are security and energy. Poland is actively pursuing development of nuclear power and shale gas capacity to address these concerns. In both areas, American technology leads the field and can offer much to help the country secure its future. Simultaneously, as an emerging leader of the EU and the leader amongst Central Eastern European nations, Poland can bolster transatlantic dialogue and influence key issues concerning overall European-American economic relations. Given the extent of these potential mutual benefits, now is the time for Poland and the U.S. to think and act strategically to drive their mutual cooperation to the "next level."

## II. FOREIGN DIRECT INVESTMENTS AND TRADE

### 1. INVESTING IN POLAND

There is no doubt that FDI has been critical to Poland's economic development since the early 1990s. FDI inflow has been a key driving force behind the country's economic restructuring and modernization. Poland's FDI attractiveness, despite growing competition from other emerging countries, remains strong.

Poland is the top investment destination for American companies among all CEE countries, including Russia and the Ukraine. Up to now, over USD 20 bn has been invested in Poland by American companies. The high investment attractiveness of Poland has been indicated by the most recent UNCTAD's World Investment Prospects Survey 2010-2012, where Poland was ranked by global managers as the world's 13th priority host economy for FDI (the U.S. ranked 4th).

American investors in Poland benefit from available investment incentives<sup>1</sup> and are among the major investors in Special Economic Zones, as well as, recipients of government grants supporting investments with high employment. American investors also benefit from available EU funds and EU R&D programs through their Polish registered entities. Poland's good economic prospects and its relative competitive advantages provide significant opportunity for further American FDI inflow to Poland.

Taking into account net U.S. FDI outward stock increase in 2000-2010, inflows to Poland at the level of 230 USD per capita were smaller compared to many EU countries, including the Czech Republic and Hungary. Closing this opportunity gap in the coming years could double the existing U.S. FDI stock in Poland.<sup>2</sup> To realize the opportunity, however, Poland must continually strengthen its attractiveness by improving education and R&D, infrastructure, the flexibility of labor laws, by cutting red tape, and by providing incentives for investors to locate their manufacturing and service centers in Poland.

One major concern of U.S. investors is the future of government investment support schemes, including investment grants and tax exemptions in the Special Economic Zones. From American investors' perspective, the current investment grant system is too rigid to adjust to the dynamic global economic environment. In addition, the evaluation and decision process is long and cumbersome, mainly due to unpredictable and subjective bureaucratic interference.

<sup>1</sup> Investors may contact directly Ministry of Economy ([www.mg.gov.pl](http://www.mg.gov.pl)) or Polish Information and Foreign Investment Agency ([www.paiiz.gov.pl](http://www.paiiz.gov.pl)).

<sup>2</sup> Estimates were made based on Bureau of Economic Analysis data. See more details in Appendix A

## 2. INVESTING IN THE UNITED STATES

The United States is the world's largest FDI recipient. In 2010, the total world FDI inflows amounted to USD 228 bn (the second was China with USD 106 bn inflow). Poland has only recently begun to leverage this dynamic trend. The U.S. offers investors a variety of support schemes including tax incentives and financial grants. These schemes are available to Polish investors.<sup>3</sup> Currently, most outbound investment from Polish companies flows to the countries of the EU and CIS. Keeping in mind the relative size of Polish companies and U.S. standards, the key investment barriers for Polish investors in the U.S. include:

- limited knowledge of the U.S. market and investment opportunities, particularly a lack of information in Poland on specific business conditions and opportunities in the US
- visa requirements that hinder travel required to gather information or to get acquainted with business conditions and potential business partners (includes company owners and top management not receiving adequate business visas for travel to the US)
- insufficient financial resources
- difficulties gaining U.S. patents
- complicated procedures for gaining access to investment incentives
- high corporate income tax (CIT) rates (35%).

The support infrastructure available to U.S. exporters and foreign investors includes U.S. Commercial Service offices in over 100 U.S. cities and in more than 75 countries, including Poland. U.S. Commercial Service is the trade promotion arm of the U.S. Department of Commerce's International Trade Administration helping companies export and increase sales in global markets. A key success factor for these offices around the world is a commitment to local staff that provides continuity and expertise independent from diplomatic postings.

Poland has a similar structure with its Network of Investor and Exporter Assistance Centers (NIEACs) which act as units of regional governments providing information to foreign investors and to Polish entrepreneurs looking for export and investment opportunities abroad. Poland's diplomatic posts in terms of investment and trade promotion, however, are understaffed, underfunded and thus not as effective in key U.S. markets like Chicago, New York, and Silicon Valley.

The model of leveraging local and diplomatic posts to promote trade and investment is an area of potential U.S.-Polish collaboration (e.g. U.S. Commercial Service and the Polish Information and Foreign Investment Agency - PAIIZ), through sharing best practices in a way that would be most effective in helping Polish and American companies access the mutual markets to find trade and investment partners. The Polish NIEACs could establish direct relationships with their counterparts in the U.S. on state or city levels. This would make access to trade and investment opportunities easier and would improve efficiency in identifying business partners interested in U.S.-Polish trade or investment.

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3 More information can be found at SelectUSA website <http://selectusa.commerce.gov/>

### 3. EXPORT PROMOTION

Although total U.S.-Poland trade turnover in goods increased in 2001-2010 almost three-fold (exports to the U.S. by 3.4 times and imports from the U.S. by 2.6 times), Poland's share of U.S.-EU trade relations remains rather small. This small share points to a significant opportunity to strengthen Polish-US trade relations. In January through October 2011, Polish-US merchandise trade turnover increased by 14% compared to the same period in the previous year, reaching USD 7 bn.

In 2010, Poland exported to the U.S. USD 2.9 bn in goods (USD 3.1 bn in January-October 2011) and USD 1.6 bn in services (2009), while it imported USD 4.5 bn in goods (3.9 bn in January-October 2011) and USD 1.6 bn in services (2009). A significant share of Polish exports is generated by Polish companies with American or other foreign ownership; the challenge is thus to activate the export of purely Polish firms. Polish companies, including Small and Medium Enterprises (SMEs), export worldwide so they already possess the capabilities to enter the U.S. market. However, the U.S. has not been on the radar of most Polish exporters to date, and much needs to be done to increase trade volumes in both directions. A detailed analysis of Polish-US investment and trade relations can be found in Appendix A of this paper.

Both Poland and the US offer a variety of instruments to stimulate exports (e.g. Poland offers export credit and insurance instruments via national banks like Bank Gospodarstwa Krajowego (BGK) and the Export Credit Insurance Corporation (KUKI), and export strategy funding programs like "Passport to Export" offered by the Polish Agency for Enterprise Development (PARP); and the Network of Investor and Exporter Assistance Centers (IEACs). In 2012, Poland will begin to implement 15 branch promotion programs (within the program - Promotion of the Polish Economy on International Markets), five of which will be targeted to the US.

The US offers the International Buyer Program, Trade Missions, Ex-Im Bank financing programs, and services of the US Commercial Service. It is worth noting that the U.S. Ex-Im bank was actively engaged in financing U.S. exports to Poland since the beginning of economic transition. In 1997 the bank's exposure amounted to USD 699 mn. Since then it has been decreasing, reaching USD 545 mn in 2000, USD 282 mn in 2004, and USD 6 mn at the end of 2011.<sup>4</sup>

Polish exporters experience the same trade barriers as those related to investment described in the previous section. Additionally, Polish investment and export are impacted by non-tariff barriers such as in the furniture or food industries (through the Lacey Act or food safety regulations). Polish exporters also complain about bureaucratic measures.

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4 Export-Import Bank of the United States, annual reports



## THE MAJOR BARRIERS IN EU EXPORT TO US

- › low level of implementation and use of international standards;
- › burdensome pharmaceutical approval system, the American Automobile Labelling Act, documentary and labelling requirements for textiles, and sunscreen protection factor labelling;
- › non-acceptance of EC certificates of origin by U.S. Customs
- › burdensome food-related provisions and sanitary and phytosanitary measures;
- › slow procedures on applications to allow import of new types of plant products (Pest Risk Analysis);
- › import restrictions on a number of animals and animal products relating to Bovine Spongiform Encephalopathy (BSE)
- › import user fees and excessive invoicing requirements on importers;
- › restrictions in public procurement caused by Buy American act, which provides preferential treatment of products produced in US;
- › pre-screening of containers before they arrive to US introduced by Container Security Initiative (100% scanning);
- › Anti-dumping measure - practice of zeroing used by US for increasing, often substantially, the exporter's margin of dumping and thus the amount of anti-dumping duty paid;
- › Lacey Act - Scope and implementation of the US legislation to combat illegal logging; detailed declaration of origin are required;
- › Buy American Act - restricts the purchase of supplies, which are not domestic end product; (similar impact has the American Recovery and Reinvestment Act)
- › Non-US reinsurers are required to post 100% collateral for their US acceptances (i.e. their US reinsurance business) in the US;
- › Foreign Account Tax Compliance Act (FATCA) - all foreign financial institutions (FFIs) will be required to enter into disclosure compliance agreements with the U.S. Treasury relating to accounts held by US citizens, and all non-financial foreign entities (NFFEs) must report and/or certify their ownership or be subject to the 30% withholding tax
- › US law requires US airlines to be under the actual control of U.S. citizens in order to be licensed for operation;
- › restrictions on new aircraft foreign repair stations (Department of Homeland Security's Transportation Security Administration - final rule on aircraft repair station security)
- › insufficient protection of geographic indications - U.S. still considers a number of European food product names as 'semi-generics'
- › FDI limitations imposed by the CFIUS / FINSA framework - authorise the US President to investigate foreign acquisitions, mergers, and takeovers of, or investments in, US companies from a national security perspective.

Source: European Commission, Non-Tariff Measures in EU-US Trade and Investment – An Economic Analysis, Reference: OJ 2007/S 180-219493, December 2009; European Commission, United States Barriers To Trade And Investment Report for 2008, July 2009; European Commission's Market Access Database – <http://madb.europa.eu/> (only Key Barriers have been listed); Polish Ministry of Economy.

Based on interviews with Polish companies, one of the key barriers is the common belief that U.S. market entry is more costly compared to markets of the EU and CIS due to its distance, highly competitive environment and unfamiliar regulatory environment. The lack of Polish FDI has a direct relationship to the low level of Polish exports. FDI often serves as market enablers with investment in logistics or retail, for example, making it easier to introduce a core product to a new market.

Some of the above mentioned barriers to trade will be eliminated as a result of agreements made during the U.S.-EU Transatlantic Economic Council (TEC) meeting in November 2011. The EU and U.S. agreed to recognize each others' "secure traders" programs as of June 2012. They also adopted a "Common Understanding on Regulatory Principles and Best Practices," and a joint understanding on "Building Bridges between the U.S. and the EU Standards System," which will create new mechanisms to promote cooperation and coherence in standardization. The 2011 TEC launched a joint High-Level Working Group on Jobs and Growth. As set out by the Summit, the Working Group will identify and assess options for strengthening the U.S.-EU trade and investment relationship, especially in those areas with the highest potential to support jobs and growth. The Working Group will report its findings, conclusions and recommendations by the end of 2012, with an interim report in June 2012.

Experience from other countries shows that one of the most important elements of effective long-term export policy is comprehensive and sustained communication. This relates to reaching a varied audience, including students, academics and entrepreneurs; taking into account different perspectives like the availability of high quality information and proper knowledge transfer. Given the weak presence of Polish firms on the U.S. market, the existing system (including government and non-government institutions), needs to be thoroughly reviewed and re-engineered if Poland is to achieve a more prominent position in trade relations with the US.

Highly-educated employees with a good understanding of foreign markets are of critical importance to Polish exporters who usually do not have sufficient resources for external advisors. As a Ministry of Foreign Affairs study of Polish exporters of advanced technologies shows, less than 30% of companies surveyed employ foreign business advisors or lawyers and 78% claim they have limited resources for export promotion. Despite the existing constraints, these respondents named the U.S. a key strategic market.

One of key elements of market development and international cooperation is the establishment of a market presence, both business and administrative. This could be of particular importance for Poland as knowledge in the U.S. business community of Poland's advantages is small compared to larger trading partners. Thus the institutions which play a key role in the development of trade and investment relations (e.g. PAIIZ) could consider establishing their presence in the US.



To stimulate bilateral trade and investment, there is also a need for more active policies of regional institutions both in the U.S. and Poland, for example by establishing working relationships between city departments responsible for investment attraction and regional chambers of commerce. To strengthen export capabilities there could be U.S.-Polish cooperation focused on training and study visits targeted to local government representatives. Such a platform would enable an exchange of opinions on best practices related to export and investment promotion instruments.

One of the key challenges is to establish bilateral cooperation between SMEs. Both in Poland and the U.S. SMEs play a very important role in the economy. Closer cooperation could be established to define possible initiatives, including the U.S. Commercial Service, the Small Business Administration, the Ministry of Economy, and PARP. Potential joint activities could include such issues as how to match SMEs, which promotion instruments would work best to increase awareness of mutual markets, what are the most efficient ways to exchange information on opportunities with business communities. Also, with the internet becoming the major global communication tool, the opportunities and any barriers for application for on-line tools to enhance trade relations between the U.S. and Poland should be explored.

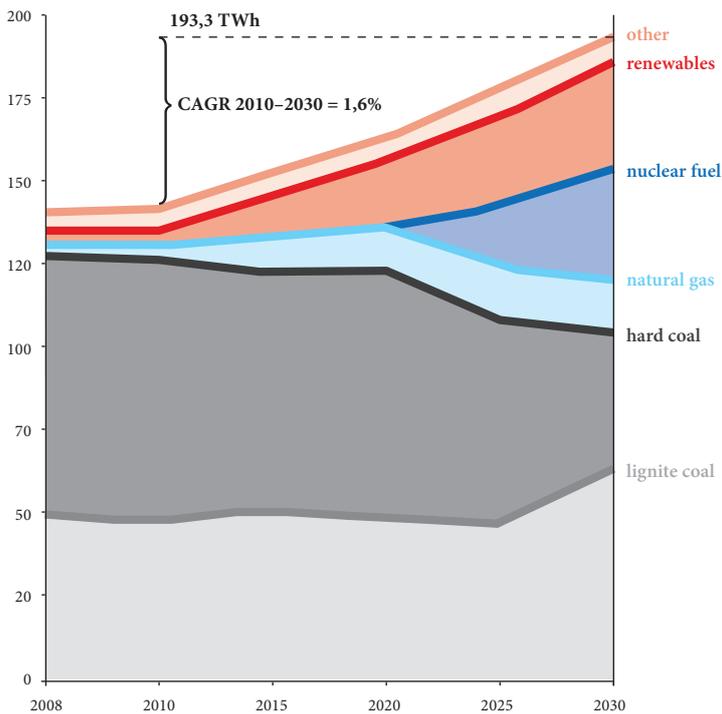
With this in mind, Poland could consider engaging actively in the EU-US dialogue Action Plan for 2012 on cooperation aimed at supporting the participation of SMEs in international trade, as stated by U.S.-EU Transatlantic Economic Council during its November 2011 meeting.

## III. AREAS OF OPPORTUNITY

### A. ENERGY

Poland's rapid economic development has put pressure on the modernization and expansion of the energy sector. According to the Polish Ministry of Economy, demand for fuel and electricity will increase by 40% from 2010-2030 (September 2011 estimates). Other factors driving investment in energy include replacement of aging units; establishment of a proper generation mix to meet Poland's energy security interests (domestic vs. foreign sources); and requirements to improve production efficiency and emission reduction.

Poland: Forecast of net electricity generation by source (TWh)



Note: other = industrial CHPs, renewables = hydro, biomass, biogas, photovoltaics,...; data do include generation from own needs, CAGR... Compound Annual Growth Rate.

Source: Analysis based on Polish Ministry of Economy, Update of the Forecast of the Fuel and Energy Demand up to 2030, September 2011

The Polish Council on the National Program of Emissions Reduction (CNPEN) estimates the technology of Polish power plants has already been significantly depreciated. Over 40% of units have been in operation for more than 40 years and approximately 15% of units are 50 years old or more. These aging units will be gradually closed down in the coming years. Having these trends in mind, energy experts estimate that at least 1000 MW of new generation capacity will need to be built annually.<sup>5</sup>

As a result of EU climate and energy policies, Poland will have to switch to a low emission economy in the next decades. The development of nuclear power, renewable energy sources and clean coal technologies will be important to meet this challenge, as well as, the development of natural gas resources. To achieve the new target energy mix Poland must find a feasible, cost-effective way of deploying technologies available now and in the future. The outline of required changes will be drafted by the Polish government in the National Program of Low-Emission Economy Development, whose framework was approved by the government in August 2011.<sup>6</sup>

Energy is the area where both Poland and the U.S. can benefit greatly from cooperation, most importantly in nuclear energy, shale gas, renewable energy, and other fields such as smart grids, carbon capture and storage, underground coal gasification and petroleum storage.

<sup>5</sup> Essay prepared by a team of experts from the energy sector, „The most important issues for the energy sector in Poland,” February 2008 (downloaded on Dec 1, 2011).

<sup>6</sup> Ministry of Economy, National Program of Low-emission Economy Development, downloaded 1 Dec 2011.

## 1. NUCLEAR POWER PROGRAM

Despite the 2011 Fukushima accident, nuclear power will continue to grow globally. According to the International Atomic Energy Agency (IAEA), the world's nuclear power capacity is expected to grow 22-47% by 2020 and 48-118% by 2030. Key growth regions include Asia Pacific and North America. The power capacity growth in Europe will depend on the evolution of the German nuclear program: if withdrawal from nuclear power continues, the total installed capacity in Europe as a whole will decrease despite its growth in other European countries.

In 2005, the Polish government announced plans to introduce a nuclear power program in order to diversify energy sources to reduce the country's dependence on (imported) natural gas and to reduce greenhouse gas emissions. According to the national strategy, by 2030 nuclear power plants should deliver approximately 15% of Poland's electricity generation.

The U.S. is the world's largest nuclear energy producer. Within the last 30 years the nuclear generation volumes in the U.S. have increased almost tenfold reaching 806968 million kWh in 2010 and its share of the country's total electricity generation increased from 4% to 20%. The U.S. also operates by far the largest number of reactors: 104, of which 69 are Pressurized Water Reactors (PWR) and 35 are Boiling Water Reactors (BWR),<sup>7</sup> in addition to 36 research and test reactors.<sup>8</sup> In mid 2011, 20 new units were under active Nuclear Regulatory Commission review.<sup>9</sup> Annual business and government expenditures on R&D related to nuclear energy exceed USD 1 bn. It is also worth noting that the U.S. is the "mother" of major commercial nuclear technologies including BWR, PWR and – in cooperation with Canadian firms – Canada Deuterium Uranium (CANDU), a Pressurized Heavy Water Reactor type. First license agreements to non-US companies were realized in the late 1950s.

According to Poland's Nuclear Energy Program, two nuclear power plants (NPP), each of a capacity of 3,000 MWe, are to be built by Polska Grupa Energetyczna (PGE). The first nuclear power plant should be operational in 2020 (in total 6,000 MWe shall be operational by 2030). PGE estimates total project cost of its first generation III nuclear power plant up to EUR 10.5 billion (EUR 2,500-3,000/kW).

Poland plans to deploy advanced III/III+ generation reactor technologies. Based on IAEA data, as of November 2011, there was only one operating III generation nuclear power plant – in Japan, with the plant reactor technology delivered by American companies. U.S. companies have built four generation III reactors in two NPPs in Japan and are currently constructing another eight around the world.

To ensure knowledge transfer, Poland has signed a series of joint declarations on energy cooperation with countries having relevant expertise to assist Poland in the construction of its nuclear power plants, including the US. PGE also has non-exclusive agreements to cooperate with industry leaders, including

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7 United States Nuclear Regulatory Commission, <http://www.nrc.gov/reactors/power.html> (downloaded 1 Dec 2011).

8 European Nuclear Society, <http://www.euronuclear.org/info/encyclopedia/n/nuclear-power-plant-world-wide.htm> (downloaded 1 Dec 2011).

9 Nuclear Energy Institute, <http://www.nei.org/resourcesandstats/documentlibrary/newplants/graphicsandcharts/newnuclearplantstatus/> (downloaded 1 Dec 2011).

American firms. The transfer of U.S. experience in the whole nuclear energy value chain would benefit Polish industry, R&D, and the country. Depending on the supply chain and financing model, American FDI related to the nuclear reactor delivery for the first NPP could reach USD 7 bn. The U.S. companies operating in Poland already employ more than 2,000 engineers involved in energy-related engineering.



**The transfer of U.S. experience in the whole nuclear energy value chain would benefit Polish industry, R&D, and the country.**

Keeping in mind the strategic importance of the nuclear program to Poland's economy and its long-lasting impact, the whole process should be carefully planned in a highly knowledge-based manner, including:

- significantly strengthening know-how on the newest nuclear technologies and related issues (e.g. technical specifications, performance, safety, environment impact) among key actors including government decision makers and process supervisors, state institutions involved in the development and assessment of the nuclear program and the research community
- executing Poland's existing bilateral cooperation in an energized and result-oriented manner, particularly in relation to U.S.-Polish cooperation, e.g. Department of Energy – Polish Ministry of Economy and Nuclear Regulatory Commission – Polish National Atomic Agency agreements
- creating a standalone knowledge base for Polish industry in the nuclear program, including cooperation on both component supplies and R&D. Thus, if possible, the technology selection process should take into account the possible impact on local industrial/R&D base development.
- ensuring transparency in the process and best practices from other countries and international organizations for all companies interested in the Polish nuclear program. This is particularly pertinent for Poland because constructing these plants will be Poland's largest ever infrastructure project and, probably more importantly, it will require high technical complexity at a time when core local technical expertise has yet to be developed
- conducting technology and capabilities assessment and selection in a fact-driven manner so that all key aspects of the project life-cycle are taken into account. Of critical importance will be the technology advancement requirements – Poland should balance its need for the safest and most up-to-date III/III+ technologies with having proven solutions. It is also of utmost importance to select a design and vendor with the ability to meet schedule and budget obligations in order to reduce overall project risk
- demonstrating full commitment from the Polish government including a willingness to provide sovereign guarantees so that an international export credit agency is able to provide attractive interest rates
- significantly strengthening fact-driven communication with the public. Late public involvement with the project could cause longer development procedures and increase investor uncertainty.

Given that this is a complex multi-factorial process for nuclear program deployment and nuclear technology selection for the country's first NPP project, this process should be strongly supported by the most experienced nuclear agencies best equipped with processes and methodology.

## 2. SHALE GAS

In May 2011, U.S. President Barack Obama said in Warsaw,

“*Shale gas is an opportunity: it has to be developed in an environmentally secure and sensitive way. We believe that there is the capacity technologically to extract that gas in a way that is entirely safe, and what we want to do is to be able to share our expertise and technology with Poland in a fully transparent and accountable way – because we think that consumers, environmentalists, everybody should be able to look at the data and say this is something that can actually work.*<sup>10</sup>

In April 2011, the U.S. Energy Information Administration estimated in its World Shale Gas Resources report technically recoverable shale gas resources in Poland at 187 trillion cubic feet (approximately 5.3 trillion m<sup>3</sup>).<sup>11</sup> On March 20, 2012 a joint U.S. –Poland report on shale gas potential was released using U.S Geological Survey methodology and Polish Geological institute historic data. That assessment puts the size of shale gas deposits at between 346 to 768 bn cubic meters.

As of January 2012, 111 concessions allowing for exploration prospecting of shale gas were issued. Although shale gas exploration has already commenced, the outcome of these operations is yet to be determined. Taking everything into account, shale gas creates a large opportunity for U.S.-Polish economic cooperation as the U.S. is the world's largest shale gas producer. Successful exploration and production have positioned U.S. companies as technology leaders in this area and thus value-added partners for the Polish shale gas industry. If shale gas exploration in Poland proves commercially viable, the capital expenditure required and FDI inflow to Poland will be huge.

To realize the investment potential, however, there needs to be a well-functioning regulatory framework in place. Current legislation requires significant adjustment to allow for potential shale gas production. The current key areas of concern include:

- Poland needs to liberalize its gas market, introduce market-based pricing and ensure non-discriminatory transportation and storage system access.
- Exploration concession holders who successfully complete exploratory tests should be granted exclusive preferential rights to obtain a production concession.

<sup>10</sup> The White House, President Obama and Prime Minister Tusk Press Conference, 28 May 2011 <http://www.whitehouse.gov/photos-and-video/video/2011/05/28/president-obama-and-prime-minister-tusk-press-conference#transcript> (downloaded 1 Dec 2011).

<sup>11</sup> US Energy Information Administration, “World Shale Gas Resources: An Initial Assessment of 14 Regions Outside the United States,” released 5 April 2011, <http://www.eia.gov/analysis/studies/worldshalegas/> (downloaded 1 Dec 2011).

- Import and in-country operational restrictions on non-EU equipment and personnel may need to be eased in order to conduct operations on a large scale, until such time when the Polish service industries develop to meet this increased demand.
- Keeping in mind national interest, efforts should be coordinated on joint regional and central government levels to include reserve areas for shale gas activities when planning local zoning. If a community does not allow for shale gas activities in its zoning plans, it may be very difficult to obtain a production concession in the future.
- The shale gas community should be consulted on any changes in the taxation, royalty, or regulatory regimes as most investors perceive shale gas in the strategic, long-term perspective. This will help ensure the creation of a balanced system that provides a proper level of income to the budget while sustaining the profitability of the project for the investor. Unexpected changes may lead to a decrease in investors' confidence and withdrawal from projects.
- US officials and regulators should continue sharing their shale gas experience with the Polish central and local governments. Communication with the public is of key importance and to be effective it should be conducted on a continuous basis by the administration authorities and firms. Opposition from local residents to shale gas investors results mainly from a lack of knowledge.
- The Polish government needs to continue to lobby for shale gas at the EU level and increase cooperation with other member countries.

Some of the critical concerns surrounding shale gas production are related to the environmental impact of exploration and extraction. To mitigate any environmental risks, the Polish government should consider:

- pursuing regulations and measures that promote and enforce best practice engineering techniques and proven drilling and fracking methods
- dedicating R&D funding to improve and propagate professional knowledge on shale gas operations among scientists and the engineering community
- continuing research related to possible environmental impact and definition of mitigation measures

The above could be stimulated by launching joint U.S.-Polish research initiatives and scientific exchange programs (e.g. through cooperation of U.S. DOE, Polish NCRD, National Fund for Environmental Protection and Water Management) as well as the development of platforms where business and government experts from both countries could exchange their opinions and share best practices. An example of this could be establishing cooperation between the U.S. Environmental Protection Agency (EPA) and its Polish counterpart (e.g. Ministry of Environment, General Directorate for Environmental Protection). The EPA already has extensive knowledge on environmental aspects of shale gas operations.

### 3. RENEWABLE ENERGY

The U.S. government is committed to developing renewable energy resources (RES), as is the EU. Member States are obliged to reduce consumption of energy by 20% against the forecasts for 2020, reduce emission of greenhouse gases by 20% and to increase the share of renewable energy sources in the final energy mix to 20%. Subsequently, in March 2011, the European Commission published “A Roadmap for moving to a low-carbon economy in 2050,” where it indicates the need for 80% to 95% greenhouse gas emission reductions by 2050 with full de-carbonization of the power sector.

According to the Energy Regulatory Office, in 2010 the share of green energy in total electricity generation in Poland reached 7.1% compared to 4.6% in 2008 and total installed capacity amounted to 2,556 MW (3,082 MW by the end of 2011).



**One of the first and largest U.S. manufacturers in Poland is also one of the biggest industrial producers of green energy, generating 50% of its electricity from biomass.**

American investors play an active role in RES development in Poland. One of the first and largest U.S. manufacturers in Poland is also one of the biggest industrial producers of green energy, generating 50% of its electricity from biomass. This represents nearly 4% of total renewable energy in Poland. Also, American financing has facilitated the three largest wind farm projects in Poland: Duszniki, Margonin and Tymien. In addition, the three leading biogas companies in Poland are funded or managed by Americans and the oldest foreign investor in energy efficiency and RES (since 1997) has been funded by American sources.

Each Member State of the EU is obliged to establish its national overall target – for Poland it is 15% of renewable energy in the final energy consumption by 2020. This means that approximately 8,000 MW<sup>12</sup> of additional capacity needs to be built. This will require significant investment from private sources. According to research by the Polish Confederation of Private Employers – Lewiatan, the renewable business community plans to add approximately 3 GW of new generation capacity by 2013.<sup>13</sup> The government forecasts that by 2030 available renewable generation will increase more than fourfold, up to 11.8 GW.

The successful transition to a lower carbon economy in Poland will require a more flexible approach in the mobilization of biomass in the marketplace. The promotion of new sources of wood biomass, for example, would provide the Polish agricultural sector with exciting new opportunities for prosperity and employment. Wood biomass production creates a doubly beneficial situation, but Poland still underutilizes its forest-based renewable resources by almost 45%. The forest products sector generates just 1.5% of GDP in Poland and only 1% employment, yet forests cover about 30% of the land area.

<sup>12</sup> Ministra of Economy, “National Action Plan regarding Renewable Energy Resources,” Warsaw 2010 (downloaded 1 Dec 2011).

<sup>13</sup> PKPP Lewiatan, „Investments in Renewable Energy Sources,” Warsaw, 26 October 2011.

There is significant scope for making better use of this resource without compromising sustainability or negatively impacting the quality of human life in Poland.

Bio-fuels could also play a key role in meeting Poland's and the EU's renewable energy targets. Bio-fuels can contribute to energy security and also help to foster rural economic development by modernizing the agricultural sector and supporting rural employment. With its strong agricultural base, Poland has great potential to increase bio-fuel production and consumption.

Biodiesel production capacity in Poland is currently approximately 1 million tons, with significant increase possible by 2020 when the bio-fuels volume mandate in Poland is due to increase from just under 6.2% in 2011 to around 11%. The Polish National Renewable Energy Action Plan also projects that biodiesel's contribution to meeting renewable targets in transport could double from 755 ktoe in 2011 to 1,451 ktoe by 2020. This mandated increase may be met by increased domestic production; import may also play a role depending on feedstock availability, market conditions and other supply and demand factors. Similarly, bio-ethanol production capacities are estimated at approximately 0.6 million tons. In 2010, bio-ethanol consumption in transport amounted to approximately 238,000 tons. The above Action Plan projects that bio-ethanol contribution to meeting renewable targets in transport will increase from 299 ktoe in 2011 to 451 ktoe by 2020.

Investing in RES in Poland however, can be difficult. The major barriers impacting investors' decisions include:

- a lack of reserve areas for the development of RES in local spatial planning documents making it highly difficult to obtain amendments in the future
- non-transparent and inefficient application, permitting and agreement procedures in the Polish power grid. These procedures make developing RES a difficult and often slow process. Poland should publish maps of available capacity on each line and transformer (GPZ) station so as to facilitate RES development
- insufficient infrastructure and interconnections to neighbors in the Polish power grid. Prompt upgrading and interconnection establishment will enhance energy security as well as support the domestic energy generation market
- uncertainties related to future energy regulation, including concern about fair, non-discriminatory provision by the Polish government of incentives for RES
- failure to adopt into law the RES Directive<sup>14</sup>
- protracted drafting of legislation on biomass and energy efficiency
- a lack of differentiation of investment procedures for small and large investments hinder small generation projects
- lengthy procedures to obtain construction permits
- a lack of waste to energy incentive structures, e.g. sludge is still treated as waste when it should be treated as a renewable fuel
- difficulties in acquiring land from Agricultural Property Stock, which could be used for increasing biomass supplies

<sup>14</sup> Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

Some of above barriers will be eliminated once the law on renewable energy sources is implemented, a draft of which is currently in the process of public consultation.

Considering U.S. expertise and knowledge in renewable technology and regulation, the exchange of experience between Poland and the U.S. would be highly valuable. The most important issues to tackle include:

- enhancing the availability of incentives for the renewable industry, and, in particular, incentives for residential use of RES (such as domestic solar, wind, heat pumps and biomass)
- creating more flexible procedures regarding state land acquisition for energy purposes
- promoting technological cooperation on RES (especially wind energy both on-shore and off-shore; biogas; and solar energy)
- commercializing innovative technologies
- developing smart grids on both large and small scales

The U.S. and Poland could strengthen their cooperation on RES. Similar to other areas, R&D cooperation is greatly needed. Some cooperation could be established between such U.S. institutions as the Department of Energy, the Department of Agriculture, Advanced Research Projects Agency - Energy (ARPA-E), Environmental Protection Agency, Geological Survey, Federal Energy Regulatory Commission and their Polish counterparts such as NCRD, Ministry of Environment, Ministry of Economy, Energy Regulatory Office. This cooperation could be implemented through bilateral partnerships between the U.S. Department of Energy – Energy Efficiency & Renewable Energy (EERE) with its Polish counterpart. In Europe, EERE has so far established bilateral partnerships with Finland, Spain and Sweden.<sup>15</sup> Poland would benefit from sharing experiences with the U.S. Global Change Research Program, which coordinates and integrates federal research on changes in the global environment and their implications for society.<sup>16</sup>



**Both countries face similar challenges of growing consumption, modernization needs, and diversification of energy sources, and both countries have long-lasting traditions in energy-related research.**

Improving the efficiency of energy use is one of the most important challenges of the future. Smart grids are one component where Poland and the U.S. could look to cooperation. Both countries face similar challenges of growing consumption, modernization needs, and diversification of energy sources, and both countries have long-lasting traditions in energy-related research. Cooperation could include development of knowledge potential through research programs for scientists, development of pilot projects,

<sup>15</sup> U.S. Department of Energy, "Energy Efficiency & Renewable Energy," 7 February 2011, <http://www1.eere.energy.gov/international/europe.html> (downloaded 1 Dec 2011).

<sup>16</sup> U.S. Global Change Research Program, <http://www.globalchange.gov/> (downloaded 1 Dec 2011).

and sharing best practices. Cooperation may be stimulated by EU requirements as the Electricity Directive (2009/72/EC) obliges Member States that 80% of all consumers have to be equipped with intelligent metering by 2020. It is worth noting that during the November 2011 TEC meeting, both sides agreed to a new work plan with the objective of developing coherent and compatible standards for electric vehicles and smart grids to promote these for adoption in relevant international forums.

#### 4. STRATEGIC PETROLEUM RESERVES

Ensuring a secure and continuous supply of oil to its economy is one of Poland's most significant and enduring challenges. The nation's robust economic growth, the consequent increase in demand for energy as well as the volatility of regional and global oil supplies have made the challenge even more acute. Even as Poland's oil supplies are being diversified, the realities of international affairs portends a global oil market that will be subject to shocks driven by both natural disasters and political events. Under these circumstances, the upgrading of Poland's strategic petroleum reserve (SPR) infrastructure and policies deserves urgent consideration as means to reinforce its energy security resilience. The Polish government addressed the need for a larger storage system for oil and liquid fuels, including underground storage facilities in salt structures, in its strategic document "Energy Policy of Poland until 2030" (Ministry of Economy, 2009).

Current petroleum and refined product storage capacity amounts to approximately 11.6 mcm in Poland of which 5.1 mcm in salt domes.<sup>17</sup> According to plans, the potential technical capacity of salt domes currently being considered for development will be close to 7 mcm, with a possibility for future expansion. The initial assessment of the project has been completed by Polish companies PERN Group and Lotos Group and submitted to the Polish Ministry of State Treasury for further evaluation and decision on the project continuation. The initial estimates of the capital cost of the project are approximately USD 570 mn. The project allows for broad private sector involvement, including project financing, engineering and geological advisory, and business and operations planning.



**Considering the U.S. experience in strategic petroleum storage, it would be of great benefit to establish closer U.S.-Polish cooperation.**

Considering the U.S. experience in strategic petroleum storage, it would be of great benefit to establish closer U.S.-Polish cooperation. The U.S. holds the world's largest stock of petroleum reserves at 696 mn bbls as of November 2011.<sup>18</sup> The SPR currently operates and maintains four major oil storage facilities in the Gulf Coast region of the US, the Bryan Mound and Big Hill sites in Texas, and the West Hack-

<sup>17</sup> International Energy Agency, Energy Policies of IEA Countries, Poland 2011 Review, Paris 2011, pages 119-120.

<sup>18</sup> United States Department of Energy, Strategic Petroleum Reserve, "Strategic Petroleum Reserve Inventory," <http://www.spr.doe.gov/dir/dir.html> (downloaded 1 December 2011).



berry and Bayou Choctaw sites in Louisiana. These four sites have a combined oil storage capacity of 727 mn barrels and a drawdown capability of 4.4 mn barrels per day. Emergency crude oil is stored in salt caverns, which range in size from 6 to 35 mn barrels in capacity; a typical cavern holds 10 mn barrels. Salt dome storage is by far the lowest cost technology for large scale petroleum storage projects. The SPR program provides the U.S. with energy and economic security through its emergency stockpile of crude oil, and its size makes it a significant deterrent to oil import cutoffs and a key tool of foreign policy.

Polish-U.S. cooperation could include sharing of lessons and best practices from the U.S. government's successful four decades of managing its SPR and salt dome petroleum storage facilities. Subjects to be addressed could include: the business model utilized for the U.S. SPR Program; regulations established at the federal, state and local levels; practices and regulations concerning environmental safety; lessons learned from the management of public concerns; safety and security practices and procedures; policies regarding the release of the SPR resources; and technologies available to ensure the safe, effective, and efficient management of underground petroleum storage facilities, among other issues.

Past cooperation on SPR between the U.S. and Poland has included assessment of the use of subsurface salt reservoirs for the crude oil storage conducted jointly by the Polish Geological Institute and Idaho National Laboratory. More intense cooperation could be established by such institutions as the U.S. Department of Energy, U.S. Environmental Protection Agency, U.S. Geological Survey, with Polish counterparts such as Ministry of Environment, Ministry of Economy, Material Reserves Agency and National Center for Research and Development.

## B. E-BUSINESS

### 1. E-GOVERNMENT

One of the major efficiency initiatives at central and regional levels is e-government that targets key interactions: government to citizen (G2C), government to business (G2B), and government to government and intra-government processes (G2G). The key enablers of the e-government program implementations are the information and communication technologies of which knowledge and access is equally important for all parts of the e-government triangle: government administration, private sector and citizens.

The Polish government continually invests in e-government services. At the EU level, e-government is high on the agenda, the basis of which was set forth in 2000 by the eEurope initiative and related action plans. In 2005, eEurope was succeeded by the i2010 initiative. Despite significant progress in recent years, the level of e-government readiness in Poland is still behind leading EU countries and EU averages. According to the most recent e-government benchmark conducted by the European Commission, in the full online availability ranking, Poland was ranked 19th out of the 32 countries measured. The best performers include Ireland, Malta, Portugal, Sweden and Austria. Poland's distance to the best performers was shown in the 2010 United Nations e-government development index: Poland ranked 45th out of 184 countries and 5th out of 10 within the Eastern Europe segment. The best world performers include Korea, the United States and Canada.



**U.S. federal and state governments have been pushing the e-government initiatives for many years in an attempt to innovate at a pace on par with the private sector, as expected by its citizens and demanded by budget constraints.**

There is much to gain from deeper cooperation with the U.S. in this area. U.S. federal and state governments have been pushing the e-government initiatives for many years in an attempt to innovate at a pace on par with the private sector, as expected by its citizens and demanded by budget constraints. Examples of ongoing federal government-wide flagship projects are the Open Government Initiative (channeled efforts to make government and its agencies more efficient and innovative) and the Federal Enterprise Architecture (guidelines for federal chief architects and CTOs in adopting best practices in IT architectures). These programs are an umbrella for many more specific e-government projects at different administration levels.

Many of these U.S. e-government initiatives were stimulated by specific laws, including the E-Government Act (2002), Government Paperwork Elimination Act (1998), Clinger-Cohen Act (1996), Federal

**Key benefits of e-government**

CITIZENS' BENEFITS	COMPANIES' / ORGANIZATIONS' BENEFITS	GOVERNMENT BENEFITS
<ul style="list-style-type: none"> <li>- Improvement of level of service</li> <li>- Improve service accessibility</li> <li>- Quicker administration procedures</li> <li>- More information access</li> </ul>	<ul style="list-style-type: none"> <li>- Improvement of level of service</li> <li>- Smaller transaction costs</li> <li>- Quicker and less cost intensive administration procedures</li> <li>- More information access</li> </ul>	<ul style="list-style-type: none"> <li>- Lower operating costs</li> <li>- Better transparency</li> <li>- Improved process management</li> <li>- Multi channel communication</li> <li>- Higher citizens' participation</li> <li>- Improvement of country competitiveness</li> </ul>

Acquisition Streamlining Act (1994) and Government Performance Results Act (1993). Each year the progress on e-government is reported to the U.S. Congress in the form of "The Report to Congress on the Benefits of the President's E-Government Initiatives."

The Polish central and regional government expenditures on IT technologies have stagnated in recent years, declining in 2009 to approximately PLN 2.9 bn, down from PLN 3.3 bn in 2008. More dynamic implementation of e-government is expected by citizens and the business community on both central and regional levels. The e-government program should be established as a priority for government specifically in times of stagnation. The creation of the new Ministry of Administration and Digitalization shows a renewed prioritization of this issue. As the U.S. example shows, the implementation of e-government initiatives can lead to substantial government savings and improve the level of service to constituents.

A significant challenge of the current e-government program in Poland is that it is highly fragmented which impacts the development costs and risks a lack of compatibility between specific systems and agencies. Nationwide vision and execution is needed, not to hinder the independence of specific government bodies, but to align objectives and ensure synergy between the projects and to enable the development of the government's own IT know-how.

As the European Commission and UN benchmarks show, Poland is moving fast with computerization, but not fast enough to close the gap between it and the world leaders. Execution has been one of the weakest elements of Poland's e-government program with many core projects either significantly delayed or cancelled. If not improved, the gap will widen and Poland will lose its opportunity and decrease competitiveness. This is particularly pertinent in the context of supporting the development of an innovative society and economy.

The U.S. and Poland would benefit from deeper cooperation in e-government. This cooperation could include exchange of best practices on implementing e-government initiatives and technological challenges faced. Natural partners seem to be CTOs from state governments and IT officers from Polish local and national government agencies. One area which would positively impact bilateral transactions is the mutual recognition and authentication of electronic signatures. This instrument is increasingly used by business and government both in domestic and cross-border transactions.

## 2. INTERNET ECONOMY

Like in other countries, the internet is becoming a significant driver of Poland's economic development. It has been estimated that in 2009 the internet contributed PLN 35.7 billion (2.7%) to the Polish GDP. Experts estimate that the internet economy in Poland will grow in the coming years by 14% annually and will double by 2015 with the potential to reach PLN 92 billion (4.9% GDP).<sup>19</sup> The main drivers of growth are consumer spending and the activity of individuals on the internet. Despite steady growth over the past few years, Poland's e-commerce development is still below EU average. According to Eurostat data, the share of individuals using the Internet who ordered goods or services for private use in 2010 amounted to approximately 30% in Poland (EU-27: 40%). Leading countries were Sweden, Netherlands, UK and Denmark, with shares above 60% in each of them.<sup>20</sup>

The participation of enterprises in electronic commerce is still rather small in Poland. In 2010, the percent of total electronic sales by enterprises of their total turnover amounted to approximately 8% - much below the EU-27 average of 14%. One of the major levers of the internet economy is access to broadband. In Poland, in 2010 only 57% of households had broadband connection. Development of the internet economy in Poland is also driven by EU policies. EU level priorities of the digital economy are set by the Digital Agenda which contains performance targets that include:

- broadband coverage of the entire EU of over 30 Mbps by 2020 and a 50% subscription rate to broadband above 100 Mbps
- online purchases to be conducted by 50% of the population by 2015
- online cross-border purchases to be conducted by 20% of the population by 2015
- online purchases and sales to be conducted by 33% of SMEs by 2015
- e-government use by 50% of citizens by 2015, with more than half returning filled-in forms

In January 2012, as part of the Digital Agenda and the Single Market Act and in response to the request from the European Council to submit a roadmap for the completion of the Digital Single Market by 2012, the European Commission has adopted a Communication presenting 16 targeted initiatives aimed at doubling the share of e-commerce in retail sales (currently 3.4%) and that of the Internet sector in European GDP (currently less than 3%) by 2015.<sup>21</sup>

Dynamic internet economy development could be one of the more significant factors driving US-Polish economic cooperation. Currently, it relates primarily to trade in the electronic and telecommunications equipment used to build the telecommunications infrastructure, but there is a rising trend in foreign trade generated by electronic commerce. The U.S. is world leader in terms of effective deployment of the internet economy and generated e-commerce value. In 2009, the total value of U.S. e-commerce amounted to USD 3371 bn.<sup>22</sup>

19 According to "Connected Poland" report (2010).

20 European Commission, Commission Staff Working Paper - Digital Agenda Scoreboard SEC(2011)708, Brussels, 31.5.2011.

21 European Commission press release - "Stimulating growth and employment: an action plan for doubling the volume of e-commerce in Europe by 2015, January 11, 2012, COM(2011)942.

22 U.S. Census Bureau, E-commerce 2009, May 26, 2011



### **Dynamic internet economy development could be one of the more significant factors driving US- Polish economic cooperation.**

One particular field of U.S.-Polish cooperation could be the sharing of experiences on the most effective policies to stimulate development of the internet economy such as the targeted policy actions taken by the U.S. to stimulate the internet economy in the mid-1990s. For example, in July 1997, the Clinton Administration released “A Framework for Global Electronic Commerce” highlighting key policy guidelines (including customs, taxation, electronic payments, uniform commercial codes, privacy, security, telecommunications infrastructure and IT technology, content and technical standards), which were then implemented step-by-step. As a follow-up, the U.S. Government Working Group on Electronic Commerce has been established. An interesting area to share experiences would be in how to attract SMEs to e-commerce and the policies related to the stimulation of international e-commerce.<sup>23</sup>

## **C. INNOVATION**

Innovation is defined as “creation resulting from study and experimentation” and it comes in many forms: “disruptive” product innovation, process innovation, experiential innovation, structural innovation, and others. Statistics indicate that despite rapid modernization in many areas of the economy, Poland is in the early phases of reinvigorating its innovation capabilities. In February 2011, the European Commission’s Innovation Union Scoreboard report listed Poland 22nd among the EU27 countries on its innovation performance composite indicator. The areas in which Poland lags most include business R&D expenditures, non-EU doctorate students, public-private co-publications, International Patent Cooperation Treaty (PCT) patent applications, and license and patent revenues from abroad.

Despite this, the possibility for dramatic progress exists. First, because experts in innovation insist the process can be learned. Second, historically Poles have been behind some of the biggest creative events in their fields: Copernicus revolutionized the way the world looks at its universe, Marie (Skłodowska) Curie pioneered diagnostic medicine, John Paul II enhanced global religious tolerance, and Lech Wałęsa and Solidarity re-drew the political map of Europe. As noted above, innovation takes many forms whereas government statistics tend to be focused only on product innovation. And third, even in this area, as one will see in selected sections of this paper, Polish engineers and inventors flourish when working within the type of entrepreneurial environment found in the US.

<sup>23</sup> For example U.S. Department of Commerce export focused e-commerce toolbox <http://export.gov/sellingonline/>

What this indicates is that Poland needs to reform its institutions and regulatory environment to become pro-innovative and the statistics will follow. In support of these efforts, the U.S. government can:

- share experiences and best practices on running organizations that support innovation development (e.g. innovation centers, technology parks, business incubators, clusters, etc.)
- share experience on specific regulations and measures that stimulate innovation and startups (e.g. U.S. initiative – Start-up America Initiative, launched by White House in January 2011, information on what drives the business environment of Silicon Valley)

Of critical importance is establishing direct U.S.-Polish relationships by the institutions that actually implement innovation policy. Thus, both the U.S. and Polish governments could encourage technology parks, clusters and other innovation-related institutions to establish closer ties. For example, Poland would benefit enormously from partnering with an institution like Stanford University's Hasso Platner Institute of Design to learn how to engender "radical collaboration" for innovation. Such cooperation could also entail better leveraging Polish businesses and business organizations in the U.S.'s innovative centers (e.g. Silicon Valley, Boston) to help develop contacts on the ground and identify business opportunities. Poland also could leverage EU funding to finance visitor programs to state-of-the-art technology parks in the U.S. and study what makes places like Silicon Valley unique. Similarly, the U.S. could encourage technology transfer organizations to conduct study visits to Poland. See Appendix D for a summary and full list of technology centers in Poland and their areas of specialization.



### **The times and task call for a concerted effort and strategic group devoted to the development of innovation in Poland.**

Poland's challenges around the innovation agenda and these ideas could be taken up by a "Polish-American Innovation Council" which could be a joint initiative to share expertise and resources. Such a Council could be made up by a mix of individuals from industry, academia, NGOs and the government whose expertise equally represents Poland and the U.S. Such a group of experts could develop recommendations for the Polish government to implement with a wide range of partners across the country. The times and task call for a concerted effort and strategic group devoted to the development of innovation in Poland.

#### **1. RESEARCH & DEVELOPMENT AND COMMERCIALIZATION**

One of the critical measures of innovation capabilities is spending on research and development (R&D). Poland's expenditures on R&D are among the smallest in the EU. In 2009, Poland's Gross Expenditure on R&D to GDP ratio amounted to 0.67% while the share of private enterprises in funding of the research and experimental development was only 27.1%.<sup>24</sup> In the US, these ratios are 2.7% and 66% respectively.<sup>25</sup> If not improved, this unbalanced structure may lead to the relative worsening of Poland's innovation capabilities.

<sup>24</sup> Central Statistical Office in Poland (GUS), Science and Technology in Poland in 2009, Warsaw, 2011

<sup>25</sup> The National Science Board, Science and Engineering Indicators: 2010, January 2010  
<http://www.nsf.gov/statistics/seind10/c4/c4s5.htm> (downloaded 1 Dec 2011).



Foreign firms play a significant role in Poland's R&D spending. According to Poland's Central Statistical Office (GUS) data, the share of enterprises with a majority of foreign capital in total business R&D increased in 2005-2009 from 58.8% to 61.8%, even though foreign-owned companies account for only 25% of all firms that conduct R&D activity in Poland in 2009. In nominal terms, the value of gross domestic expenditure on R&D of enterprises with a majority of foreign capital in 2005-2009 more than doubled, increasing from 543 to 1,236 mn PLN.



### **U.S. companies are amongst the major R&D spenders in Poland.**

U.S. companies are amongst the major R&D spenders in Poland. According to data from the U.S. Bureau of Economic Analysis (BEA), in 2008 U.S. majority-owned foreign affiliates' expenditures on R&D located in Poland amounted to USD 109 mn (in 2005 it was USD 54 mn). This represents only a small fraction of the total expenditures on R&D by U.S. majority-owned affiliates located in Europe, which amounted to USD 24 bn and on a country basis breaks down as follows in USD bn: Germany 7.0; UK 5.2; France 2.2; Sweden 1.6; Netherlands 1.5; and Belgium 1.3. Extrapolating from the 2005-2008 BEA data, it can be estimated that U.S. company R&D spending in Poland reached approximately USD 150 mn, a figure representing 25% of total business R&D in Poland. If R&D expenditures from U.S. companies investing in Poland through the Netherlands or Luxembourg were included, this share would be even higher.

When considering U.S.-Polish bilateral knowledge flow, it is worth mentioning that U.S.-registered companies are the third largest filer (after domestic and German companies) of patent applications in Poland (according to the Polish Patent Office – 62 out of total 3,430 applications in 2010). U.S.-registered companies also

occupy a strong third place (after domestic and German companies) in terms of patents issued – 251 out of total 3,004 patents granted. Additionally, some domestic companies in Poland are US-invested enterprises, making the U.S. position stronger than it appears.

There are a growing number of foreign investor-established R&D centers in Poland, currently about 40, out of which 25% are run by American investors. American R&D centers in Poland employ over 5,000 of the country's professional research staff. See Appendix E for a list of major U.S. R&D Centers in Poland.

Despite a growing emphasis on R&D, there are still areas that should be addressed by the government:

- increasing the amount of R&D funds available for the private sector, as government funded R&D often stimulates firms to further invest in their own R&D
- ensuring that private/industrial R&D institutions enjoy the same access to R&D resources as public ones
- increasing tax incentives for additional stimulation of R&D, including Special Economic Zone benefits and CIT credit
- assessing the performance and eventual streamlining of tax regulation associated with R&D
- stimulating more actively universities to form joint research consortia with industry to apply for grant-funded R&D
- creating a regulatory environment that enables easy and cost effective R&D commercialization especially for SMEs and startups (small and mid-sized companies often do not have sufficient resources to protect their IP rights – e.g. legal advice grants)
- creating a regulatory and support environment, especially for innovation-related startups and SMEs that encourages the ability to attract and keep top technical and managerial talent as well as easy and cost effective commercialization
- ensuring access to high-speed broadband internet, an enabling regulatory environment for innovating and doing business online (e.g. modernization of intellectual property and data protection frameworks), and more active promotion of methods of online entrepreneurship to enable technology innovation as well as create growth opportunities for Polish SMEs in traditional industries, including capacity to export
- improving public procurement practices to allow bidders to propose a wider variety of solutions what could lead to innovation stimulation (e.g. through following the European Commission's Guide on Dealing with Innovative Solutions in Public Procurement)<sup>26</sup>
- promoting more actively a culture of innovation and entrepreneurship

In October 2011, President Obama directed all federal agencies with research facilities to streamline and accelerate their processes related to issuing small-business R&D grants and collaboration with universities and private companies. In 2010, the President also launched the University Research Commercialization initiative. The objective of these actions is to accelerate the commercialization of publicly funded research to market. The U.S. is one of the best countries for research commercialization. Early stage companies' funding in the U.S. comes from a variety of public and private sources, including ap-

<sup>26</sup> European Commission, "Enterprise and Industry: Industrial Innovation," 9 July 2011, [http://ec.europa.eu/enterprise/policies/innovation/policy/public-procurement/index\\_en.htm](http://ec.europa.eu/enterprise/policies/innovation/policy/public-procurement/index_en.htm) (downloaded 1 Dec 2011).

proximately 32-47% from industry, 26-36% from angel and venture capital investors, and the remaining funds from the federal government, states, and universities.<sup>27</sup>

In Poland, the level of private investment in the commercialization of research is low. Based on Eurostat data, in 2009 there were only EUR 1.1 mn of venture capital invested in early stage high technology companies.<sup>28</sup> Lack of financing mechanisms to bridge the gap decreases the returns from public-supported R&D funding, since the research results are not transformed into marketable product or services. This situation may change thanks to the EU-funded “Initiation of Innovation Activity” program, launched by PARP in 2008. The program aims to provide funding for selected entities making investments into pre-incubation and early stage start-ups. Another significant initiative, the Top 500 Innovators – Science, Management, Commercialization Program, was launched in June 2011 by the Polish Ministry of Science and Higher Education. This grant program is addressed to young Polish scientists and technology transfer practitioners with a special focus on technology commercialization. A total of 500 will participate in technology transfer courses at the best U.S. universities. The duration of the program has been planned to last until 2014, with a total of PLN 30 mn of funding assigned.

The transfer of U.S. experience could improve Poland’s existing capabilities and develop new ones. Of particular importance would be establishing a joint training/visitor program focused on knowledge transfer of early stage high-tech company financing.

## 2. BUSINESS-ACADEMIA COOPERATION

According to many global surveys, high quality education is the key to long-term development and competitiveness in the 21st century. The impact of education depends to a large extent on how well academia cooperates with industry and to what extent there is an effective mutual transfer of knowledge.



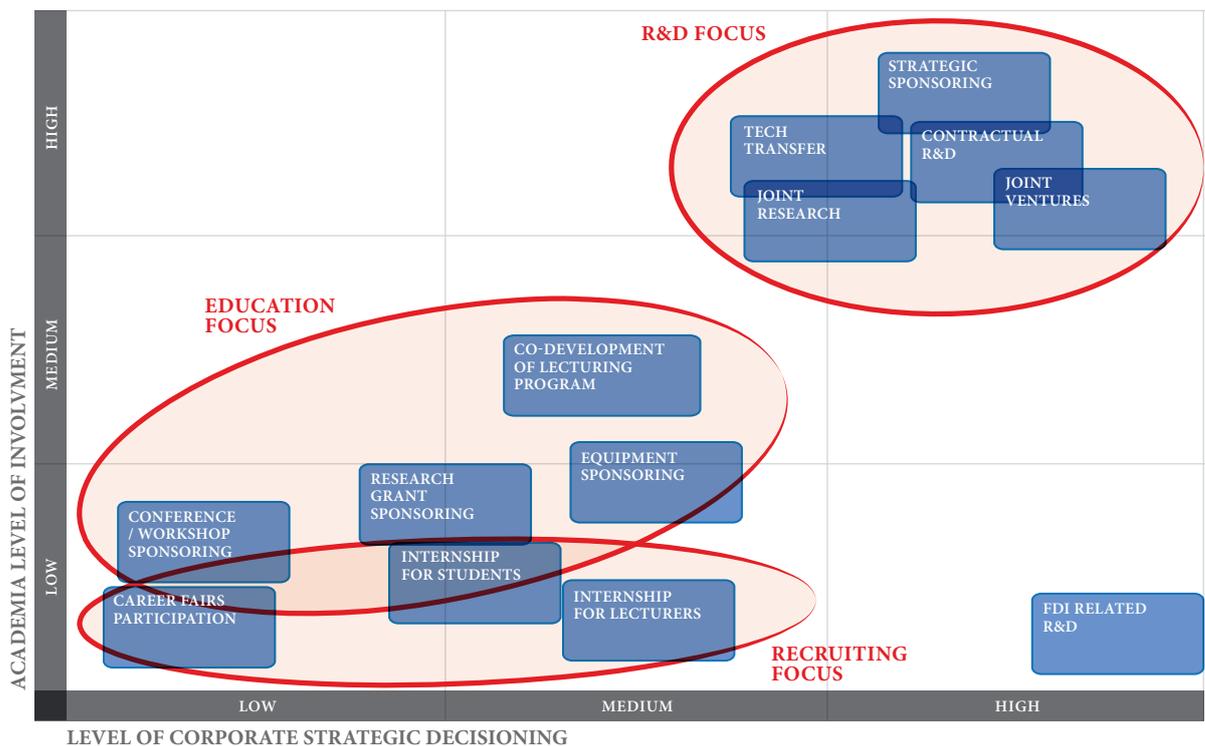
**Well functioning business-academia cooperation is of key interest to American investors, as it impacts their current operations and their future innovative capabilities.**

Well functioning business-academia cooperation is of key interest to American investors, as it impacts their current operations and their future innovative capabilities. The scope of this cooperation varies, ranging from future staff recruitment to strategic R&D partnerships and capital investments. This figure illustrates how cooperation models can be viewed from a firm’s level of strategic decision-making and the level of academia involvement.

<sup>27</sup> National Institute of Standards and Technology, “Between Invention and Innovation - An Analysis of Funding for Early-Stage Technology Development,” 2002.

<sup>28</sup> Eurostat, “Science, Technology and Innovation in Europe,” 2011 Edition (downloaded 1 Dec 2011).

## High-level perspective on industry-academia cooperation models



Source: Amcham, Industry-Academia cooperation in Poland. Challenges and ways to narrow the gap, Warsaw, January 2010

The need for cooperation in education is related to matching demand for specific skills generated by industry with supply of these skills by university education programs. Due to the shortening of technology cycles and the specialization and globalization of manufacturing and services, entrepreneurs have to address these challenges to stay competitive. The American Chamber of Commerce in Poland's (AmCham) survey shows that a significant share of American companies cooperate with Polish universities by making available their skills development programs. It also shows rather limited flexibility of Polish universities to dynamically address the skills shortages companies face. The elimination of the skills gap is an important lever for ensuring continuous inflow of FDI, including those focused on areas demanding highly specialized skills. See Appendix F for a list of U.S. companies working with Polish academia and the nature of their cooperation.



**The need for cooperation in education is related to matching demand for specific skills generated by industry with supply of these skills by university education programs.**

AmCham's report on Industry-Academia cooperation recommends the following steps be undertaken to help narrow the gap existing in Poland:

#### GOVERNMENT

- promote and raise awareness of industry-academia cooperation
- measure the output of state/EU funding targeted at R&D and industry-academia cooperation
- continuously improve and promote R&D tax incentives
- launch an industry-wide survey on skills assessment
- create a government-wide committee on decreasing administrative barriers that hamper industry-academia cooperation in education and R&D

#### ACADEMIA

- encourage business representatives to get involved in the decision-making bodies of universities
- launch a working platform aimed at filling knowledge gaps
- develop, in cooperation with business associations, a "Business to University Ombudsman" position
- establish forums to share "best practice" experiences and knowledge between firms and industries
- encourage academia to open its doors to industry
- incorporate into university curricula coursework aimed at filling industry-identified needs (e.g. "soft skills" such as working in teams, etc.) and other areas related to industry-academia partnerships
- create financial incentives that would encourage individuals to attract industry funds to universities

### 3. EDUCATION AND SCIENTIFIC COOPERATION

Another important factor for stimulating the development of knowledge is international student exchanges. The U.S. university system ranks among the world's best, attracting large numbers of foreign students. Polish-American bilateral student exchange is, however, small and decreasing. According to the U.S. National Science Foundation, in 2006-2009 the total overall enrollment of Polish science and engineering students in the U.S. decreased from 910 to 690 (in total for European countries overall it decreased from 20,700 to 17,900); while new enrollments decreased from 160 to 110 (for European countries it decreased from 4,530 to 4,300). According to GUS statistics, in 2009/2010 the number of U.S. citizens in tertiary education in Poland was 972 out of an overall total 17,000 foreign students. In doctoral studies, 5 American citizens were present amongst a total of 828 foreign students.

The largest Polish-American academic exchange program is the Fulbright Program. Since its launch in 1959, 2,477 Polish nationals and 1,576 U.S. citizens have participated in the program. In 2011, the total budget was PLN 6.1 mn of which 56% was funded by the U.S. and 44% by the Polish government.

In recent years, Poland's share in program funding has increased and is planned to reach the level of PLN 4 mn (PLN 2,7 mn in 2011) comparable to the contribution of the United States, making it one of the few countries in the world that partners on an equal basis. It should be a priority of the Polish and U.S. governments to do everything possible to increase the enrollment and effectiveness of this flagship program and consider increasing the number of exchanges of academics and scientists.

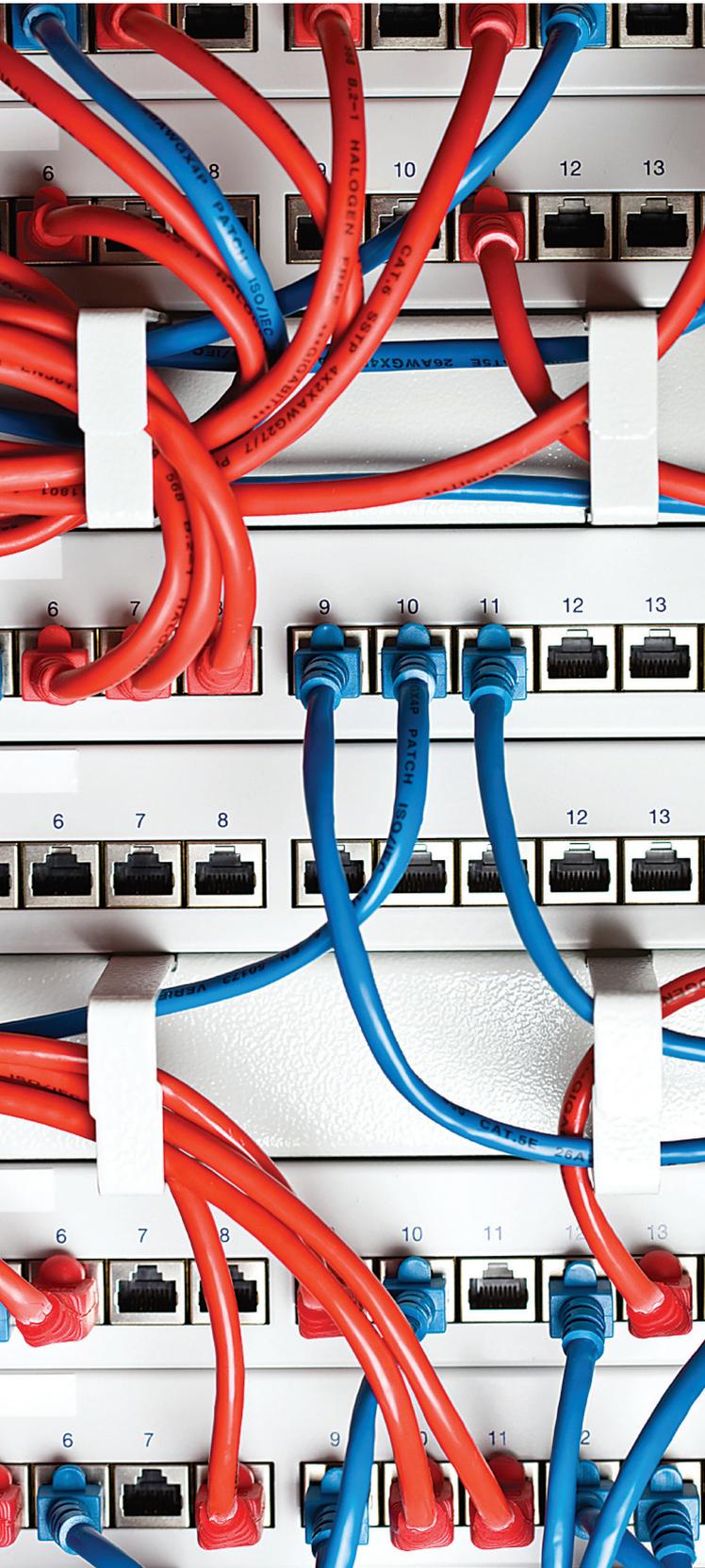
On the funding level, a major challenge is the development of a collaboration model that will stimulate research cooperation. In this respect, on the Polish side a major role is being played by the National Center for Research and Development (NCRD), the National Science Center (NSC) and the Polish Science Foundation (PSF). The NSC has recently been qualified as a partnering institution to the NSF program Materials World Network: Cooperative Activity in Materials Research between U.S. Investigators and their Counterparts Abroad. The program is dedicated to research projects conducted by U.S. and foreign (including Polish) research consortia, where the U.S. researchers apply to NSF for funding while the Polish to NSC.

A similar idea could be implemented by NCRD and its U.S. counterparts. NCRD implements and coordinates major national R&D programs (including civil, security and defense sectors) and is heavily engaged in providing instruments facilitating the commercialization of research results. One potential candidate for cooperation could be U.S. Defense Advanced Research Projects Agency (DARPA), widely known for its innovative approach to R&D and technology transfer. Other potential partners could be National Institutes of Health (NIH) and the Department of Energy (DOE). This collaboration could make existing programs available for U.S.-Polish research consortia as well as develop new programs.

American firms and R&D institutions are strongly encouraged to participate in the NCRD programs. Some of them already take part in the newly implemented "sectoral programs" where a defined business sector and NCRD create a joint R&D funding pool available for best R&D projects launched by firms from the sector. Despite existing formal framework and long-lasting contacts, the U.S.-Polish scientific cooperation lags significantly behind the dynamics of economic cooperation in the FDI and trade areas. Strengthening scientific cooperation should be one of the strategic imperatives of the U.S.-Polish cooperation in the coming years.

## D. INDUSTRY

Despite the doom and gloom of the global crisis rampant across Europe and in the U.S., the Polish economy continues to do well. Industry is concerned and challenged, but generally growing as Poland continues to be an attractive investment destination with a large domestic market. This section highlights several of the industries that provide some of the best opportunities for U.S.-Polish collaboration and investment: aviation, defense, biotechnology, and software programming.



## 1. BUSINESS SERVICES AND SOFTWARE DEVELOPMENT

Poland is one of the world's leading centers of cross-border business and is clearly a preferred destination in Europe with foreign investors driving the business services sector. By the end of 2010, 282 business service centers with foreign capital were active in Poland, approximately one-third of them are American investments. See Appendices B and C for a list of American BPO/SSC and software development operators.

**!** Poland is one of the world's leading centers of cross-border business and is clearly a preferred destination in Europe with foreign investors driving the business services sector.

Business services are one of the most quickly developing areas of Poland's international economic relations. In 2000-2009 the export of this service increased more than six-fold from USD 1.3 bn to USD 7.6 bn; import increased from USD 1.8 bn to USD 5.5 bn. There is a strong growth trend in highly value-added services. The sector is also a large creator of highly skilled employment. In 2010, the business services sector employed approximately 70,000 highly skilled people, approximately 50% more than in 2008. It is expected that by 2013, employment will increase to 100,000.<sup>29</sup>

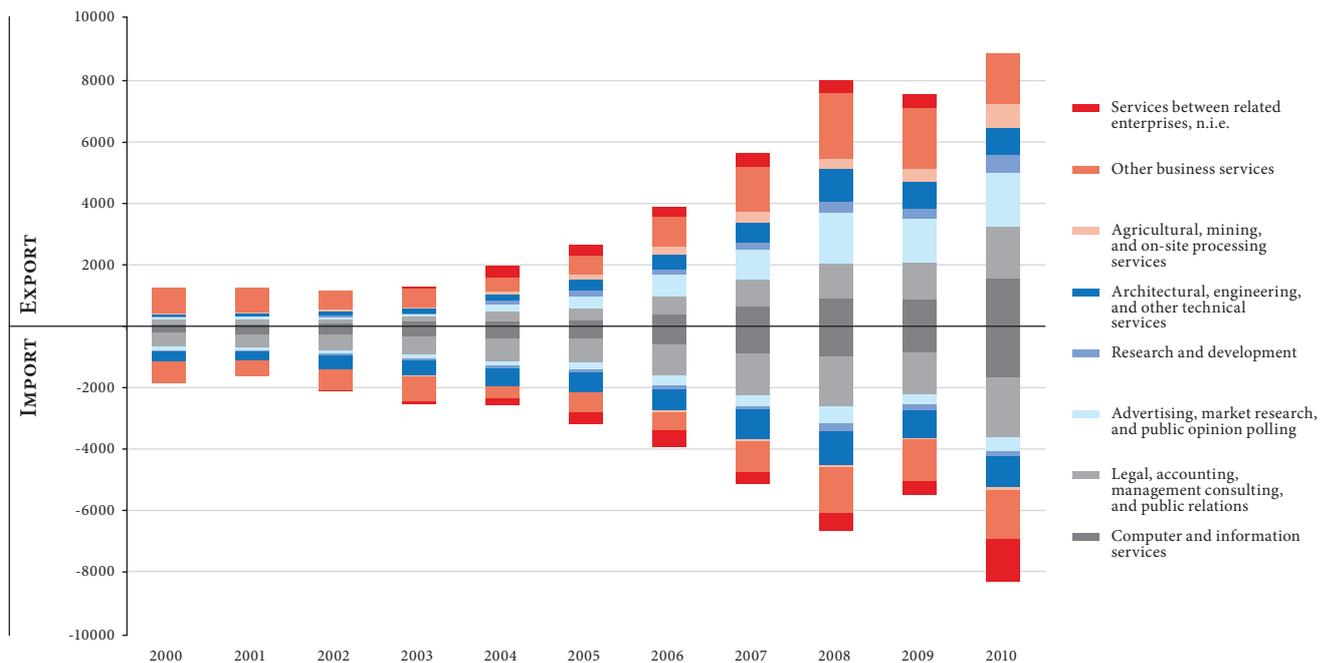
In terms of software programming, Poland excels. In 2011 a Polish team from Poznań once again won Microsoft's Imagine Cup - the world's largest student technology competition. Fellow Poznań students won both the Europeana (European Commission-supported) Hack4Europe competition and the Samsung Global

<sup>29</sup> Rzeczpospolita daily „25,000 New Jobs in Service Center,” p. B1, 10 December 2011.

Developer Challenge. A team from Kraków took 3rd place in ACM International Collegiate Programming Contest - dubbed the Olympics of computer programming (Polish teams won multiple times during previous years). Warsaw University, formerly ranked #1 in the world in TopCoder competitions, still maintains a healthy #2 position (Stanford University, for example, is ranked #30). In TopCoder country rankings, Poland earned enough points to be ranked #3, just behind Russia and China. It is no surprise, thus, that leading American companies have software development centers in Poland, but what may be surprising is that they have multiple centers in the country.

One of the key benefits of the business services development is that it is nationwide. The core tier 1

Poland: Export and import of selected business services (USD, mn)

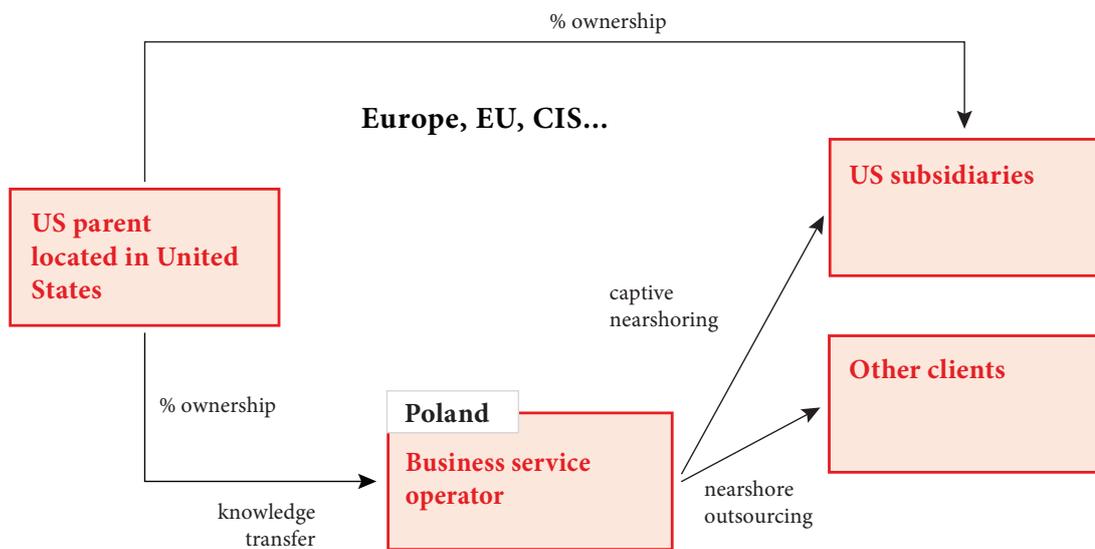


Source: Analysis based on UN data

destinations are located in large academic centers like Kraków, Wrocław, Gdańsk and Łódź. Now, due to relative job market saturation and higher labor costs in tier 1 cities, the number of business service centers in tier 2 and tier 3 cities is growing dynamically.

Poland has specific advantages making it an attractive destination for U.S. companies, particularly for those looking for business improvement opportunities within their EU/CIS business network (captive nearshoring and nearshore outsourcing). Only a small share of Poland's business centers directly serve clients located in the US, thus the sector only marginally competes for jobs with the US.

## Simplified operating model of American invested business services companies



Poland's specific advantages include:

- good skills in a variety of languages
- EU standard of education
- large pool of suitable employees
- competitive labor costs
- Polish employees easily establish working relations and integrate with foreign teams
- acceptable standards of data security
- predictable political and business environment

Despite the Polish government's growing awareness of the impact of the business services sector on the Polish economy, there are barriers that need to be addressed in order to increase American FDI inflow and employment in the centers, such as:

- low awareness of the needs and the essence of this sector among representatives of municipal administration
- limited cooperation between universities and companies from the sector
- growing labor costs
- exclusion from public support
- insufficiently flexible labor law
- emigration of educated employees to other European countries
- difficulties in finding qualified specialists speaking rare foreign languages
- poor entrepreneurial environment for software start-ups

Of major concern to American investors is the future supply of employees with relevant skills. As the sector moves to more advanced services the demand for more complex and specific skills increases, but university programs are slow to match these skill requirements. Joint industry-academia cooperation based on specialized courses delivered in universities fill the gaps to some extent, but remains inadequate.

There is a need for much stronger awareness among Polish universities of the specific skills needed by the business services sector. American investors have requested universities put more emphasis on teaching programmers “soft skills” such as working in teams and presentation skills. Poland also needs to think about how to increase the number of women studying software engineering. This should be stimulated by central and local governments. Up to now, the sector’s influence on university educational programs has been limited. A failure to improve the skill set would risk Poland’s ability to attract foreign investments (including American ones) into advanced services (e.g. knowledge process outsourcing) and would limit its position to the basic services segment (e.g. voice services, data entry services) where the labor cost competition from other CEE countries is the strongest.

U.S.-Polish cooperation would help achieve these priorities by fostering:

- knowledge transfer – e.g. the organization of Silicon Valley-style software companies (effective symbiosis of programmers, legal support and venture capital investors)
- information exchange on regulatory best practices
- intensification of bilateral cooperation in areas of strategic importance (e.g. cyber security, robotics which could apply for U.S. and Polish/EU research funding)
- funding of student and researcher exchanges

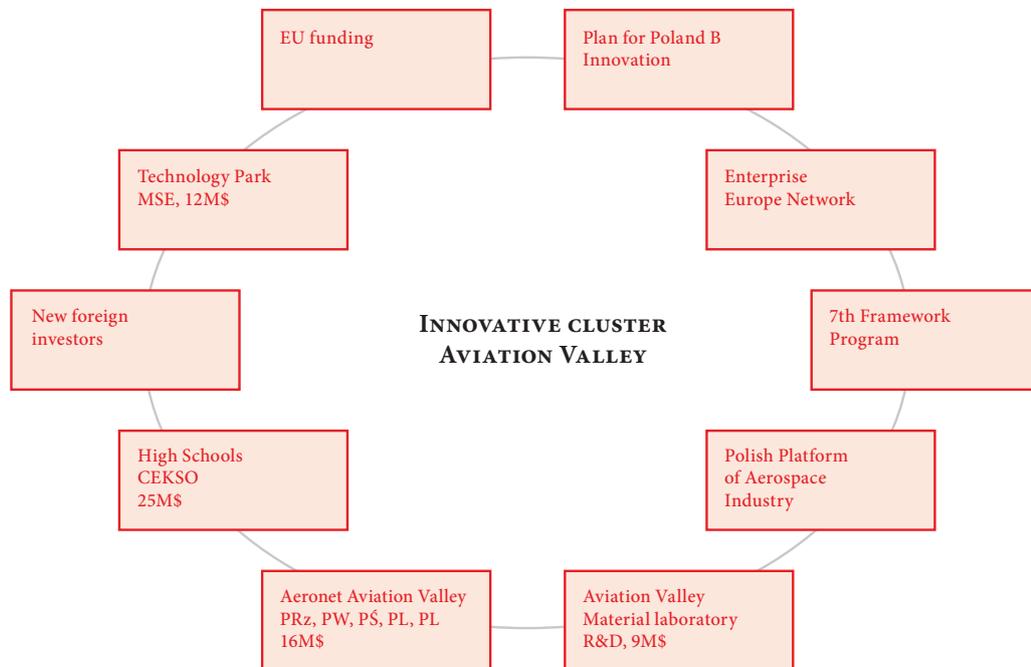
## 2. AVIATION

Poland has a 100-year tradition in aviation and an impressive Aviation Valley in the southeast. Poland’s Aviation Valley is one of Europe’s leading aerospace clusters and a unique example of its kind in Poland. Thanks to local engineering potential and a large manufacturing base it has attracted world-class aerospace investment with 87 companies (10 of them American) and 23,000 jobs (8,000 created by American investors). American FDI in the Polish aerospace sector exceeds USD 1 bn<sup>30</sup> and is one of the key drivers of Poland’s export to the US. Aviation Valley produces 90% of Poland’s aerospace industry output and the export sales of the cluster are estimated to exceed USD 1.5 bn.

Overall, the future of the Aviation Valley is to offer comprehensive and highly advanced value-added within the whole aerospace value chain. This vision is already being realized as more and more firms are building R&D and engineering centers that operate on a global scale. The Polish Academy of Sciences contends that aviation is one of the most innovative sectors in Poland and continues to be attractive for U.S. investors. With a relatively small share of Poland’s total value-added at 0.09% in 2009 the aviation

30 Gazeta Rzeszów, „Amerykańskie Innowacje w Dolinie Lotniczej,” [http://rzeszow.gazeta.pl/rzeszow/1,34975,10720655,Amerykanskie\\_innowacje\\_w\\_Dolinie\\_Lotniczej.html](http://rzeszow.gazeta.pl/rzeszow/1,34975,10720655,Amerykanskie_innowacje_w_Dolinie_Lotniczej.html) 28 listopad 2011. [Gazeta Rzeszów, „American Innovation In the Aviation Valley,” 28 November 2011.]

### Aviation Valley strategy



industry's share of Poland's total R&D spending exceeds 5%. The R&D leaders spend between 10-20% of their total revenues on R&D which is unprecedented compared to other sectors in Poland.

To enhance science and research activity in aerospace, the Center for Advanced Technology "Aeronet - Aviation Valley" has been established. It consists of the Aviation Valley cluster and several Polish technical universities and R&D institutions (Rzeszów University of Technology, Warsaw University of Technology, Institute of Aviation in Warsaw, and Institute of Fundamental Technological Research of the Polish Academy of Sciences). In 2005, the Aviation Valley, together with the National Contact Point of the Framework Programs and the Rzeszów University of Technology, initiated the Polish Technological Platform of Aeronautics. The Aviation Valley has already been successful in participating in Polish- and EU-funded programs in forming industry-academia consortia.



**Overall, the future of the Aviation Valley is to offer comprehensive and highly advanced value-added within the whole aerospace value chain.**

The long-term strategic objective of the Aviation Valley is to integrate more deeply into global manufacturing channels. Continuing and strengthening the existing government support schemes for cluster development and R&D will be of high importance to achieving this strategic objective.

The government could further support the global ambitions of the Aviation Valley by playing a more active role in promoting its achievements and capabilities in engineering excellence to the international aviation community. This would help attract new partners and further intensify international cooperation.

tion. With some global aerospace players already present in the Aviation Valley, the next step should be to attract SMEs, which could benefit from access to the EU market, subcontractor networks and contracts from aerospace majors.

### 3. DEFENSE

The Polish Armed Forces have undergone significant changes in the past two decades, including participation in foreign military missions, professionalization of armed forces and military base modernization.

The defense budget has grown, reaching PLN 27.5 bn (1.95% of GDP) in 2011, 20% of which is allocated to acquisitions. A budget of PLN 29 bn is expected in 2012. The Polish government is continuing its dynamic modernization of the armed forces, which may reach approximately PLN 35 bn in investments from 2013 to 2015. According to the Ministry of Defense's plan on technical modernization of the Polish Army for 2010-2011, planned long-term modernization programs include air defense systems, multi-task helicopters, command support systems, unmanned reconnaissance systems, training aircraft, and M28 transport aircraft.<sup>31</sup>

The U.S. and Poland have long-lasting cooperation in defense that has deepened significantly in economic terms since the late 1990s. Economic ties will be further strengthened by the Reciprocal Defense Procurement Agreement (RDPA), signed in September 2011, which will facilitate defense cooperation by greatly reducing barriers to trade. The agreement opens the U.S. defense market for military equipment produced in Poland, as countries that have signed the RDPA with the U.S. Department of Defense are exempt from the "buy-American" requirements for federal procurement.<sup>32</sup> Additionally, a Memorandum of Understanding is currently being negotiated for Research and Development Testing and Evaluation. This would open the door for cooperation in scientific and technology development.

Polish-American industrial cooperation may be impacted by the implementation of the EU Defense Package consisting of two major directives: the EU Defense Procurement Directive<sup>33</sup> and the EU Directive on Intra-EU Transfers.<sup>34</sup> The implementation of these directives may lead to a decrease in some market access barriers to intra-EU defense trade and standardize control over

31 Zespół Naukowo-przemysłowy przy Radzie Uzbrojenia MON, "Informacja o Modernizacji Sił Zbrojnych RP w latach 2010-2011," 10 sierpień 2011, [http://www.znp.wat.edu.pl/index.php?option=com\\_content&view=article&id=64:informacja-o-modernizacji-technicznej-sz-rp-w-latach-2010-2011&catid=1:aktualnoci](http://www.znp.wat.edu.pl/index.php?option=com_content&view=article&id=64:informacja-o-modernizacji-technicznej-sz-rp-w-latach-2010-2011&catid=1:aktualnoci) (pobrano 1 grudzień 2011). [Scientific-Industrial Team of the Military Council of the Ministry of National Defense, Republic of Poland, "Information about the Modernization of the Armed Forces of the Republic of Poland in the year 2010-2011," 10 August 2011 (downloaded 1 Dec 2011)].

32 United States Diplomatic Mission to Warsaw Poland, "US and Poland Signed Reciprocal Defense Procurement Agreement," 8 September 2011, <http://poland.usembassy.gov/agreement.html> (downloaded 1 Dec 2011).

33 Directive 2009/81/EC of the European Parliament and of the Council of 13 July 2009 on the coordination of procedures for the award of certain works contracts, supply contracts and service contracts by contracting authorities or entities in the fields of defence and security, and amending Directives 2004/17/EC and 2004/18/EC.

34 Directive 2009/43/EC of the European Parliament and of the Council of 6 May 2009 simplifying terms and conditions of transfers of defense-related products within the Community.

**! To survive on the integrated EU defense market, Polish companies will have to dynamically modernize and innovate.**

transfers of defense equipment between EU Member States. Neither directive has yet been implemented into Polish law.

Market liberalization resulting from the implementation of the EU Defense Package may result in larger market opportunities but also higher competition for the Polish defense industry. To survive on the integrated EU defense market, Polish companies will have to dynamically modernize and innovate. The regulations may, however, create an impulse for attracting to Poland defense-related FDI seeking cost or education advantages and access to the EU market. American companies are already driving this effort.

On the other hand, the advantages offered by the EU Defense Package provisions on security of supply and subcontracting are worrying to U.S. industry, which fears it may be used to exclude it from the EU market. These concerns relate both to U.S. exporters and U.S. firms that have invested in Poland – usually operating within EU and beyond-EU supply chains. This may mean that Poland's access to U.S. technologies may decrease. Despite good Polish-American cooperation to date, there are some barriers that impact defense industry investments, including:

- Procurement uncertainty – despite the strategic approach of the Ministry of Defense to long-term planning, execution often differs when compared to the initial objectives and deadlines. This makes efforts to plan development cycles and prioritize investments very difficult for industry.
- Interaction between the defense administration and the defense industry is still insufficient and results in costly information gaps. Often the administration is not fully aware of industry's technical capabilities while the defense industry has limited knowledge of administration plans and issues. The Industry Days organized by the Polish Ministry of Defense is one effort to address this barrier.
- Better government-industry interaction would lead to improved government access to innovation and advanced technology (e.g. through better focused R&D programs financed by government or industry) and enable industry to better allocate capital.

RDPA's implementing guidelines indicate regular meetings to review the progress in executing the agreement. These meetings could also involve U.S. and Polish industrial enterprises and showcase best practices and successful projects.

There is need for continuous U.S.-Polish dialogue and actions related to R&D and education. The implementation of the EU Defense Package may put Poland under pressure to more dynamically improve the competitiveness of its industry. The presence of American investors in Poland has had a positive impact on defense sector innovation capabilities.

#### 4. BIOTECHNOLOGY

One sector that is quickly developing in Poland is biotechnology which covers a wide area of applications, including pharmaceuticals, medicine and health care, agriculture (crop and livestock production), and environmental uses (bio-fuels, toxic site reclamation). In its “Life Sciences and Biotechnology — A Strategy for Europe” report, the European Commission stated that life sciences and biotechnology are regarded as some of the most promising frontier technologies for the coming decades. Despite its early stage in adoption, Poland has already attracted international players who leverage Poland’s scientific potential as well as cooperate with local firms - some of which have recorded international success.

Poland has established a wide network of biotech and life sciences clusters, concentrated around the strongest academic institutions. Based on reports of the Polish Agency for Information and Investment (PAIiIZ), almost 30 universities and institutions across Poland offer education in biotechnology with approximately 8,000 graduates annually. There are more than 60 enterprises actively engaged in biotechnology and the sector already benefits from almost 10 billion EUR in EU program funds dedicated to its development. However, as the cost of R&D and technology commercialization are extremely high, support is needed on a continuous basis across the whole value chain – from R&D to successful commercialization and international expansion.



**Poland has established a wide network of biotech and life sciences clusters, concentrated around the strongest academic institutions.**

Despite significant efforts made, Poland has not yet emerged as a leading player in biotechnology. In the Scientific American 2011 Worldview Scorecard on countries’ overall capabilities to generate innovation in biotechnology, Poland ranked 38th out of 48 countries. The leaders were the US, Denmark and Sweden. Poland was superseded by several CEE countries, including Estonia, Hungary, Czech Republic, Slovakia and Lithuania. Poland ranked poorly in criteria relating to efforts driving innovation by companies and R&D expenditure. Poland, however, was the best performer among CEE countries in terms of education and workforce criteria.<sup>35</sup>

The U.S. is the world leader in biotech, originating 62% of the top 50 drugs on the market today. Between 2001-2010, the U.S. fostered 57% of new chemical entities<sup>36</sup> and has the world’s highest R&D budget for life sciences. For example, the total budget of the National Institutes of Health (the U.S.

35 Worldview, “The 2011 Scientific American Worldview Overall Scores,” 2011, <http://www.saworldview.com/article/the-2011-scientific-american-worldview-overall-scores> (downloaded 1 Dec 2011).

36 BIOTechNOW, “Commercialization and Job Creation in the Biotechnology Sector,” 31 October 2011, <http://www.biotech-now.org/public-policy/patently-biotech/2011/10/commercialization-and-job-creation-in-the-biotechnology-sector-what-does-it-really-take> (downloaded 1 Dec 2011).

federal medical research agency) was USD 31 billion in 2010.<sup>37</sup> Total public funding for agriculture research exceeds USD 5 billion annually.<sup>38</sup>

Given the current state of the biotechnology sector in Poland, several fundamental issues should be considered by the U.S. and Polish governments in order to stimulate biotechnology growth and attract investors:

- Regulators should encourage investing in early stage companies (e.g. tax credits for investors/business angels to provide equity), in order to attract investments in the highly capital intensive and lengthy process of biotechnology R&D.
- Dedicated venture capital funds for biotech start-ups should be created and financed or co-financed by public funding (if other incentives are not provided to encourage the private sector to provide funding).
- Public sector R&D funding should be increased significantly and made available to both public institutions and private firms. Access to R&D funding is important for private investors, as biotechnology start-ups finance their activity by a mix of private and public capital and typically spend money with no revenue inflows for years.
- Emphasis should be put on commercialization including channelling funding into public institutions (e.g. university R&D) where results are measured by new innovations and marketable products (e.g. through licensing, JV).
- There is a need for bilateral collaboration in translational research in order to facilitate discovery commercialization and open two-way cooperation. For example, Poland has good experience in translational research in the field of drug development in collaboration with academia, regenerative medicine (stem cells research), and transgenic animals.

Poland already plays an important role in the development of new, innovative medicines and is the largest clinical trials market in CEE. In 2010, pharmaceutical and biotechnology companies invested more than USD 300 million in Poland through clinical trials and other research. Given the size of the market and its highly skilled health practitioners, even more pharmaceutical research and development could be conducted. Accelerating the market growth and maximizing the potential benefits to the economy is possible provided that administrative difficulties are solved, transparency of process enhanced, and operational and regulatory requirements rationalized.

In order to achieve measurable economic impact, the biotechnology policy framework should be properly restructured and coordinated to foster innovation:

- eliminating bureaucratic procedures that hamper issuance of permits to conduct enclosed research and research with potential controlled released into the environment through field trials (green biotechnology applications)
- adopting new streamlined product approval procedures to reduce time, cost, and bureaucratic delay
- extending program support eligibility to new innovative products, e.g. refund program for new medicines

<sup>37</sup> National Institutes of Health, Office of Health, "Mechanism Detail Actual Obligations," (downloaded 1 Dec 2011).

<sup>38</sup> United States Department of Agriculture, Economic Research Service, "Agricultural Research Funding in the Public and Private Sectors," 19 February 2010, <http://www.ers.usda.gov/Data/AgResearchFunding/> (downloaded 1 Dec 2011).

- coordinating the regulatory environment covering the whole product life cycle. Investors will not invest in R&D if restrictions exist on the commercialization of the final product (e.g. plant biotechnology or GMOs).
- encouraging innovation through public procurement policy (e.g. biofuels for the administration's fleet)
- incentivizing capital markets to invest in the biotechnology sector

Poland and the U.S. could benefit from closer cooperation to develop a more highly innovative and efficient biotechnology sector. The scope of the cooperation may be defined either as technology-focused (e.g. drug development in collaboration with academia, regenerative medicine, xenotransplantation, 3rd generation bio-fuels) or problem focused (e.g. healthy ageing, obesity, rare diseases; life cycle approach to new product development; regenerative medicine and nutrigenomics).

In addition, the U.S.-Polish cooperation could address areas such as:

- knowledge transfer – e.g. the organization and success factors of biotechnology clusters (effective symbiosis of researchers, entrepreneurs and venture capital investors)
- information exchange on regulatory best practices
- intensification and promotion of bilateral research cooperation (e.g. joint research labs, which could apply for U.S. and Polish/EU research funding) and stimulation for cooperation in the new paradigm of “Open Innovation”
- funding of student and researcher exchanges

U.S. experience shows that it is of key importance to create an environment for start-ups that includes academic participation. SMEs are major innovation drivers in this sector and so it is crucial to limit barriers to their formation and operation. In this respect, the U.S. example stands out with many new and globally successful companies emerging and benefiting from strong ties to academia and from government incentives. As knowledge transfer is of key importance in efficient development, the Polish government could play a more active role in facilitating international cooperation.



**In order to achieve tangible results, institutional cooperation should be strengthened on a variety of levels, including policy, R&D funding, business-academia collaboration and innovation clusters.**

In order to achieve tangible results, institutional cooperation should be strengthened on a variety of levels, including policy, R&D funding, business-academia collaboration and innovation clusters. The involvement on the U.S. side could include the Food and Drug Administration, National Institutes of Health, Department of Agriculture, Environmental Protection Agency and on the Polish side, the Ministry of Agriculture, Ministry of Environment, Ministry of Health, and NCRD. Several U.S. state governments also have experience with stimulating growth in the biotechnology industry, and could serve as partners in bilateral cooperation.

## IV. CONCLUSION

In conclusion, what should be clear is the evolution and progress of the Polish economy since 1989 and the changing nature of U.S.-Polish relations. By having developed a strong and more sophisticated domestic economy, especially in these times of global crisis, Poland has become a real player for the U.S. to look to for trade and business opportunities.

To the extent that business should be left to do its business, there is a place for both the U.S. and Polish governments to provide needed support and incentives to enhance and steer companies towards the opportunities demonstrated in this paper. These issues shall be widely discussed at the 2012 U.S. Poland Business Summit organized by the authors of this paper in cooperation with and at the request of both governments. Of key importance is wide participation and the commitment of all parties to act now and seize the opportunities at hand.



## V. ACRONYMS

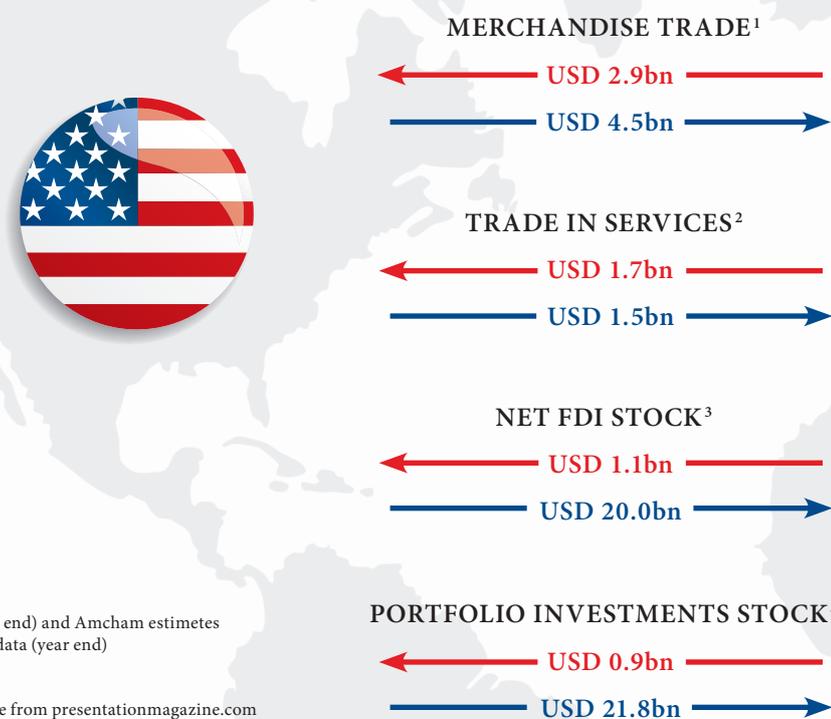
<b>BEA</b>	U.S. Bureau of Economic Analysis
<b>CTO</b>	Chief Technology Officer
<b>DOA</b>	U.S. Department of Agriculture
<b>DOD</b>	U.S. Department of Defence
<b>DOE</b>	U.S. Department of Energy
<b>EPA</b>	U.S. Environmental Protection Agency
<b>FDI</b>	foreign direct investments
<b>GUS</b>	Polish Central Statistical Office ( <i>Główny Urząd Statystyczny</i> )
<b>MSHE</b>	Polish Ministry of Science and Higher Education
<b>NBP</b>	National Bank of Poland ( <i>Narodowy Bank Polski</i> )
<b>NCRD</b>	Polish National Center for Research and Development ( <i>Narodowe Centrum Badań I Rozwoju</i> )
<b>NIEAC</b>	Network of Investor and Exporter Assistance Centers ( <i>Sieć Centrów Obsługi Inwestorów i Eksporterów</i> )
<b>NIH</b>	U.S. National Institutes of Health
<b>NIST</b>	National Institute of Standards and Technology
<b>NSC</b>	National Science Center ( <i>Narodowe Centrum Nauki</i> )
<b>NSF</b>	National Science Foundation
<b>PAIiIZ</b>	Polish Information and Foreign Investment Agency ( <i>Polska Agencja Informacji i Inwestycji Zagranicznej</i> )
<b>PARP</b>	Polish Agency for Enterprise Development ( <i>Polska Agencja Rozwoju Przedsiębiorczości</i> )
<b>PSF</b>	Polish Science Foundation ( <i>Fundacja na Rzecz Nauki Polskiej</i> )
<b>SPR</b>	Strategic Petroleum Reserves
<b>TEC</b>	Transatlantic Economic Council
<b>U.S.</b>	United States of America

## APPENDIX A

### Report on the State of Polish-American Economic Cooperation

#### SUMMARY OF TRADE AND INVESTMENT RELATIONS

##### Outline of the US-Poland bilateral economic relations – 2010



1 GUS data

2 UN data

3 NBP data (year end) and Amcham estimates

4 NBP and IMF data (year end)

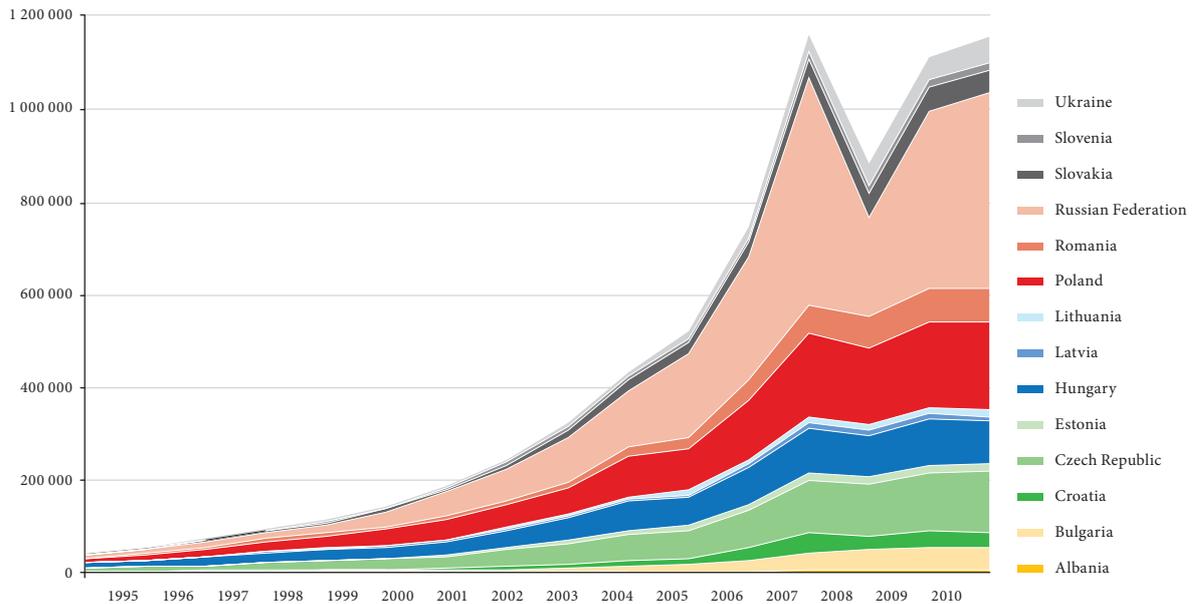
Source: map outline from presentationmagazine.com

#### 1. US – POLAND FDI RELATIONS

##### POLAND'S INWARD FDI IN THE REGIONAL PERSPECTIVE

Foreign direct investments (FDI) have been the major driver of Poland's economic growth bringing required capital and technology transfer. FDI played a key role in Polish economic transformation and competitiveness improvements. The increase in competition levels caused by the inflow of foreign companies, forced Polish companies to restructure and improve their operations. Currently, a significant number of local Polish companies are part of the global supply chains of transnational corporations (TNC) benefiting from the TNCs global reach and sales scale.

### Poland: Export and import of selected business services (USD, mn)



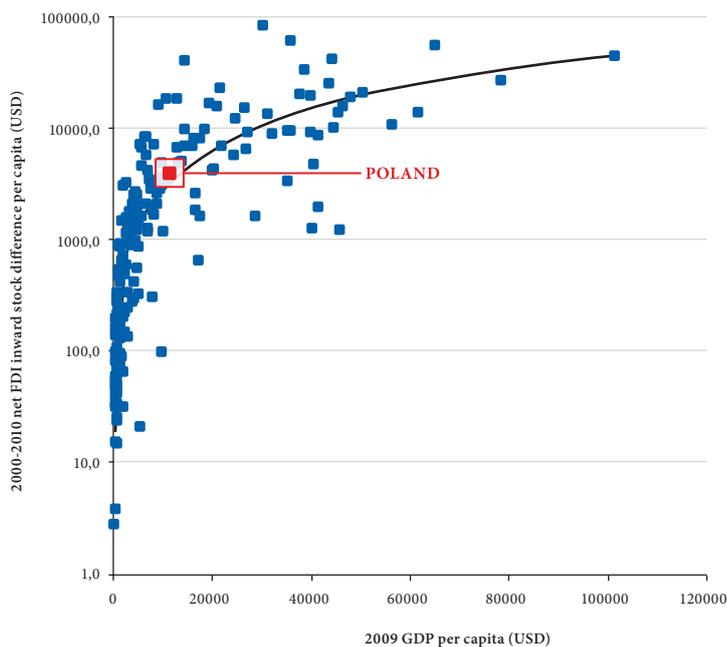
Source: Analysis based on UN data

According to the National Bank of Poland (NBP) data on Poland's International Investment Position, by the end of Q3 2011, in Poland total net inward FDI stock amounted to approximately USD 198 bn. This positions Poland among Central and Eastern Europe's (CEE) largest FDI recipients. Based on UNCTAD data, in 2010, the share of Poland in total inward FDI stock of the European Union amounted to 2.8% (1.5% in 2000). This share seems small, however it should be taken into account that large amounts of FDI stock were built by Western Europe in the 1980s and 1990s, while Poland received its first FDI in the beginning of the 1990s. A very different picture arises is when looking only at the CEE region. Having in mind the region's OECD definition - covering the group of countries comprising Albania, Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, the Slovak Republic, Slovenia, and the three Baltic States: Estonia, Latvia and Lithuania; Poland's share in FDI stock in 2010 amounted to 28%, what is slightly less compared to 2000 (32%). Among the above group of countries, Poland has been the number one recipient followed by the Czech Republic (USD 130 bn), Hungary (USD 92 bn) and Slovakia (USD 51 bn).

Despite such large FDI inflow, the relative position of Poland compared to other European Union and CEE countries indicates that the potential of FDI inflow is significantly higher.

This can be illustrated by simplified indicators like FDI to total country population; FDI to total country GDP or the relation between FDI per capita and GDP per capita. Based on UNCTAD data, Poland's FDI inward stock per capita has increased from approximately USD 100 in the early 1990s to

### Relationship between GDP per capita and FDI inward stock per capita



Covers: 189 countries; does not include Luxembourg, Cayman Islands, British Virgin Islands

Source: Analysis based on UNCTAD data

growth at approximately 2.7% annually over the last decade, liberalization of capital and trade flows and Poland's integration with the world economy. Of these, membership in the European Union, which replaced the EU Association Agreement signed in 1991, is the most important one. The internal factors are well known: close proximity to EU markets, stable GDP growth rates, large internal market, and well-educated and cost-competitive labor pool. The world economy is however changing and thus the traditional, hard factors, start to play a smaller role. These trends impacted also the Polish economy and FDI inflows.

#### FDI INFLOWS TO POLAND

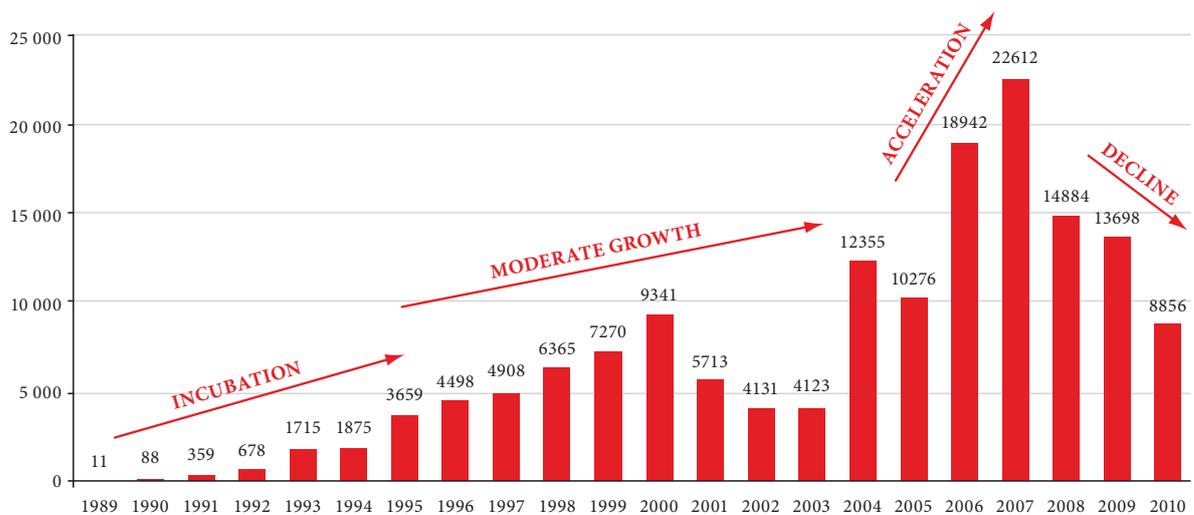
FDI entered the reality of the Polish economy since the beginning of economic liberalization. Since then up to Q3 2011 approximately USD 198 bn of net inward FDI stock has been invested in Poland.

The FDI inflow pattern can be divided into a few specific phases – (a) “incubation” early to mid 1990s; (b) “moderate growth” from mid-1990s to 2003; (c) “acceleration” in 2004-2007; (d) “decline” from 2008 till now. The “incubation” phase was related to the market opening and from the foreign investors' perspective it was the testing of the stability of Polish economic environ-

USD 5046 in 2010. This amount is significantly smaller than the EU average (USD 13708) and top CEE countries: Czech Republic (USD 12379), Estonia (USD 12257), Slovakia (USD 9278) and Hungary (USD 9208). This shows that there is potential at least to double the current FDI inward stock. The second indicator, FDI inward stock to GDP, shows the relative dependence of GDP from FDI inflow. In 2010, this ratio for the European Union amounted to 42% (Euro area 39%). Poland has been close to this level with 41%, which is, however, far less compared to top CEE countries – Estonia 85%, Hungary 71% and Czech Republic 67%. Keeping in mind Poland's GDP per capita, which is still below EU average, there is potential for growth.

The above positioning should be addressed in the global context. From the very beginning of the transition, Poland benefited both from positive external and internal developments. The most important external factors include, stable world GDP

### FDI net inflow to Poland (USD, mn)



Source: Analysis based on NBP data

ment. FDIs were driven primarily by privatization transactions with few major greenfield projects. International institutions (International Finance Corporations and EBRD) played an important role. The “moderate growth” phase was characterized by dynamic economic growth and improving reputation of CEE emerging markets. Poland and other countries were also aligning their legal regulations to EU standards which positively affected the confidence of foreign investors. The third phase “acceleration” has been so far the best FDI period in Poland’s history. The last two years of this growth phase, (2006 and 2007) generated record levels of FDI inflow, almost exceeding USD 19 bn each year (NBP data). FDI was driven by brownfield and greenfield projects, fuelled largely by reinvested profits.

The next “decline” phase shows the slowdown of FDI inflow. These are the years of global economic downturn and recovery. Almost all countries in the region have followed the Polish trend with a few – Czech Republic and Russia showing improvement in 2010. It is worth mentioning that such a sharp decline of FDI inflow in 2008-2010 affected FDI flows globally. In 2010, the world FDI inflow was by 38% lower compared to 2007 (UNCTAD data); for the European Union the decline was even stronger –64% in total (e.g. largest EU economies: France –65%, Germany –42%, United Kingdom –77%).

### US FDI IN POLAND

#### *POLAND IS THE LARGEST US FDI RECIPIENT AMONG CEE COUNTRIES*

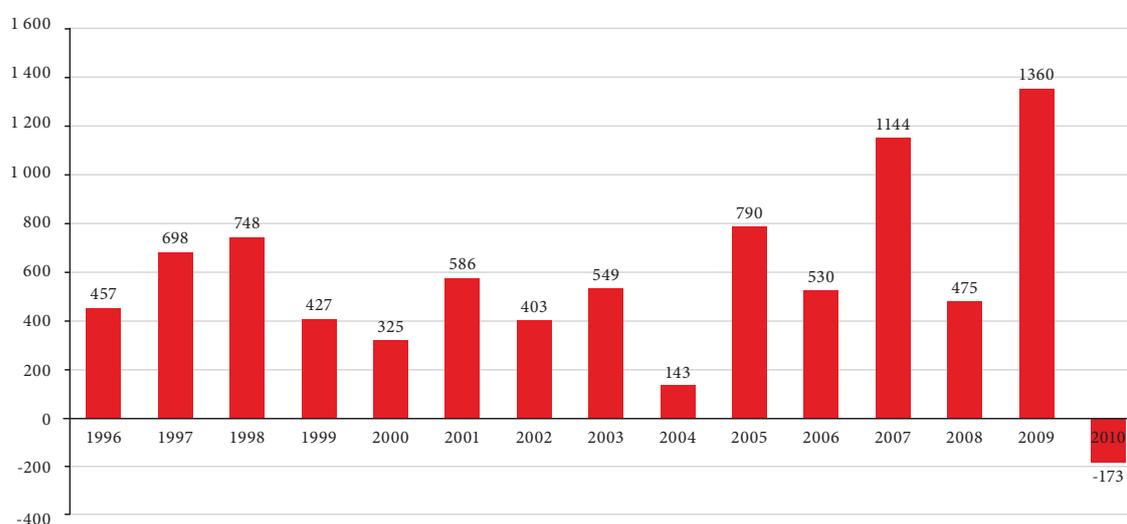
Based on US Bureau of Economic Analysis (BEA) data, as of 2010, taking into account the total net US FDI stock invested in Poland (USD 12.7 bn), Poland was the top US investment target among all CEE countries (including Russia and Ukraine). The next countries include, Russia (USD 9.9 bn in 2010),

Czech Republic (USD 5.9 bn), and Hungary (USD 4.9 bn). Poland's share in the above group of countries total net FDI stock amounted in 2010 to 34%. In 2000 it was even higher (43%) what was caused by relatively lower share of US investment in Russia.

#### *THE US IS THE MAJOR FDI PLAYER IN POLAND*

American companies were the pioneers of Poland's economic transition. The US companies quickly became one of the largest foreign investors. Based on NBP data, in the mid 1990s, the share of US investment in total net FDI stock amounted to almost 14% (USD 12.7 bn out of USD 19.3 bn in total). Since then the dynamics of the US FDI inflow has slowed down, reaching in 2010 approximately 6% of total net FDI stock, positioning US in 5th place of largest foreign investors – after Netherlands, Germany, France and Luxembourg.

#### US FDI net inflow to Poland (USD, mn)



Source: Analysis based on NBP data

The actual value of US investment is higher as, due to favorable tax regimes, Luxembourg and the Netherlands are often used by US companies as investment vehicles. It has been estimated that actual US net FDI stock in Poland may exceed USD 20 bn.<sup>39</sup> Some indication of that “surplus” provides the list of major foreign investors published annually by the Polish Information and Foreign Investment Agency (PAIiIZ). In its 2009 data, the amount of American investors registered in other countries amounted to: The Netherlands 13, United Kingdom 4, Luxembourg 3, Germany 3, Greece 1, Italy 1, Cyprus 1, Finland 1, Canada 1, Spain 1, Sweden 1. This would position US investors as the second largest FDI source in Poland, just after Germany – Poland's main trading partner.

<sup>39</sup> Amcham and KPMG report, „20 years of American investment in Poland”, 2010

Based on BEA data, US investments are primarily concentrated in wholesale, finance and food industries. These three sectors amounted in 2010 to almost 60% of total net US FDI stock in Poland. Other large sectors are chemicals and IT. From the perspective of the Polish economy as a whole, US investors play a top role in the following sectors – chemicals, defense, food, automotive and finance.

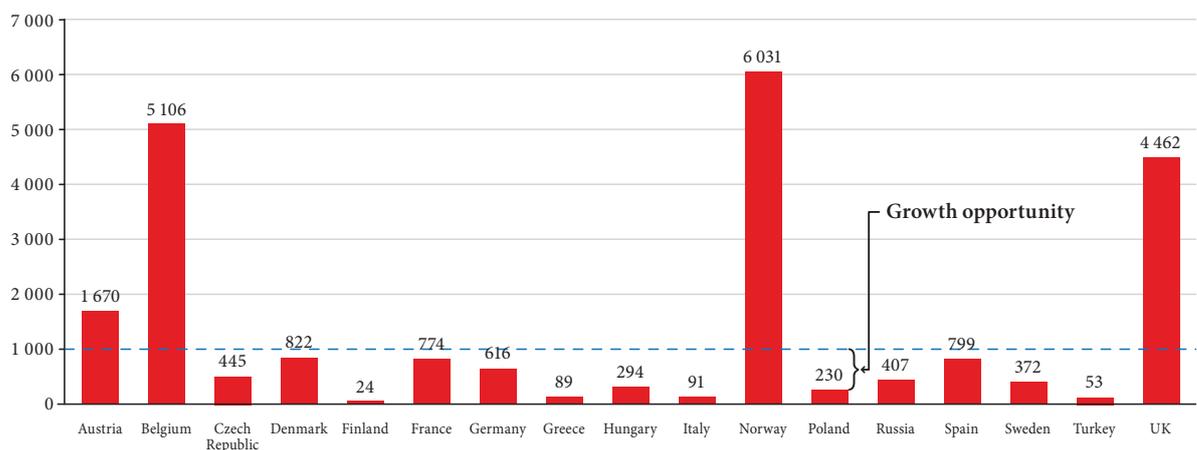
According to the Polish Central Statistical Office (GUS) data, in 2010 the total amount of foreign companies registered in Poland was exceeded 19,000, the amount of US companies was 756 (589 in 2009), which was the 9th position after Netherlands (2438), Germany (5950), France (1295), Cyprus (1212), United Kingdom (1219), Luxemburg (1079), Switzerland (599), Spain (678) and United Kingdom (953).

The location of foreign companies' registration is highly concentrated in Poland. This trend is also characteristic to US investors. Based on GUS data, in 2010 almost 70% of the total US companies' share capital (PLN 5.2 bn; excluding financial institutions) was registered in Mazowieckie, the most developed economic voivodeship. The next ones include Wielkopolskie (10%) and Śląskie (5%). Traditionally, Warsaw is chosen by foreign investors for corporate headquarters, further integrated with regional operations – through supply chain or regional branches. Due to high labor cost differences and local market specifics, companies with larger operations more and more optimize their nationwide footprint.

### THE OPPORTUNITY

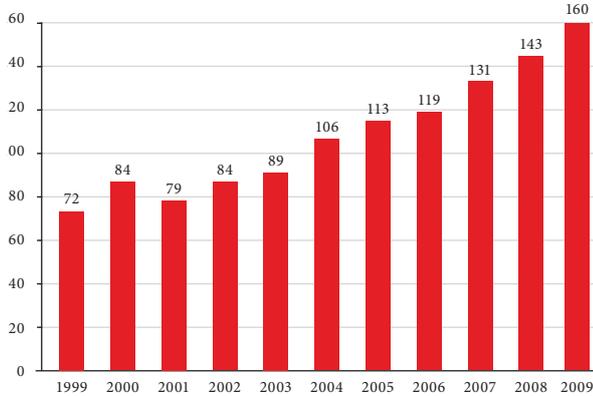
If relative measures for US FDI inflows would be considered, Poland still lags behind other EU countries. Taking into account net US FDI outward stock increase in 2000-2010 per capita ratio; Poland with 230 USD per capita ranks below many EU countries, including CEE ones e.g. Czech Republic (445 USD) or Hungary (294 USD). If this opportunity gap would be realized, the US FDI stock in Poland could be at least doubled.

Net US FDI outward stock increase in 2000-2010 per capita (USD)



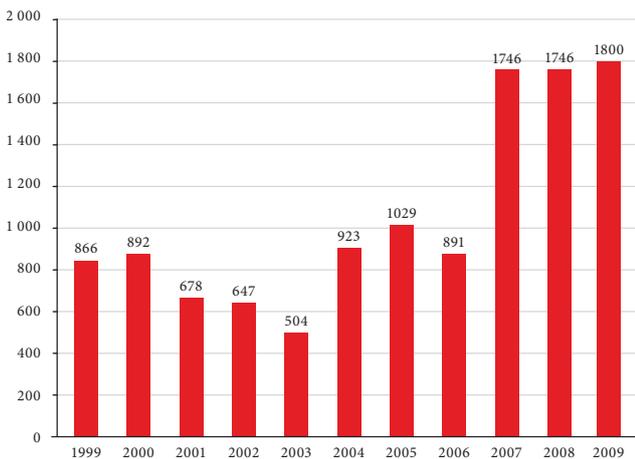
Source: Analysis based on US Bureau of Economic Analysis data

**US companies' employment in Poland**



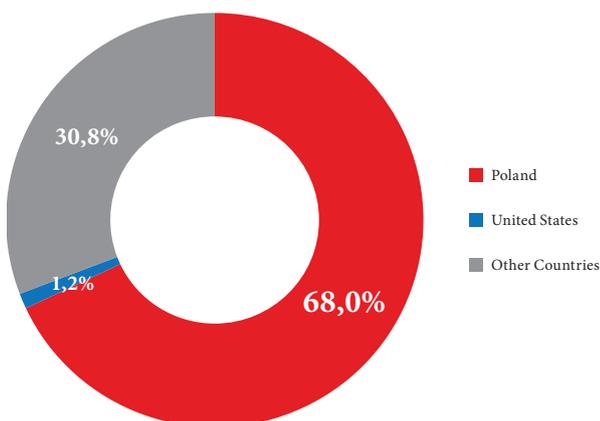
Source: Analysis based on US Bureau of Economic Analysis data

**US companies' capital expenditures in Poland (USD, mn)**



Data relates to majority-owned nonbank US affiliates  
Source: Analysis based on US Bureau of Economic Analysis data

**US companies' sales destinations (2009, USD mn)**



Source: Analysis based on US Bureau of Economic Analysis data

**US FDI CONTRIBUTION TO THE POLISH ECONOMY**

US investors are one of Poland's major employers. Based on BEA data, within the last decade US non-bank enterprises increased their employment in Poland by 91%, to 160,000 employees; 3.8% of total US investors related employment generated in Europe and 1.6% of total employment of the Polish private sector. The employment growth in Poland generated by the US enterprises has largely exceeded employment growth generated by US companies in other markets (EU-27 16%; all countries 33%).

The sales revenues of American companies in Poland during 2000-2009 almost quadrupled to approximately USD 40 bn (estimate based on BEA data). Similar growth dynamics was achieved also by the total value added, which reached approximately USD 10 bn in 2009 (USD 2.5 bn in 2000).

During 2000-2009 the total capital expenditures of the majority-owned nonbank US affiliates registered in Poland amounted to more than USD 11 bn.

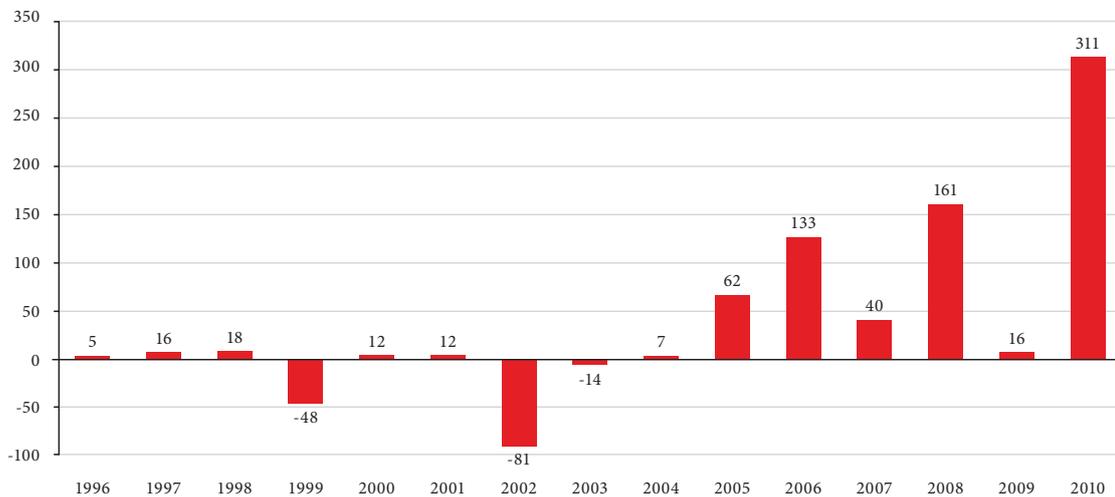
The majority of US companies which invested in Poland are export oriented. The share of export sales in total sales reached 31% in 2009 (39% in 2008). In 2009, the value of total export amounted to USD 10.4 bn (in 2008 – USD 13.6 bn) which is approximately 8% of the total Polish export. Export to the US totaled USD 418 mn, which is approximately 17% of total Polish export to the United States.

US companies operate complex supply chain networks. In order to optimize cost and quality, US affiliates in Poland conduct extensive local sourcing. The AmCham report found that almost 60% of the surveyed US companies have more than 26 business partners or suppliers.

### POLISH OUTWARD FDI INVESTMENTS

Poland is a net FDI recipient country. The amount of outward FDI is, however, steadily growing which is a natural consequence of the country's industrialization and business sector build up.

#### Net FDI outflow from Poland to US (USD, mn)



Source: Analysis based on NBP data

According to NBP international investment data at the end of Q3 2011, the stock of Polish direct investment abroad amounted to approximately USD 48 bn. The net outflows of FDI have intensified in the last 5 years, when annual outflows exceeded USD 3 bn.

Most of Poland's outward FDI are located in the European Union (2010 net FDI outward stock): Luxembourg (USD 9.1 bn), Netherlands (USD 2.9 bn), Czech Republic (USD 2.5 bn), Germany (USD 2.4 bn), United Kingdom (USD 2.5 bn), Cyprus (USD 1.6 bn), and Lithuania (USD 2.2 bn).

United States is a minor FDI destination for Polish investors. By 2010, approximate net FDI outward stock of USD 1.1 bn has been invested.

## 2. US – POLAND PORTFOLIO INVESTMENT RELATIONS

US-PL financial relations have a long-lasting history.

US is one of major lending markets for the Polish government. First issue of the Polish government's bonds nominated in USD was made in 1994 and was related to Brady bonds. The issue was an integral element of the Poland's foreign debt restructuring and arrangements with the London Club.

First commercial issue of USD nominated bonds was completed in 1995 and amounted to USD 250 mn. Since 1995 till January 2012, Polish government has raised through USD nominated bonds directed to US investors approx. USD 13 bn. As of June 2011, the share of US nominated debt in total Polish government's foreign debt amounted to 14.8%<sup>40</sup>.

US financial market attracts also Polish private institutions, which sell debt or equity instruments to the American investors.

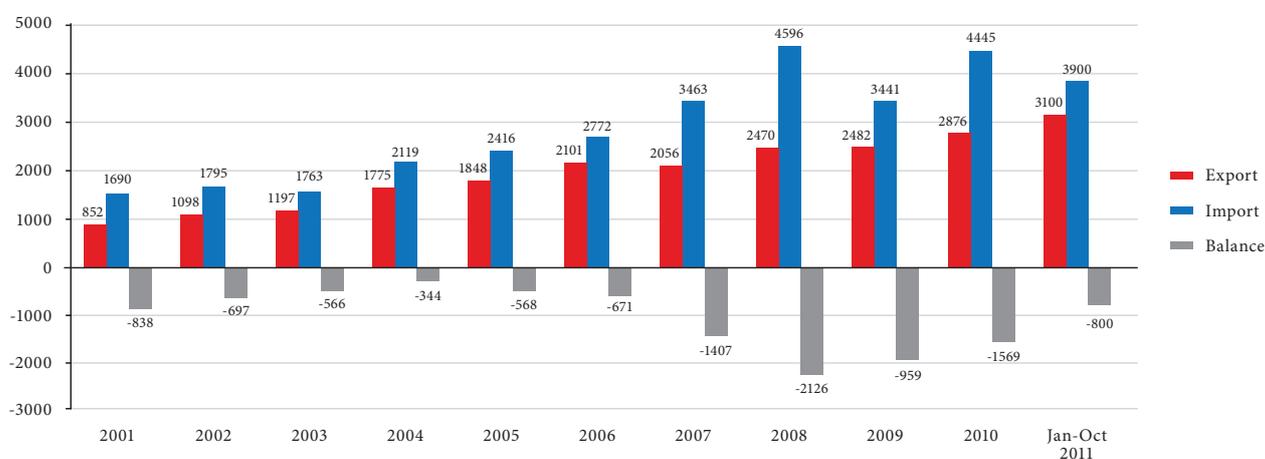
Taking into account both public and private financial instruments, American investors play a key role for the Polish issuers. According to IMF data, during 2001-2010 the total value of US investments in the Poland's portfolio investment liabilities increased from USD 3.1 bn to USD 21.8 bn (19% out of total Poland's portfolio investment liabilities in 2010). This ranked US at the first place.

Polish investments share in the US portfolio investments is relatively small. According to National Bank of Poland data, by end of 2010 they amounted to USD 867 mn.

### 3. US-POLAND FOREIGN TRADE RELATIONS – MERCHANDISE TRADE<sup>41</sup>

Despite some improvements in recent years, bilateral trade relations are relatively weak and below expectations. According to GUS data, in 2000-2010, total Polish-US merchandise trade turnover (export plus import) increased from USD 2.5 bn to USD 7.3 bn. Throughout the whole period of 2000-2010,

Poland's merchandise trade with US (USD, mn)



Source: Analysis based on GUS data

40 Ministry of Finance, Strategia zarządzania długiem sektora finansów publicznych w latach 2012-15 (Strategy of public debt management in 2012-15), December 2011.

41 Analysing foreign trade data, it should be taken into account that data collected by Polish and US statistical Office differ due to applied methodologies. Data collected by GUS are presented in imports – according to the country of origin, and in exports – according to the country of destination. US BEA data on exports are valued on a free alongside ship (FAS) basis at the US port of export; imports are valued on a customs value basis at the foreign port of export.

Poland generated a negative balance on foreign trade, with import from US largely exceeding Polish export. The year 2011 shows some signs of trade recovery, as according to the Polish Ministry of Economy data, in January – October 2011, the Polish-US merchandise trade turnover increased by 14% compared to the same period in previous years reaching USD 7 bn.

Trade relations with the US are to some extent similar to other far away countries. Polish trade is concentrated on neighboring European countries. Trade with remaining partners is relatively small, what is the particular case of export. Most of Polish trade is generated with European Union countries. The difference represents significant role of China and Korea in import flows. In 2010, the share of European Union countries in the Polish export amounted to 79%; while in import 60%. The share of China and Korea in the Polish import amounted to 12%.

From the perspective of Polish firms, specifically those not related to TNCs, the relatively low value of export to the US can be a result of such factors as:

- existing barriers of trade, most importantly, non-tariff measures
- large distances which drive up logistics costs and decrease competitiveness of low value-added exports
- lack of specific and detailed market and country/state information
- insufficient level of product competitiveness
- lack of financial resources to invest in distribution, promotion, etc.

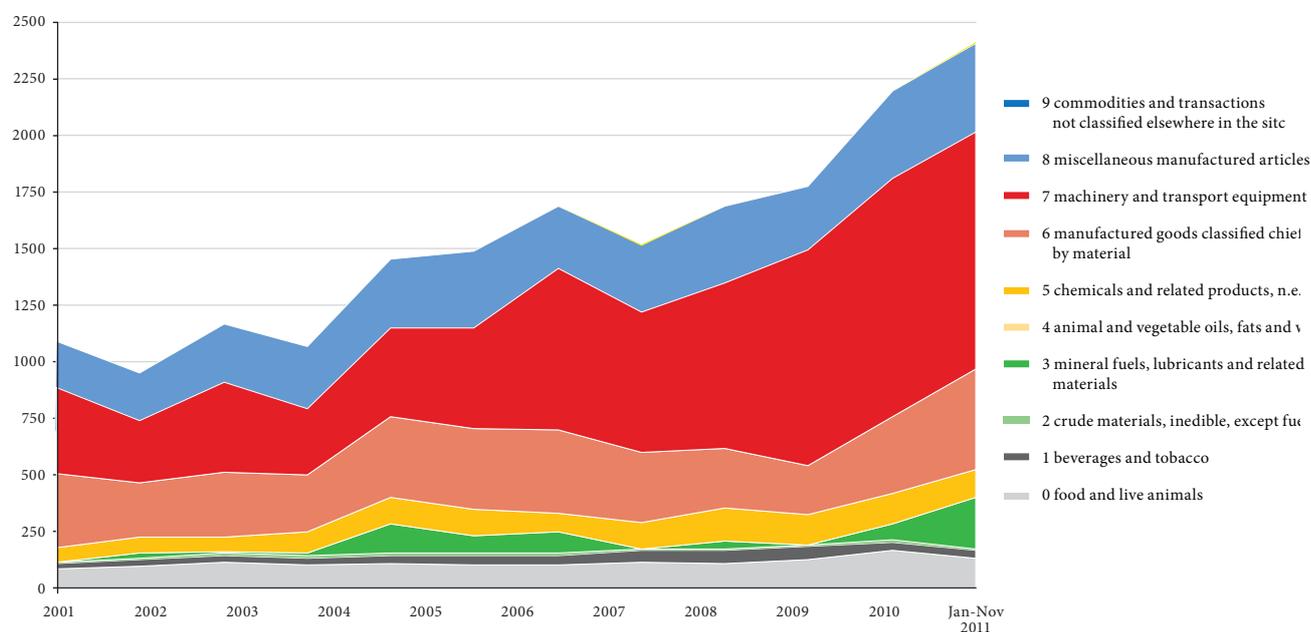
Some of the above factors are specific primarily to Polish capital-based enterprises, which usually have not developed such extensive international presence and global distribution networks compared to TNCs. This is a significant US market entry barrier, taking also into account capital availability constraints. The product competitiveness is also an issue as price-based competition may not balance logistics and other market entry costs.

US-Polish trade relations are to a large extent shaped by transnational corporations, their global strategy and Poland's positioning in their value chains. Poland, due to its location, market size and labor cost advantages, has attracted investors whose decisions were driven by market access and cost optimization. These strategies have significantly impacted trade volumes as following effects through FDI were generated: investment-trade substitution (former export to Poland has been replaced by production in Poland) and trade creation (reexport/export of goods produced in Poland; import of goods for production needs). The scale of these effects however is difficult to assess. Some high level indication is in general a leading role of foreign invested enterprises in Poland's foreign trade (including American ones). In 2010, their share in Poland's total merchandise export was 61% and import 60%.

#### **POLISH EXPORT TO THE UNITED STATES**

United States are rather a medium-sized export partner for Poland. The US share in total Polish export amounted in 2010 to only 1.8%.

## Poland's export to the US (EUR, mn)



Source: Analysis based Eurostat data (SITC codes)

Polish export to the US has been constantly growing, however at a moderate rate. Based on GUS data, in the years 2008-2010, export even stagnated at the average level of USD 2.6 bn (in 2010 – USD 2.9 bn). According to Polish Ministry of Economy data, in January-October 2011, the Polish export to US increased by 29% compared to the same period in previous year reaching USD 3.1 bn.

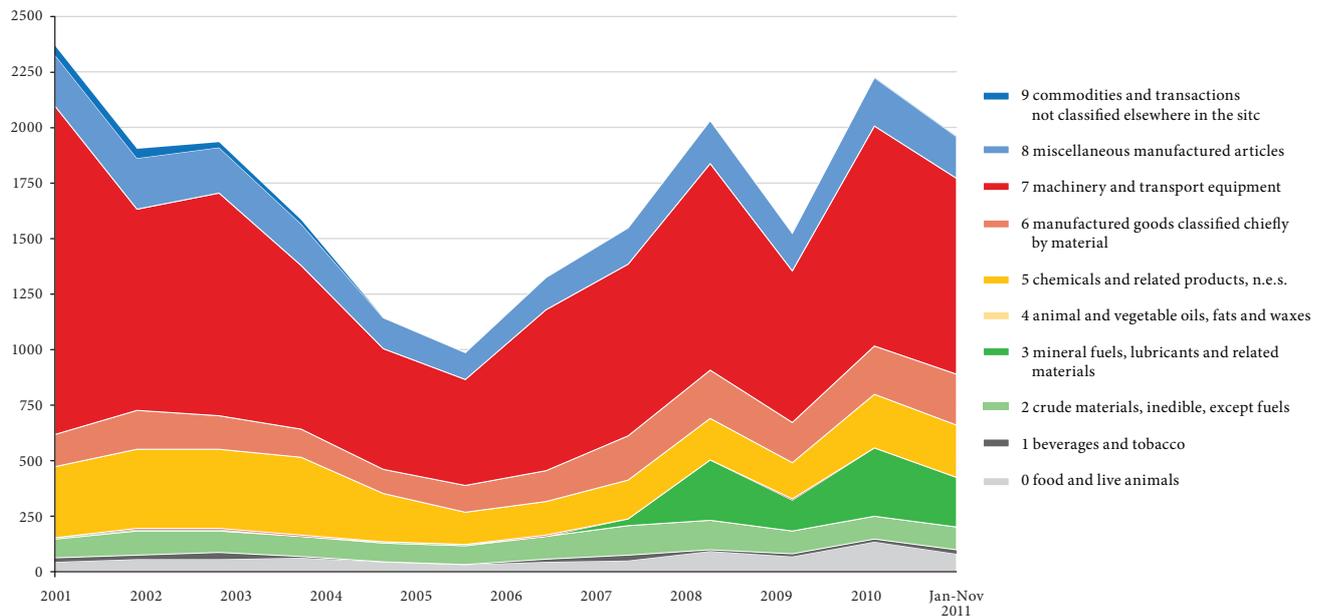
On an aggregate level (based on Eurostat data), major products exported from Poland to the US include products and components related to aerospace industry, furniture, food, silver and energy products (coal and petroleum oils).

## Major Polish products exported to the United States (EUR)

Product	Jan-Dec 2000	Jan-Dec 2005	Jan-Dec 2008	Jan-Dec 2009	Jan-Dec 2010	Jan-Nov 2011
parts for turbo-jets or turbo-propellers	0.2%	1.4%	2.1%	7.3%	12.0%	10.1%
furniture and parts thereof	6.5%	8.2%	11.9%	8.7%	9.8%	9.2%
food	7.5%	6.8%	6.3%	6.9%	7.5%	5.3%
ships, boats (including hovercraft) and floating structures	0.9%	2.3%	7.6%	20.5%	6.7%	4.1%
silver	0.0%	0.7%	1.1%	0.5%	4.3%	8.8%
other vessels (ships/boats) for the transport of goods (including vessels for the transport of both passengers and goods)	0.0%	0.3%	0.0%	0.0%	4.2%	1.6%
other parts of aeroplanes or helicopters	1.1%	0.6%	1.0%	1.6%	2.0%	1.8%
coal, coke and briquettes	0.0%	3.9%	1.0%	0.0%	1.8%	1.0%
wheat gluten, whether or not dried; casein; caseinates and other casein derivatives; casein glues	1.5%	1.8%	3.3%	2.9%	2.0%	1.5%
syringes, needles, catheters, cannulae and the like	0.3%	0.7%	1.4%	1.5%	1.1%	0.9%
petroleum oils and oils obtained from bituminous minerals (other than crude)	0.1%	1.1%	0.9%	0.1%	1.6%	8.5%
parts and accessories of the motor vehicles	0.2%	1.6%	2.8%	1.1%	1.7%	2.2%
equipment for distributing electricity, n.e.s.	2.2%	2.3%	2.8%	0.8%	1.6%	1.9%

Source: Analysis based on Eurostat data (SITC codes).

### Poland's import from the US (EUR, mn)



Source: Analysis based Eurostat data (SITC codes)

#### IMPORT FROM THE UNITED STATES

Compared to export, the United States has a relatively stronger position in Polish import amounting to 2.5% in 2010.

Based on GUS data, from the end of 1990s until 2006, import from the US has been at an average annual level of USD 1.5-2.8 bn. Since then import has accelerated, reaching USD 4.5 bn in 2010; 60% above the 2006 level. According to Polish Ministry of Economy data, in January-October 2011, the Polish import from the US increased by 5% reaching USD 3.9 bn.

On an aggregate level (based on Eurostat data), Polish import from US includes primarily products and components related to aerospace industry, motor vehicles and parts and machinery.

A more detailed view shows clearly that a significant share of import from the US supplies production in Poland.

## Major products imported to Poland from the United States (EUR)

Product	Jan-Dec 2000	Jan-Dec 2005	Jan-Dec 2008	Jan-Dec 2009	Jan-Dec 2010	Jan-Nov 2011
parts for turbo-jets or turbo-propellers	0.1%	0.6%	1.0%	7.3%	11.0%	13.0%
ships, boats (including hovercraft) and floating structures	1.6%	0.8%	0.4%	1.1%	4.0%	1.4%
aeroplanes and associated equipment; parts thereof	23.7%	6.6%	3.0%	5.1%	4.0%	5.0%
feeding stuff for animals (not including unmilled cereals)	0.1%	0.2%	1.2%	1.3%	4.0%	1.3%
medicaments, n.e.s., put up in measured doses or in forms or packings for retail sale	2.6%	3.8%	1.4%	1.5%	1.7%	2.4%
essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations	1.1%	1.6%	1.4%	1.6%	1.3%	1.6%
motor vehicles for the transport of persons, n.e.s.	0.6%	3.4%	13.6%	3.6%	2.9%	1.0%
pulp and waste paper	1.5%	4.2%	3.4%	3.9%	2.7%	3.0%
optical fibres and optical fibre bundles and cables; sheets and plates of polarizing material; unmounted optical elements, n.e.s.	0.1%	0.1%	1.1%	1.1%	1.1%	0.9%
non-ferrous metals (mainly nickel and aluminium)	0.2%	1.1%	0.8%	0.7%	0.7%	0.9%
articles of nickel, n.e.s.	0.0%	0.1%	1.8%	2.6%	1.9%	2.1%
pumps for liquids and non-liquids	1.3%	1.7%	1.6%	2.6%	2.7%	3.4%
taps, cocks, valves and similar appliances for pipes, boiler shells, tanks, vats or the like, including pressure-reducing valves and thermostatically controlled valves	0.4%	0.6%	0.5%	1.0%	1.0%	1.1%
telecommunications equipment, n.e.s., and parts, n.e.s., and accessories of apparatus	9.3%	5.1%	2.8%	3.1%	2.0%	1.7%
electrodiagnostic apparatus for medical, surgical, dental or veterinary purposes, and radiological apparatus	1.3%	2.1%	1.4%	1.4%	1.3%	1.1%
motor vehicles for the transport of persons, n.e.s.	0.6%	3.4%	13.6%	3.6%	2.9%	1.0%
parts and accessories of the motor vehicles	0.6%	0.6%	1.0%	0.8%	0.7%	0.7%
agricultural machinery (including tractors) and parts thereof	0.6%	2.7%	2.1%	2.0%	1.7%	1.1%
parts for boring or sinking machinery of heading and other boring or sinking machinery, not self-propelled	0.1%	0.3%	0.5%	0.5%	0.5%	0.9%
other vessels (ships, boats) for the transport of goods (including vessels for the transport of both passengers and goods)	0.0%			0.0%	3.9%	1.3%

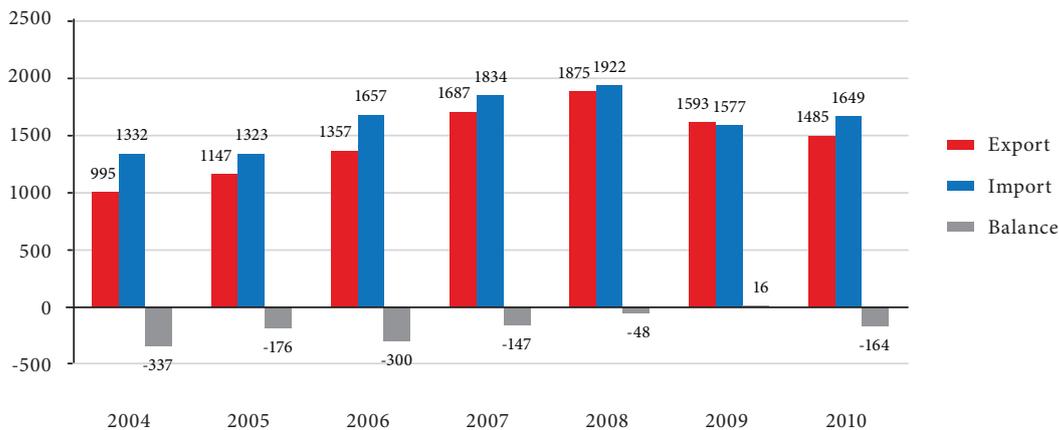
Source: Analysis based on Eurostat data (SITC codes).

#### 4. US-POLAND FOREIGN TRADE RELATIONS – TRADE IN SERVICES

Polish trade in services is dynamically growing. According to NBP data; in 2000-2010 in total the export of services has grown from USD 10.4 bn to USD 32.5 bn; and import from USD 9.0 bn to USD 29.0 bn.

The dynamics of US-Poland trade in services has been slightly below the average growth of Poland's total trade in services. According to United Nations data, in 2004-2010 the export of services from Poland to the US has grown from USD 1.0 bn to USD 1.5 bn; and import from USD 1.3 bn to USD 1.7 bn. Highest value of trade in services has been up to now generated in 2008 when the PL export to US reached USD 1.9 bn and import USD 2.0 bn.

### Poland's trade in services with US (USD, mn)



Source: Analysis based on UN data

In 2010, according to UN data, the main services exported were: transportation 27% (45%), travel 14% (15%), computer and information services 14% (9%), R&D 9% (2%), management consulting 6% (2%). In 2004-2010 the highest average annual growth rate<sup>42</sup> in export was achieved by business services and computer and information services; both exceeding 23% per annum.

Regarding import, main services imported in 2010 were: transportation 23% (31% in 2009), royalties and license fees 17% (13%), computer and information services 14% (7%), financial services 9% (3%), management consulting 8% (2%). In 2004-2010, among the services with relative high share in total services, the highest average annual growth rate in import was achieved by financial services (16%), computer and information services (15%) and management consulting (40%).

The relative position of the US in the Poland's international trade in services is higher compared to its share in Poland's international merchandise trade. In 2010, the share of Poland's export to the US in Poland's total export of services amounted to 5% (7% in 2004) and in import 6% (10% in 2004).

There are several service sectors in which US play a leading role in the Poland's international trade in services. These include following sectors (2010, UN data, % share in total export /or import/ of services): in export – R&D services (24%), computer services (14%), education services (14%), non-franchise royalties and license fees (13%), legal services (12%), management consulting (11%), accounting services (10%) and financial services (9%); in import – education services (14%), legal services (11%), financial services (17%), computer and information services (14%), royalties and license fees (14%), insurance services (10%). Significant amounts of these services is being conducted through Business Process Outsourcing (BPO) / shared services center operations located in Poland.

42 CAGR ... Compound Annual Growth Rate





## APPENDIX C

### U.S. Software Development Centers in Poland

December 2011

COMPANY	CITY	EMPLOYEES
<i>ranked by number of employees</i>		
1. IBM	Wrocław	3000
2. Motorola	Kraków	1000
3. Intel Technology Poland	Gdańsk	800
4. Alcatel-Lucent	Bydgoszcz	700
5. Sabre Holdings	Kraków	300
6. IBM	Kraków	200
7. Compuware	Gdańsk	150
8. Jeppesen by Boeing	Gdańsk	150
9. Antenna Volantis	Kraków	140
10. Synopsys	Gdańsk	100
11. Rockwell Automation	Katowice	100
12. Accenture	Łódź	80
13. Microsoft	Wrocław	60
14. Lionbridge	Warsaw	50
15. Ncomputing	Gdańsk	50
16. Symantec	Warsaw	40
17. IBM	Gdańsk	20
18. Microsoft	Poznań	20
19. Computer Associates	Warsaw	
20. Epicor Software	Warsaw	
21. Google	Warsaw	
22. Hewlett-Packard	Warsaw	
23. Intergraph Europe	Warsaw	
24. Microsoft	Warsaw	
25. Oracle Poland	Warsaw	
26. Progress Software	Warsaw	
27. Google	Kraków	
<b>TOTAL</b>		<b>6960</b>

Sources: AmCham research among Member Companies; "Outsourcing Poland 2011 - BPO and Shared Services Center", BiznesPolska Media sp. z o.o., Warsaw 2011.

## APPENDIX D

### Technology Centers in Poland

The main goal of Technology Parks in Poland is to provide infrastructure targeted at entrepreneurs' needs, especially in the start-up phase.

Most technology parks in Poland provide supporting services to entities interested in developing innovative ideas. These services include: consulting; training; information services; and help in acquiring additional funding, including EU funding, local grant financing, and seed funds. Consulting services include preparing documents (business plans, feasibility studies, grant applications) and supervision over the course of a venture. Pro-innovation services include technology audits, technology and scientific research commercialization, innovation implementation, as well as research and implementation services.

Technology centers in Poland see themselves as platforms for promoting entrepreneurship, development and creativity, where ideas are transformed into real business. They also work as supporting agencies in initiating contacts with foreign partners, acquiring innovative technologies and facilitating participation in EU framework programs.

The majority of technology centers do not do their own research nor development, but rather facilitate and create the environment for start-ups and mature companies alike to conduct their research on preferential terms. Technology Parks provide access to laboratories, exhibition areas, modern manufacturing floors, server rooms/data centers, office space and offices for complementary services, including archive and warehouse space. Data centers established at technology parks provide cloud computing services. Technology parks also act as a middleman between science and business aiming at creating business-academia networks. These networks include the following entities: academic centers, entrepreneurs, large and small companies, technology transfer centers, public agencies, foundations and investment funds. The technology park formula aims to be a venue where businesses, independent research and development entities, university research employees, local government and business support organizations can meet and cooperate. An additional advantage of technology parks is the close proximity to other innovative companies.

In terms of ownership, technology parks are oftentimes co-owned in the form of a joint-stock company by local governments on the provincial and city level as well as local universities or higher education institutions. If the technology park is part of a Special Economic Zone, the Zone is also co-owner of the Park. However, a number of parks are open to cooperation with other, external non-state entities, including business. Large companies and corporations who place their branches within a park can acquire shares in the company. This co-ownership of a park provides direct access to facilities and laboratories and contact with scientists in nearby universities. Some parks are also open to potential investors for further development.

## TECHNOLOGY INCUBATORS

Technology incubators are designed to support newly founded, innovative enterprises as they mature and until they can independently operate on the market. Incubators support start-up companies by providing: preferential rates for rent, access to research infrastructure, business networks, laboratories in R&D centers and establishing contacts with the scientific community, consulting, support in technology transfer, commercialization and fundraising.

Companies in their early stage can make use of an incubator through regular contacts with its management and employees, coaches, consultants and other incubated enterprises. Cooperation is the highest value added to the benefits companies receive when in the incubator.

The incubator's goal is to make start-up companies more familiar with the free market environment. The average incubation period is between three and five years.

Services provided by technology incubators include: business consulting in matters of starting a company, legal and book-keeping advice, patent advice (intellectual property & patent law), fundraising, training courses for those running companies as part of the incubators, advertising, marketing and other promotional activities, office management, contact with technology experts, access to laboratories and libraries, aid in organizing business meetings and searching for business, commercial and technology partners, organize cooperation and technology forums and audits. Incubators also help in establishing cooperation with domestic and foreign universities, R&D centers, technology parks and incubators. They also support the process of finding funding (including low-interest loans).

## TECHNOLOGY TRANSFER CENTERS

The primary role of technology transfer centers (TTC) is to create links between science and business and to commercialize scientific output. On average, a single center works with approximately 90 companies, mostly local SMEs.

Their activities are focused on raising awareness about the research being conducted, acquiring business partners and commercializing the results of research work. They are often attached to academic centers and support academic entrepreneurship, deal with universities' innovation and patent policies and IP (copyrights, property rights) matters. Usually, Polish TTCs are non-profit organizations. There are approximately 90 technology transfer centers in Poland. Enterprises utilize TTCs to seek consultancy and training services, cooperation opportunities with the scientific community, aid in establishing and maintaining contacts, support when transferring and commercializing technology.

Each TTC creates approximately four business plans per year. The number of clients for an average technology transfer center ranges from 500 to 700 people. Centers also aid in establishing academic spin-off firms. In total over 100 spin-offs are founded each year around the country, mostly by undergraduate, postgraduate and PhD students.

Many centers target their services to scientific and R&D units and entrepreneurs. Services include promoting the intellectual potential of universities, research organizations and innovative life science enterprises. They also support the process of commercializing state-of-the-art solutions, helping spin-off/spin-out companies, intellectual property management consulting which include creating internal regulations for the protection and use of intellectual property in a research unit. Some centers assist in obtaining funds for innovative projects with the use of EU funds, government grants and private capital (seed/venture capital, business angels).

Centers support academic entrepreneurship by evaluating new ideas, helping in model or prototype construction and protecting intellectual property, developing commercialization agreements and establishing new businesses. They also offer pro-innovation consulting services for entrepreneurs and R&D organizations, including help in finding domestic and international partners for technological, economic scientific cooperation by delivering databases, organizing broker meetings and conducting business trips.

Technology transfer centers also act as institutions responsible for managing the intellectual property of a University, given that the center is part of one. A center might also search for entities willing to invest in the University's new solutions.

Source: "Innovation Centers in Poland – Directory of innovative business support institutions" – the Polish Agency for Enterprise Development, Warsaw 2011.

<b>MAŁOPOLSKA (LESSER POLAND)</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Krakow Technology Park	Kraków	Special Economic Zone status; issued 90 permits for conducting activities in SEZ; helps developed companies gain public help for investments in the zone
Jagiellonian Centre of Innovation, LifeScience Park	Kraków	Life Sciences, healthcare sector, biotechnology, medicine, pharmacy, biology, chemistry, physics, nanotechnology and environmental protection
MMC Brainville	Nowy Sącz	Business Development Center for ICT companies, in construction, expected to end in mid-2012
Technology Transfer Center - Cracow University of Technology	Kraków	It has helped to establish 84 new companies, performs nearly 10 technology transfers each year
Center for Innovation, Technology Transfer, and University Development (CITTRU) of the Jagiellonian University in Kraków	Kraków	Thanks to CITTRU, the number of patents registered by JU scientists has significantly increased (from 0 registered in 2006 to 26 registered in 2010 alone).
Stanisław Staszic Center for Technology Transfer at the Kraków University of Science and Technology	Kraków	The Center managed to submit 120 domestic and 10 international patent applications. It also participated in establishing two spin-off companies and assisted in granting 25 business licences.
Center for Medical Technology Transfer and Technological Park	Kraków	Life Sciences, author of first set of comprehensive rules for managing intellectual property in a healthcare organization
<b>SILESIA</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
"Technopark Gliwice" Science and Technology Park	Gliwice	Agreements with 30 scientific institutions, 4 universities, 4 other parks in Poland; Currently 28 technology companies, mainly from the IT industry
Euro Centrum Science and Technology Park	Katowice	Energy Efficient Technologies, power savings in buildings; 12 partnership agreements with universities and institutions, cooperates with 70 different entities
Silesian Industrial and Technology Park	Ruda Śląska	Geodetic survey, architecture and construction companies
Rybnik Technological Incubator	Rybnik	50 SMEs currently, mostly from design, IT, construction and commercial-service sectors
Upper-Silesian Agency for Entrepreneurship Promotion Co. Former Upper-Silesia Agency for Enterprise Restructuring Co.	Katowice	Participated in several dozen regional, domestic and international projects
Innovation and Technology Transfer Center at the Silesian University of Technology	Zabrze	participated in the success of the Silesian Green Power 2011 racing car (second place and award for The Best Engineered Car in the Greenpower Corporate Challenge 2011 race at the Silverstone Racing Track, Great Britain). The Silesian University of Technology has completed 504 research projects, 398 tertiary research projects, and 74 R&D projects

<b>WIELKOPOLSKA (GREATER POLAND)</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Nickel Technology Park Poznań	Poznań	Biotechnology and IT industry; first and largest park in Poland
Poznan Science and Technology Park of the Adam Mickiew	Poznań	Chemistry Technologies, waste management, archeology, medical diagnostics, speech technologies,
Western Innovation Center	Gorzów Wielkopolski	60 companies have used the Center so far
Kalisz Business Incubator	Kalisz	20 companies from various sectors; 1100 people participate in training courses every year
Technology InQbator of the Poznan Science and Technology Park of Adam Mickiewicz University Foundation	Poznań	a company from the Park - INNO-GENE S.A. was listed on the NewConnect secondary market
Institutional Center for Innovation and Technology Transfer of Adam Mickiewicz University (UCITT UAM)	Poznań	Up to mid-2011, UCITT AM completed four projects financed from external funds, related to technology transfer, commercialization and intellectual property

<b>LOWER SILESIA</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Wrocław Medical Science and Technology Park	Wrocław	IT, medical, biotechnology and pharmaceutical sector
Wrocław Technology Park	Wrocław	Hi-tech sector, Part of a consortium of enterprises that is building components for the international XFEL project (X-Ray Free Electron Laser); Over 120 companies present
KGHM Letia Legnica Technology Park	Legnica	Currently houses 27 enterprises employing approximately 200 people
Lower Silesian Regional Development Agency (DARR); Lower Silesian Technology Park T-Park	Szczawno-Zdrój	BPO, start-ups
Wrocław Center for Technology Transfer, Wrocław University of Technology	Wrocław	Participated in about 60 international technology transfer agreements, conducted about 300 technology audits, trained over 33,000 people, aided in founding nearly 140 innovative enterprises and took part in about 70 projects, financed by the European Commission; Member of the Enterprise Europe Network

<b>ŁÓDZKIE PROVINCE</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Bełchatów and Kleszczów Industry and Technology Park	Bełchatów	part of the Łódź Special Economic Zone: industrial, manufacturing, service and logistics activities. Implemented adding nano-crystal coal layers to medical implants
Łódź Regional Science and Technology Park - Technopark Łódź	Łódź	3 patents have been developed so far in the field of devices for the motor impaired; an Internet browser controlled by blinking (b-link)
Foundation for the Support of Entrepreneurship and Science	Łódź	TV studios, media and film industry
Technology Transfer Office of Technical University of Łódź	Łódź	winner of the "Innovation Creator - Support for Innovative Academic Entrepreneurship" program organized by the Ministry of Science and Higher Education
Technology Transfer Center of the University of Łódź	Łódź	The center has been awarded the title of "Regional Leader in Innovation and Development" for the Łódzkie Province

<b>WEST POMERANIA</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Białogard Technology Incubator Social and Economic Initiative Association	Białogard	Has modern processing lines for powder coating and a spray-painting chamber
West Pomerania Economic Development Association - Szczecin Entrepreneurship Center	Szczecin	During the last 15 years (the oldest institutions of its type in the country), 400 companies went through the Incubator
Pomeranian Technopark, Szczecin Science and Technology Park	Szczecin	IT sector, Information and communications technologies.
Regional Center for Innovation and Technology Transfer, West Pomeranian University of Technology in Szczecin	Szczecin	Member of the Enterprise Europe Network
<hr/>		
<b>MAZOWIECKIE</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Center for Technology Transfer and Entrepreneurship Development at the Warsaw University of Technology (CTTIRP)	Warsaw	Environmental protection
University Technology Transfer Center of the Warsaw University	Warsaw	Sectors: biology, chemistry, physics and geology; Member of EEN (Enterprise Europe Network) network
FIRE Innovation Center Foundation	Warsaw	Contributed to the establishment of two companies in the life-science industry
Technology Partners Foundation (coordinator and legal representative of the Technology Partners Consortium)	Warsaw	Scientific research and implementation organization specialized in large-scale interdisciplinary domestic and international research projects
<hr/>		
<b>TRI-CITY AREA</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Prof. Hilary Koprowski Gdańsk Science and Technology Park (part of the Pomeranian Special Economic Zone)	Gdańsk	Biotechnology, biomedicine, ICT and energy. Sectors present: building, electrical, design, catering, multimedia, furniture, automotive and recreation industry. Over 60 companies established
Pomeranian Science and Technology Park	Gdynia	Globally recognized companies; business-academia network of 100 business and science partners
Business Point: Team for Innovation and Knowledge Transfer at the Medical University of Gdańsk	Gdańsk	Manages the intellectual property of the Medical University of Gdańsk; life sciences sector
<hr/>		
<b>SUBCARPATHIAN</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Krosno Technology Incubator	Krosno	12 companies which exited from the incubator are still on the market; currently nine entities are present
IN-TECH New Technology Incubator IN-MARR Business Incubator	Mielec	124 enterprises used the Incubator (94 start-ups), hiring 1,150 people; Incubator won competitions regarding the electric vehicle market + infrastructure in the context of energy security
"HORYZONTY" Association for Innovation and Technology Transfer	Rzeszów	volunteer association which cooperates with local government and academic institutions, student organizations, entrepreneurs and various associations

<b>WARMIAN - MASURIAN</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
The Business and Sports Center Elbląg Modern Information Technology Incubator	Elbląg	67 entities within the last 4 years; IT sector
Center for Innovation and Technology Transfer, University of Warmia and Mazury in Olsztyn (CIiTT)	Olsztyn	To date 7 international technology transfers have been completed in the fields of renewable energy sources, dairy science, machine technology, poultry farming and geodetic surveying. 270 organizational and technological innovations have been implemented in companies from the Warmia and Mazury region. Member of Enterprise Europe Network
<b>LUBLIN</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Lublin Science and Technology Park	Lublin	network of 400 scientists who conduct research in various industry sectors
Lublin Technology Transfer Center of the Lublin University of Technology	Lublin	To date has implemented 20 technologies from the fields of production engineering, modern production technologies and production process automation
<b>ŚWIĘTOKRZYSKIE</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Kielecki Park Technologiczny	Kielce	Two areas of activity: Technology incubator (professional support for start-ups) + Technology Center (facilities + investment land)
Świętokrzyskie Regional Center for Innovation and Technology Transfer	Kielce	3 regional development projects in three key fields: regional innovation systems, information society and renewable energy sources
<b>PODLASKIE</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Science and Technology Park Poland-East in Suwałki	Suwałki	Meeting place for businesses b/w East and West; 16 companies present
International Innovation Centre of East (IICoE) - Innovative Eastern Poland Association	Białystok	organized periodic international forums, which have resulted in over 400 concrete cooperation proposals in new projects in joining business ventures. Biomedical engineering, medical technologies, biotechnology, healthcare and ICT
<b>LUBUSZ</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Academic Entrepreneurship Incubator of the University of Zielona Góra	Zielona Góra	geared to academia (students, high school graduates and academics) who wish to start a business
<b>KUJAWY-POMERANIA</b>	<b>CITY</b>	<b>SPECIALIZATION/HIGHLIGHTS</b>
Torun Technology Park	Toruń	Success so far: 365 business offerings in the European Commission's Business Cooperation Database, 23 technological offerings in the Bulletin Board Service cooperation database, and 32 pieces of research with market potential

Source: "Innovation Centers in Poland – Directory of innovative business support institutions" – the Polish Agency for Enterprise Development, Warsaw 2011.

## APPENDIX E

### U.S. R&D Centers in Poland

	COMPANY	CITY	SECTOR	EMPLOYEES
<i>ranked by number of employees</i>				
1.	General Electric	Warsaw	Industrial design	1300
2.	Alcatel-Lucent	Bydgoszcz	Telecommunications	700
3.	Delphi	Kraków	Automotive	700
4.	IBM (Tivoli SWG Lab)	Kraków	IT	350
5.	Citi International	Warsaw	Financial	350
6.	Mentor Graphics	Katowice	IT	200
7.	Woodward Governor	Niepołomice	Automation	150
8.	Hamilton Sundstrand	Rzeszów	Aviation	150
9.	McKinsey & Company	Wrocław	KPO	100
10.	Whirlpool	Wrocław	White Goods	100
11.	Avio Polska	Bielsko-Biala	Aviation	80
12.	General Motors	Gliwice	Automotive	76
13.	Microsoft	Wrocław	IT	60
14.	NVIDIA	Warsaw	IT	50
15.	Bristol-Myers Squibb	Warsaw	Clinical Trials	43
16.	Wabco	Wrocław	Automotive	40
17.	3M	Wrocław	Industrial	30
18.	Telcordia Technologies	Poznań	Telecommunications	25
19.	Pharmaceutical Research	Warsaw	Pharmaceutical	22
20.	Citi Group	Łódź	Financial	20
21.	W.R.Grace	Poznań	Chemical	20
22.	Wikia	Poznań	IT	20
23.	Mentor Graphics	Poznań	IT	20
24.	Rockwell Automation	Katowice	Automation	14
25.	Animex	Ostróda	Agriculture	8
26.	Lionbridge	Warsaw	Language Technology	4
27.	Google	Kraków	Engineering Office	
28.	Microsoft	Łódź	IT	
29.	Cooper Standard	Myślenice	Automotive	
30.	GlaxoSmithKline	Poznań	Pharmaceutical	
31.	Microsoft	Poznań	IT	
32.	Google	Warsaw	Engineering Office	
33.	Oracle	Warsaw	IT	
34.	Pittsburgh Glass Works	Wrocław	Process	
35.	Remy International	Wrocław	Automotive	
36.	Amgen		Clinical trials	
37.	Pfizer		Clinical trials	
38.	TPSA		Telecommunications	
			<b>TOTAL</b>	<b>4632</b>

Sources: AmCham research among Member Companies; "Outsourcing Poland 2011 - BPO and Shared Services Center", BiznesPolska Media sp. z o.o., Warsaw 2011.

## APPENDIX F

### List of U.S. companies cooperating with Polish Universities

December 2011

COMPANY	INSTITUTION	COOPERATION
1. 3M	Technical Universities in Wrocław	R&D
	Technical University of Łódź	R&D
	Szczecin University of Technology	Lecture at the Company's Technical Forum
	Warsaw University of Technology	
	Wrocław University of Technology	
	AGH University of Science and Tech	
	Technical University of Łódź	
	Silesian University of Technology	
	Poznań University of Technology	
	Kraków University of Technology	
	West Pomeranian University of Tech	
	Military University of Technology	
Polish-Japanese Institute of Information Technology		
Lublin University of Technology		
2. Amgen	University Clinical Center - Medical University in Gdańsk	R&D
3. Amway	University of Economics in Kraków	Joint event in 2011
4. Animex	Warsaw University of Life Sciences	
	University of Warmia and Mazury	
5. Avio Polska	Aviation Valley partners: Silesian University of Technology, Faculty of Materials Science and Metallurgy, Faculty of Mechanical Engineering and Institute of Thermal Technologies, ITC	
	Partnered with Warsaw University of Technology and Military Aircraft Works No. 4 in establishing the Polonia Aero Company	Started building a very modern laboratory dedicated to research and testing of aircraft engine turbine prototypes. The project's value is approx. 50 million euro.
	Warsaw University of Technology Faculty of Materials Science, Faculty of Power and Aeronautical Engineering	
<b>Agreements of collaboration in preparation with:</b>		
	Lublin University of Technology, Faculty of Engineering	
	Częstochowa University of Technology	
	Szewalski Institute of Fluid Flow Machinery Polish Academy of Science, Faculty of Transonic Flows and Numerical Methods	
6. Boeing	Warsaw University of Technology	
7. CB Richard Ellis	Warsaw School of Economics	
8. CH2M Hill	AGH	
	Kraków University of Technology	
	Kraków University of Economics	

COMPANY	INSTITUTION	COOPERATION
9. Colgate-Palmolive	Medical University of Warsaw	
	Poznan University of Medical Sciences	
	Medical University of Lodz	
	Medical University of Lublin	
	Medical University of Białystok	
	Medical University of Silesia	
	Pomeranian Medical University	
	Medical University of Gdańsk	
	Wrocław Medical University	
10. Delphi	Jagiellonian University Medical College	
	Universities of Technology in Warsaw, Wrocław, Poznań, Gdańsk, Gliwice	
11. Dow Corning	AGH	
	in discussion with 5-7 universities, academy of sciences and indep institutions	
12. EIP	Warsaw University of Life Sciences	
	Warsaw School of Economics	
	University of Warsaw	
13. Ernst & Young	All major universities and business schools:	
	Warsaw School of Economics	
	Universities of Economics in Warsaw, Wrocław, Kraków, Poznań	
	University of Warsaw	
14. Fluor S.A.	Warsaw University of Technology	
	Silesian University of Technology:	
15. GE Hitachi Nuclear Energy	<i>Formal Cooperation Agreement to provide future engineers practical knowledge and experience in their future profession; also donates funds for software and equipment, supported "My Idea for a Business" contest and sponsored "Entrepreneurship Incubator" creativity workshops; students have the possibility to use Fluor's experts for their theses; Fluor experts present to Polytechnic's students</i>	
	Warsaw University of Technology	Gave over a dozen of licenses (worth over 200 000\$) of the GATE
	AGH University of Science and Technology	Cycle program to calculate power unit
	Gdańsk University of Technology	technology, including Gas/Steam and Nuclear
	University of Szczecin	
	West Pomeranian University of Technology in Szczecin	
16. GE	Koszalin University of Technology	
	AGH University of Science and Technology	
	Warsaw University of Technology	
	Lublin University of Technology	
	Silesian University of Technology	
	Wrocław University of Technology	
	Koszalin University of Technology	
	West Pomeranian University of Technology	
Gdańsk University of Technology		

COMPANY	INSTITUTION	COOPERATION
17. GM	University of Science and Technology in Kraków	Presentations to students about solutions applied at GM in the field of robotics and automated production processes
	Jagiellonian University	
	Industry Congress in Wrocław	GMMP board permanently present at the Faculty of Mechanics and Technology & publishes technical novelties
	Military University of Technology	
Silesia University of Technology	R&D activities: development and launch of a new innovative solution used by the Gliwice plant in the area of a new control system of semi-automated resistive welding stations.	
18. Halcrow	Warsaw University of Technology	Implementation of modern power supply systems; upgrading all existing bridges and viaducts to allow trains to operate with maximum speed – 300 km/h
19. Hyatt Regency	The Jozef Pilsudski University of Physical Education in Warsaw	
	Koźminski University	
	University of Finance and Management in Warsaw	
20. IBM	25 universities in main cities in Poland, mainly Universities of Technology	
21. Intel	Gdańsk University of Technology	
	Gdańsk University	
	Polish-Japanese Institute of Information Technology	
22. Lionbridge	University of Warsaw	A few dissertations were written based on data provided by Lionbridge
23. Marathon Oil	Letter of agreement with AGH in Kraków	
24. Philip Morris	University of Economics in Kraków	Job Fairs, Joint events
	AGH University of Science and Technology	
	Warsaw School of Economics	
25. Pittsburgh Glass Works	Ceramics Institute in Kraków	Research
26. Prologis	Poznań Higher School of Logistics	
27. TPSA	Warsaw University of Technology	R&D; HR activities
	Technical University of Łódź	R&D activities; HR activities
	University of Warmia and Mazury	R&D activities: Telco 2.0
	Polish - Japanese Institute of Information Technology	HR activities
28. UPC	University of Silesia - Faculty of Computer Science and Material Science	
	Katowice Institute of Information Tech	
	University of Economics in Katowice	
	Warsaw University of Technology	

Source: AmCham research among Member Companies

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