



Center for American Progress

## **Transatlantic Study Tour of German Vocational Training In the Fields of Renewable Energy, and Climate-Friendly Technologies**

March 17-23<sup>rd</sup>, 2012 (Berlin, Wolfsburg, Erlangen and Stuttgart)

### **Executive Summary**

Following its established method of problem-focused, goal-oriented and geographic-specific transfers of innovations between Germany and the US, the Northern Virginia Regional Commission (NVRC) partnered with the Friedrich Ebert Foundation, the Northern Virginia Community College, the Center for American Progress, the BlueGreen Alliance, and German businesses VW, Rehau, Siemens and EnBW, for a one-week peer-to-peer policy exchange to study German vocational training and its promotion of economic development and sustainable energy management best practices. On March 18-23, 2012, the five-member delegation met with senior experts representing German federal, state and local governments, unions, utilities, corporations and academic institutions involved with the German education and vocational training system.

This work is part of larger efforts to address the Northern Virginia region's workforce challenges – needed to support a vibrant, competitive regional economy. NVRC, George Mason University and the Northern Virginia Community College estimate that 650,000 new workers will be needed between 2010 and 2020 to fill new and replacement jobs from population growth and baby-boomer retirements.

The participants observed:

- The ways that German secondary and post-secondary education system seamlessly links to business, labor, and government. This linkage occurs so successfully that German Industries enjoy a workforce that is continuously available. The workforce in Germany also is agile enough to support workforce challenges that emanate from rapidly changing technologies and global competition.
- There is an exceptional breadth and depth of cooperation among the governmental, educational, business and labor sectors that supports the *Dual System* of vocational training. The German vocational training system (secondary to post-secondary) and its stakeholders (governmental officials, union leaders, elected officials at the state and local levels, corporations, chambers of commerce) value the vocational training system's "consensus basis".

- There are multiple lessons from the German vocational training system with potential application in the US in general and Northern Virginia in particular. The success of the German vocational training model confirms the critical importance of strong relationships between education and industry. If the US education system understands the occupational requirements industry expects, the likelihood of a suitable workforce becomes more realistic. In this case, industry could provide the knowledge, skills, and abilities or core competencies required for all occupations. “Education” could then “map” its curriculum, programs, and degrees to industry requirements – a process often referred to as credentialing. The outcomes can be a sufficiently trained workforce at all levels of sophistication. Germany, for example, has 345 approved occupations.
- Presently, the Virginia Community College System has started a credentialing initiative as part of a cooperative national energy industry consortium. This initiative began through the Virginia Energy Workforce Consortium (VEWC) and has direct ties to the Northern Virginia Community Energy Planning programs, which were informed also by the German model.
- The Virginia Community College systems will explore more formal cooperation between the Energy Industry and the Secondary Education systems across the Commonwealth. This includes the VEWC and efforts to further institutionalize the Energy Industry as its own Industry Cluster.
- Northern Virginia can seek opportunities to improve secondary science, technology, engineering and mathematics (STEM) outcomes. An example of corporate/industry support can be Exxon-Mobil, one of the largest energy companies in the world with roots in Northern Virginia. ExxonMobil has launched such a strategy to improve outcomes, but this will require financial support for implementation. Northern Virginia Community College has established the Pathway to the Baccalaureate (P2B) program to help students navigate from high school to community college or related vocational training and ultimately to a four-year university.
- Northern Virginia Community College can explore pertinent opportunities for follow-up and cooperation among and between German corporations and education. This could include disciplines such as architecture & construction; STEM; information technology; manufacturing; and energy. Also, there may be opportunities for international articulation agreements. One specific example discussed during the exchange is Germany’s experiences with design standards for passive housing, for both new and renovated construction.
- The German vocational training system incorporates the voices of business and workers and is supported by the coordination of government. The effect is inclusion of short-term business and long-term worker interests. This strengthens the entire system for all involved. While this structure is unlikely to be copied to the US, it provides a useful benchmark that can inform the development of vocational training efforts in the US.

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## **Study Tour Background**

Northern Virginia faces economic and environmental challenges in maintaining a diverse, economic and reliable supply of energy. These challenges include rising energy use, rising prices, strained supply security and global climate change. For example, Virginia would need to build over 12 new large electric power plants, plus the new power lines to bring the electricity to population centers, just to meet the business-as-usual growth in electric demand through 2020 and support a vibrant, competitive economy. It is increasingly difficult to build new power plants and energy infrastructure due to their environmental and economic impacts.

In response to these challenges, the Northern Virginia Regional Commission and its member localities have helped create for its localities several long-term (30-year), quantitatively-based and comprehensive energy plans that call for realistic applications of district energy, energy efficient housing and building retrofits, cogeneration, renewable energies, integrated land-use and transportation planning, and improved use of electric grids and networks. When implemented, these Community Energy Plans (CEPs) will highlight Northern Virginia as a location of first-choice for sustainable investment, lower energy costs relative to surrounding areas, reduce emissions of greenhouse gases, and job creation and economic development.

Analysis of the CEPs suggests that they can strengthen job creation in tandem with large-scale building energy retrofits, the development of district heating and cooling systems, and design and planning of renewable energies. For example the Arlington CEP recommends that by 2040, the residents and businesses in the County improve energy performance of renovated buildings by 30 to 50% over 2007 practices, and deploy 160 MW of solar PV to reduce summer peak demand, 200 units of passive housing, and over 260 MW of gas-powered cogeneration via district energy systems.

However, finding and training the workforce needed to install and maintain energy, and other, technologies and systems will not be easy. NVRC, George Mason University, and the Northern Virginia Community College project a gap of over 650,000 new and replacement jobs between 2010 and 2020, from population growth and baby-boomer retirements. It appears that the pressures of globalization and technical innovation will surely complicate meeting the demand for a more highly-skilled workforce.

## **Key Components of German “Dual System” Vocational Education Training**

The German Dual System has been proven very effective in training new workers for long-term skilled employment in German businesses. This is proven by the low youth unemployment rate in Germany. The key components of the Dual System include:

- All youth in Germany between the ages of 6 and 16 must attend full-time schooling. Thereafter, all youth in Germany attend full-time education (such as a “Gymnasium”) or part-time vocational schooling for three years.
- “Primary” education is mandatory, starts at age 6 at the “Grundschule” and lasts to age 10.
- “Secondary” education starts at ages 10 and goes, in most cases to 18, and is mandatory. Depending upon the German state, “secondary” education is framed around four types of schools. Placement into the secondary schools is based on testing, exam results and letters of recommendation from teachers, but is not necessarily permanent or irrevocable. These schools consist of the:
  - o *Realschulen*. A six to seven year education that emphasizes math, technical studies and humanities, with some entrance requirements.
  - o *Gesamtschulen*. A six to seven year comprehensive school with no entrance requirements that offer some general education as well as college-prep level courses.
  - o *Hauptschulen*. A six-year education that prepares students for vocational training with an academic rigor considered less than those of the Real or Gesamtschulen.
  - o *Gymnasium*. An eight to nine -year secondary education that is considered the stepping stone to enrollment in the German universities.
- After graduation from the secondary schools, students might matriculate into a university, start an apprenticeship via a *Berufsschule* and the “Dual System of Vocational Educational Training”, or attend a private vocational training program.
- The *Dual System* is rooted in the medieval trade and crafts guilds and is the largest educational sector of secondary (“sector II”) education. More than 50 percent of all youth in Germany learn a trade that blends paid apprenticeships in a company (“applied training”) with vocational training at school (“theoretical training”).
- The apprenticeship is grounded in work at a company under a standardized contract between the apprentice and the company. The apprentice works for approximately 3 or 4 days per week for approximately 2 or 3 years, depending on the trade. The company ensures that the apprentice is paid, insured, granted annual leave (often up to 6 weeks per year) and properly trained. The average salary is €740 per month, but there is a considerable range of salaries among occupations. Technical occupations tend to pay more.

- The schooling is conducted approximately 1 or 2 days per week, in tandem with the apprenticeship.
- The *Dual System* includes processes to ensure student success. Students failing intermediate tests are typically given student-specific accommodation to catch up in weak areas and are given a second (or third) chance at the exams.
- The *Dual System* in Germany is regulated by a board convened under the auspices of the German Federal Ministry of Education and the Federal Institute for Vocational Training (BIBB). The governing board consists of equal representation by officials from (i) the German federal and state governments, (ii) the national and regional chambers of commerce, and (iii) the trade unions. The BIBB oversees the policy developments for the *Dual System* for the approximately 345 recognized occupations (e.g. car mechanics, plumbing, or even mechatronics). The Board oversees the development of the curricula, the training exams and the framework of contracts for apprentices. Labor unions are equal partners with the employers and government in framing the training and creating new trades.
- The *Dual System* certification is generally accepted throughout Europe. But within Germany, Dual System credits are non-transferrable to the universities.
- Funding of Dual System is split – approximately 27% public and 73% private employers.
- In Germany, union workers comprise 15% or 6.9 million of total workforce of 41 million. There also are over 2.1 million companies, of which 21% to 23% of total companies are part of the Dual System. The Chamber of Commerce reports that over 3 million companies are members of Chamber of Commerce.

### **Complementary Labor Policy Instruments Supporting German Vocational Educational Training**

- Short-time Policy Compensation (*Kurzarbeit*). This program grants a subsidy (about 60% of pay) for working time reductions to avoid layoffs. Unemployment insurance partially covers workers' income losses and the costs to firms for holding on to workers.
- Working-time Accounts (*Arbeitszeitkonten*). This program allows employers to increase hours above standard work-hours and permit excess hours to be banked when less work is available. Companies are required to pay employees for the banked hours if they are laid off, providing an incentive for employers to keep workers on the job. This allows companies to keep workers during recessionary times and resulted in less impact to German employment than other countries during the recession of the early 2010s.
- Coordinated Industrial Employer-Employee Relations. The decades-long integration of board members from labor, commercial and sometimes governmental sectors in to bodies such as BIBB helps frame a less confrontational national industrial and economic policy in Germany.

## **Challenges Facing German's System**

While the German workforce training system is an outstanding model that meets the needs of German businesses and youth in most cases, our delegation heard about several challenges. These included:

- Immigrants, particularly of Turkish origin, are disproportionately funneled toward the vocational side of the German system, as opposed to the “Gymnasium” that leads to a university-level education. In addition, a larger percentage of these students drop out of the system, creating persistent unemployment problems. The system will be challenged to find means to improve education of immigrant youth and families at all levels – including the need for and benefits of workforce training. This might include making the training system more culturally sensitive to immigrants – or perhaps a vocational equivalent of “*Fordern und Fördern*”.
- Movement of students between the Gymnasium, the *Dual System*, and private workforce training schools is rigid and sometimes inflexible.
- Many students apply for *Dual System* positions at top tier companies, such as those with whom our group met. But students not hired by these companies often turn to the University system (Applied Science or full University) without full qualifications for University-level study. There may need to be more support for placing students in workforce training programs at middle and smaller companies.
- In a time where Germany needs every young person to enter the workforce, these structural issues with the system have caused concern for those students who fall through the cracks. Programs exist to support these students, but they are resource intensive.

## **Key Outcomes**

- The German youth unemployment rate is 8.2 %, compared to 23% in the US.
- Germany has been able to fill 320,000 jobs in the renewable energy sector with skilled workers over the past ten years.
- The advantages of the German *Dual System* include the availability of a highly-skilled and technically trained workforce, low recruiting costs and low turn-over and the balancing of technical with soft/social skills education. The *Dual System* also focuses on standardization, quality control and critical thinking to promote high probability of employment by the apprentices. The *Dual System* is recognized across Europe for its flexibility in creating new occupations and training curriculum, as well as responding quickly to global economic trends (such as renewable energy).
- German engineering and “Made in Germany” is a global brand.

## **Observations About the Transfer of Vocational Training Lessons From Germany to Northern Virginia and the US**

Germany and Northern Virginia have a long-term history with the exchange and application of energy, urban development, environment, transportation and climate policies. Recently, these exchanges have included the creation of the nationally-recognized Community Energy Plans (CEP). As we develop and implement the CEPs, there are opportunities to use the lessons from the German workforce training system, particularly with the need to connect workforce training to energy industry needs, into CEP implementation plans. Germany has much knowledge and experience with the vocations necessary for successful CEPs. Germany's education system has an excellent Pathway model from which the US and Northern Virginia can learn.

The German *Dual System* Vocational Training system succeeds in providing German industry with the high-quality human capital required for a knowledge-based global economy. The success of this system is inextricably rooted to the "consensus" worked out among the governmental, industrial, and labor sectors. Especially noteworthy are the leadership roles of the Chambers of Commerce (IHK) and unions in a sustained and engaged conversation with each other. Industry and labor have managed to work together to identify and catalog credentials among 345 occupations.

The credentials developed by industry and labor are intended to recognize the knowledge, skills, abilities, and experiences required to learn the fundamental requirements of an occupation. Mastering these fundamental requirements leads to a "core of knowledge" and serves as the foundation upon which further detailed and sophisticated occupational knowledge is learned. Throughout the *Dual System*, academic and vocational learning complement each other. Instruction, mentoring, and examinations yield professionals with occupational certifications that are valued by employers.

The lessons for the US in general and Northern Virginia in particular might start with a focus on developing "consensus" between educational and industrial sectors. Ideally this will lead to the community college system becoming an indispensable partner as the energy sector expands and needs a skilled workforce. Educational institutions and industry could share their complementary expertise to develop customized credentialing programs that meet the specific needs of industry.

The United States is still in the early stages of aligning vocational training, post-secondary education and industry-recognized credentials and still has a lot to learn from the German model. Next steps could include alignment or mapping post-secondary community colleges and industry credentials to available curriculum content, certifications, and degrees, or "credentialing". But successful credentialing will depend on cooperative industry players and trade associations who help to ensure that occupational credentials earned at community colleges reflect the skill requirements of the industry.

Close cooperation between community college and industry representatives can help to avoid vocational training gaps between industry credentials and post-secondary education curriculum content, certifications and degrees. Their solution is usually to contract for training from a third party or to develop an industry school close to or eliminate the vocational training gaps. Credentialing can transform the customary thinking to a more sustainable vocational training system.

But there are many challenges to developing and sustaining an industry-education cooperative relationship and solutions unfortunately are often elusive. This is not to say that industry and education have not successfully worked together. For example IKEA operates a production facility in Virginia and the regional community college reached out to IKEA to assist with workforce development and the provision of vocational credentials necessary to operate the plant. This was similar to North Carolina's work with Siemens and the construction of a production facility in Charlotte. There, the Piedmont Community College reached out to study Siemens' credentials and tailored a curriculum to train and ensure a local workforce.

Another example of a sustainable pathway model in Virginia is the French company, AREVA. AREVA is a worldwide industry leader in nuclear energy. They have worked with Central Virginia Community College in Lynchburg, Virginia to develop a successful apprenticeship program that has some parallels to the German *Dual System*.

These examples demonstrate that post-secondary community colleges can get the education job done with professional educators. Unfortunately these cases remain the exception rather than the rule and are inconsistent business models. The lesson for the US appears to be the need to support training for a collective industrial sector rather than a single company. Companies operating within an industry have similar ongoing vocational training needs and similar needs for a skilled workforce. Collaborating across an entire industry can build a pipeline of skilled workers that will benefit all employers in the industry.

Therefore, we believe there is substantial potential for Virginia to build a community college and industry partnership model – based on credentialing – that works within the existing post-secondary education system to achieve results that are similar to Germany.

Credentialing done in tandem with the implementation of the Northern Virginia Community Energy Plans and the energy industry, offers the potential to make available the appropriate vocational training in the region and state. A foundation for this action already exists. Presently the energy industry has prioritized work with post-secondary education. The trade associations for electricity, nuclear energy, and natural gas formed the Center for Energy Workforce Development (CEWD) a national organization that assures current and evolving vocational energy workforce requirements. The purpose of CEWD is to identify core competencies and occupational credentials for the energy industry.

CEWD's interest in occupational credentials led to the formation of the Virginia Energy Workforce Consortium (VEWC) in January 2011, which was endorsed by Virginia utilities, the Center for Energy Workforce Development, and the Virginia Community College System (VCCS).



The Northern Virginia Community College provided the leadership and guidance in vocational pathways and credentialing mapping. A critical task of the VEWC is credentialing CEWD core competencies and stackable credentials as well as the VCCS curriculum. The VEWC was recognized by the Virginia Governor in October 2011. The VEWC and its partners offer an ideal form of support to harmonize with the Northern Virginia CEPs. Since the CEPs evolved out of consensus by the industry, governmental and educational sectors, there is then an opportunity for the CEPs to be a framework on which attributes of the German consensus model evolves.

But anyone attempting to apply the German *Dual System*, in Virginia should consider the challenges associated with the state's secondary school systems and the special pedagogical challenges associated with the early teenage years. The Virginia Community College System is working to address the challenges of motivating teenagers and forming a career track that inspires as well as educates. In response, the VCCS developed the Virginia Wizard ([www.wizard.org](http://www.wizard.org)) that assists with the early elements of vocational interests. Also, the VCCS and Northern Virginia Community College System provide "career coaches", who reside in public high schools and help further vocational planning – or creating a "Career Pathway" as it is commonly called. The goal of Career Pathway is to find student passions and interests in ways that might inspire interest in a vocation.

Two optimal outcomes are imaginable from this career planning process. A student embarks upon a Career and Technical Education (CTE) pathway or a student follows the "Pathway to the Baccalaureate (P2B)", a creation of Robert Templin, President of NOVA. The P2B process can be likened to the German "Gymnasium" education scheme in that it reaches into the secondary school to help students navigate from High School to a community college or related vocational training system, and ultimately to a four-year university. Academic counseling, financial aid counseling, and mentoring begin in high school are part of the P2B process.

Virginia will begin to put this type of system in place as a result of legislation enacted in 2013. The legislation (<http://leg1.state.va.us/cgi-bin/legp504.exe?121+ful+CHAP0454+pdf>) establishes requirements for standard and advanced studies high school diplomas. The standard diploma will require students earn a career and technical education credential such as successful completion of an industry certification, a state licensure examination, a national occupational competency assessment, or the Virginia workplace readiness skills assessment. The advanced studies diploma is to provide students pursuing baccalaureate study with a foundation for further education or training.

In terms of assessing opportunities to import the *Dual System* from Germany to the US, it is necessary to highlight the role of federal policy, particularly the Carl D. Perkins Vocational & Technical Education Act. Approved in 1984, the Perkins Act reflects concepts similar to the German Vocational Training Act of 1969. Both recognize the inextricable link between a skilled workforce and sustainable economic development which requires an effective system of vocational training and credentialing. In Germany, the cooperation between education and industry appears seamless. In fact, legislation outlines the role of industry in the vocational training system. In the US, however, the Perkins Act places the responsibility for developing appropriate credentials on the education system. In the US, industry is not a required partner

in the Perkins Act. NOVA's challenge will be to bring industry to the table on a committed and sustainable basis. As mentioned above the Virginia Energy Workforce Consortium (VEWC) has been successful in bringing the Energy industry to the table.

The VEWC plans to assist CTE secondary school planning, particularly via the National Association of Career and Technical Education (NACTE), which utilizes CTE categories known as industry clusters. NACTE currently recognizes 16 distinct industry clusters – such as manufacturing, health science and information technology. But energy is not currently one of them. The VEWC believes the energy industry is important enough to warrant its own cluster. If NACTE adds energy as its own industry cluster, it would help legitimize the energy industry as a vocational choice. VEWC has also embraced President Obama's October 2010 initiative called Skills for America's Future (SAF). Housed in the Aspen Institute, the SAF works to improve industry partnerships with community colleges.

The nation's 1200 community colleges educate nearly half of college undergraduates in the US. But they are financially strained and burdened with demands to meet the training needs of the US workforce which simultaneously seeks or requires remedial education. More than half of the students arriving at community colleges are not college-ready and require remedial education. Moreover, fewer than half of the students entering community colleges meet their educational goal within six years and the performance among disadvantaged students is worse. The Lumina Foundation is working to address these disappointing academic outcomes and together with the American Association of Community Colleges, sponsors a national initiative called Achieving the Dream, designed to focus on and strengthen educational outcomes at community colleges.

In addition to the fundamental differences between the US and German vocational training systems concerning industry involvement and consensus with government, there are the differences between the countries in regards to funding for education as well. In the US, there is a constant need to measure return on investment for the student and the US taxpayer. The obvious initial metrics in need of improvement include completion rates (i.e. the percentage of students graduating on time) and the percentage of graduates that attain pertinent quality, gainful employment. We should also perhaps acknowledge the enormous loan burdens students have when they graduate college. One relevant policy the Obama Administration has recently strengthened is known as "income-based repayment" which links a graduate's monthly loan payments to their level of earnings. Another potential policy intervention would be to offer partial or full loan forgiveness to graduates who enter career fields with critical shortages. This could be akin to a reverse "signing" bonus" in which the number of years in the profession translates to a reduction in loan principal.

## **Follow-up – Northern Virginia Actions**

There are a number of short-term actions that can be taken to facilitate cooperation on workforce training. These will begin to create the linkages between our educational systems, companies, and labor on which to implement the broader recommendations resulting from this learning exchange.

- NVRC should introduce EnBW to Abakus and Rehau to Abakus to facilitate joint business opportunities.
- NVCC should reach out and create new or stronger connections/exchanges/internships between NVCC, Rehau, Abakus, EnBw, VW and Siemens.
- NVRC should facilitate development of an internship/exchange between EnBW and Washington Gas and EnBW and Dominion. EnBW indicated an interest in this type of exchange during the visit.
- NVCC can create an “Articulation Agreement” between University of Stuttgart and VCCS (such as, but not limited to, finance or accounting)
- NVCC and the BlueGreen Alliance should share energy jobs skill set analysis. NVCC, through the Virginia Energy Workforce Consortium, has skill-set information for conventional energy jobs. BlueGreen Alliance, through contact with the wind and solar industry trade associations, is currently collecting this information for renewable energy jobs. This will allow both groups to see where there may be gaps in training and what additional credentials are needed.
- The Center for American Progress should incorporate lessons from the Dual System into federal policy recommendations, as appropriate, about how to improve the US post-secondary education and training system.

## **List of Participants**

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## **Thank you**

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## **Program**

Saturday, March 17	Depart Washington, DC
Sunday, March 18	Arrive Berlin
Monday, March 19	Meetings in Berlin (Friedrich Ebert Foundation, Chambers of Commerce, Unions, and Wind Energy Training Institute)
Tuesday, March 20	Site Visits in Wolfsburg (Volkswagen)
Wednesday, March 21	Site Visits in Erlangen (Rehau and Siemens)
Thursday, March 22	Site Visits in Stuttgart (EnBW and local officials),
Friday, March 23	Return to Washington, DC

## **Attachments:** Transatlantic Study Tour Presentations

- Dr. Gisela Dybowski. The Dual Vocational Education and Training System in Germany. German Federal Institute for Vocational Training (BIBB).
- Jurgen Haase. Wanderjahre Programme. Volkswagen Coaching GmbH.
- Dr. Daniel-Sascha Roth. Environmental Protection & Sustainability Reporting at Volkswagen. Volkswagen, Department of Sustainability , Environment.
- Sonja Jakob. Education is the Future: Vocational Training at Siemens. Siemens Training Center, Erlangen.
- Dietmar Tietke. Vocational Training at EnBW: A Wide Spectrum of Knowledges; and MechatronickPlus. EnBW Vocational Training