PROPOSAL
FOR THE
DEVELOPMENT
OF PUERTO RICO

PROFESSIONAL COLLEGE OF ENGINEERS AND LAND
SURVEYORS OF PUERTO RICO

APRIL 20, 2016
Greetings,

We are pleased to present and share the result of an ambitious project by the Professional College of Engineers and Land Surveyors of Puerto Rico (CIAPR) for the benefit of our Island.

Refusing to stand idly as the problems facing our Island continue to unfold, we decided to use our knowledge, capabilities, and experience to identify solutions and alternatives. Thus, we organized a commission for the creation of the Proposal for the Development of Puerto Rico.

After a multitude of meetings, work by sub-committees, and the discussion, organization and presentation of ideas, we bring our proposals for your consideration and implementation. These proposals are guided solely by our goal to serve the public interest.

We are confident that the recommended actions will be considered by the current and future leaders of our Island so that we may strategically plan the use of our services, resources and infrastructure.

Respectfully,

Ralph A. Kreil Rivera, PE
President
MEMBERS OF THE SPECIAL COMMISSION FOR THE PROPOSAL FOR THE DEVELOPMENT OF PUERTO RICO

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For 78 years, the Professional College of Engineers and Land Surveyors of Puerto Rico has demonstrated its commitment to the island of Puerto Rico. It has not only strengthened and developed the professionals it represents, has also implemented diverse initiatives ranging from community education, to raising our voice to defend what we believe is right and necessary for our people.

Puerto Rico is facing one of the most challenging moments in its history and it is up to all of us, not only the government, to identify the solutions that will promote the development of our Island, its stability, economic development, and the best quality of life for our citizens.

We take pride in knowing that our College has the combined talents of thousands of engineers and land surveyors, all of them professionals who, thanks to their education and experience, have played a key role in planning and transforming today’s Puerto Rico. The performance of our professionals impacts practically all areas of our daily lives, such as infrastructure, health, technology, and the environment, among others.

Conscious of this fact, the CIAPR decided to take a step ahead in the search for solutions to some of the problems affecting the Island, based on our expertise and experience.
That is how we identified the opportunity of developing this initiative. Instead of waiting to learn about the platforms of the different political parties, we proactively create the Special Commission for the Proposal for the Development of Puerto Rico. This commission is made up of engineering and land surveying professionals with different specialties. The Commission had the task of developing a series of strategic recommendations for the areas of energy, water, environment, climate change, transportation & highways, planning, permits, and telecommunications. All of these areas impact the quality of services provided to our citizens, the protection of the environment, and economic development.

The ideas summarized in this document are not in any way related to partisan politics. Quite the contrary, they offer an objective vision of the direction that our island should take in fundamental aspects to achieve sustained growth. We hope that political parties and their candidates take these ideas into consideration.

Puerto Rico can move forward, but it needs the will of its people and its elected leaders, and the generous collaboration of its professionals. The Professional College of Engineers and Land Surveyors of Puerto Rico is ready to help.

Together we can succeed!
VISION: PROVIDE AN ELECTRIC POWER SERVICE THAT IS RELIABLE, EFFICIENT AND COST-EFFICIENT, ADAPTED TO THE REALITY OF TODAY’S PUERTO RICO.

RECOMMENDED ACTIONS:

1. Adopt an Energy Efficiency Policy.

We recommend adopting an energy efficiency policy, through a mechanism that transcends government administrations, as it exists in all developed countries. The energy efficiency policy should cover a period of at least 20 years and should include, at a minimum, the following:

- Energy efficiency
- Culture of energy use
- Use of energy in the public sector
- Safety in the use of energy
- Energy matrix
- Service rates by consumption and hours of use
- Citizen participation
- Long-term strategic planning
- Strategic goals for the island
- Strategic projects
- Public outreach and education
2. Adopt and implement studies.

Implement the recommendations of the following studies undertaken by competent external entities such as Siemens Industry, Inc./Siemens Power Technologies International:


The evaluation and pursuit of these plans will allow the Energy Commission to guarantee that our electric system can develop in an orderly and integrated fashion, and guarantee a power system that is reliable, efficient, transparent, and provides electric service at reasonable prices.

3. Reduce our dependence on petroleum-derived fuels and diversify into other energy sources.

The infrastructure to receive, transport and use natural gas is a short and long-term priority, in addition to maximizing the use of renewables. In the long-term, consider other energy options such as the use of ocean thermal energy.

4. Reconsider the option of natural gas using a gas pipeline.

The transfer of natural gas through gas pipelines is the preferred option in developed countries and the most cost-effective method. We recommend conducting a thorough and objective technical evaluation to consider this option.

5. Evaluate the viability of nuclear energy.

The use of nuclear power as an energy source has experienced significant enhancements, both in safety and management of
nuclear wastes. We recommend appointing a team of competent professionals in the matter to evaluate its viability.

6. Increase the reliability and safety of Transmission and Distribution Systems.

Give the Transmission and Distribution Systems infrastructure the same priority and urgency as the Generation System, due to its impact on service reliability.

VISION: PROVIDE THE NECESSARY MEASURES TO PROJECT THE WATER RESOURCES FOR THE USE AND ENJOYMENT OF THE PEOPLE OF PUERTO RICO.

RECOMMENDED ACTIONS:

1. Educate citizens about water resources and conservation.

Implement an ongoing and aggressive public outreach campaign about the conservation of water resources, beyond periods of drought. We should create school-level courses to teach our children about the cycle of water and its adequate use. Establish alliances with the private sector, universities, and mass media.

2. Incentivize the use of low water consumption equipment.

Government agencies should take measures and create strict laws to require the use of low water consumption equipment in new housing, commercial and industrial developments.

Also, establish incentives to replace similar existing artifacts for others that consume less water. Concerned government agencies should identify the equipment available in the market that meets these criteria and use them for replacements or new projects.
3. **Reuse treated water.**

Puerto Rico Aqueduct and Sewer Authority (PRASA) should implement programs to water golf courses and urban green areas using treated water. Investigate the viability of establishing additional treatments for the effluents of its used water treatment plants to replenish aquifers. This measure should be a joint effort of PRASA, the Health Department (HD), the Environmental Quality Board (EQB), and the Department of Environment and Natural Resources (DENR).

4. **Use rain water.**

Promote and incentivize the construction of cisterns to collect rainwater from roofs, to be used for purposes besides human consumption, such as watering lawns and gardens, cleaning patios, toilets, and others.

5. **Deal with the problem of water leaks.**

PRASA should establish continuous short, medium and long-term goals to reach the levels of other countries, which lose between 25-35% of their water due to leaks.

6. **Protect the basins.**

Through the Department of Environment and Natural Resources establish the following measures:

a. Develop aggressive monitoring programs to control erosion and sedimentation on our lands and avoid it from reaching our basins, especially those that serve as a source for water treatment plants.

b. Intensify reforestation programs around basins.

c. Control the use of nutrients in animal feed that reach our watersheds through water runoffs. When these feeds reach our basins, they create the problem of an abnormal enrichment of nutrients which promote the growth of algae and aquatic plants, known as eutrophication, causing maintenance problems in those bodies of water.
d. Control the establishment of cattle and hog farms which increase the problem of eutrophication in reservoirs.

e. Limit new residential developments in areas next to reservoirs through urban planning and the creation of natural reserves.

7. Create a reservoir dredging program.

Avoid the reduction in the volume capacity of our reservoirs through a consistent dredging program. The low levels of our reservoirs are the leading cause of water rationing during periods of drought. We highly recommend it for those reservoirs that provide water to our main water treatment plants: La Plata, Dos Bocas, and Carraizo.

a. Prepare viability studies for the creation of new reservoirs in the valleys of Manati and Aguada (Culebrinas River), as well as downstream from some existing reservoirs.

b. Evaluate the viability of interconnecting water basins, such as Toa Vaca and Manati River, through the constructions of tunnels.


Create this office through a legislative bill to guarantee its permanence. Its members should come from PRASA, DENR, EQB, and HD.

The purpose of this office should be to compile all information related to water, such as rainfall events around Puerto Rico, flows of the island’s rivers, levels of the reservoirs, information about aquifers, water consumption by towns and cities, water production of treatment plants, among other facts. This information will be a valuable instrument to make decisions about projects related to water resources.

9. Develop a Water Use Planning.

This plan should list all activities that require the use of water to manage this resource effectively. Contrary to the stipulations of the Land Use Planning, the area needed for agriculture should be
proportional to the amount of water available for this activity. The primary criteria should be water and agricultural value.

**VISION:** PROVIDE THE NECESSARY MEASURES TO PROTECT OUR ENVIRONMENT IN SUCH A WAY THAT IT GUARANTEES THE QUALITY OF LIFE OF THE PEOPLE OF PUERTO RICO.

**RECOMMENDED ACTIONS:**

1. **Develop an Ecosystems Protection Planning.**

Delegate in the Environmental Quality Board (EQB) and the Department of Environment and Natural (DENR) the development of an Ecosystems Protection Planning, tied to the Land Use Planning, to designate ecologically-sensitive areas and establish their protection.

2. **Educate about the problem of solid waste management.**

The biggest environmental issue that Puerto Rico faces today is the management of solid waste. We should design school-level courses to create awareness and educate about the proper management of solid waste.

3. **Promote the reduction of waste at its origin or generation.**

To reduce waste, the Solid Waste Authority (SWA) should oversee and enforce the Law for the Promotion of Reusable Bags and the Regulation for the Use of Plastic Bags.

4. **Promote recovery, reuse, and recycling.**

Reduce solid waste from homes, businesses, and industries reaching our landfills. Concurrently, enforce all laws and executive orders currently in place, to promote recycling.
5. **Promote the creation of industries to manage used tires.**

One of the mayor problems in Puerto Rico is the disposal of vehicle tires. We should support the creation of industries to manage this waste. For example, tires can be shredded and used as an aggregate for pavement and running tracks, among other purposes. This activity will promote the development of satellite industries that create jobs and generate revenue. Also, the importation of used tires to Puerto Rico should be banned.

6. **Incentivize glass recycling.**

To have a robust recycling system, we recommend the creation of industries that process recycling materials through incentives. For example, one of the most serious problems related to the management of solid wastes is glass. Currently, there are no local industries that process glass for recycling. The government should incentivize the establishment of this industry in Puerto Rico.

7. **Improve air quality.**

In general, the quality of our air is monitored by the Environmental Protection Agency (EPA), through the Environmental Quality Board. Air quality is mainly affected by carbon dioxide emissions, which are responsible for greenhouse gases which in turn, are the cause of climate change.

We should reduce the use of fossil fuels due to their high carbon footprint and have a better control of the vehicles entering the Island, which are another source of greenhouse gas emissions. Use a combination of different sources, such as natural gas, which although is a fossil fuel, has a lower carbon footprint compared to petroleum. Also, promote the use of renewable energy, which has no emissions.
**VISION:** PROVIDE THE NECESSARY MEASURES TO ELIMINATE OR REDUCE ALL THOSE ELEMENTS THAT ARE RESPONSIBLE FOR PROMOTING CLIMATE CHANGE, TO GUARANTEE THE SECURITY OF THE PEOPLE OF PUERTO RICO.

**RECOMMENDED ACTIONS:**

1. **Reduce carbon dioxide emissions.**

   These emissions are produced primarily through burning fossil fuels in power generation plants, which contribute to global warming. We should reduce these emissions using a combination of fuels, such as natural gas, renewable energy, and nuclear power.

2. **Prepare agencies and the community for disaster situations.**

   Due to climate change, two problems are likely to happen: high-intensity storms and polar ice melting. We recommend that government agencies that manage natural disasters create the infrastructure to face these challenges and maintain our population educated for these eventualities.

3. **Proactively manage the reduction of coastlines.**

   The government should contemplate the phenomenon of rising sea levels which is gradually reducing coastlines. When developing the Land Use Planning, it should establish a strip where the construction of housing, businesses, and industries is banned, and take it into consideration when reestablishing a new Maritime Land Zone.

   This will cause saline intrusion in aquifers to increase, affecting the reserves of underground water. This situation will adversely impact agricultural farms near the ocean that use water wells for irrigation and the wells used by PRASA for water distribution. The Land Use Planning and the Integrated Water Resources Planning should consider this scenario.
VISION: ACHIEVE EFFICIENCY AND AGILITY IN THE GRANTING OF PERMITS IN PUERTO RICO.

RECOMMENDED ACTIONS:

1. Standardize the validity period of recommendations.

Adjust the validity period of the recommendations of each agency according to the validity period of final determinations in discretional and ministerial cases. Also, the Integrated Permits System (IPS) should indicate the expiration date of rectifications.

2. Standardize the online permits system.

Standardize online permits systems and unify them into a single system. Currently, there are municipalities which do not have systems that are as complete as the one in the Permits Management Office (OGPe, in Spanish) or simply do not have an online system at all. Also, we recommend revising the current system of presenting permits online.

3. Establish a uniform algorithm platform for the evaluation of cases.

This platform should include all permit offices, from municipalities and the central government.

4. Create a Permanent Permits Board.

This board will serve as a liaison between the government sector and the private sector to discuss particular topics that negatively affect the economic development of P.R., from the perspective of the evaluation and granting of permits, as well as ways to improve through innovative ideas.
5. Promote professional development.

Establish and implement a joint professional development program among government employees with competencies in permits, and the private sector with the same skills.

6. Solve the controversy of the Authorized Professionals who can file for permits in autonomous municipalities.

Act 161 of 2009 and the Joint Regulation which are in effect, provide a practical, efficient, and faster option for the development of the island, through the implementation of the position of the Authorized Professional. These allow the professional private sector of the country to accelerate ministerial permits, and environmental health and fire prevention endorsements. Currently, Authorized Professionals are not allowed to process cases in the autonomous municipalities with permit offices, since there are no systems for this purpose. The Permits Management Office (OGPe, in Spanish) blocked the system of the IPS alleging that autonomous municipalities could not offer this service to the Professionals. Solving this controversy is essential to provide services to the citizens of these towns. During the last five (5) years, authorized professionals have obtained more permits than the agency and sometimes in less than 24 hours.

7. Incentivize the filing of green permits.

Even though the Joint Regulation allows for the submission of “Green Permits”, the reality is that the percentage is very low when compared to total annual filings. We recommend the government to identify incentives that generate interest among the population regarding investments and filing green permits to achieve the following:

a. Maximize energy efficiency (not to be confused with renewable energy) and cost savings in maintenance and operation.

b. Reduce the emissions of greenhouse effect gases with cause climate change.
c. Extend the useful life of houses, buildings, and other types of structures.

d. Reduce the consumption of drinking water.

e. Increase the collection and reuse of greywater and rainwater.

f. Minimize the generation of residues during construction and operation.

g. Improve the interior environmental quality of buildings, the health of its occupants, and productivity.

h. Provide accessibility to more efficient transportation options.

i. Promote the economic development of the island.

**VISION:** PROVIDE A BROADBAND TELECOMMUNICATIONS SYSTEM THAT IS ACCESSIBLE, RELIABLE AND COST-EFFICIENT FOR ALL THE ISLAND.

**RECOMMENDED ACTIONS:**

1. Incentivize the expansion of Internet connection services.

Incentivize small, non-traditional providers to expand the services of Internet connection in the center of the island, probably through tax credits.

These companies should establish distribution links outside the urban centers of the municipalities in the heart of the island.
2. Develop free “Hot Spots”.

Incentivize municipalities in the center of the island to create “hot spots” to provide free internet access to its citizens, possibly in the urban center. Also, build computer centers with extended hours to allow residents to access the internet.

3. Create a registry of available infrastructure.

Delegate to the Puerto Rico Telecommunications Regulation Board the creation of an inventory of available infrastructure to grow communication networks and coordinate its use among all providers registered with the Board. This list will include roofs of public buildings and vacant pipes in the island's roads.

4. Study the creation of a redundant network.

Create a technical committee to study and present recommendations to establish a redundant system of government data, to avoid losing the network due to a breakdown in a single point.

5. Develop an education program.

Establish and implement a program to educate citizens about available services though government websites and where to access the internet if home connections are unavailable.

VISION: PROVIDE A TRANSPORTATION SYSTEM THAT IS EFFICIENT, SAFE, BALANCED, AND SUSTAINABLE TO GUARANTEE THE MOBILITY AND ACCESSIBILITY OF ALL USERS.
RECOMMENDED ACTIONS:

1. Prioritize rehabilitation, restoration, and optimization of existing infrastructure over new construction.

Focus efforts on the maintenance and strategic restoration of the land transportation infrastructure and its assets.

2. Use new materials and technologies.

Explore the use of new techniques, technologies, and materials (including recycled products) for the development of transportation projects. For example, warm asphalt mix, permeable concrete, accelerated bridge construction, and roller-compacted concrete. Continue promoting initiatives such as “Every Day Counts” (EDC4) and the Strategic Transportation and Innovation Council (STIC).

3. Promote the development of mass transportation.

Review the regulations to promote transit-oriented development and mixed uses. Review regulations related to truck overloads and their impact on the premature damage of the road infrastructure and bridges.

4. Revitalize urban areas.

Promote urban revitalization projects in primary urban corridors (such as Piñero, Roosevelt, and Muñoz Rivera avenues) along with the development of business improvement districts. Promote the geometric reconfiguration of main roads to provide better access to businesses, lanes for bicycles, and transform traditional intersections into modern roundabouts and complete streets.

5. Access additional funds.

Identify sources of local matching funds to capitalize on the funds available through the federal FAST Act (Fixing America's Surface Transportation) to strengthen mass transportation service, promoting its efficiency, and expand the operation of the system.
6. Foster research.

Provide local research funds that allow the development of new technologies and techniques to meet the Island's needs, motivate the retention of professionals, and serve as sources of export. These funds could help to research measures for the reuse of elements such as car tires, which today have become a critical issue in Puerto Rico.

7. Educate citizens.

Increase awareness campaigns for citizens to foster a culture of road safety, touching subjects such as aggressive driving, security in construction zones, consolidation of agencies, and public aesthetics versus infrastructure.

VISION: FOSTER THE USE OF PUERTO RICO’S LANDS TO PROMOTE THE SAFETY AND WELLBEING OF CITIZENS AND SUSTAINABLE DEVELOPMENT.

RECOMMENDED ACTIONS:

1. Amend the Land Use Planning.

We recognize the effort of the Puerto Rico Planning Board to prepare a Land Use Planning, signed last November 19, 2015. Nevertheless, said Planning does not demonstrate taking into account fundamental aspects for its elaboration.

The Land Use Planning oversees fundamental aspects. Among them, it gives priority to the conservation of 638,000 “cuerdas“ (619,639 acres) of land for agricultural use, when the reality is that Puerto Rico does not have the necessary water supply for this land to be
developed and preserved efficiently. The Land Use Planning should be amended with clear goals and objectives that contemplate aspects such as:

- Densification through scientific methods

- Use tax and exemptions mechanisms to discourage low population density in rural areas and urban sprawl.

- Stimulate: mixed uses, urban densification, and intensive agriculture.

- Create zoning taking into consideration tsunami risks and recognizing the effects of global warming.

- Control urban measures that limit natural fluvial spaces to avoid the deterioration of natural resources.

- Re-establish natural systems with an adequate urban planning that allows for the integration of nature and the environment in urban spaces.

- Protect and use watersheds as planning unit.

- Use the scientific knowledge of the Department of Environment and Natural Resources (DENR).

The Land Use Planning should be part and of an integrated system of land management composed of a multi-purpose cadastral system, which integrates a physical and judicial registry. In turn, it will be represented by a digital cartography showing the exact measurements of parcels.
The Professional College of Engineers and Land Surveyors of Puerto Rico hopes that the candidates for elected positions consider the actions outlined in this document to develop their government platforms. Setting party politics aside, we should all contribute to the best of our abilities and work to move Puerto Rico ahead.

We are aware that these recommendations require an extensive process of analysis, which includes the identification of the resources to make them achievable. But if we have the will, anything is possible.

Fulfilling our mission, the CIAPR offers its services to the current and future leaders of Puerto Rico, to provide suggestions or opinions about these recommendations and other areas that impact the quality of life in Puerto Rico.
Ralph A. Kreil-Rivera, PE, President of the Professional College of Engineers and Land Surveyors of Puerto Rico, presenting the Proposal for the Development of Puerto Rico.