I Mina'Trentai Dos Na Liheslaturan Guahan

Bill Log Sheet

BILL NO.	SPONSOR	TITLE	DATE INTRODUCED	DATE REFERRED	CMTE REFERRED	PUBLIC HEARING DATE	DATE COMMITTEE REPORT FILED	FISCAL NOTES
61-32 (COR)	T.C. Ada	AN ACT TO ADD A NEW § 67101.7 OF CHAPTER 67, TITLE 21, GUAM CODE ANNOTATED, RELATIVE TO ADOPTING THE GUAM TROPICAL ENERGY CODE (GTEC)	3/4/2013 11:32 a.m.	03/04/13	Committee on Public Safety, Infrastructure, & Maritime Transportation.	10/22/13 9:00 a.m.	1/27/14 2:28 p.m.	**Fiscal Note Requested 03/08/13 Fiscal Note Received 04/01/13**

Senator Thomas C. Ada

Chairman - Committee on Public Safety, Infrastructure & Maritime Transportation

I Mina'trentai Dos Na Liheslaturan Guåhan • 32nd Guam Legislature

January 27, 2014

The Honorable Judith T. Won Pat, Ed.D.
Speaker
I Mina'trentai Dos Na Liheslaturan Guåhan
155 Hesler Place
Hagåtña, Guam 96910

VIA: The Honorable Rory J. Respicio
Chairperson, Committee on Rules

RE: Committee Report on Bill No. 61-32 (COR)

Dear Speaker Won Pat:

Transmitted herewith is the Committee Report on Bill No. 61-32 (COR), T.C. Ada – "An act to add a new § 67101.7 of Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC)"

Committee votes are as follows:

2 TO DO PASS

_____ TO NOT PASS

4 TO REPORT OUT ONLY

_____ TO ABSTAIN

_____ TO PLACE IN INACTIVE FILE

RECEIVED
2014 JAN 27 PM 2:28

Si Yu'os ma'åse',

Thomas C. Ada

Ada Plaza Center, Suite 207 • 173 Aspinall Ave. • Hagåtña, Guam 96910
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Senator Thomas C. Ada
Chairman - Committee on Public Safety, Infrastructure & Maritime Transportation
I Mina'trentai Dos Na Liheslaturan Guåhan • 32nd Guam Legislature

COMMITTEE REPORT
ON

Bill No. 61-32 (COR), T.C. Ada

"An act to add a new § 67101.7 of Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC)"

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Senator Thomas C. Ada

Chairman - Committee on Public Safety, Infrastructure & Maritime Transportation

I Mina'trentai Dos Na Liheslaturan Guåhan • 32nd Guam Legislature

January 24, 2014

MEMORANDUM

To: **All Members**
Committee on Public Safety, Infrastructure and Maritime Transportation

From: **Senator Thomas C. Ada**
Committee Chairperson

Subject: **Committee Report on Bill No. 61-32 (COR)**

Transmitted herewith for your consideration is the Committee Report on Bill No. 196-32 (COR), T.C. Ada – "An act to add a new § 67101.7 of Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC)."

This report includes the following:

- Committee Vote Sheet
- Committee Report Digest
- Copy of Bill No. 61-32 (COR)
- Public Hearing Sign-in Sheet
- Copies of Submitted Testimony and Supporting Documents
- COR Referral of Bill No. 61-32 (COR)
- Notices of Public Hearing
- Public Hearing Agenda

Please take the appropriate action on the attached vote sheet. Your attention to this matter is greatly appreciated. Should you have any questions or concerns, please do not hesitate to contact me.

Si Yu'os ma'åse'!

Thomas C. Ada

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Senator Thomas C. Ada

Chairman - Committee on Public Safety, Infrastructure & Maritime Transportation

I Mina'trentai Dos Na Liheslaturan Guåhan • 32nd Guam Legislature

COMMITTEE VOTE SHEET

Bill No. 61-32 (COR) – An act to add a new § 67101.7 of Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC). Intro. by T.C. Ada.

COMMITTEE MEMBERS	SIGNATURE	TO DO PASS	TO NOT PASS	TO REPORT OUT ONLY	TO ABSTAIN	TO PLACE IN INACTIVE FILE
SENATOR THOMAS C. ADA Chairperson		✓				
SENATOR RORY J. RESPICIO Vice Chairperson		1.27.19				
VICE SPEAKER BENJAMIN J.F. CRUZ Member				✓		
SENATOR FRANK B. AGUON, JR. Member						
SENATOR MICHAEL F.Q. SAN NICOLAS Member				✓		
SENATOR ALINE A. YAMASHITA, PH.D. Minority Member				1/25		
SENATOR V. ANTHONY ADA Minority Member				1/27 ✓		
SENATOR BRANT McCREADIE Minority Member						

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COMMITTEE REPORT DIGEST

I. Overview

Bill 61-32 (COR) was introduced on March 4, 2013, by Senator Thomas C. Ada, and was subsequently referred by the Committee on Rules to the Committee on Public Safety, Infrastructure and Maritime Transportation on March 4, 2013.

The Committee on Public Safety, Infrastructure and Maritime Transportation convened a public hearing on Tuesday, October 22, 2013 at 9:00 am in *I Liheslatura*'s Public Hearing Room to receive public testimony on Bill 61-32 (COR).

Public Notice Requirements

Notices were disseminated via email to all Senators and all main media broadcasting outlets on Tuesday, October 15, 2013 (5-Day Notice), and again on Friday, October 18, 2013 (48-Hour Notice). Announcement of such Public Hearing was also published in the Pacific Daily News and Marianas Variety on Monday, October 21, 2013.

Senators Present

Senator Thomas C. Ada	Committee Chairman
Senator Rory J. Respicio	Committee Vice Chairman
Senator Frank B. Aguon, Jr.	Member
Senator Aline Yamashita	Minority Member
Senator Tony Ada	Minority Member
Senator Christopher Duenas	
Senator Thomas Morrison	
Senator Michael Limtiaco	

Testimony Provided by

Brent Wiese	Guam Building Code Council	In Support
Cedric Q.T. Cruz	American Institute of Architects, Guam	In Support
Gregory Johnson, PE	ASHRAE, Guam local section	In Support
Clare Delgado	Guam Association of REALTORS	In Support
Peter Calvo	Guam Energy Office	In Support
Dr. Robert Underwood and Peter S. Calvo	Guam Energy Task Force	In Support
Joaquin C. Flores, PE	Guam Power Authority	In Support
Jeffrey Voacolo	Guam Renewable Energy Association	In Support
William D. Beery, PE	Guam Society of Professional Engineers	In Support
H. Mark Ruth, FAIA	Taniguchi Ruth Makio Architects	In Support
Dr. Robert Underwood	University of Guam	In Support
Alfred Ysrael	representing self	Not In Support
Michael Makio	representing self	In Support
Bill Hagan	representing self and GREA	In Support
Jeffrey C. Wheaton, PE	representing self	Not In Support
Jose S. Servino, PE	representing self	In Support

The Public Hearing was Called-to-Order at 9:00 am.

II. Summary of Testimony and Discussion

Brent Wiese – Guam Building Code Council

Provided oral testimony and written supplementary material (see attached)

Mr. Brent Wiese, President of the Guam Building Code Council, provided oral testimony in support of Bill 61-32. He also provided an informational handout to all Senators, which is included in this Committee Report. Mr. Wiese introduced himself as the President of the Guam Building Code Council, and noted that a number of sitting members of the GBCC were also in attendance should questions be posed that are related to their area of expertise. He also notes that Mr. Mark Ruth, who provided written testimony in support of the legislation, was instrumental in the creation of the Model Tropical Energy Code, upon which the GTEC is based. He further notes that Mr. Ruth is a well-respected and conservative architect who has consistently opposed over-regulation, and that his support for the GTEC highlights its importance to the local industry.

He explained that the GTEC is based on the Model Tropical Energy Code, which was funded by the Department of Interior (and the MTEC was itself based on the energy code standard used nationwide, the International Energy Efficiency Code); the purpose of the MTEC was to provide a model code that is more applicable to tropical jurisdictions that do not have a need for heating insulation requirements, such as Hawaii, Puerto Rico, Guam, etc. Neither the IECC nor the MTEC was ever adopted into Guam law; instead, when the GBCC was created, it was tasked by P.L. 30-199 to revisit the MTEC and further develop it for Guam. As such, when the GBCC met for first time, it reached out to on-island members (such as Mark Ruth) who were involved with drafting the original MTEC, and asked them to join a working group to further develop it for the specific needs and requirements of Guam.

The working group worked on amending the MTEC for well over a year, eventually resulting in the GTEC. Several public hearings were held on the matter to further receive input from the public, all of which were advertised in the newspaper. Members of the working group also consistently reached out to local architects, engineers, real estate professionals, contractors, and developers, including a number of mechanical engineers, to get their guidance and make sure the code was something they could all stand behind. The number and diversity of organizations providing testimony in support of the GTEC highlights the GBCC's successful outreach efforts.

The GBCC is aware that educational efforts will be needed. The Guam Energy Office has already hosted intensive technical seminars for local engineers, architects, and contractors, as well as additional seminars open to policy makers and all members of the public. The GBCC and GEO are also working with GCC to implement a series of workshops for the public. The GCC workshops are ready to go, and will be scheduled and conducted immediately after passage of the bill; after these workshops are completed, and feedback is collected, GCC will schedule additional workshops to meet the needs of the community. Long-term, GCC is also looking to develop an entire curriculum based on energy conservation and renewable energy. Its aim is to train students to go into the field and develop the industry for Guam. But GCC and GEO are not the only organizations planning to spearhead educational outreach efforts. The International Code Council, which is the central industry organization that updates and publishes the building

and fire codes used nationwide, has offered to come to Guam and conduct trainings in the future. And, lastly, the GBCC has a strong budget for education and training, and intends to use it.

Mr. Wiese continues by stating that, in the end, everyone's big concern is cost. And implementing energy efficient standards will of course cost more than the alternative of doing nothing. However, the GBCC has consistently aimed to strike a balance between cost and payoff, with the intent of creating an energy code that is: 1) affordable, and 2) able to realize significant savings that will quickly pay for any initial costs.

A similar energy code for Guam was considered back in 2000, when the cost of power was lower, but it was never adopted. However, financial analysis done in 1997 on implementing an energy code found that the full payback on investment for a standard residential house with a standard utility bill would be realized in 1.5 years. Considering that the cost of energy conservation materials and equipment has remained the same since 1997 (and, for this same price, the technology has improved), while GPA's rates have increased significantly during this same time, it is safe to assume that the payback today is even quicker than 1.5 years.

Mr. Wiese also noted his initial concern about the possible impact the GTEC would have on low-cost houses and rental units, and shared that he and other members of the GBCC have researched the matter significantly. They found that the GTEC would benefit these populations even more than other groups. The initial cost would be minimal, and the payback could be realized in less than 1.5 years. Additionally, that initial cost can be amortized over a number of years, making it even more affordable. So for an initial small investment, which is recouped in less than 1.5 years, the payback will continue to accrue through energy savings for many years after.

Additionally, the GTEC will help those who are renting homes. Renters have no say in the way their building is constructed. But with the GTEC in place, all rental units built in the future will be energy efficient, even those intended for low-income housing.

It is true that a small handful of developers are not necessarily pleased with the proposed GTEC. They are concerned that there is no payoff for them because they will not be paying power bills on the structures they construct. However, a number of other developers have stated their support, recognizing that the GTEC will add value to their building. They can recoup the costs of the initial investment because buyers will seek out construction that will save them money on their power bill. And, by having a GTEC in place, it will level the playing field for all developers, so that one does not undercut the costs of others by building cheap units and renting them to unsuspecting or uninformed families in our community.

Mr. Wiese also explains that some jurisdictions adopt LEED standards, green building codes, and things of that nature. However, the GBCC is not attempting to go that far, nor would it seek to do so without there being strong public will for such a change. Instead, with the GTEC, the GBCC is aiming to simply set a cost effective minimum standard that will be both economically and environmentally beneficial for the entire community.

Additionally, there are federal funds tied to the successful adoption of an energy code. In order to secure its ARRA funding, the CNMI adopted the MTEC in 2009 in its entirety and unchanged.

Around that same time, Guam leadership communicated to the Department of the Interior that it intended to tailor the MTEC to meet the specific needs of Guam. They were supportive of the initiative, and the GTEC is the result of years of hard work to this end.

Mr. Wiese closes by stating that he is excited about the GTEC because it meets some very pressing needs of the community. There is no such thing as an endless supply of energy. The adoption of an energy code will help us be good neighbors, good environmental stewards, and reduce the need for energy on Guam. And, it will also boost our economy; instead of sending funds off-island to purchase fuel, we will be able to keep more money on Guam and circulating within our community. In short, the GTEC is something Guam needs, and is good for the island.

Cedric Q.T. Cruz – American Institute of Architects (AIA), Guam & Micronesia Chapter

Provided written testimony (see attached)

Mr. Cedric Q.T. Cruz, President of the American Institute of Architects Guam & Micronesia Chapter (AIA), submitted testimony in support of the bill. He shares that buildings account for approximately 30% of overall energy consumption. The GTEC focuses on reducing power consumption through the promotion of energy efficient products and building practices. Better building envelope requirements will help prevent air leakage; and for homes that are non-air conditioned, requirements for larger or more strategically placed windows will provide for better, and cooler, natural airflow. Thermal performance requirements for doors and windows will reduce the wasteful leaking of cooled air, and improved requirements for lighting will maximize the use of natural light. The implementation of the GTEC is a means to improve the quality of life on Guam through the development of better buildings that support daily activities and the need for comfort while also reducing energy consumption and helping the environment. He closes by stating that the GTEC will have a lasting positive impact on the lives of current and future generations of Guamanians, and encourages its adoption.

Gregory Johnson, PE – ASHRAE, Guam local section

Provided written testimony (see attached)

Mr. Gregory Johnson, representing the Guam section of ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers), stated his organization's support for Bill 61-32. Having had members of the local section of ASHRAE review the code, he reports that they believe the code is well developed and will be effective in achieving its goals. ASHRAE further finds that the code is important to adopt, as it will help reduce the island's current and future energy consumption.

Clare Delgado – Guam Association of REALTORS

Provided written testimony (see attached)

Ms. Clare Delgado, President of the Guam Association of REALTORS (GAR), submitted testimony in support of Bill 61-32. She states that GAR applauds the efforts of the Guam Building Code Council in developing the GTEC, and that the implementation of it will promote energy conservation in a cost-effective manner (inclusive of reduced energy bills and a comfortable healthy home and workplace). GAR further understands that the energy savings derived from the use of the new energy code will offset in a very short time the modest increase in the cost of compliance. She states that the six-month grace period prior to implementation will

give the public and the energy-use industry the opportunity to prepare for compliance, and that the GTEC is good for Guam. She closes by urging for the swift passage of Bill 61-32.

Peter S. Calvo – Guam Energy Office

Provided oral and written testimony (see attached)

Mr. Peter S. Calvo, Director of the Guam Energy Office, submitted written testimony in support of Bill 61-32. He states that the Guam Energy Office fully supports the adoption of the GTEC, and applauds the hard work and dedication of the Guam Building Code Council in its development. The GTEC, as mandated by P.L. 30-199, has been developed with input from the community and is consistent with industry standards. Adopting the GTEC should alleviate some of Guam's dependency on foreign fossil fuels, reduce carbon emissions, and provide savings to island residents by allowing them to spend less on their utility bills. Designed to be cost-effective when implemented, the GTEC will aid Guam in achieving its goal of 20% less use of fossil fuel by 2020. While the GEO supports passage, it recommends one minor change to the timeline of adoption. While it recognizes the need to provide a six-month lead time to allow on-island vendors to sell inefficient products that will be restricted by the new GTEC, it recommends that all new orders should be disallowed from the moment of passage. In other words, existing on-hand stock will have six-months to be sold, but businesses and developers, from the moment of enactment onward, shouldn't be allowed to place new orders for inefficient products. He closes by stating his support for the GTEC as it is a bold legislative step toward supporting our island's energy future.

Dr. Robert Underwood and Peter S. Calvo – Guam Energy Task Force

Provided written testimony (see attached)

Dr. Robert Underwood and Mr. Peter S. Calvo, as President of the University of Guam and Director of the Guam Energy Office, respectively, are Co-Chairs of the Guam Energy Task Force (GETF). And, in this capacity, they submitted written testimony stating the GETF's full support of Bill 61-32. They share that the GBCC has worked hard in reviewing existing industry standards, and, in incorporating community input and industry advice, has developed an energy code that meets US DOE requirements for State Certification while not adversely affecting the community. Adopting the GTEC, and thus promoting energy efficiency in building standards, will significantly reduce the community's need for fossil fuels. The Co-Chairmen continue by stating that the GETF has recommended a goal of reducing the island's use of fossil fuels by 20% by the year 2020. If this goal is met, it is estimated that an annual savings of $50-70 million will be realized; these savings will stay on-island and circulate in the local economy, rather than going off-island to pay for fuel costs. The adoption of the GTEC is seen as an initial, important step toward realizing this goal. They close by stating that while the GTEC is a significant first step, the GETF looks forward to working closely with the Legislature in the creation of policies that will help realize an energy sustainable Guam.

Joaquin C. Flores, PE – Guam Power Authority

Provided written testimony (see attached)

Mr. Joaquin C. Flores, General Manager of the Guam Power Authority, submitted written testimony in support of Bill 61-32. He notes that GPA has participated in energy efficiency initiatives since the early 1990s, and that it continues to do so in partnership with the Guam Energy Office and as a member of the Guam Energy Task Force. GPA supports energy

efficiency and renewable energy as part of a holistic approach to reducing electricity costs to its customers. GPA further commits to strong environmental stewardship through the promotion of green energy, energy conservation, and energy efficiency. With this goal in mind, GPA has implemented a number of internal and external projects – from building a new LEED Silver central office, to conducting residential rebate and energy audit programs, to implementing $15 million in ARRA energy efficiency projects across the island – in an effort to be a leader in energy efficiency on Guam. He closes by stating that GPA has six Certified Energy Managers and ten Certified Energy Auditors, all of whom have received substantial training in the same ASHRAE standards that went into the development of the GTEC.

Jeffrey Voacolo – Guam Renewable Energy Association

Provided written testimony (see attached)

Mr. Jeffrey Voacolo, President of the Guam Renewable Energy Association, submitted written testimony in support of Bill 61-32. He commends the intent of the legislation to reduce Guam's dependence on fossil fuel, and that this is a goal shared by GREA. He adds that while GREA intends to accomplish this goal through the advancement of renewable energy technologies, the core foundation of energy independence should always begin with energy efficiency in facilities and buildings. As such, the Guam Tropical Energy Code is much needed. He closes by reiterating the Association's full support for the bill.

William D. Beery, PE – Guam Society of Professional Engineers

Provided written testimony (see attached)

Mr. William D. Beery, President of the Guam Society of Professional Engineers, submitted written testimony in support of Bill 61-32. He shares that the GSPE has participated, through the actions and time of many of its Professional Engineer members, in the drafting of the GTEC. He characterizes the creation of the GTEC as a collaborative effort between Guam's Architects and Mechanical Engineers and General Contractors, along with many other professionals and community members, and that the resulting document is well thought out and balanced with the realities of Guam's climate and economy. He closes by stating the GSPE's support in all efforts to make Guam a more energy efficient island to live.

H. Mark Ruth, FAIA – Taniguchi Ruth Makio Architects

Provided written testimony (see attached)

Mr. H. Mark Ruth, representing Taniguchi Ruth Makio Architects, submitted written testimony in support of Bill 61-32. He states his support for the adoption of the GTEC, and shares that he was a member of the original task force brought together by the Guam Energy Office in 2000 to develop an energy law appropriate for Guam. He notes that the earlier task force did not produce a bill for legislative consideration, and is pleased that the GBCC, along with the support of the Legislature, took up the challenge and finalized the document. He also states that he assisted the GBCC in developing the current GTEC, and that numerous drafts were reviewed and commented upon by many individuals knowledgeable in the field. In his opinion, the bill is ready to be brought into law. The GTEC is important to the island because when the International Building Code was made the building code of Guam, legislation did not include the International Energy Code. The reason for this was that it was expected that the Guam Tropical Energy Code would be more relevant to the climatic conditions and building practices found locally. He closes by stating that the document is well researched and reflects the knowledge and practices of

professional engineers, architects, equipment and material suppliers, and others who understand good, practical, and effective design for Guam. He urges favorable passage of the bill.

Dr. Robert Underwood – University of Guam

Provided written testimony (see attached)

Dr. Robert Underwood, President of the University of Guam, submitted written testimony in support of Bill 61-32. He states that through the work of the University's Center for Island Sustainability, as well as the three successful Sustainability Conferences that have been held, he has become aware of the energy consumption patterns of Guam as an economic, social and environmental policy concern. He finds the wasteful use of energy due to the inefficient design of buildings should be a source of great concern to everyone. The GTEC will provide builders, designers, engineers, building/structure owners and their tenants with the basic guidelines on how an energy efficient building should be constructed. There will be many long-term benefits that will result from this, including lesser fuel consumption and the preservation of resources for years to come. He closes by stating his support for the bill, and stating that the University is committed to working with the Legislature to achieve policy goals that are environmentally, economically, and socially appropriate for our island community.

Alfred Ysrael

Provided oral testimony

Mr. Alfred Ysrael, representing himself, provided oral testimony not in support of Bill 61-32. He stated that his business has been very involved in pursuing energy efficiency, and that he believes that he and his son are more experienced and knowledgeable in the practical matters of energy efficiency than anyone else in the room. He states that model codes from the states cannot simply be adopted for Guam. Though the intentions of policy makers are good, adopting a model code developed stateside will not take into account the unique characteristics of Guam. Furthermore, he shares that his new construction project uses special thermal energy efficient windows. And, for the first few months they realized significant savings on their power bill. However, by the third month, those savings were lost when GPA raised its power rates. He says that the real culprit is GPA, and that the entity should be privatized. It does not make sense to focus on investing in energy efficiency when GPA is raising its rates continuously and artificially. He also argues that government should not get involved in matters that are not about saving lives. For example, in matters such as requiring a certain number of parking spots for each building, the government should step back and allow the free market to decide. Instead, the government should be concerning itself with privatizing GPA, particularly as it has shown itself to be wasteful in the development of its new shared central operations building on the back road to Anderson. He also states that the Toyota Prius is a useful vehicle for its first seven years, and that the extra premium you pay for the car certainly pays for itself during that time. But after those seven years, the car is worthless and the savings are thus negated. He adds that GovGuam also does not have qualified inspectors, and that this shortage should be addressed before the Legislature concerns itself with energy codes. He closes by stating that government should leave business and economic decisions to business owners, and devote the time of the legislature toward privatizing GPA. Given the way GovGuam currently acts, it is anti-business. It should leave businesses to determine how best to implement energy efficient construction, and instead focus itself on safety issues.

Michael Makio

Provided oral testimony

Mr. Michael Makio, representing himself, provided oral testimony in support of Bill 61-32. He shares that he is an architect on Guam who has been practicing for 30 years, and was one of the first LEED certified designers on-island. Energy efficiency has been central to his work for his entire career, and every day he deals with issues related to its cost, effectiveness, and implementation. He believes the proposed legislation reflects what the community expects of the Legislature, and that the public wants to see its policy makers step up to guide and enable energy efficiency, sustainable design, and environmental responsibility. He believes that any costs associated with the GTEC will be recovered through power savings. However, aside from any concerns about costs, he believes it is also important to emphasize that we all have a responsibility to the environment. By making the best use of our resources, we will be able to better provide for our families and future generations. He also notes the importance of community outreach. Between the GETF, GEO, GCC, and the GBCC, there is a concerted effort to reach out to many different populations within our community. And he has closely watched the implementation of similar codes in Hawaii, which has gone very well; in fact, among the elderly population, it has been partocularly successful. He closes by saying that his entire career has focused on energy efficiency, and he believes it is ultimately something that is very good for Guam.

Bill Hagan – representing self and Guam Renewable Energy Association

Provided oral and written testimony (see attached)

Mr. Bill Hagan, representing both himself as well as the Guam Renewable Energy Association, provided oral testimony in support of Bill 61-32. He noted that the president of GREA, Jeffrey Voacolo, was unable to attend, but that the Committee should already have a copy of his written testimony. He continues by stating that the cost of energy will only continue to rise in the future. Anything our community can do to decrease our use of energy, particularly through effective methods like the establishment of a building energy code, will be good for our environment and good for our local economy.

Jeffrey C. Wheaton

Provided written testimony (see attached)

Mr. Jeffrey C. Wheaton, representing himself, submitted written testimony not in support of Bill 61-32. He states that while the intent of the legislation is useful, the bill should not be passed due to a number of unintended consequences, the difficulty in enforcement, and that it will add to the growing encroachment of government regulations into daily lives. Instead, he believes the code should be adopted as a set of recommendations without enforcement provisions. He states that the fact that the GTEC references and makes use of copyrighted codes will increase the cost of construction. Engineers and architects will now how have to reference those additional codes, increasing billable hours, and those codes themselves will need to be purchased in order to be read, which are all costs that will be passed on to the developer. He then states that DPW may not have the in-house expertise, training, or staffing to be able to handle the increased and specialized workload. Should increased backlogs of building plans result, developers and the community will be burdened by the cost. He further believes that the increased burden of building, fire, and energy codes have effectively priced low-income housing out of reach of those it is intended to serve. Because these codes impose minimum standards, substandard construction

that would otherwise have been financed by a bank will now be rejected by the same bank. As such, people are unable to secure mortgages, and are forced to build even cheaper and more sub-standard housing. So while well intentioned, these codes are unintentionally pricing people out of building houses. He also states his concern that codes enacted into law are difficult to update, and will quickly become obsolete. Lastly, he states his concerns about the proper role of government. While government should concern itself with safety and the well being of its citizens to a degree, it should not overreach and begin limiting freedoms. As long as an individual is not doing harm to another, free people do not need to be protected from themselves. So while building codes are useful in protecting people from unsafe structures, energy codes do not provide similar safety benefits. For these reasons he encourages not adopting the GTEC into law.

Jose S. Servino

Provided written testimony (see attached)

Mr. Jose S. Servino, representing himself, submitted written testimony in support of Bill 61-32. He states that the GTEC establishes the minimum standards needed to help Guam reduce energy use, lessen carbon emission, and limit the exportation of local dollars for buying fossil fuel. He also finds the cost of implementing the GTEC to be minimal, and easily offset by tax credits and the realization of savings on a customer's energy bill. Furthermore, the investment itself can be fully amortized. He closes by noting that proper training will be needed to ensure enforcement of the code, and that oversight will be needed to make certain it is implemented well. He includes a diagram outlining the steps needed to ensure proper training and compliance.

Question and Answer

Chairman Tom Ada opened by providing an introduction to Bill 61-32. He stated that the Guam Tropical Energy Code (GTEC) is the product of over two years of work, and is based on the Model Tropical Energy Code that was funded by the Department of the Interior. He then listed the letters of testimony currently submitted to the Committee. Prior to opening up the floor to questions from the Committee, he clarified that the GBCC has held five public hearings on the GTEC, dating back to May of 2012, and up to as recently as February 12, 2013. He further added that the code would apply to new construction and substantial renovations; existing structures would not be impacted. He then opened the floor to questions and comments by the Senators present.

Mr. Brent Wiese added that the requirements for residential homes in the GTEC are lower than the requirements for commercial buildings. For example, the GTEC does not mandate anything in regards to lighting for residential structures.

Senator Yamashita thanked Mr. Wiese for his insight on the matter, and asked if the insulation requirements of the GTEC would help with noise mitigation.

Mr. Wiese replied that while noise mitigation is not an expressed intent of the GTEC, the improved insulation will likely have the side-benefit of also improving noise reduction.

Senator Duenas asked if the GTEC would require DPW to conduct additional field inspections.

Mr. Wiese began his response by sharing that DPW was heavily involved throughout the entire process of developing the GTEC. With regards to inspections, submitted building plans currently need to be sealed and signed by mechanical engineers and architects stating that they meet the requirements of all current codes. Then the plans need to be reviewed by DPW. If the GTEC is adopted, inspectors in the field would need to inspect installed equipment and materials to make certain it matches what is stated in the submitted plans, much like how they currently check for ADA compliance, and electrical, fire safety, and structural requirements. These are all things that DPW currently does. In regards to the GTEC, the basic concern DPW has is with regards to training its staff to be up to speed with the new energy code. The GBCC, of which DPW is a member, acknowledges that need, and recommends a six-month window to allow for training to be conducted. GCC and GEO are planning to host workshops in the months following adoption of the GTEC, and the GBCC has additional funds to conduct further training as needed.

Mr. Wiese continued by explaining the rationale for the six-month window between when the code is adopted and when enforcement begins. First, there may be existing building plans that are nearing the submittal stage, and it would only be fair to allow developers to submit said plans to DPW without forcing them to go back and incorporate energy efficiency requirements that need to be considered during initial planning stages. Second, a few businesses on Guam are currently selling air conditioners and other equipment that do not meet the requirements of the GTEC; the window will allow them to sell off their stock. Lastly, the six-month window will allow for public education and training workshops to be held, so that everyone will be up to speed prior to enforcement.

Senator Aguon stated that he was pleased to hear that the GBCC has held five public hearings on the matter. He is glad that the GTEC will apply to new construction, but is wondering if it would be possible to find a way to encourage the community to also bring existing structures up to the GTEC standards. He additionally stressed that it is very important that DPW be able to have the training and capability to ensure proper compliance with the GTEC; and, if they are unable to do so, that the Guam Energy Office be able to step in and provide help.

Chairman Ada said that Carl Dominguez, the Director of DPW, spoke with him that morning. While the Director was unable to attend the hearing due to a scheduling conflict, he assured the Senator that DPW will be standing ready to enforce the new code.

Mr. Wiese added that the GBCC shares the same views stated by Senator Aguon. He notes that the Guam Energy Task Force is working to find ways to encourage the improvement of existing infrastructure. The GCC training workshops will also go a long way toward educating the community about the new code, and the GBCC has additional funds it can use for training as well. Lastly, he notes that there will probably be some developers who are against any building standards because it will impact short-term profits, and that he has heard from LEED professionals who feel that the GTEC does not go far enough. So, given the art of compromise, he believes that the GBCC has struck a fair and balanced approach in taking a reasonable middle-ground that will please a significant majority of people and help the entire community.

Senator Duenas stated that, in his research, Hawaii does good job implementing its energy efficiency standards. He added that he believes that the role of government should also include the promotion of energy efficiency standards, but asked what sort of balance should be struck when considering the imposed initial cost on the community.

Mr. Alfred Ysrael replied that such an approach avoids the core problem, which is that GPA is continuously increasing its power rates. He also said that his company was one of the first to invest in solar hot water heaters, back in the mid-1990s. They worked very well, until they were blown away by a typhoon. He says that the focus should not be on promoting energy efficiency and savings on part of the consumers, but rather the focus of the legislature should be on GPA and its rising rates. GPA is overstaffed and inefficient, and its power quality is significantly substandard. He calls for legislation that will change GPA, particularly toward privatization.

Chairman Ada clarified that the rising rates of GPA are largely due to the rising, unavoidable cost of oil. The base rate was only recently raised after nearly ten years of remaining stagnant.

Mr. Michael Makio says that he often works with GPA General Manager, Kin Flores, in their roles on the Guam Energy Task Force. And, he has found the GPA team to be working very hard on cost. He notes that there are some existing laws that hinder the ability of GPA to pursue cost savings, particularly in the area of energy production. But, ultimately, there are very good and smart people within GPA who are working on this issue. He also believes that the Guam Energy Task Force is an important resource to utilize in researching policies for Guam and developing efforts to promote island-wide energy efficiency improvements.

Chairman Ada thanked those who provided testimony for the valuable feedback, and stated that Bill 61-32 is now considered duly heard. The public hearing was adjourned at 2:36 pm.

III. Findings and Recommendations

The Committee on Public Safety, Infrastructure and Maritime Transportation convened a public hearing on Tuesday, October 22, 2013 at 9:00 am in *I Liheslatura*'s Public Hearing Room to receive public testimony on Bill No. 61-32 (COR), "An act to add a new § 67101.7 of Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC)", as authored by Senator Tom Ada.

The Committee finds that the Guam Building Code Council (GBCC) followed the mandate of P.L. 30-199 by diligently working to amend the 2009 Model Tropical Energy Code to meet the unique needs of Guam. A GBCC led working group of local professionals met regularly to incorporate numerous technical amendments, and five public hearings were held on the proposed code. The resulting Guam Tropical Energy Code (GTEC) is the product of the collaborative efforts of DPW, local organizations representing architects, engineers, contractors, and real estate professionals, and members of the public.

The Committee finds that the GTEC has far-reaching benefits. It establishes a minimum energy efficiency standard for all construction, which both protects the environment and saves money on energy bills. The payback from energy savings is estimated to be less than 1.5 years, and will

continue to realize savings on energy bills long after initial costs are recouped. Low-income families and renters also benefit, as they can be assured that all future construction will meet the same minimum energy saving standards.

The Committee further finds that implementation of the code is feasible given the current building plan approval process. The standards set by the GTEC are readily available and are based on the same codes currently required of mechanical engineers and architects. The Department of Public Works has expressed its readiness to implement the GTEC. And, upon adoption, training workshops will be conducted by the Guam Community College, the Guam Energy Office, and the Guam Building Code Council.

The Committee finds that the Guam Tropical Energy Code has promising benefits for Guam's environment and economy. By establishing a minimum standard for all construction, the community will be able to effectively reduce its dependence on fossil fuels. The resulting savings on power bills will also boost the local economy. Funds previously sent off-island to purchase fuel will now remain on-island and continue to circulate throughout the community.

As such, the Committee on Public Safety, Infrastructure and Maritime Transportation hereby reports out Bill 61-32 (COR) with the recommendation TO REPORT OUT ONLY

I MINA'TRENTAI DOS LIHESLATURAN GUÅHAN
2013 (First) Regular Session

Bill No. 61-32 (COR)

Introduced by: T.C. Ada

2013 MAR -1 AM 11:32

AN ACT TO ADD A NEW § 67101.7 OF CHAPTER 67, TITLE 21, GUAM CODE ANNOTATED, RELATIVE TO ADOPTING THE GUAM TROPICAL ENERGY CODE (GTEC)

BE IT ENACTED BY THE PEOPLE OF GUAM:

Section 1. Legislative Findings and Intent. *I Liheslaturan Guåhan* finds that building energy codes set an energy efficiency baseline that address the energy-efficiency requirements for the design, materials, and equipment used in nearly all new constructions and renovations. These requirements affect the overall energy efficiency of a building and can reduce the energy needed to maintain a healthy, comfortable, and fully functioning indoor environment.

I Liheslaturan Guåhan further finds that energy codes can play a key role in reducing the island's reliance on foreign oil, and carbon emissions. Finally, current industry techniques enable construction of buildings that comply with energy codes, at minimal increase in first cost. Ultimately, building owners benefit with reduced energy bills and a comfortable healthy home or business facility.

I Liheslatura further finds that in accordance with P.L. 30-199, the Guam Building Code Council met regularly and conducted public hearings to receive input and recommendations. The product of that effort is the 2012 Guam Tropical Energy Code (GTEC), an energy conservation code applicable to Guam's tropical environment and intended for implementation in conjunction with the current Guam Building Code that was previously adopted by P.L. 30-199. The Guam Building Code Council approved the GTEC on Jan 8, 2013, and now needs Legislative ratification.

I Liheslatura finds that the 2012 GTEC should be the standard used on new construction and renovations. It is therefore the intent of *I Liheslatura* to adopt the Guam

Tropical Energy Code into law, and to provide a six-month period before implementation in order to allow for a smooth transition.

Section 2. The existing §§ 67101.7 and 67101.8 of Chapter 67, Title 21, Guam Code Annotated, are hereby renumbered as §§ 67101.8 and 67101.9, respectively.

Section 3. A new § 67101.7 of Chapter 67, Title 21, Guam Code Annotated, is hereby added to read:

"§ 67101.7. Guam Tropical Energy Code Adopted. The *Guam Tropical Energy Code*, Attachment A, is hereby adopted."

Section 4. Applicability. This code shall apply to all Residential and Non-Residential construction as prescribed in the GTEC; however, Section 5 of this code shall not be applicable to:

1. Unconditioned Groups S & U Occupancy Buildings, or
2. Temporary Structures, as defined by the International Building Code.

Section 5. Severability. If any of the provisions of this law or its application to any person or circumstance is found to be invalid or contrary to law, such invalidity shall not affect other provisions or applications of this law which can be given effect without the invalid provisions or application, and to this end the provisions of this law are severable.

Section 6. Effective Date. This Act shall become effective six (6) months from the date of enactment.

Committee on Public Safety, Infrastructure and Maritime Transportation
Public Hearing
October 22, 2013
9:00 am
I Liheslaturan Guåhan, Hagåtña

Bill 61-32 (COR): T.C. Ada
An act to add a new §6101.7 to Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC).

NAME (please print)	AGENCY/ ORGANIZATION	ORAL TESTIMONY	WRITTEN TESTIMONY	IN FAVOR	NOT IN FAVOR	CONTACT NUMBER
Bill Hagen				✓		
STEVEN MUNA	GEC			✓		
Mark Pangilinan	GEC			✓		
Luis Kono	GEC			✓		
Bernie Perez	GEC			✓		
RICHARD DIEGO	GEC			✓		
BRENT WIELE	GBCC	✓		✓		477-2111

Committee on Public Safety, Infrastructure and Maritime Transportation
Public Hearing
October 22, 2013
9:00 am
I Liheslaturan Guåhan, Hagåtña

Bill 61-32 (COR): T.C. Ada
An act to add a new §6101.7 to Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC).

NAME (please print)	AGENCY/ ORGANIZATION	ORAL TESTIMONY	WRITTEN TESTIMONY	IN FAVOR	NOT IN FAVOR	CONTACT NUMBER
Michael Makio	TRMA Architects	✓		✓		475-8772

Committee on Public Safety, Infrastructure and Maritime Transportation
Public Hearing
October 22, 2013
9:00 am
I Liheslaturan Guåhan, Hagåtña

Bill 61-32 (COR): T.C. Ada
An act to add a new §6101.7 to Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC).

NAME (please print)	AGENCY/ ORGANIZATION	ORAL TESTIMONY	WRITTEN TESTIMONY	IN FAVOR	NOT IN FAVOR	CONTACT NUMBER
ALFRED YSRAEL						

GUAM BUILDING CODE COUNCIL

c/o Guam Contractors License Board
542 N. Marine Corps Drive, Building A (DPW), Tamuning, GU 96913
contact@guambcc.org
671-649-9676

32-13-167
Office of the Speaker
Judith T. Won Pat, Ed. D.
Date 3/4/13
Time 11:24AM
Received by

March 4, 2013

The Honorable Judith T. Won Pat, Ed. D
Speaker, 32nd Guam Legislature
155 Hessler Street
Hagåtña, Guam

Re: Guam Tropical Energy Code

Hafa Adai Speaker Won Pat,

Per the mandate of P.L. 30-199, the proposed *2012 Guam Tropical Energy Code* (GTEC) is hereby transmitted for adoption as part of the *Guam Building Code*. The GTEC was developed by the Guam Building Code Council (GBCC) with input from the community, and is consistent with industry standards.

Energy codes can play a key role in reducing the island's demand of foreign oil, and reducing carbon emissions. Additionally, current industry techniques enable construction of buildings that comply with energy codes, at minimal increase in first cost. Ultimately, building owners benefit with reduced energy bills and a comfortable healthy home or business facility.

The GTEC is a set of industry based construction standards promoting energy conservation. If adopted, the GTEC will be applicable to all new residential and non-residential construction and to existing structures undergoing substantial renovation. Additionally, the GTEC is intended to promote energy conservation in a cost-effective manner. Implementation of these standards is not expected to have a significant impact in the total cost of construction.

With the support of the Guam Energy Office, the GBCC conducted community outreach and public hearings, to include information workshops for technical and non-technical stakeholders. Input was received from contractors, real estate professionals, engineers, architects, and the general public. Articles have been written about the GTEC in the local media and five Public Hearings were held on the matter. Input that was received was evaluated and incorporated, and the resulting GTEC was adopted unanimously by the GBCC on January 8, 2013.

The Guam Building Code Council (GBCC) looks forward to the timely adoption of the *2012 Guam Tropical Energy Code* (GTEC).

Sincerely,

Brent Wiese, AIA NCARB LEED AP BD+C
Chairman, Guam Building Code Council

CC: Chairman, Committee on Public Safety, Infrastructure, and Maritime Transportation

32-13-107
Office of the Speaker
Judith T. Won Pat, Ed. D.
Date 3/4/13
Time 11:24 AM
Received by

2012 Guam Tropical Energy Code

Guam Building Code Council
As Approved on January 8, 2013

DEFINITIONS

GENERAL

Scope. Unless stated otherwise, the following words and terms in this code shall have the meanings indicated in this chapter.

Interchangeability. Words used in the present tense include the future; words in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural includes the singular.

Terms defined in other codes. Terms that are not defined in this code but are defined in the *International Building Code*, *International Fire Code*, *International Fuel Gas Code*, *International Mechanical Code*, *International Plumbing Code*, the *International Residential Code*, *or the International Energy Conservation Code* shall have the meanings ascribed to them in those codes.

Terms not defined. Terms not defined by this chapter shall have ordinarily accepted meanings such as the context implies.

GENERAL DEFINITIONS

ACCESSIBLE. Admitting close approach as a result of not being guarded by locked doors, elevation or other effective means (see "Readily *accessible*").

ADDITION. An extension or increase in the *conditioned space* floor area or height of a building or structure.

AIR BARRIER. Material(s) assembled and joined together to provide a barrier to air leakage through the building envelope. An air barrier may be a single material or a combination of materials.

ALTERATION. Any construction or renovation to an existing structure that requires a permit. Also, a change in a mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

APPROVED. Approval by the *code official* as a result of investigation conducted by him or her, or by reason of accepted principles or tests by nationally recognized organizations.

AUTOMATIC. Self-acting, operating by its own mechanism when actuated by some impersonal influence, as, for example, a change in current strength, pressure, temperature or mechanical configuration (see "Manual").

BASEMENT WALL. A wall 50 percent or more below grade and enclosing *conditioned space*.

BUILDING. Any structure used or intended for supporting or sheltering any use or occupancy.

BUILDING THERMAL ENVELOPE. The basement walls, exterior walls, floor, roof, and any other building element that enclose *conditioned space*. This boundary also includes the boundary between *conditioned space* and any exempt or unconditioned space.

***C*-FACTOR (THERMAL CONDUCTANCE).** The coefficient of heat transmission (surface to surface) through a building component or assembly, equal to the time rate of heat flow per unit area and the unit temperature difference between the warm side and cold side surfaces (Btu/h ft^2 x°F) [W/(m^2 xK)].

CODE OFFICIAL. The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative.

COMMERCIAL BUILDING. For this code, all buildings that are not included in the definition of "Residential buildings."

CONDITIONED FLOOR AREA. The horizontal projection of the floors associated with the *conditioned space*.

CONDITIONED SPACE. An area or room within a building being heated or cooled, containing uninsulated ducts, or with a fixed opening directly into an adjacent *conditioned space*.

CURTAIN WALL. Fenestration products used to create an external nonload-bearing wall that is designed to separate the exterior and interior environments.

DAYLIGHT ZONE.
1. Under skylights. The area under skylights whose horizontal dimension, in each direction, is equal to the skylight dimension in that direction plus either the floor-to ceiling height or the dimension to a ceiling height opaque partition, or one-half the distance to adjacent skylights or vertical fenestration, whichever is least.
2. Adjacent to vertical fenestration. The area adjacent to vertical fenestration receiving daylight through the fenestration. For purposes of this definition and unless more detailed analysis is provided, the daylight *zone* depth is assumed to extend into the space a distance of 15 feet (4572 mm) or to the nearest ceiling height opaque partition, whichever is less. The daylight *zone* width is assumed to be the width of the window plus 2 feet (610 mm) on each side, or the window width plus the distance to an opaque partition, or the window width plus one-half the distance to adjacent skylight or vertical fenestration, whichever is least.

DEMAND CONTROL VENTILATION (DCV). A ventilation system capability that provides for the automatic reduction of outdoor air intake below design rates when the actual occupancy of spaces served by the system is less than design occupancy.

DUCT. A tube or conduit utilized for conveying air. The air passages of self-contained systems are not to be construed as air ducts.

DUCT SYSTEM. A continuous passageway for the transmission of air that, in addition to ducts, includes duct fittings, dampers, plenums, fans and accessory air-handling equipment and appliances.

DWELLING UNIT. A single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

ENERGY ANALYSIS. A method for estimating the annual energy use of the *proposed design* and *standard reference design* based on estimates of energy use.

ENERGY COST. The total estimated annual cost for purchased energy for the building functions regulated by this code, including applicable demand charges.

ENERGY RECOVERY VENTILATION SYSTEM. Systems that employ air-to-air heat exchangers to recover energy from exhaust air for the purpose of preheating, precooling, humidifying or dehumidifying outdoor ventilation air prior to supplying the air to a space, either directly or as part of an HVAC system.

ENERGY SIMULATION TOOL. An *approved* software program or calculation-based methodology that projects the annual energy use of a building.

ENTRANCE DOOR. Fenestration products used for ingress, egress and access in nonresidential buildings, including, but not limited to, exterior entrances that utilize latching hardware and automatic closers and contain over 50-percent glass specifically designed to withstand heavy use and possibly abuse.

EXTERIOR WALL. Walls including both above-grade walls and basement walls.

FENESTRATION. Skylights, roof windows, vertical windows (fixed or moveable), opaque doors, glazed doors, glazed block and combination opaque/glazed doors. Fenestration includes products with glass or non-glass glazing materials.

***F*-FACTOR.** The perimeter heat loss factor for slab-on-grade floors (Btu/h xft x°F) [W/(m xK)].

HEAT CAPACITY (HC). The amount of heat necessary to raise the temperature of a given mass 1°F. Numerically, the mass expressed per unit of wall surface multiplied by the specific heat [BTU/ft^2 °F]

HEAT TRAP. An arrangement of piping and fittings, such as elbows, or a commercially available heat trap that prevents thermosyphoning of hot water during standby periods.

HIGH-EFFICACY LAMPS. Compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:
1. 60 lumens per watt for lamps over 40 watts.
2. 50 lumens per watt for lamps over 15 watts to 40 watts, and
3. 40 lumens per watt for lamps 15 watts or less.

HUMIDISTAT. A regulatory device, actuated by changes in humidity, used for automatic control of relative humidity.

INFILTRATION. The uncontrolled inward air leakage into a building caused by the pressure effects of wind or the effect of differences in the indoor and outdoor air density or both.

KNEE WALL (PONY WALL). A split wall with different wall types for the upper and lower portions.

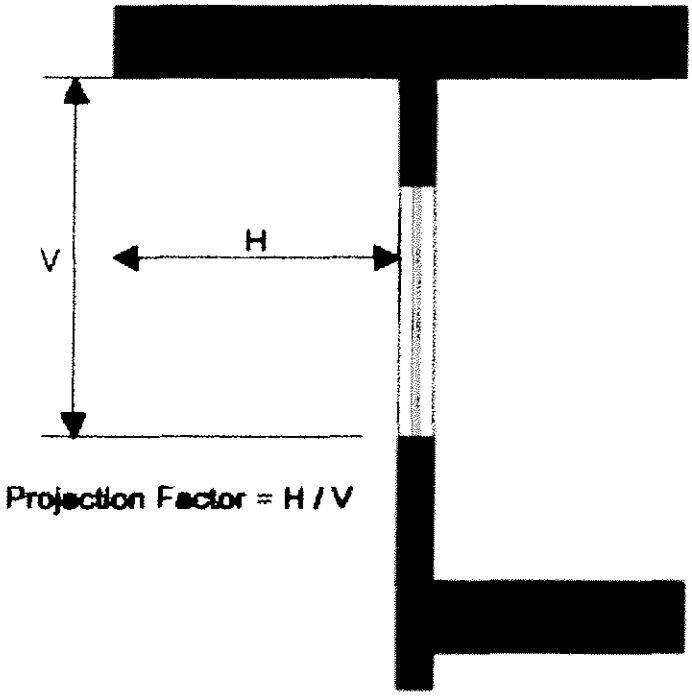
LABELED. Equipment, materials or products to which have been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the *code official* and concerned with evaluation of products or services that maintains periodic inspection of production of *listed* equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose.

LOW-RISE RESIDENTIAL. Single-family houses, multi-family structures of three stories or fewer above grade.

MANUAL. Capable of being operated by personal intervention (see "Automatic").

PROJECTION FACTOR (PF). The ratio of the horizontal depth of the external shading projection divided by the sum of the height of the fenestration and the distance from the top of the fenestration to the bottom of the farthest point of the external shading projection, in consistent units.



PROPOSED DESIGN. A description of the proposed building used to estimate annual energy use for determining compliance based on total building performance.

READILY ACCESSIBLE. Capable of being reached quickly for operation, renewal or inspection without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders or access equipment (see "*Accessible*").

REPAIR. The reconstruction or renewal of any part of an existing building.

RESIDENTIAL BUILDING. For this code, includes R-3 buildings, as well as R-2 and R-4 buildings three stories or less in height above grade.

ROOF ASSEMBLY. The upper portion of the building envelope, including opaque areas and fenestration, that is horizontal or tilted at an angle of less than 60° from horizontal. For the purposes of determining building envelope requirements, the classifications are defined as follows:

a. Mass roof: a roof with a heat capacity exceeding 7.5 or a weight greater than 40 lb/ft^2. Concrete roofs equal to or greater than four inches are considered mass roofs.
b. Metal building roof: a roof (1) that is not in the roof with insulation entirely above deck category and (2) whose structure consists simply of metal spanning members supported by metal structural members (i.e., does not include composite concrete and metal deck construction.)
c. Other roofs: all other roofs, including wood roofs, but excluding metal building roofs.

***R*-VALUE (THERMAL RESISTANCE).** The inverse of the time rate of heat flow through a body from one of its bounding surfaces to the other surface for a unit temperature difference between the two surfaces, under steady state conditions, per unit area ($h \times ft^2 \times °F/Btu$) [$(m^2 \times K)/W$].

SERVICE WATER HEATING. Supply of hot water for purposes other than comfort heating.

SKYLIGHT. Glass or other transparent or translucent glazing material installed at a slope of 15 degrees (0.26 rad) or more from vertical. Glazing material in skylights, including unit skylights, solariums, sunrooms, roofs and sloped walls is included in this definition.

SLEEPING UNIT. A room or space in which people sleep, which can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not *sleeping units*.

SOLAR HEAT GAIN COEFFICIENT (SHGC). The ratio of the solar heat gain entering the space through the fenestration assembly to the incident solar radiation. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation which is then reradiated, conducted or convected into the space.

THERMOSTAT. An automatic control device used to maintain temperature at a fixed or adjustable set point.

***U*-FACTOR (THERMAL TRANSMITTANCE).** The coefficient of heat transmission (air to air) through a building component or assembly, equal to the time rate of heat flow per unit area and unit temperature difference between the warm side and cold side air films ($Btu/h \times ft^2 \times °F$) [$W/(m^2 \times K)$].

VENTILATION. The natural or mechanical process of supplying conditioned or unconditioned air to, or removing such air from, any space.

VENTILATION AIR. That portion of supply air that comes from outside (outdoors) plus any recirculated air that has been treated to maintain the desired quality of air within a designated space.

ZONE. A space or group of spaces within a building with heating or cooling requirements that are sufficiently similar so that desired conditions can be maintained throughout using a single controlling device.

TABLE OF CONTENTS

1. Purpose

The purpose of this code is to provide minimum design requirements to achieve energy-efficiency in buildings constructed in Guam.

2. Scope

(A) This code shall apply to all non-residential and residential construction.

(B) This code provides minimum energy-efficiency requirements for the design and construction of any of the following:

(1) new buildings,

(2) additions, alterations, renovations, or repairs to existing buildings requiring a permit,

(3) new or replacement air conditioning, water heating, and lighting equipment in existing buildings, or

(4) replacement roofing.

(C) Where this code is found in conflict with the safety, health, or environmental codes, the safety, health or environmental codes shall govern.

(D) Historic Buildings Exemption. *Any building or structure that is listed in the National Register of Historic Places or the Guam Register of Historic Places*; designated as a historic property under local designation law or survey; certified as a contributing resource with a National Register listed or locally designated historic district; or with an opinion or certification that the property is eligible to be listed on the National Register of Historic Places either individually or as a contribution building to a historic district by the State Historic Preservation Officer or the Keeper of the National Register of Historic Places, are exempted from this code, insofar as complying with the code would compromise or damage the historic character of the building.

3. Administration and Enforcement

3.01 Compliance Requirements

(A) New Buildings

(1) Low-rise residential buildings shall comply with the provisions of Section 4 through Section 6 of this code.

(2) Other buildings shall comply with either Section 4 through Section 7 of this code or the International Energy Conservation Code 2009, Chapter 5, including §506 on Total Building Performance, as amended by Section 4.03(A)(2) of this code.

(B) **Additions, alterations, renovations or repairs.** Additions, alterations, renovations or repairs to those parts of an existing building that are affected by this code, or parts thereof, building systems or portions thereof shall conform to the provisions of this code. **Unaltered portion(s) of the existing building or building system shall not be required to comply with this code.** Additions, alterations, renovations, or repairs shall not create an unsafe or hazardous condition or overload existing building systems.

Note: Major alterations to a building, where the estimated cost of construction is more than 50% of the appraised value of the building, the entire building shall comply with the provisions of this code.

Exception: The following need not comply provided the energy use of the building is not increased by any of the following:

(1) Glass only replacements in an existing sash and frame.

(2) Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.

(3) Construction where the existing roof, wall or floor cavities are not exposed.

(4) Alterations that replace less than 50 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.

(5) Alterations that replace only the bulb and ballast within the existing luminaires in a space provided that the *alteration* does not increase the installed interior lighting power.

(C) **Change in occupancy.** Buildings undergoing a change in occupancy that would result in an increase in demand for either fossil fuel or electrical energy shall comply with this code.

(D) **Mixed occupancy.** Where a building includes both residential and other occupancies, each occupancy shall be separately considered and meet the applicable provisions for each occupancy.

(E) **Replacement Roofing.** Replacement roofing membranes shall comply with the roof requirements of Section 4.03(A)(2).

3.02 Administrative Requirements

Administrative requirements relating to permit requirements, enforcement, interpretations, claims of exemption, and calculation methods are specified by the Department of Public Works. Administrative requirements relating to rights of appeal are specified by the Guam Building Code Council.

3.03 Compliance Documents

(A) General: Plans, specifications, calculations, diagrams, reports, and other data shall constitute the compliance documents.

(B) Construction Details: Compliance documents shall show pertinent data and features of the building, equipment, and systems in sufficient detail to permit an evaluation by the Department of Public Works relative to this code.

(C) Supplemental Information: The Department of Public Works may require supplemental information necessary to verify compliance with this code, such as calculations, worksheets, compliance forms, vendor literature, or other data.

(D) Alternative method for prescriptive requirement compliance: The Energy Cost Budget Method, as defined by Chapter 11 of ASHRAE Standard 90.1-2007, may be used in place of prescriptive method outlined within this code. In such a case, evidence must be provided demonstrating that building performance is equal to or better than the energy conservation standards established within this code.

4. Envelope

4.01 General

(A) Scope. The envelope requirements apply to all enclosed buildings, except unconditioned factories, storage spaces, and warehouses.

(B) Compliance. The building envelope shall comply with the mandatory provisions of Section 4.02 and either the prescriptive criteria of Section 4.03 or the building envelope trade-off procedures of Section 4.05. Low-rise residential buildings have the additional option of complying with the criteria for naturally ventilated buildings in Section 4.04.

4.02 Mandatory Provisions

(A) Insulation. Insulation materials shall be installed to achieve proper densities, maintain clearances, and maintain rated R-value of insulation. Exception: Insulation may be compressed at the structural support for draped applications in metal buildings.

(B) Moisture Control. The building envelope shall be designed to prevent moisture migration that leads to deterioration of the insulation or equipment and structural damage.

(C) U-factors. U-factors for opaque constructions shall be calculated using procedures consistent with the ASHRAE Fundamentals, 2009.

(D) Certification and labeling of cool roof products. The initial reflectance, aged reflectance, emittance, and the aged SRI of roofing products shall be determined by the Cool Roof Rating Council (CRRC) in accordance with the CRRC-1.

(E) Fenestration product rating. The solar heat gain coefficient (SHGC) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer. As an alternative, the center-of-glass SHGC from glass manufacturers may be used. Products lacking such a SHGC as described above shall be assigned a default SHGC from Table 4.1.

(F) Building Envelope Sealing:

(1) The building thermal envelope shall be durably sealed to limit air infiltration. The sealing methods between dissimilar materials shall allow for differential expansion and contraction. The following shall be caulked, gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material:

a) All joints, seams and penetrations.

b) Site-built windows, doors and skylights.

c) Openings between window and door assemblies and their respective jambs and framing.

d) Utility penetrations.

e) Dropped ceilings or chases adjacent to the thermal envelope.

f) Joints at knee walls.

g) Joints in walls and ceilings separating unconditioned spaces from conditioned spaces.

h) Behind tubs and showers on exterior walls.

i) Common walls between dwelling units.

j) Other sources of infiltration.

(2) Fenestration air leakage. Operable windows shall be capable of being tightly closed. Windows, skylights and sliding glass doors shall have an air infiltration rate of no more than 0.3 cfm per square foot (1.5 L/s/sq m), and swinging doors no more than 0.5 cfm per square foot (2.6 L/s/sq m), when tested according to NFRC 400 or

AAMA/WDMA/CSA101/I.S.2/A440 by an accredited, independent laboratory and listed or labeled by the manufacturer.

Exception to 4.02(F)(2): Windows, skylights and glass doors in naturally ventilated low-rise residential buildings that comply with Section 4.04.

(3) Non-Residential Building entrances enclosing conditioned space shall be revolving or self-closing doors, or be enclosed by other means as shall be approved by the Department of Public Works.

4.03 Prescriptive Building Envelope Requirements

(A) Roofs.

(1) Roofs shall meet the requirements of Table 4.2

(2) Low-slope roof membranes shall have an aged reflectance of at least 0.55 and a minimum thermal emittance of 0.75, or a minimum aged SRI of at least 64.

a) If only the new reflectance is known, the aged reflectance shall be calculated as follows:

Equation 4.03-1:

$$REFL_{Aged} = 0.60 + 0.70 \times Refl_{Initial}$$

b) If the SRI is not known, but the reflectance and emittance are known, then the SRI shall be calculated:

Equation 4.03-2:

$$SRI = -84 + 85 \times Emit + 203 \times Ref - 75 \times Refl \times Emit$$

c) Roof surfaces shall have a minimum slope of 1/4 inch per foot of run.

Exception to 4.03(A)(2)(c): Replacement roofing.

(B) Walls. Wall insulation shall meet the requirements of Table 4.3.

(C) Windows. Fenestration products shall meet the requirements of Table 4.4. The window wall ratio is limited to a maximum of 40% of the gross wall area.

(D) Skylights. Area is limited to a maximum of 3% of the gross roof area. The maximum SHGC for glass products is 0.40 and the maximum SHGC for plastic skylights is 0.35.

4.04 Prescriptive Building Envelope Requirements for Naturally Ventilated Low-Rise Residential Buildings

This section may be used as an alternative to 4.03 for low-rise residential buildings.

(A) Roofs shall meet the requirements of 4.03(A). Walls shall meet the requirements of 4.03(B). Windows shall meet the requirements of 4.03(C) and skylights shall meet the requirements of 4.03(D).

4.05 Building Envelope Trade-Off Option

A trade-off for the Mandatory Requirements shall be allowed if the envelope performance factor of the proposed building is less than or equal to the envelope performance factor of the budget building.

(A) The envelope performance factor shall be calculated using the following equations.

$$EPF_{Total} = EPF_{Roof} + EPF_{Wall} + EPF_{Fenest}$$

Where:

$$EPF_{Roof} = c_{Roof,Mass}\sum_{s=1}^{n} U_s A_s (1 - SRI)_s + c_{Roof,MtlBldg}\sum_{s=1}^{n} U_s A_s (1 - SRI)_s + c_{Roof,Other}\sum_{s=1}^{n} U_s A_s (1 - SRI)_s$$

$$EPF_{Wall} = c_{Wall,Mass}\sum_{s=1}^{n} U_s A_s + c_{Wall,MtlBldg}\sum_{s=1}^{n} U_s A_s + c_{Wall,MtlFrm}\sum_{s=1}^{n} U_s A_s + c_{Wall,Other}\sum_{s=1}^{n} U_s A_s$$

$$EPF_{Fenest} = c_{Fenest,North}\sum_{w=1}^{n} A_w SHGC_w M_w +$$

$$c_{Fenest,East}\sum_{w=1}^{n} A_w SHGC_w M_w +$$

$$c_{Fenest,South}\sum_{w=1}^{n} A_w SHGC_w M_w +$$

$$c_{Fenest,West}\sum_{w=1}^{n} A_w SHGC_w M_w +$$

$$c_{Fenest,Skylight}\sum_{s=1}^{n} A_s SHGC_s$$

Where:

EPF_{Roof}	Envelope performance factor for roofs. Other subscripts include walls and fenestration.
A_S, A_W	The area of a specific envelope component referenced by the subscript "s" or for windows the subscript "w".
$SHGC_W$	The solar heat gain coefficient for windows (w). $SHGC_S$ refers to skylights.
M_W	A multiplier for the window SHGC that depends on the projection factor of an overhang or side fin. These values are determined by the procedures in Section 4.05(B).
U_S	The U-factor for the envelope component referenced by the subscript "s".
SRI_S	The aged SRI shall be used. If the aged SRI is not known, it can be calculated from the aged reflectance and emittance using Equation 4.03-2. If the SRI is not known and cannot be calculated for a product, an SRI of 10 shall be used.
C_{Fenest}	The coefficients for use in the EPF equations are contained in

Table 4.5.

$C_{RoofMass}$ A coefficient for the "Roof, Mass" class of construction. Values of "C" are taken from Table 4.5 for each class of construction.

(B) Credits for fixed shading devices (M) such as overhangs, awnings, trellises, or side fins shall be calculated using the following equations:

(overhangs) $M = 0.16 \times PF^2 + -0.61 \times PF + 1$
(side fins) $M = 0.23 \times PF^2 + -0.74 \times PF + 1$

where: PF is Projection Factor (see definitions section)

(C) The following rules shall be used to define the budget building.

(1) The budget building shall have the same building floor area, gross wall area, and gross roof area as the proposed design. If the building has both 24-hour and daytime occupancies, the distribution between these shall be the same as the proposed design.

(2) The U-factor of each envelope component shall be equal to the criteria from Section 4.03 for each class of construction.

(3) The vertical fenestration area shall be equal to the proposed design or 40% of the gross exterior wall area, whichever is less. The skylight area shall be equal to the proposed design or 3% of the gross exterior roof area, whichever is less.

(4) The SHGC of each window or skylight component shall be equal to the criteria from Section 4.03.

(5) If the roof is low-sloped or metal, the SRI shall be 64. Otherwise, the SRI shall be 27.

Table 4.1 Default Glazed Fenestration SHGC

Single Glazed		Double Glazed		
Clear	Tinted	Clear	Tinted	Glazed Block
0.8	0.7	0.7	0.6	0.6

Table 4.2 Roof Assembly

	Non-Residential		Residential	
Class	Maximum U-factor	Or Minimum Insulation:	Maximum U-factor	Or Minimum Insulation:
Mass	0.072	R-13	0.072	R-13
Metal building	0.065	R-19	0.065	R-19
Other	0.034	R-30	0.034	R-30

See definitions section for definitions of these terms.

Table 4.3 Wall Assembly

Class	All Building Types Maximum U-factor	Or Minimum Insulation
Mass	None	None
Metal building	0.113	R-13
Steel-Framed	0.124	R-13
Wood-Framed and other	0.089	R-13

A mass wall has a Heat Capacity (HC) greater than 7.0 or a weight greater than 35 lb/ft2.

Table 4.4 Window Heat Gain

Building Type	Window Wall Ratio	Un-Shaded	Partially Shaded	Well Shaded or North Facing
Nonresidential or high-rise residential	Less than 15%	No Requirement	No Requirement	No Requirement
	15% - 25%	Special Coated Glass	Tinted Glass	No Requirement
	More than 25%	Special Coated Glass	Special Coated Glass	Tinted Glass
Low-rise residential	All	No Requirement	No Requirement	No Requirement

- Window wall ratio is the ratio of the total window area of the building, measured to the outside of the frame, to the gross exterior wall area.
- A north facing window is one that faces within 22.5 degrees of true north.
- Partially shaded windows are those that are protected from direct sun for the majority of the time. Shading can be provided by overhangs, side fins, mature trees, or other devices. Qualifying overhangs shall have a projection factor greater than or equal to 0.5 and the overhang shall extend past the window jambs a distance at least equal to the overhang projection. Qualifying side fins shall have a projection factor greater than or equal to 0.5 and the side fin shall extend above the window head a distance at least equal to the side fin projection.
- Well-shaded windows are those that are more completely protected from direct sun. Shading can be provided by overhangs, side fins, mature trees, or other devices. Qualifying overhangs shall have a projection factor greater than or equal to 1.0 and the overhang shall extend past the window jambs a distance at least equal to the overhang projection. Qualifying side fins shall have a projection factor greater than or equal to 1.0 and the side fin shall extend above the window head a distance at least equal to the side fin projection.
- Tinted glass includes all glazing products with a bronze, green, gray or blue integral tint; clear glass with a coating or film; or any other glazing product that has a solar heat gain coefficient (SHGC) equal to or less than 0.61.
- Special coated glass includes glass with reflective coatings or films that have a solar heat gain coefficient (SHGC) equal to or less than 0.30.

Table 4.5 Envelope Performance Factor Coefficients		
Component, Class	Daytime	24-Hour
Roofs, Mass	1.47	3.61
Roofs, MtlBldg	15.83	25.26
Roofs, Other	2.84	3.82
Wall, Mass	2.53	6.14
Wall, MtlBldg	6.36	9.28
Wall, MtlFrm	6.36	9.28
Wall, Other	6.36	9.28
Fenest, East	53	86
Fenest, North	31	51
Fenest, South	58	98
Fenest, West	50	85
Fenest, Skylights	101	163

5. Ventilation and Air Conditioning

5.01 General

All mechanical equipment and systems serving the building's cooling, dehumidification, or ventilation needs shall meet the requirements of this section.

5.02 Applicability of Mandatory Provisions[1]

The requirements of this section apply to ventilation and cooling systems that:

(A) use unitary packaged or split-system air conditioners that are either air-cooled or evaporatively cooled.

(B) serve a single thermal zone.

(C) have a cooling capacity less than 65,000 Btu/h, and do not have a humidistat.

Ventilation and air conditioning systems that do not satisfy the above requirements shall be designed in accordance with Section 503 of the IECC 2009.

5.03 Mandatory Provisions:

[1] Aluminum or copper condenser coils which are exposed to salty and humid marine conditions typical of the climates covered by this code will quickly corrode. Corrosion leads to rapid losses in capacity, reduced efficiency, and increased energy consumption. In seaside locations especially, the operating performance of unprotected condenser coils may decrease over 50% in a single year (Source: Coatings Can Help Condensers Live Longer, Joanna Turpin, February 13, 2002, HVACR Directory). For this reason, protective coatings are recommended, although not required by the code. Many manufacturers offer protective coatings that reduce corrosion. Coatings may also be field installed, but factory applied coatings are recommended, since it is difficult to maintain quality under field conditions.

(A) Each system shall be controlled by a thermostat.

(B) Each thermostat shall be provided with setback controls that are controlled by either an automatic time clock or programmable control system.

(1) Thermostat setback capabilities. Thermostat controls shall have the capability to set back or temporarily operate the system to maintain zone temperatures up to 85°F.

(2) Automatic setback and shutdown capabilities. Automatic time clock or programmable controls shall be capable of starting and stopping the system for a seven day schedule and retaining their programming and time setting during a loss of power for at least 10 hours. Additionally, the controls shall have a manual override that allows temporary operation of the system for up to 2 hours; a manually operated timer capable of being adjusted to operate the system for up to 2 hours; or an occupancy sensor.

(3) Exceptions to 5.03(B):

a) Zones that will be operated continuously.

b) Zones with a full HVAC load demand not exceeding 6,800 Btu/h and having a readily accessible manual shutoff switch.

(C) Hotel and motel rooms shall be equipped with a mechanism that shuts off the cooling mechanism for the room when exterior doors and/or windows to the room are open.

(D) All equipment installed in the building shall have the U.S. DOE Energy Guide Label.

(E) Refrigerant suction piping on split systems shall have at least 1/2 in. cellular foam, cellular glass, or fiberglass insulation. Insulation exposed to weather shall be protected by aluminum sheet metal, painted canvas, stainless steel, or plastic cover.

(F) Duct and plenum insulation. All supply and return air ducts and plenums shall be insulated with a minimum of R-5 insulation when located in unconditioned spaces and with a minimum of R-8 insulation when located outside the building. When located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by a minimum of R-8 insulation. Supply air ducts that transport chilled air at or below 55°F (13°C) that are located in spaces that are conditioned shall be insulated with a minimum of R-5 insulation with a vapor retarder jacket.

Exception to 5.03(F): When located within equipment.

(G) Duct and plenum sealing. All joints, longitudinal and transverse seams and connections in ductwork, shall comply with the International Mechanical Code, 2009 edition.

5.04 HVAC equipment performance requirements.

Equipment shall meet the minimum efficiency requirements of Tables 503.2.3(1), 503.2.3(2), 503.2.3(3), 503.2.3(5), 503.2.3(6) and 503.2.3(7) when tested and rated in accordance with the applicable test procedure. The efficiency shall be verified through certification under an approved certification program or, if no certification program exists, the equipment efficiency ratings shall be supported by data furnished by the manufacturer. Where multiple rating conditions or performance requirements are provided, the equipment shall satisfy all stated requirements. Where components, such as indoor or outdoor coils, from different manufacturers are used, calculations and supporting data shall be furnished by the designer that demonstrates that the combined efficiency of the specified components meets the requirements herein.

Exception: Water-cooled centrifugal water-chilling packages listed in Table 503.2.3(7) not designed for operation at ARHI Standard 550/590 test conditions of 44°F (7°C) leaving chilled water temperature and 85°F (29°C) entering condenser water temperature with 3 gpm/ton (0.054 l/s.kW) condenser water flow shall have maximum full load and NPLV ratings adjusted using the following equations:

Adjusted maximum full load kW/ton rating = [full load kW/ton from Table 503.2.3(7)]/K_{adj}

Adjusted maximum NPLV rating = [IPLV from Table 503.2.3(7)]/K_{adj}

where:

K_{adj} = $6.174722 - 0.303668(X) + 0.00629466(X)^2 - 0.000045780(X)^3$

X = DT_{std} + LIFT

DT_{std} = {24 + [full load kW/ton from Table 503.2.3(7)] x 6.83}/Flow

Flow = Condenser water flow (GPM)/Cooling Full Load Capacity (tons)

LIFT = CEWT = CLWT (°F)

CEWT = Full Load Condenser Entering Water Temperature (°F)

CLWT = Full Load Leaving Chilled Water Temperature (°F)

The adjusted full load and NPLV values are only applicable over the following full-load design ranges:

Minimum Leaving Chilled Water Temperature: 38°F (3.3°C)

Maximum Condenser Entering Water Temperature: 102°F (38.9°C)

Condensing Water Flow: 1 to 6 gpm/ton 0.018 to 0.1076 1/s · kW) and $X \geq 39$ and ≤ 60

Chillers designed to operate outside of these ranges or applications utilizing fluids or solutions with secondary coolants (e.g., glycol solutions or brines) with a freeze point of 27°F (-2.8°C) or lower for freeze protection are not covered by this code.

Table 503.2.3(1)
Unitary Air Conditioners and Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Air conditioners, Air cooled	< 65,000 Btu/h[d]	Split system	13.0 SEER	AHRI 210/240
		Single package	13.0 SEER	
	≥65,000 Btu/h and <135,000 Btu/h	Split system and single package	11.2 EER[c]	
	≥135,000 Btu/h and <240,000 Btu/h	Split system and single package	11.0 EER[c]	AHRI 340/360
	≥240,000 Btu/h and <760,000 Btu/h	Split system and single package	10.0 EER[c] 9.7 IPLV[g]	
	≥760,000 Btu/h	Split system and single package	9.7 EER[c] 9.4 IPLV[c]	
Through-the-wall, Air cooled	<30,000 Btu/h[d]	Split system	12.0 SEER	AHRI 210/240
		Single package	12.0 SEER	

(*continued*)

Table 503.2.3(1) (*continued*)
Unitary Air Conditioners and Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Air conditioners, Water and evaporatively cooled	<65,000 Btu/h	Split system and single package	12.1 EER	AHRI 210/240
	≥65,000 Btu/h and <135,000 Btu/h	Split system and single package	11.5 EER[c]	
	≥135,000 Btu/h and <240,000 Btu/h	Split system and single package	11.0 EER[c]	AHRI 340/360
	≥240,000 Btu/h	Split system and single package	11.5 EER[c]	

For SI: 1 British thermal unit per hour = 0.2931 W.
a. Chapter 6 of the 2009 International Energy Conservation Code contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
b. IPLVs are only applicable to equipment with capacity modulation.
c. Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.
d. Single-phase air-cooled air conditioners < 65,000 Btu/h are regulated by the National Appliance Energy Conservation Act of 1987 (NAECA); SEER values are those set by NAECA.

Table 503.2.3(2)
Unitary Air Conditioners and Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Air cooled, (Cooling mode)	< 65,000 Btu/h[d]	Split system	13.0 SEER	AHRI 210/240
		Single package	13.0 SEER	
	≥65,000 Btu/h and <135,000 Btu/h	Split system and single package	11.0 EER[c]	
	≥135,000 Btu/h and <240,000 Btu/h	Split system and single package	10.6 EER[c]	AHRI 340/360
	≥240,000 Btu/h	Split system and single package	9.5 EER[c] 9.2 IPLV[c]	
Through-the-wall (Air cooled, cooling mode)	<30,000 Btu/h[d]	Split system	12.0 SEER	AHRI 210/240
		Single package	12.0 SEER	
Water Source (Cooling mode)	<17,000 Btu/h	86°F entering water	11.2 EER	AHRI/ASHRAE 13256-1
	≥17,000 Btu/h and <135,000 Btu/h	86°F entering water	12.0 EER	AHRI/ASHRAE 13256-2
Groundwater Source (cooling mode)	<135,000 Btu/h	59°F entering water	16.2 EER	AHRI/ASHRAE 13256-5
Ground source (Cooling mode)	<135,000 Btu/h	77°F entering water	13.4 EER	AHRI/ASHRAE 13256-4

(*continued*)

Table 503.2.3(2) (*continued*)
Unitary Air Conditioners and Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Air cooled (Heating mode)	<65,000 Btu/h[d] (Cooling capacity)	Split system	7.7 HSPF	AHRI 210/240
		Single package	7.7 HSPF	
	≥65,000 Btu/h and <135,000 Btu/h (Cooling capacity)	47°F db/43° wb Outdoor air	3.3 COP	
	≥135,000 Btu/h (Cooling capacity)	47°F db/43° wb Outdoor air	3.2 COP	AHRI 340/360
Through-the-wall (Air cooled, heating mode)	<30,000 Btu/hd	Split system	7.4 HSPF	AHRI 210/240
		Single package	7.4 HSPF	
Water source (Heating mode)	<135,000 Btu/h (Cooling capacity)	68°F entering water	4.2 COP	AHRI/ASHRAE 13256-1

(*continued*)

Table 503.2.3(2) (*continued*)
Unitary Air Conditioners and Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Groundwater source (Heating mode)	<135,000 Btu/h (Cooling capacity)	50°F entering water	3.6 COP	AHRI/ASHRAE 13256-1
Ground source (Heating mode)	<135,000 Btu/h (Cooling capacity)	32°F entering water	3.1 COP	AHRI/ASHRAE 13256-1

For SI: °C=[(°F) - 32]/1.8, 1 British thermal unit per hour = 0.2931 W.
db = dry-bulb temperature, °F; wb = wet-bulb temperature, °F.
a. Chapter 6 of the 2009 International Energy Conservation Code contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
b. IPLVs and Part load rating conditions are only applicable to equipment with capacity modulation.
c. Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.
d. Single-phase air-cooled air conditioners < 65,000 Btu/h are regulated by the National Appliance Energy Conservation Act of 1987 (NAECA); SEER values are those set by NAECA.

Table 503.2.3(3)
Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
PTAC (Cooling mode) New Construction	All Capacities	95°F db outdoor air	12.5 - (0.213 Ÿ Cap/1000) EER	AHRI 310/380
PTAC (Cooling mode) Replacements[c]	All Capacities	95°F db outdoor air	10.9 - (0.213 Ÿ Cap/1000) EER	
PTHP (Cooling mode) New Construction	All Capacities	95°F db outdoor air	12.3 - (0.213 • Cap/1000) EER	
PTHP (Cooling mode) Replacements[c]	All Capacities	95°F db outdoor air	10.8 - (0.213 • Cap/1000) EER	
PTHP (Heating mode) New Construction	All Capacities	--	3.2 - (0.026 • Cap/1000) COP	
PTHP (Heating mode) Replacements[c]	All Capacities	--	2.9 - (0.026 • Cap/1000) COP	

For SI: °C=[(°F) - 32]/1.8, 1 British thermal unit per hour = 0.2931 W.
db = dry-bulb temperature, °F; wb = wet-bulb temperature, °F.

a. Chapter 6 of the 2009 International Energy Conservation Code contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. Cap means the rated cooling capacity of the product in Btu/h. If the unit's capacity is less than 7,000 Btu/h, use 7,000 Btu/h in the calculation. If the unit's capacity is greater than 15,000 Btu/h, use 15,000 Btu/h in the calculation.

c. Replacement units shall be factory labeled as follows: "MANUFACTURED FOR REPLACEMENT APPLICATIONS ONLY: NOT TO BE INSTALLED IN NEW CONSTRUCTION PROJECTS." Replacement efficiencies apply only to units with existing sleeves less than 16 inches (406 mm) high and less than 42 inches (1067 mm) wide.

Table 503.2.3(5)
Boilers, Gas- and Oil-fired, Minimum Efficiency Requirements

Equipment Type[f]	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Boilers, Gas-fired	<300,000 Btu/h	Hot water	80% AFUE	DOE 10 CFR Part 430
		Steam	75% AFUE	
	≥300,000 Btu/h and ≤2,500,000 Btu/h	Minimum capacity[b]	75% E_t and 80% E_c (See Note c, d)	DOE 10 CFR Part 431
	>2,500,000 Btu/h[f]	Hot water	80% E_c (See Note c, d)	
		Steam	80% E_c (See Note c, d)	
Boilers, Oil-fired	<300,000 Btu/h	--	80% AFUE	DOE 10 CFR Part 430
	≥300,000 Btu/h and ≤2,500,000 Btu/h	Minimum capacity[b]	78% E_t and 83% E_c (See Note c, d)	DOE 10 CFR Part 431
	>2,500,000 Btu/h[a]	Hot water	83% E_c (See Note c, d)	
		Steam	83% E_c (See Note c, d)	

(*continued*)

Table 503.2.3(5) (*continued*)
Boilers, Gas- and Oil-fired, Minimum Efficiency Requirements

Equipment Type[f]	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Boilers, Oil-fired (Residual)	≥300,000 Btu/h and ≤2,500,000 Btu/h	Minimum capacity[b]	78% E_t and 83% E_c (See Note c, d)	DOE 10 CFR Part 431
	>2,500,000 Btu/h[a]	Hot water	83% E_c (See Note c, d)	
		Steam	83% E_c (See Note c, d)	

For SI: 1 British thermal unit per hour = 0.2931 W.
a. Chapter 6 of the 2009 International Energy Conservation Code contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
b. Minimum ratings as provided for and allowed by the unit's controls.
c. E_c = Combustion efficiency (100 percent less flue losses). See reference document for detailed information.
d. E_t = Thermal efficiency. See reference document for detailed information.
e. Alternative test procedures used at the manufacturer's option are ASME PTC-4.1 for units greater than 5,000,000 Btu/h input, or ANSI Z21.13 for units greater than or equal to 300,000 Btu/h and less than or equal to 2,500,000 Btu/h input.
f. These requirements apply to boilers with rated input of 8,000,000 Btu/h or less that are not packaged boilers, and to all packaged boilers. Minimum efficiency requirements for boilers cover all capacities of packaged boilers.

Table 503.2.3(6)
Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Equipment Type	Size Category	Minimum Efficiency[b]	Test Procedure[a]
Condensing units, air cooled	≥135,000 Btu/h	10.1 EER	AHRI 365
		11.2 IPLV	
Condensing units, water or evaporatively cooled	≥135,000 Btu/h	13.1 EER	
		13.1 IPLV	

For SI: 1 British thermal unit per hour = 0.2931 W.

a. Chapter 6 of the 2009 International Energy Conservation Code contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. IPLVs are only applicable to equipment with capacity modulation.

Table 503.2.3(7)
Water Chilling Packages, Efficiency Requirements[a]

Equipment Type	Size Category	Units	As of 1/1/2010		As of 1/1/2010[c]				Test Procedure[b]
					Path A		Path B		
			Full Load	IPLV	Full Load	IPLV	Full Load	IPLV	
Air-cooled chillers	<150 tons	EER	≥9.562	≥10.416	≥9.562	≥12.500	NA[d]	NA[d]	AHRI 550/590
	≥150 tons	EER			≥9.562	≥12.750	NA[d]	NA[d]	
Air-cooled without condenser, electrical operated	All capacities	EER	≥10.586	≥11.782	Air-cooled chillers without condensers must be rated with matching condensers and comply with the air-cooled chiller efficiency requirements				
Water cooled, electrically operated, reciprocating	All capacities	kW/ton	≤0.837	≤0.696	Reciprocating units must comply with water cooled positive displacement efficiency requirements				
Water cooled, electrically operated, positive displacement	<75 tons	kW/ton	≤0.790	≤0.676	≤0.780	≤0.630	≤0.800	≤0.600	
	≥75 tons and <150 tons	kW/ton			≤0.775	≤0.615	≤0.790	≤0.586	
	≥150 tons and <300 tons	kW/ton	≤0.717	≤0.627	≤0.680	≤0.580	≤0.718	≤0.540	
	≥300 tons	kW/ton	≤0.639	≤0.571	≤0.620	≤0.540	≤0.639	≤0.490	

(*continued*)

Table 503.2.3(7) (*continued*)

Water Chilling Packages, Efficiency Requirements[a]

Water cooled, electrically operated, centrifugal	<150 tons	kW/ton	≤0.703	≤0.669	≤0.634	≤0.596	≤0.639	≤0.450	AHRI 550/ 590
	≥150 tons and <300 tons	kW/ton	≤0.634	≤0.596					
	≥300 tons and <600 tons	kW/ton	≤0.576	≤0.549	≤0.576	≤0.549	≤0.600	≤0.400	
	≥600 tons	kW/ton	≤0.576	≤0.549	≤0.570	≤0.539	≤0.590	≤0.400	
Air-cooled, absorption single effect	All capacities	COP	≥0.600	NR[e]	≥0.600	NR[e]	NA[d]	NA[d]	AHRI 560
Water-cooled, absorption single effect	All capacities	COP	≥0.700	NR[e]	≥0.700	NR[e]	NA[d]	NA[d]	
Absorption double effect, indirect-fired	All capacities	COP	≥1.000	≥1.050	≥1.000	≥1.050	NA[d]	NA[d]	
Absorption double effect, direct fired	All capacities	COP	≥1.000	≥1.000	≥1.000	≥1.000	NA[d]	NA[d]	

For SI: 1 ton = 3517 W, 1 British thermal unit per hour = 0.2931 W.

a. The chiller equipment requirements do not apply for chillers used in low-temperature applications where the design leaving fluid temperature is <40°F.

b. Section 12 of the 2009 International Energy Conservation Code contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

c. Compliance with this standard can be obtained by meeting the minimum requirements of Path A or B. However, both the full load and IPLV must be met to fulfill the requirements of Path A or B.

d. NA means that this requirement is not applicable and cannot be used for compliance.

e. NR means that there are no minimum requirements for this category.

6. Service Water Heating

6.01 General

This section covers the minimum efficiency of, and controls for, service water-heating equipment and insulation of service hot water piping. New service water heating systems and equipment shall meet the requirements of this section.

6.02 Mandatory Provisions

(A) **Service water-heating equipment performance efficiency.** Water-heating equipment and hot water storage tanks shall meet the requirements of Table 601. The efficiency shall be verified through data furnished by the manufacturer or through certification under an *approved* certification program.

(B) **Temperature controls.** Service water-heating equipment shall be provided with controls to allow a setpoint of 110°F (43°C) for equipment serving dwelling units and 90°F (32°C) for equipment serving other occupancies. The outlet temperature of lavatories in public facility rest rooms shall be limited to 110°F (43°C).

(C) All water heating systems shall be certified as Energy Star compliant.

(D) Heat traps. Water-heating equipment not supplied with integral heat traps and serving noncirculating systems shall be provided with heat traps on the supply and discharge piping associated with the equipment.

(E) Pipe insulation. For automatic-circulating hot water systems, piping shall be insulated with 1 inch (25 mm) of insulation having a conductivity not exceeding 0.27 Btu per inch/h x ft^2 x °F (1.53 W per 25 mm/m^2 x K). The first 8 feet (2438 mm) of piping in noncirculating systems served by equipment without integral heat traps shall be insulated with 0.5 inch (12.7 mm) of material having a conductivity not exceeding 0.27 Btu per inch/h x ft^2 x °F (1.53 W per 25 mm/m^2 x K).

(F) Hot water system controls. Automatic-circulating hot water system pumps or heat trace shall be arranged to be conveniently turned off automatically, or manually when the hot water system is not in operation.

(G) Water Conservation. Shower heads and lavatories shall be labeled as meeting the requirements of the International Plumbing Code, 2009 edition, Section 604.4.

Table 601
Minimum Performance of Water-Heating Equipment

Equipment Type	Size Category (input)	Subcategory or Rating Condition	Performance Required[a, b]	Test Procedure
Water heaters, Electric	≤12 kW	Resistance	0.97 - 0.00132*V*, EF	DOE 10 CFR Part 430
	>12 kW	Resistance	1.73*V* + 155 SL, Btu/h	ANSI Z21.10.3
	≤24 amps and ≤250 volts	Heat pump	0.93 - 0.00132*V*, EF	DOE 10 CFR Part 430
Storage water heaters, Gas	≤75,000 Btu/h	≥20 gal	.067 - 0.0019*V*, EF	DOE 10 CFR Part 430
	>75,000 Btu/h and ≤155,000 Btu/h	<4,000 Btu/h/gal	80% E_t (Q/800 + 110$\sqrt{V}$)SL, Btu/h	ANSI Z21.10.3
	>155,000 Btu/h	<4,000 Btu/h/gal	80% E_t (Q/800 + 110$\sqrt{V}$)SL, Btu/h	
Instantaneous water heaters, Gas	>50,000 Btu/h and <200,000 Btu/h[c]	≥4,000 (Btu/h)/gal and <2 gal	0.62 - 0.0019*V*, EF	ANSI Z21.10.3
	≥200,000 Btu/h	≥4,000 Btu/h/gal and <10 gal	80% E_t	
	≥200,000 Btu/h	≥4,000 Btu/h/gal and ≥10 gal	80% E_t (Q/800 + 110$\sqrt{V}$)SL, Btu/h	
Storage water heaters, Oil	≤105,000 Btu/h	≥20 gal	0.59 - 0.0019*V*, EF	DOE 10 CFR Part 430
	>105,000 Btu/h	<4,000 Btu/h/gal	78% E_t (Q/800 + 110$\sqrt{V}$)SL, Btu/h	ANSI Z21.10.3

(continued)

Table 601 (continued)
Minimum Performance of Water-Heating Equipment

Equipment Type	Size Category (input)	Subcategory or Rating Condition	Performance Required[a, b]	Test Procedure
Instantaneous water heaters, Oil	≤210,000 Btu/h	≥4,000 Btu/h/gal and <2 gal	0.59 - 0.0019V, EF	DOE 10 CFR Part 430
	>210,000 Btu/h	≥4,000 Btu/h/gal and <10 gal	80% E_t	ANSI Z21.10.3
	>210,000 Btu/h	≥4,000 Btu/h/gal and ≥10 gal	78% E_t (Q/800 + 110$\sqrt{V}$)SL, Btu/h	
Hot water supply boilers, Gas and Oil	≥300,000 Btu/h and <12,500,000 Btu/h	≥4,000 Btu/h/gal and <10 gal	80% E_t	ANSI Z21.10.3
Hot water supply boilers, Gas	≥300,000 Btu/h and <12,500,000 Btu/h	≥4,000 Btu/h/gal and ≥10 gal	80% E_t (Q/800 + 110$\sqrt{V}$)SL, Btu/h	
Hot water supply boilers, Oil	>300,000 Btu/h and <12,500,000 Btu/h	>4,000 Btu/h/gal and >10 gal	78% E_t (Q/800 + 110$\sqrt{V}$)SL, Btu/h	
Pool heaters, Gas and Oil	All	--	78% E_t	ASHRAE 146
Heat pump pool heaters	All	--	4.0 COP	AHRI 1160
Unfired storage tanks	All	--	Minimum insulation requirement R-12.5 (h • Ft2 • °F)/Btu	(none)

For SI: °C=[(°F) - 32]/1.8, 1 British thermal unit per hour = 0.2931 W, 1 gallon = 3.785 L, 1 British thermal unit per hour per gallon = 0.078 W/L.

a. Energy factor (EF) and thermal efficiency (E_t) are minimum requirements. In the EF equation, V is the rated volume in gallons.

b. Standby loss (SL) is the maximum Btu/h based on a nominal 70°F temperature difference between stored water and ambient requirements. In the SL equation, Q is the nameplate input rate in Btu/h. In the SL equation for electric water heaters, V is the rated volume in gallons. In the SL equation for oil and gas water heaters and boilers, V is the rated volume in gallons.

c. Instantaneous water heaters with input rates below 200,000 Btu/h must comply with these requirements if the water heater is designated to heat water to temperatures 180°F or higher.

7. Lighting

7.01 General

Lighting systems and equipment shall comply with this Chapter. The lighting requirements in this section shall apply to:

(A) interior spaces of buildings,

(B) exterior building features, including facades, illuminated roofs, architectural features, entrances, exits, loading docks, and illuminated canopies, and

(C) building grounds for lighting that is provided through the building's electrical service.

(D) Exceptions to Section 7.01:

(1) emergency lighting that is automatically off during normal building operation and is powered by battery, generator, or other alternate power source.

(2) residential dwelling units, provided that a minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps. For additions or extensions, unaltered portions of the existing residential dwelling unit shall not be required to comply with this requirement.

7.02 Mandatory Provisions

(A) Lighting Control

(1) Space Control. Each space enclosed by ceiling-height partitions shall have at least one control device to independently control the general lighting within the space. Each control device shall be activated either manually by an occupant or automatically by sensing an occupant. Each control device shall:

a) control a maximum of 2,500 ft^2 for a space less than 10,000 ft^2 and a maximum of 10,000 ft^2 for a space greater than 10,000 ft^2

b) be capable of overriding the automatic shutoff control required in Section 7.02(A)(1) for no more than 2 hours, and

c) be readily accessible and located so the occupant can see the controlled lighting.

Exception to Section 7.02(A)(1)(c). The required control device may be remotely installed if required for reasons of safety or security. A

remotely located device shall have a pilot light indicator as part of or next to the control device and is clearly labeled to identify the controlled lighting.

(2) Automatic Lighting Shutoff. Interior lighting systems serving more than 5,000 ft^2 shall be equipped with an automatic control device. This automatic control device shall function on either a scheduled basis at specific programmed times or on an unscheduled basis by occupant sensors. An independent program schedule shall be provided for areas of no more than 25,000 ft^2 but not more than one floor.

Exception: lighting systems designed for 24-hour use.

(3) Daylighted Area Control. Luminaires in daylighted areas greater than 250 ft^2 shall be equipped with an independent control device that: (a) is capable of reducing the light output of the luminaires in the day lighted areas by at least 50%, and (b) controls only the luminaires located entirely within the day lighted area.

(4) Exterior Lighting Control. Lighting for all exterior applications not exempted shall be controlled by a photosensor or astronomical time switch that is capable of automatically turning off the exterior lighting when daylight is available or the lighting is not required.

(5) Additional Control. The following lighting applications shall be equipped with a control device to control such lighting independently of general lighting:

a) Display/Accent Lighting. Display or accent lighting within a 3,000 ft^2 area shall have a separate control device.

b) Case Lighting. Lighting in cases used for display purposes within a 3,000 ft^2 area shall be equipped with a separate control device.

c) Hotel and Motel Guest Room Lighting. Hotel and motel guest rooms and guest suites shall have a master control device at the main room entry that controls all permanently installed luminaires and switched receptacles.

d) Task Lighting. supplemental task lighting including permanently installed undershelf or undercabinet lighting shall have a control device integral to the luminaire or be controlled by a wall-mounted control device provided the control device complies with Section 7.02(A)(1)(c).

e) Nonvisual Lighting. Lighting for nonvisual applications, such as plant growth and food-warming, shall be equipped with a separate control device.

f) Demonstration Lighting. Lighting equipment that is for sale or for demonstrations in lighting education shall be equipped with a separate control device accessible only to authorized personnel.

(B) Exit Signs. Exit sign luminaire power shall not exceed 5 watts for each exposed face.

(C) Installed Interior Lighting Power. The installed interior lighting power shall include the power of all the lighting indicated on the plans and specifications. The installed interior lighting power includes all power used by the luminaires, including lamps, ballasts, current regulators, and control devices except as specifically exempted in Section 7.01.

Exception to Section 7.02(C). If two or more independently operating lighting systems in a space are controlled to prevent simultaneous user operation, the installed interior lighting power shall be based solely on the lighting system with the highest power.

(D) Luminaire Wattage. Luminaire wattage incorporated into the installed interior lighting power shall be determined in accordance with the following criteria:

(1) The wattage of incandescent luminaires with medium screw base sockets and not containing permanently installed ballasts shall be the maximum labeled wattage of the luminaire.

(2) The wattage of luminaires containing permanently installed ballasts shall be the operating input wattage of the specified lamp/ballast combination based on values from manufacturers catalogs or values from independent testing laboratory reports.

(3) The wattage of all other miscellaneous luminaire types not described in (1) or (2) shall be the specified wattage of the luminaire.

(4) The wattage of lighting track, plug-in busway, and flexible-lighting systems that allow the addition and/or relocation of luminaires without altering the wiring of the system shall be the larger of the specified wattage of the luminaires included in the system or 30 W/lin ft. Systems with integral overload protection, such as fuses or circuit breakers, shall be rated at 100% of the maximum rated load of the limiting device.

(E) Exterior Building Grounds Lighting. Lighting for exterior building grounds luminaires which operate at greater than 100 W shall contain lamps having a minimum efficacy of 60 lm/W unless the luminaire is controlled by a motion sensor or exempt under Section 7.01.

7.03 Interior Lighting Power

(A) The installed interior lighting power for a building or a separately metered or permitted portion of a building shall be calculated in accordance with Section

7.02(D) and shall not exceed the interior lighting power allowance determined in accordance with either Section 7.03(B) or Section 7.03(C). Tradeoffs of interior lighting power allowance among portions of the building for which a different method of calculation has been used are not permitted.

(B) Building Area Method Determination of interior lighting power allowance (watts) by the building area method shall be in accordance with the following:

(1) Determine the appropriate building type from Table 7.1 and the allowed lighting power density. For building area types not listed, selection of a reasonably equivalent type shall be permitted.

(2) Determine the gross lighted floor area of the building.

(3) The interior lighting power allowance is the product of the lighted floor area of the building times the allowed lighting power density.

(4) If a building is comprised of different building area types, an allowance for each shall be computed separately. Trade-offs among building area types are permitted provided that the total installed interior lighting power does not exceed the interior lighting power allowance.

Exceptions to Section 7.03(B): The following lighting equipment and applications shall not be considered when determining the interior lighting power allowance, nor shall the wattage for such lighting be included in the installed interior lighting power identified in accordance with Section 7.02(D).

a) The connected power associated with the following lighting equipment is not included in calculating total connected lighting power.

i) Sports arena or playing field lighting.

ii) *Sleeping unit* lighting in hotels, motels, boarding houses or similar buildings.

iii) Emergency lighting automatically off during normal building operation.

iv) Lighting in spaces specifically designed for use by occupants with special lighting needs including the visually impaired and other medical and age-related issues.

v) Lighting in interior spaces that have been specifically designated as a registered historic structure.

b) Lighting equipment used for the following shall be exempt provided that it is in addition to general lighting and is controlled by an independent control device.

i) Lighting specifically designed for medical or dental procedures and lighting integral to medical equipment.

ii) Display or accent lighting that is an essential element for the function performed in galleries, museums, and monuments.

c) Lighting for theatrical purposes, including performance, stage, and film or video production.

d) Lighting for photographic processes.

e) Lighting that is integral to equipment or instrumentation and is installed by its manufacturer.

f) Lighting for plant growth or maintenance.

g) Lighting that is an integral part of advertising or directional signage.

h) Lighting integral to food warming and food preparation equipment.

i) Lighting that is for sale or lighting educational demonstration systems.

j) Lighting *approved* because of safety or emergency considerations, inclusive of exit lights.

k) Lighting integral to both open and glass-enclosed refrigerator and freezer cases.

l) Lighting in retail display windows, provided the display area is enclosed by ceiling-height partitions.

m) Furniture mounted supplemental task lighting that is controlled by automatic shutoff.

(C) Alternative Method: The interior lighting power may alternatively be calculated by using Section 7.04 Alternative Compliance Path: Space-by-Space Method.

Table 7.2 Interior Lighting Power Densities – Building Area Method			
Building Area Type	W/ft^2	Building Area Type	W/ft^2
Automotive Facility	0.9	Multi-Family	0.7
Convention Center	1.2	Museum	1.1
Court House	1.2	Office	1.0
Dining: Bar Lounge/Leisure	1.3	Parking Garage	0.3
Dining: Cafeteria/Fast Food	1.4	Penitentiary	1.0
Dining: Family	1.6	Performing Arts Theater	1.6
Dormitory	1.0	Police/Fire Station	1.0
Exercise Center	1.0	Post Office	1.1
Gymnasium	1.1	Religious Building	1.3
Health Care-Clinic	1.0	Retail	1.5
Hospital	1.2	School/University	1.2
Hotel	1.0	Sports Arena	1.1
Library	1.3	Town Hall	1.1
Manufacturing Facility	1.3	Transportation	1.0
Motel	1.0	Warehouse	0.8
Motion Picture Theater	1.2	Workshop	1.4
In cases where both general building type and a specific building area type are listed, the specific building area type shall apply. ASHRAE 90.1-2007.			

7.04 Alternative Compliance Path: Space-by-Space Method

Space-by-Space Method of Calculating Interior Lighting Power Allowance. Use the following steps to determine the interior lighting power allowance by the Space-by-Space Method:

(A) Determine the appropriate building type from Table 7.2. For building types not listed, selection of a reasonably equivalent type shall be permitted.

(B) For each space enclosed by partitions 80% or greater than ceiling height, determine the gross interior floor area by measuring to the center of the partition wall. Include the floor area of balconies or other projections. Retail spaces do not have to comply with the 80% partition height requirements.

(C) Determine the *interior lighting power allowance* by using the columns designated Space-by-Space Method in Table 7.2. Multiply the floor area(s) of the space(s) times the allowed *LPD* for the space type that most closely represents the proposed use of the space(s). The product is the *lighting power*

allowance for the space(s). For space types not listed, selection of a reasonable equivalent category shall be permitted.

(D) The interior *lighting power allowance* is the sum of *lighting power allowances* of all spaces. Trade-offs among spaces are permitted provided that the total *installed interior lighting power* does not exceed *the interior lighting power allowance*.

7.05 Additional Interior Lighting Power

When using the Space-by-Space Method, an increase in the *interior lighting power allowance* is allowed for specific lighting functions. Additional power shall be allowed only if the specified lighting is installed and automatically controlled, separately from the general lighting, to be turned off during non-business hours. This additional power shall be used only for the specified *luminaires* and shall not be used for any other purpose.

An increase in the *interior lighting power allowance* is permitted in the following cases:

(A) For spaces in which lighting is specified to be installed in addition to the general lighting for the purpose of decorative appearance, such as chandelier-type luminaries or sconces or for highlighting art or exhibits, provided that the additional lighting power shall not exceed 1.0 W/ft^2 of such spaces.

(B) For lighting equipment installed in sales areas and specifically designed and directed to highlight merchandise, calculate the additional lighting power as follows:

Additional Interior Lighting Power Allowance = 1000 watts + (Retail Area 1 x 1.0 W/ft^2) + (Retail Area 2 x 1.7 W/ft^2) + (Retail Area 3 x 2.6 W/ft^2) + (Retail Area 4 x 4.2 W/ft^2),

where
Retail Area 1 = the floor area for all products not listed in Retail Areas 2, 3, or 4;
Retail Area 2 = the floor area used for the sale of vehicles, sporting goods, and small electronics;
Retail Area 3 = the floor area used for the sale of furniture, clothing, cosmetics, and artwork; and
Retail Area 4 = the floor area used for the sale of jewelry, crystal, and china.

Exception: Other merchandise categories may be included in Retail Areas 2 through 4 above, provided that justification documenting the need for additional lighting power based on visual inspection, contrast, or other critical display is approved by the Department of Public Works.

Table 7.2 Lighting Power Densities Using the Space-by-Space Method

Common Space Types[a]	*LPD*, W/ft²
Office--Enclosed	1.1
Office--Open Plan	1.1
Conference/Meeting/Multipurpose	1.3
Classroom/Lecture/Training	1.4
For Penitentiary	1.3
Lobby	1.3
For Hotel	1.1
For Performing Arts Theater	3.3
For Motion Picture Theater	1.1
Audience/Seating Area	0.9
For Gymnasium	0.4
For Exercise Center	0.3
For Convention Center	0.7
For Penitentiary	0.7
For Religious Buildings	1.7
For Sports Arena	0.4
For Performing Arts Theater	2.6
For Motion Picture Theater	1.2
For Transportation	0.5
Atrium--First Three Floors	0.6
Atrium--Each Additional Floor	0.2
Lounge/Recreation	1.2
For Hospital	0.8
Dining Area	0.9
For Penitentiary	1.3
For Hotel	1.3
For Motel	1.2
For Bar Lounge/Leisure Dining	1.4
For Family Dining	2.1
Food Preparation	1.2
Laboratory	1.4
Restrooms	0.9
Dressing/Locker/Fitting Room	0.6
Corridor/Transition	0.5
For Hospital	1.0
For Manufacturing Facility	0.5
Stairs--Active	0.6
Active Storage	0.8
For Hospital	0.9
Inactive Storage	0.3
For Museum	0.8
Electrical/Mechanical	1.5

Building-Specific Space Types	*LPD*, W/ft²
Gymnasium/Exercise Center	
Playing Area	1.4
Exercise Area	0.9
Courthouse/Police Station/Penitentiary	
Courtroom	1.9
Confinement Cells	0.9
Judges' Chambers	1.3
Fire Stations	
Engine Room	0.8
Sleeping Quarters	0.3
Post Office--Sorting Area	1.2
Convention Center--Exhibit Space	1.3
Library	
Card File and Cataloging	1.1
Stacks	1.7
Reading Area	1.2
Hospital	
Emergency	2.7
Recovery	0.8
Nurses' Station	1.0
Exam/Treatment	1.5
Pharmacy	1.2
Patient Room	0.7
Operating Room	2.2
Nursery	0.6
Medical Supply	1.4
Physical Therapy	0.9
Radiology	0.4
Laundry--Washing	0.6
Automotive--Service/Repair	0.7
Manufacturing	
Low Bay (<25 ft Floor to Ceiling Height)	1.2
High Bay (≥25 ft Floor to Ceiling Height)	1.7
Detailed Manufacturing	2.1
Equipment Room	1.2
Control Room	0.5
Hotel/Motel Guest Rooms	1.1
Dormitory--Living Quarters	1.1
Museum	
General Exhibition	1.0
Restoration	1.7
Bank/Office--Banking Activity Area	1.5

(continued)

Table 7.2 Lighting Power Densities Using the Space-by-Space Method (continued)

Common Space Types[a]	*LPD*, W/ft²	Building-Specific Space Types	*LPD*, W/ft²
Workshop	1.9	Religious Buildings	
Sales Area[b]	1.7	Worship Pulpit, Choir	2.4
		Fellowship Hall	0.9
		Retail	
		Sales Area[c]	1.7
		Mall Concourse	1.7
		Sports Arena	
		Ring Sports Area	2.7
		Court Sports Area	2.3
		Indoor Playing Field Area	1.4
		Warehouse	
		Fine Material Storage	1.4
		Medium/Bulky Material Storage	0.9
		Parking Garage--Garage Area	0.2
		Transportation	
		Airport--Concourse	0.6
		Air/Train/Bus--Baggage Area	1.0
		Terminal--Ticket Counter	1.5

[a]In cases where both a common space type and a building-specific type are listed, the building specific type shall apply.

[b]For accent lighting, see Section 9.6.2(b) of the ANSI/ASHRAE/IESNA Standard 90.1-2007 (I-P Edition)

[c]For accent lighting, see Section 9.6.3(c) of the ANSI/ASHRAE/IESNA Standard 90.1-2007 (I-P Edition)

7.06 Exterior Building Lighting Power

The total exterior lighting power allowance for all exterior building applications is the sum of the individual lighting power densities permitted in Table 7.3 plus an additional allowance of up to 5% of that sum. Trade-offs are permitted only for those elements designated as "Tradeable Surfaces" in Table 7.3 All fixtures shall comply with Section 7.02(E).

Exceptions to Section 7.06: Lighting used for the following exterior applications is exempt when equipped with a control device independent of the control of the nonexempt lighting:

(A) Specialized signal, directional, and marker lighting associated with transportation.

(B) Advertising signage or directional signage.

(C) Lighting integral to equipment or instrumentation that is installed by its manufacturer.

(D) Lighting for theatrical purposes, including performance, stage, film production, and video production.

(E) Lighting for athletic playing areas.

(F) Temporary lighting.

(G) Lighting for industrial production, material handling, transportation sites, and associated storage areas.

(H) Theme elements in theme/amusement parks.

(I) Lighting used to highlight features of public monuments and registered historic landmark structures or buildings.

Table 7.3 - Exterior Lighting Power Densities		
Tradeable Surfaces: (Lighting power densities for uncovered parking areas, building grounds, building entrances and exits, canopies and overhangs, and outdoor sales areas may be traded)	**Uncovered Parking Areas**	
	Parking lots and drives	0.15 W/ft^2
	Building Grounds	
	Walkways less than 10 feet wide	1.0 W/linear foot
	Walkways 10 feet wide or greater	0.2 W/ft^2
	Plaza areas	0.2 W/ft^2
	Special feature areas	0.2 W/ft^2
	Stairways	1.0 W/ft^2
	Building Entrances and Exits	
	Main entries	30 W/linear foot of door width
	Other doors	20 W/linear foot of door width
	Canopies and Overhangs	
	Canopies (free standing and attached overhands)	1.25 W/ft^2
	Outdoor Sales	
	Open areas (including vehicle sales lots)	0.5 W/ft^2
	Street frontage for vehicle sales lots in addition to "open area" allowance	20 W/linear foot
Non-Tradeable Surfaces: (Lighting Power density calculations for these applications can be used only for the specific application and cannot be traded between surfaces or with other exterior lighting. The following allowances are in addition to any allowance otherwise permitted in the "Tradeable Surfaces" section of this table.)	**Building Facades**	0.2 W/ft^2 for each illuminated wall or surface or 5.0 W/linear foot for each illuminated wall or surface length
	Automate Teller Machines and Night Depositories	270 W per location plus 90W per additional ATM per location
	Entrances and Gatehouse Inspection Stations at Guarded Facilities	1.25 W/ft^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradeable Surfaces")
	Loading areas for law enforcement, fire, ambulance, and other emergency vehicles	0.5 W/ft^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradeable Surfaces")
	Drive-Up Windows at Fast Food Restaurants	400 W per drive-through
	Parking near 24-hour retail entrances	800 W per main entry

AIA
american institute of architects guam & micronesia chapter

October 18, 2013

Honorable Senator Thomas C. Ada, Chairperson
Committee on Public Safety, Infrastructure, & Marine Transportation
32nd Guam Legislature
Hagatna, Guam 96910

Subject: Bill 61-32, Adoption of the Guam Tropical Energy Code

Buenas Senator Ada,

The AIA Guam & Micronesia Chapter supports the adoption of the Guam Tropical Energy Code.

Buildings account for approximately thirty-percent of overall energy consumption. In our tropical climate, where it is always hot and humid, the bulk of building energy use is for year-round air-conditioning to make our homes, schools, businesses, and social places comfortable and conducive to our daily activities. Lighting and hot water also contribute to power consumption. The Tropical Energy Code focuses on reducing the power consumption associated with these necessities of our everyday life by requiring energy efficient products.

The Guam Tropical Energy Code also includes requirements for buildings that maximize energy efficiency. Building envelope requirements better insulate interior spaces from the exterior environment and air leakage. Thermal performance requirements for doors and windows also improve building envelopes. Requirements are also included to enhance the performance and comfort of naturally ventilated low-rise residential buildings. Requirements for lighting controls allow people to use lights when needed and to maximize the use of natural daylight.

The implementation of the Guam Tropical Energy Code is a means to improving the quality of life on Guam. It is a fundamental step in the development of better buildings that support our daily activities and our need for comfort while simultaneously reducing energy consumption and helping the environment. The passage of Bill 61-32 into law will have a lasting positive impact on the lives of current and future generations of Guamanians.

We encourage the 32nd Guam Legislature to adopt the Guam Tropical Energy Code.

Senseramente,

AIA Guam and Micronesia Chapter

Cedric Q.T. Cruz, AIA
President

c/o P.O. Box EA Hagatna, GU 96932

ASHRAE Guam Section

MEMORADUM

October 21, 2013

TO: Committee on Public Safety, Infrastructure, and Maritime Transportation

SUBJECT: §6101.7 to Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC).

Dear Sirs:

The local Guam section of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, (ASHRAE) is pleased support this legislation, Bill 61-32, to adopt the 2013 Guam Tropical Energy Code (GTEC).

The Guam Energy Code Task Force and the Guam Building Code Council have developed an effective Guam Tropical Energy Code. The Guam Section of ASHRAE members have reviewed the GTEC and feel that the adoption of this code is important. Adoption of the GTEC shows that the people of Guam are forward thinking and recognize the need to sensibly reduce the island's current and future energy consumption.

Respectfully Yours,

Gregory Johnson PE, LEED AP
ASHRAE, Guam local section

Guam Association of REALTORS®

"Voice for Real Estate"

October 18, 2013

Honorable Thomas C. Ada
Senator, 32nd Guam Legislature
Chairman, Committee on Public Safety, Infrastructure & Maritime Transportation
Suite 207, Ada Plaza Center
173 Aspinall Ave
Hagatna, Guam 96910

Subject: Bill 61-32 (COR): An Act to Add a New Section 67101.7 of Chapter 67,Title 21, Guam Code Annotated, relative to Adopting the Guam Tropical Energy Code

Re: Testimony in Support of Bill 61-32

Hafa Adai Senator Ada:

The Guam Association of REALTORS® (GAR) is pleased to support the enactment of the Bill 61-32 relative to adopting the Guam Tropical Energy Code.

We applaud the efforts of the Guam Building Code Council (GBCC) in developing the proposed Guam Tropical Energy Code, the implementation of which is intended to promote energy conservation in a cost-effective manner. The benefits the GTEC offers include reduced energy bills and a comfortable healthy home and workplace. GAR understands that the energy savings derived from the use of the new energy code will offset in a very short time the modest increase in the cost of compliance. The 6-month grace period prior to implementation provided in the bill gives the public and the energy-use industry the opportunity to adequately prepare for compliance. In short, the Guam Tropical Energy Code is good for Guam.

We urge swift passage of Bill 61-32.

Sincerely,

Clare Delgado,
2013 President, Guam Association of REALTORS®

cc:
Carl Peterson, Legislative Chair – Guam Association of REALTORS®
John P. Duenas, Principal Broker – REMAX Diamond Realty and Member of GBCC
Peggy Llagas, Executive Officer – Guam Association of REALTORS®

Suite 236A, Julale Center 424 West O'Brien Drive, Hagatna, Guam USA 96910
Telephone: (671)477-4271 Facsimile: (671) 477-4275 Email: eo@guamrealtors.com Website: www.guamrealtors.com

Submitted by GBCC as supplement to oral testimony.

2012 Guam Tropical Energy Code Information Sheet

Presented by the Guam Building Code Council October 2013

Why it is important to have an Energy Code in Guam

The Guam Building Code Council (GBCC) has put together the following information to help the public better understand the background and impact of the *2012 Guam Tropical Energy Code* (GTEC).

A PDF copy of the code is available online on the Guam Energy Office's (GEO) website; http://www.guamenergy.com/outreach-education/guam-tropical-energy-code/
Questions can be sent to the GBCC, at contact@guambcc.org

Good globally

Need to reduce energy use. Buildings consume over 40% of all energy and over 70% of all the electricity used in the United States. ASE Fact Sheet, Building Energy Codes

Need to reduce greenhouse gasses. Buildings in the United States account for 40% of the nation's carbon dioxide emissions. ASE Fact Sheet, Building Energy Codes

> A study conducted by the *Climate Policy Initiative* found that between 1990 and 2010, the US created 5-6,000 million metric tons of CO2 emissions. Of that, residential buildings created 1,200 metric tons, and commercial space created 1,000 metric tons of CO2 emissions. And states that adopted federal building energy codes reduced household energy usage by 10% and household greenhouse gas emissions by 16% from 1986–2008.

Good for the Island

The implementation of the GTEC will reap the following benefits for Guam:

- Reduces the island's energy demand. A Guam energy code is an integral piece of the *Guam Energy Task Force* toolkit. The *Guam Energy Task Force* was charged with finding ways to reduce reliance on fossil fuels, and explore alternative means of energy generation. The most effective way to accomplish this is to reduce demand. An effective energy code is critical to accomplish this.
- Promote the generation of more on-island jobs resulting from the development and deployment of new building technologies and design strategies.
- Reduce demand for energy production growth. Provide a cost-effective tool toward mitigating problems associated with the growing demand for energy and power resources.
- Make possible for the earlier retirement of the older, inefficient power generation equipment.
- Overcome market barriers that inhibit investment in buildings energy efficiency. Currently,

developers have little incentive since they pay the initial costs, but not the power bills.

- Safeguard owners and tenants from long-term financial burdens that can result from short-term design and construction decisions. This is especially important for renters who have no say in the building construction. The developer can reduce the initial cost by not installing insulation and using an in-efficient mechanical system resulting in increased monthly costs that are borne by the tenant. More information can be found from these references:
  http://www.greenleaselibrary.com
  http://www.rmi.org/Knowledge-Center/Library/2012-05_GuideForLandlordsTenants
- Promote increased property values and increased rent potential. Increased initial investment in building energy systems increases the building value. Rentals that have lower power bills and greater thermal comfort will be worth more to tenants, allowing for higher rents.
- Reduce the amount of dollars sent off island to pay for diesel. For every hour we sit here and debate this issue, GPA has just spent roughly $35,000 in fuel. In 2012, GPA spent over $300,000,000 in residual fuel oil (RFO) and ultralow sulfur diesel (ULSD) fuel to generate electricity. GPA 2013 Integrated Resource Plan Money not spent on GPA fuel is money that can stay on island. And when those dollars are spent over and over again here, the island GNP grows, and everyone can profit.
- Saved energy saves money. Look at an air conditioning system. For every kilowatt/hour of energy not needed, roughly 3 kilowatt/hours of energy is not produced. Working backwards, there is pump and motor efficiency losses from your equipment, energy is lost before it gets to your home from transmission and distribution losses through the power grid, losses from power generation, from the energy it takes to ship diesel here, from being refined, from being drilled and pumped for use.

  For example, this is from Lawrence Livermore National Laboratory's *Estimated California Energy Use in 2008* results. Electricity generated for Residential use was 1614.1 trillion BTU's. Of that, only 898.7 actually reached the house. And from that, only 584.2 was actual serviceable energy used. That's a loss of roughly 64% of energy generated. That loss is considered "rejected energy". In this scenario, for every dollar saved in energy not used, $2.76 of energy is saved from being generated. And this doesn't even account for power required to ship the diesel here, refinement, and raw material acquisition. LLNL Estimated California Energy Use In 2008
- Reduce smoke emissions. Less demand will require less energy production, which will produce fewer emissions. Fewer emissions mean cleaner air, increased visibility, as well as potential cost savings. EPA requirements may get 6-7 times as strict than previous years. To mitigate this, infrastructure improvements may be required, which means higher costs (potentially $5M over five years). GPA 2013 Integrated Resource Plan
- Enables Guam to receive energy-related federal funds. The U.S. Department of Energy requires an energy code for many of its programs. In the last couple years, Guam has benefited from ARRA money to improve existing buildings' energy performance. DoE has also provided other grants and funding for energy development, conservation education, and improved energy efficiency. A requirement of most of that funding is that Guam has, or soon will have, an energy conservation code. Failure to approve of an energy code will put Guam at risk for future funding.

Good Individually

An effective energy code provides additional available income for spending. The more efficient our homes are, the less we pay for power. The more businesses save on power costs, the less they need to charge to capture those expenses.

For homeowners, lower power bills would be welcome. But they will also see reduced maintenance costs, increased home value, improved comfort, and improved health and safety. Reduced maintenance costs can be achieved by avoiding cooling equipment maintenance and replacement due to excessive run time, reduced insect and rodent infestation due to improper sealing, and less mold grown from condensation. Improved comfort can be achieved by less outdoor noise, less condensation, and better thermal performance. Improved health can be achieved by reducing health risks such as mold, radon, pollen, rodents, and insects.

Building energy codes save consumers money. While there may be a modest initial cost for energy efficiency improvements, once that cost is rolled into the mortgage, it will be more than paid back through lower energy bills. Because the total monthly cost to the homeowner—mortgage payments plus utility bills—is lower, energy efficiency makes homes more affordable.

Initial construction is the most effective time to make a building energy efficient. Trying to save the same amount of energy after the building is constructed, could cost as much as five times as work done initially.

Energy codes set a standard that can be compared. Provides a common foundation for evaluating, regulating, and incentivizing building design, construction, technologies, and performance. They level the playing field, so all development is making the same minimum commitment in infrastructure. This helps the consumer in evaluating property for purchasing.

Better designed mechanical systems provide more comfortable living and working environments. A well designed mechanical system allows for additional thermal control, so you don't have to blast frigid artic air for the whole office anymore. It provides plenty of fresh air, which is healthier and reduces the potential for "Sick Building Syndrome". And happier employees means higher employee retention, less employee turnover, less spent on training, and less sick days taken.

US Energy Codes' Current and Future Status

The International Code Council's *International Energy Conservation Code (IECC)* is in use or adopted in 42 states, the District of Columbia, and most US Territories.

In 2012, Florida approved its own tropical energy code, in partnership with the ICC, *2010 Florida Building Code Energy Conservation*. This code references the ASHRAE 90.1 2007 / 2009 IECC standards.

In 2009 the Commonwealth of the Northern Marianas Islands (CNMI) approved compliance to the *Tropical Energy Code*. This code references the ASHRAE 90.1 2001 / 2003 IECC standards. This is the same code that was the basis of the current GTEC.

Both Puerto Rico and the US Virgin Islands require compliance to the ASHRAE 90.1 2007 / 2009 IECC standards.

Hawaii requires compliance to the ASHRAE 90.1 2004 / 2006 IECC standards.

The next version, the 2012 IECC is estimated to save an additional 30% of energy over the 2009 IECC. Potential nationwide savings from adoption of the 2012 IECC, Estimated by the Alliance to Save Energy, November 2010

The Alliance Commission on National Energy Efficiency Policy aims to double US energy productivity by 2030, and one of its many ways to achieve that goal is to create more stringent energy codes for buildings.

The Commission has created Energy 2030, a set of policy recommendations that urges policymakers at all levels of government – local, state, and federal – to take action.
The Alliance Commission on National Energy Efficiency Policy says if its suggestions are adopted, by 2030 the US could:

- Add 1.3 million jobs;
- Cut average household energy costs;
- Save American businesses $169 billion a year;
- Increase GDP by up to 2 percent;
- Decrease energy imports by more than $100 billion a year;
- and Reduce CO2 emissions by one-third.

The diverse Commission is made up of leaders from the power sector, environmental groups, the financial community, manufacturing, transportation and government. Work already has begun to turn the Commission's recommendations into meaningful legislation.
http://www.energymanagertoday.com/energy-2030-report-calls-for-stricter-energy-building-codes-089089/
http://www.ase.org/programs/ee-commission

Alternate energy codes/standards are available for use:

Leadership in Energy and Environmental Design (LEED) is a third party certification program from the U.S. Green Building Council. The LEED program was created for the design, operation, and construction of high performance green buildings. This ensures the buildings are environmentally compatible, provide a healthy work environment, and their entire lifecycle is considered. Energy use is only one of many green-building issues addressed. This is a for-fee service, and documentation for certification requires substantial effort and additional costs.

2012 International Green Construction Code (IgCC) developed by the ICC, is administered in 10 states, or within local jurisdictions in those states. Typically, this is administered in addition to the IECC. Its goals are similar to LEED, but as a code, compliance is mandatory in the jurisdictions adopting the code.

GTEC Development

The *Guam Building Energy Code* was developed and implemented around 2000. It was prepared for Guam and America Samoa, funded by the U.S. Department of Energy. It was based on the ASHRAE 90.1-1989 standard, and modified for tropical environments.

The *Model Tropical Energy Code* was completed in 2009, but was never approved by the Legislature for use in Guam. Funded by the U.S. Department of Energy, it was developed for Hawaii, Guam, Puerto Rico, Virgin Islands, and the Commonwealth of the Northern Marianas Islands. It was based on the 2006 IECC / ASHRAE 90.1-2004 standard, and modified for tropical environments.

December 1, 2011, the Guam Energy Code Task Force had its first meeting. Several members of the task force were the same individuals who help craft the *2009 Model Tropical Energy Code*. The Task Force met regularly to update the code. Over a half dozen mechanical engineers, several mechanical contractors, electrical engineers, architects, contractors, realtors, and representatives from DPW participated. This is a consensus document.

The Task Force used the 2009 *Model Tropical Energy Code* as a starting point with the intention of updating any standards that were outdated, and to take a second look at the requirements so that the final document would be solely focused on Guam's environment.

In the development of the 2012 GTEC, several public hearings were held to provide the public opportunities to comment and provide feedback on the code development. The formal meetings were all publicly advertised in local newspapers (often in both the PDN and the Marianas Variety and specifically listing the GTEC to be discussed) with at least 5 days and 48 hours notice, per Guam law.

- 05/15/12 Guam Contractor's License Board; public hearing for the first GBCC meeting, provided status of the Guam Tropical Energy Code.
- 07/03/12 Westin Hotel; public hearing to introduce the draft GTEC. Public comments were received and two work sessions subsequently held. Stakeholders were personally invited to the work sessions on 07/17/12 and 08/16/12.
- 09/13/12 Guam Energy Office; public hearing to adopt GTEC. The GTEC was unanimously approved.
- 11/27/12 Guam Energy Office; public hearing to review the GTEC. Due to subsequent recommended changes, the GTEC was revised but no vote was held due to lack of quorum.
- 01/08/13 Guam Energy Office; public hearing to adopt GTEC. The GTEC was unanimously approved.
- 02/12/13 Guam Energy Office; public hearing to review GTEC submittal documents.

In all of the hearings, nobody ever recommended that the GTEC should not be implemented. Feedback provided by the public was reviewed and often changes were made. Changes were then provided to the persons making the recommendations, for their consensus. The Task Force made a significant effort to make it a fair and reasonable standard. Through this process, several articles were printed in the local papers and aired on the local television news about the GTEC.

On March 4, 2013, the GTEC was formally transmitted to the Legislature for action. On the same day, Senator Tom Ada introduced Bill 61-32 to adopt the GTEC into law.

The GBCC has a contractual agreement with ICC, and written authority from ASHRAE to use and publish their tables within the GTEC.

GTEC Education

Guam Energy Office (GEO). The GEO previously hosted the *Energy Code Workshop*, October 8 & 9, 2012 for the public, and October 10 & 11, 2012 for government officials at the Westin Resort. Presented by Sean Penrith, Earth Advantage Institute.
Two days for each group to review the 2012 GTEC, energy codes overview, building science fundamentals and energy efficiency best practices as they relate to the 2012 GTEC.

Guam Community College (GCC). The Guam Energy Office has funded an educational effort for the general public to learn and apply the 2012 GTEC. In November, the GCC is planning to host a *Guam Tropical Energy Code Conference* where the GTEC will be introduced to the public in detail and implementation of the GTEC will be explored. The GCC is also planning future *GTEC Workshops,* where targeted audiences and information will be tightly focused. And, the GCC is looking at *GTEC Curriculum* to provide education to the general public to implement the code, and to students for tradesmen training to physically do the work.

International Code Council (ICC). The ICC has offered to partnership in future workshops upon the 2012-2015 IECC code changes.

GTEC Implementation

GBCC recommended in its proposed legislation that a waiting period of 6 months be provided before compliance to the GTEC's requirements. This allows current projects being developed by architects and engineers to be processed as they are. It allows time for designers, agencies, tradesmen, and vendors to learn the GTEC requirements prior to implementation. And, it allows vendors to sell any existing stock that may not be allowed after the GTEC implementation.

The Department of Public Works (DPW) will be responsible for enforcing compliance to the new energy code. Licensed mechanical and electrical engineers must seal plans submitted for permit. By the nature of the license, per PEALS standards and existing Guam laws, the professional signing the documents will be certifying compliance to the new code.

Access to the GTEC will be via the internet and established public locations. Currently, PDF copies are available for downloading from the GEO website. Upon completion, copies will be available for downloading from the GBCC website. Hard copies will be available at the Compiler of Laws, DPW, and GCLB.

What does the GTEC do, not do?

It will have impact on ALL new buildings. It will have impact on additions, alterations, renovations, and some repairs. However, it will have limited impact on low-rise residential buildings and could have no impact on some historical buildings. It allows for trade-off options to provide maximum flexibility in designing a building.

It allows for naturally ventilated low-rise residential buildings. By recognizing the desire for some homeowners to not have air conditioning, it has limited requirements for the residential building shell.

The current version of the code was crafted here by professionals and individuals, calling Guam their home. If parts of the code prove to be unworkable or unwieldy, the GBCC can make timely changes.

How much will it cost?

Yes there will be additional initial cost. How much will depend on the building type, and level of savings seeking to be achieved. Conforming buildings will have a higher market and resale value. With the current high cost of electrical power, the initial investment will likely see a return within five to ten years.

A cost analysis was performed in 1997 as part of the review of the 2000 *Guam Building Energy Code* to gauge the impact of implementation of an energy code. In most cases, the current version (the GTEC) has slightly higher performance requirements. During the time period from 2001 to 2010, there has been an increase in costs due to inflation of about 23%. US Department of Labor Bureau of Labor Statistics Consumer Price Index, US city average; ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt

In that same period, Guam Power Authority rates per kilowatt-hour rose. From 2001 to 2010, GPA estimates that the Annual Electricity Cost per Residential Customer rose from $1,750 to $2,500, an increase of nearly 43%. National Renewable Energy Laboratory Technical Report NREL/TP-7A40-50580 April 2011, Guam Initial Technical Assessment

For required items similar in both versions, the payback has been improved by nearly 20% over that same range of time. For insulation, roof coatings, and windows, the payback has improved even more since the last economic study. After closer look, we found some material costs actually held, or dropped in some cases.

- Spray on insulation for concrete roofs was priced at $3/sf. Today, we pretty much get a better product for the same price.
- R-13 batt insulation was priced at $0.44/sf. Recently on the Home Depot website, R-13 unfaced batt insulation is sold locally for $0.40/sf.
- Glazing film, high performance with a SHGC of 0.43, was priced about $4/sf. Glazing in a recent project had integral glazed film with a SHGC of 0.23 for the same price.

With the increased requirements of the updated code, current construction costs, increased electrical power costs, the impact on residential and commercial building life cycle costs will be negligible. The 1997 analysis claimed a 1.3 year payback for residential construction. From the numbers above, the updated code is expected to have a similar result. But even at twice the cost, payback is well within five years, a completely acceptable rate of return.

Conclusion

A lot of work has been invested in the GTEC to provide an effective, yet fair tool to be used specifically for Guam. Guam needs an effective energy code. The Guam Energy Code Task Force and the Guam Building Code Council sincerely believes that the *Guam Tropical Energy Code* is the best solution. With this as code, it creates a win-win situation for the residents, businesses, and island.

GUAM ENERGY OFFICE

Ufisinan Alentos Guåhan

Eddie Baza Calvo • Governor
Ray Tenorio • Lt. Governor
Eric M. Palacios • Administrator
Peter S. Calvo • Director

March 27, 2013

Senator Thomas C. Ada
32nd Guam Legislature
155 Hessler Street
Hagåtña, Guam

REFERENCE: Guam Tropical Energy Code

Buenas yan Håfa Adai.

The Guam Energy Office fully supports the passage of Bill 61-32 (COR). The hard work and dedication of the Guam Building Code Council should be applauded.

The proposed 2012 Guam Tropical Energy Code (GTEC), as mandated by P.L. 30-199, has been transmitted for adoption to the 32nd Guam Legislature as part of the Guam Building Code. GTEC was developed by the Guam Building Code Council, with input from the community, and it is consistent with industry standards.

Having the energy codes become law should alleviate some of Guam's dependency and use of fossil fuel imported from foreign countries, reduce our carbon emissions, and give savings to our island residents in spending less on their utility bill. GTEC is applicable to all new residential and non-residential construction and to existing structures planned for substantial renovations. Designed to be cost effective when implemented, to promote energy efficiency for the consumers and at minimal cost to homebuilders and the business enterprises, GTEC will aide Guam in achieving its goal of 20% less use of fossil fuel by 2020.

While the Guam Energy Office fully supports passage, a minor concern is the timeline of implementation of the law once it is adopted. The vendors on island that sell products that would be directly affected by the GTEC's passage would need to sell stock on hand as it would impact their stock in inventory. While we appreciate the six month delay, we feel the law can be implemented immediately for all new orders and allow for existing, on hand and on order at the time of passage to be used and depleted.

Indeed, the 2012 GTEC is addressing the 2009 International Building Code standards, and upon approval of Bill 61-32, the Council plans to begin reviewing the 2012 IBC. Technology has improved quite substantially and allows for higher standards at affordable prices. However, it

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makes sense to initiate softer standards for the GTEC to start and get the buy-in and gradually step up standards as the public realizes the benefit. We look forward to the 2012 IBC updated standards as our island and its people will benefit greatly from the savings generated with new efficient technology.

Thank you for the opportunity to support this effort and the bold legislative support for our island's energy future.

Sincerely,

Peter S. Calvo
Director

Cc: Telo Taitague, External Affairs, Governor's Office

GEL #13-008

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GUAM ENERGY OFFICE

Ufisinan Alentos Guåhan

Eddie Baza Calvo • Governor
Ray Tenorio • Lt. Governor
Eric M. Palacios • Administrator
Peter S. Calvo • Director

October 21, 2013

The Honorable Judith T. Won Pat, Ed. D
Speaker, 32nd Guam Legislature
155 Hessler Street
Hagatna, Guam

REFERENCE: Guam Tropical Energy Code

Buenas yan Hafa Adai.

On behalf of the Guam Energy Task Force, we would like to fully support the adoption of the proposed 2012 Guam Tropical Energy Code (GTEC), as mandated by P.L. 30-199, and as transmitted to the 32 Guam Legislature by the Guam Building Code Council (GBCC).

The GBCC has worked hard at reviewing the International Building Code, and the proposed Tropical Energy Codes to ensure the codes apply to Guam and does not adversely affect the community. With community input and industry advise, the GBCC developed a version that Guam can work with to meet the U.S. Department of Energy (U.S. DOE) requirements for State Certification. The U.S. DOE, "has determined that the updated model building energy codes for both commercial and residential buildings would achieve greater energy savings over prior editions." Adopting the GTEC would allow Guam to take advantage of energy efficiency in building standards that will reduce our need for fossil fuels.

As you are aware, the GETF has recommended the 2020 goal, proposing to reduce our use of fossil fuels by 20% by the year 2020. While our present rate of spending exceeds 350 million dollars annually for residual oil to power our electrical generators, the proposed savings could realize a 50 to 70 million savings. This savings could potentially be reinvested into greater enhancement of Guam's energy sustainability. The adoption of this code is an initial step, and should become a common practice to ensure timely approval to begin energy efficiency at its earliest opportunity.

While the GTEC is a good initial step, more must be done to shield Guam from volatile supply and demand variations. The GETF is looking forward to working closely with you and your colleagues to realize an energy sustainable Guam.

Sincerely,

Robert Underwood
Co-Chairman

Peter S. Calvo
Co-Chairman

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GUAM POWER AUTHORITY

ATURIDÅT ILEKTRESEDÅT GUAHAN
P.O.BOX 2977 • AGANA, GUAM U.S.A. 96932-2977

16 October 2013

HONORABLE SENATOR TOM C. ADA
Assistant Majority Leader
Committee on Public Safety, Infrastructure & Maritime Transportation
Suite 207, Ada Plaza Center
173 Aspinall Avenue
Hagåtña, Guam 96910
Tel.: (671) 473-3301
Fax: (671) 473-3303
Email: office@senatorada.org

Bueñas Yan Hafa Adai Senator Ada,

Guam Power Authority (GPA) supports the passage of Bill No. 61-32 (COR): an act to add a new § 67101.7 of Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC). Additionally, GPA supports the application and enforcement of the 2012 Guam Tropical Energy Code.

GPA has participated in Energy Codes for Guam and energy efficiency since the early 1990s. It continues to do so with the Guam Energy Office and as a member of the Guam Energy Task Force. GPA's actions strongly speak to its support of energy efficiency and renewable energy as part of a holistic approach to reducing electricity costs to our customers.

The Guam Power Authority's vision commits to strong environmental stewardship and the promotion of green energy through energy conservation & efficiency. GPA tracks energy efficiency and renewable energy generation as part its Key Performance Indicators. Furthermore, GPA's new LEEDS Silver central office showcases GPA's commitment to building energy efficiency from the initial concept planning for buildings.

As part of its strong commitment, GPA completed $15MM in ARRA projects including: energy efficient retrofits for Government of Guam buildings, replacement of over 500 streetlights in the Tumon Hotel District with energy efficient induction lighting, replacing over 1000 low pressure sodium streetlights with efficient LED lights, and conducting a residential rebate and energy audit program for rooftop solar water heating. Furthermore,

GPA and its ESCO (Energy Services Contractor) partner Johnson Controls, Inc. supported the Guam International Airport Authority on its energy efficiency program to save $4,000 daily in energy costs.

Additionally, Guam Power Authority has recently contracted for about 35 MW of solar photovoltaic and wind turbine generation. The end of calendar year 2014 will see the commissioning of the solar photovoltaic plant followed by the wind turbine generator farm in late 2015. This initiative will ensure that the benefits of renewable energy can be made available to all.

The Guam Power Authority is poised to assist customers achieve energy efficiency. GPA has conducted considerable training resulting in certification of six Certified Energy Managers and ten Certified Energy Auditors. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1 and 90.2 is emphasized as part of the training curriculum in this effort.

Senseramente,

JOAQUIN C. FLORES, P.E.
General Manager

GREA

Guam Renewable Energy Association

10/21/2013

Senator Thomas C. Ada
Committee on Public Safety, Infrastructure
& Maritime Transportation
155 Hesler Place
Hagatna, Guam 96932

Dear Senator Ada,

The Guam Renewable Energy Association (GREA) fully supports Bill 61-32, the 2012 Guam Tropical Energy Code. GREA commends the introduction of this Bill to help reduce the Island of Guam's dependence on fossil fuel by adding these design requirements to achieve energy efficiency in buildings constructed in Guam. GREA's mission is to lower Guam's carbon footprint by lowering our dependence on fossil fuel by the advancement of renewable energy technologies. However, the core foundation of energy independence should always start with energy efficiency in any facility or building. On behalf of our Association, please accept our full support on this Bill.

Thank you,

Jeffrey Voacolo
President
Guam Renewable Energy Association

P.O. Box 27389
Barrigada, 96921
Phone 671-487-3763

GUAM SOCIETY OF PROFESSIONAL ENGINEERS

357 Route 8
Maite, Guam 96910

October 17, 2013

HONORABLE SENATOR TOM C. ADA
Assistant Majority Leader
Committee on Public Safety, Infrastructure, & Maritime Transportation
Suite 207, Ada Plaza Center
173 Aspinall Avenue
Hagatna, Guam 96910

Hafa Adai Senator Ada,

Guam Society of Professional Engineers (GSPE) supports the passage of Bill No. 61-32 (COR): an act to add a new 67101.7 of Chapter 67, Title 21, Guam Code annotated, relative to adopting the Guam Tropical Energy Code (GTEC).

GSPE has participated, thru the actions and time of many of its P.E. members in the drafting efforts for this GTEC as presented. The collaborative efforts of Guam's Architects and Mechanical Engineers and General Contractors along with many other professionals, has allowed this GTEC to be well thought out and balanced with the realities of Guam's climate and economy.

GSPE's actions speak strongly to the Guam Professional Engineering community's support of energy efficiency, renewable energy generation, LEED programs, and sustainable design efforts in the planning and construction of the many projects underway today or planned for the future.

As always, please continue to count on GSPE's support in all of your efforts to make Guam a more energy efficient island to live.

Senseramente,

William D. Beery, P.E.

President, GSPE

TRMA
Taniguchi Ruth Makio Architects

October 18, 2013

Committee on Public Safety, Infrastructure & Marine Transportation
32nd Guam Legislature
Hagatña, GU 96910

Subj: Bill 61-32, Adoption of Guam Tropical Energy Code

Dear Senators;

I am writing in support of bill 61-32 to adopt the Guam Tropical Energy Code. I was a member of the original task force brought together by the Guam Energy Office in 2000 to develop an energy law appropriate to Guam. This task force did not produce a bill for legislative consideration and I am pleased that the Guam Building Code Council, with support of Senator Ada's office took up the challenge and has finalized the document. I also assisted the GBCC in this effort, participating in many drafts which have been reviewed and commented upon by many individuals knowledgeable in the field.

In my opinion the bill is ready to be brought into law. The GTEC is important to Guam as when the International Building Code was made the building code of Guam, legislation did not include the International Energy Code - for the reason that it was expected the Guam Tropical Energy Code would be more relevant to the climatic conditions and building practices we have here.

I believe the document introduced at this time has been researched, compared, reviewed, massaged, refined and word-smithed as much as necessary and that it reflects the knowledge and practices of professional engineers, architects, equipment and material suppliers, and others who understand what is good, what is practical, and what is effective.

I urge the Committee to favorably recommend and push the passage of this bill.

Very truly yours,

Taniguchi Ruth Makio Architects

H. Mark Ruth, FAIA

M:\HMR\TROPICAL ENERGY CODE BILL.13.DOCX

Guam • Northern Marianas Islands • Micronesia
P.O. Box EA, Hagåtña , Guam 96932 • 100 Cliff Business Center
671/475-8772 • Fax: 671/472-3381 • email: arch@traguam.com

UNIVERSITY OF GUAM
UNIBETSEDÅT GUAHAN
OFFICE OF THE PRESIDENT
UOG Station, Mangilao, Guam 96923
Telephone: (671) 735-2990 • Fax: (671) 734-2296

October 21, 2013

The Honorable Thomas C. Ada
Senator, 32nd Guam Legislature
155 Hesler Place
Hagatna, Guam

Hafa Adai Senator Ada,

I have read and examined the Guam Tropical Energy Code and I wish to offer my support for the passing and implementation of Bill No. 61-32 (COR) relative to adopting the Guam Tropical Energy Code (GTEC).

One of the goals of the University of Guam's Center for Island Sustainability (CIS) is to promote awareness on the efficient use of energy in our island community. I am acutely aware of the energy and utility demands of our island. Through participation in three very successful conferences on Island Sustainability, I have become aware of the energy consumption patterns of Guam as an economic, social and environmental policy concern. The wasteful use of energy due to inefficient design of our structures contributes should be a source of great concern to all of us. In my role as co-chair of the Guam Energy Task Force for the past four years, the inefficient design of our physical infrastructure has been one of the most important considerations in developing a path forward for increased self sufficiency in energy.

With the Guam Tropical Energy Code in place it will provide builders, designers, engineers, building/structure owners and their tenants the basic guidelines on how an energy efficient building should be constructed and the materials needed to sustain efficient operations of the facilities. There will be many long term benefits including lesser fuel consumption and the preservation of our previous resources for years to come.

The CIS is already leading change through outreach, hands-on demonstrations, and alternate energy models designed to instruct and inform students, and others in the public arena, about the critical challenges and opportunities our diverse island communities face. Our goal is to demonstrate, model, and give the opportunity for all stakeholders to become engaged, informed stewards of our unique environments and cultures. As a university, we feel strongly that the next generation, our region's future leaders, need to be prepared with knowledge about our natural world and are aware of the social impacts global climate change is having on remote islands, and the limited resources under which we increasingly must manage and grow

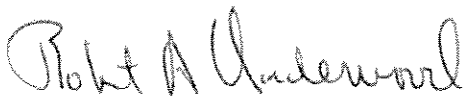
our economies. It is incumbent upon UOG to lead this change in giving students the skill-sets necessary to address and find solutions to the many challenges our region faces.

In closing, I agree with the spirit of the bill and support its efforts to set standards promoting energy conservation and energy efficiency in new residential and non-residential construction and to existing structures undergoing substantial renovation. The CIS is committed to working with you and your colleagues to achieve these goals in ways that are environmentally, economically, and socially appropriate for our island community.

Thank you for considering our support.

Biba UOG
Biba GUAM

Sincerely,



Robert A Underwood
President

Jeffrey C. Wheaton, P.E.

Phone: (671) 472-1687

337 Clara Road Toto, GU 96910

Email: wheatons@ite.net

22 October, 2013

Senator Thomas C. Ada, Chairperson
Assistant Majority Leader
Committee on Public Safety, Infrastructure, & Maritime Transportation
Main Legislature Building at 155 Hesler Place, Hagåtña, Guam 96932

Subject: Thoughts regarding **Bill 61-32 (COR):** An act to add a new §6101.7 to Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC).

Dear Senator Ada,

I have read the proposed law and the proposed Guam Tropical Energy Code as a supplement to the building codes and other regulations in force here in the Territory. There are several concerns regarding the adoption of the code as a law enforced by the Department of Public Works.

It is readily acknowledged that the intent of bringing the code forward under law is born of a spirit meant to benefit all Guamanians. Efficiency is a concept embraced by the engineering profession. So it is argued that the improvements in efficiency and the intent to better the conditions on our wonderful island that would ostensibly be brought by expanding the law and regulations are without a rational logical opposition.

This would be the case except for complications such as unintended consequences, difficulty in enforcement, and adding more to the government regulations that are becoming more and more a part of all our lives.

I will bring forward concerns item by item in an effort to convince the reader(s) that the code should not be adopted as a law, but carried as a recommendation without enforcement provisions. It could even be informational as provided by the Guam Energy Office located down in the DPW compound.

The technical specifics of the code rely heavily on copyrighted documents. This is burdensome for the professional providing a design service to someone wishing to construct under the building code. The architect or engineer can blindly quote the narrative in the code (on drawings and specifications submitted to DPW for building permits) without actually reviewing the information. When this is done it can result in complications, i.e. delays and cost increases during construction. If the cross referenced specifications, tests, and such are thoroughly researched and complied with in good faith, there will be a significant increase in fees from the architect or engineer; they must do so because there is an increase in time invested in any particular project. Access to the information will cost money. Copy righted documents are sold and represent a significant source of income for the organization writing them, be it ASTM, ASCE, ASHRAE or whoever. It takes the time of talented people to write and mainting these bodies of knowledge and the cost must be recouped through sales. This is

additional overhead that will be passed through to the owner. All regulatory costs are passed through to the owners be they EPA, Historic Preservation, Coastal Zone Management, building code knowledge and compliance, utility hook up fees, or even Guam Tropical Energy Code compliance costs.

DPW will be burdened with reviewing all submission for compliance with the newly adjudicated code. Do they have sufficient personnel to review the work? If not, the additional duties will delay issuance of permits by contributing to a back log. Are those personnel in possession of skills, references, and such that they can perform a timely review of the newly expanded submissions? The submissions will be larger than is currently the case if this Code becomes mandatory by adoption as law. There is a real possibility that the increase in size and technical depth of submissions will become such a burden to those tasked with getting permits out in a timely manner, they will be tempted to either selectively enforce them or outright overlook them.

An unintended consequence of the proposed legislation is in the construction of single family homes, the residences of many if not most Guamanians. With the current utility fees, the cost of a design professional, permit fees, and even the down payment on a mortgage the cost for initiating the of construction of a primary residence has risen through the years. Professional fees will potentially include time necessary to address the new regulations. Additionally the regulations will bring restrictions on products that are beyond what is safe to the newer threshold of what is appropriately energy efficient. Again, all costs end up being born by the owner. Every day I drive by tin house that may or may not have building permits and occupancy certificates. My suspicion is that these are people that could acquire land but simply do not have the means to accrue the financial resources necessary to initiate construction of a typhoon proof home complying with all regulations, DPW, CSM, EPA (clearing and grading, pollution prevention plans, water management plans, etc, even ad nauseam). They build a house. It starts out like a ranch, then grows large as need and resources require/allow. It suffices, but is not saleable real estate as no bank will mortgage it. It must be evacuated during typhoons. They are less safe as they're susceptible to fire, termites and other natural enemies of wood frame construction. I honestly believe the more regulations thrown down, regardless of the intent, the more people will be driven to live in tin houses, container house, and other poorer quality lower cost alternatives. This is an unintended consequence.

Regulations have a habit of becoming obsolete and suffer from lack of maintenance just as infrastructure and buildings do. Though they may be written with absolutely current and cutting edge information via cross referenced specifications and testing provided by many organizations, technology changes. What was well meant can become a serious impediment to innovation in construction techniques and materials. This too is a very possible and even likely unintended consequence of adopting the GTEC as hard law.

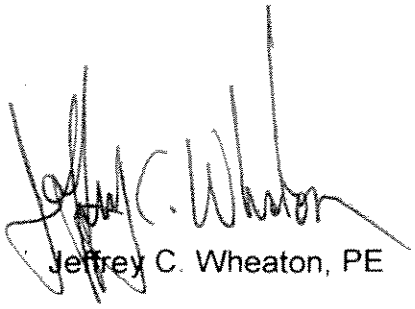
Finally I will wind this listing of concerns up with the question regarding the proper role of our government. Yes, concerns for safety and well being of the citizens are legitimate to a degree. Such things as dietary requirements, banning alcohol (prohibition gave us the foundations for nationwide organized crime syndicates and really didn't stop the use of alcohol; great intentions but some serious and long lasting

adverse consequences), are quite simply beyond the pale. Free people do not need to be protected from themselves. We are each our own property to operate and maintain as we see fit so long as we bring no harm to others. Building codes, if universally enforced, prevent the creation of unsafe real estate in the market place, i.e. innocent people can suffer if these are not in place. The GTEC is not a safety issue. It is something potentially desirable, but has embedded within it serious opportunities for unpleasant and long lasting unintended consequences.

For the preceding reasons and more that available time does not allow to be written, I encourage and respectfully request that the Guam Tropical Energy Code not be adopted into the Guam Code.

I thank you for your time and offer to discuss this with you, your staff, other legislators if you or they feel there would be benefit from doing so.

Sincerely,



Jeffrey C. Wheaton, PE

From: Jose S. Servino, P.E. [mailto:servinoj@yahoo.com]
Sent: Thursday, October 24, 2013 9:19 AM
To: Ben Pangelinan; Rory; Brant; Judi; Chris; tommy@senatormorrison.com; Mike; aline; senatortonyada@guamlegislature.org; senatorsannicolas@gmail.com; Frank; dennis; office@senatorada.org; Tina; bj
Cc: Brent Wiese; wgmiller@guam.net; jvoacolo@microneslarenewableenergy.com; peter.calvo@epa.guam.gov; news@k57.com
Subject: Guam Tropical Energy Code, Recommendation for adoption

Buenas Senators,

As President of Advanced Innovative Energy Solutions, I recommend adoption of the Guam Tropical Energy Code as modified for Guam and presented by the Guam Energy Council. It contains the minimum essential energy conservation standards needed to help Guam move forward to reduce energy use, reduce carbon emission and exportation of Guam dollars for buying fossil fuel.

The additional cost to implement the Guam Energy Code standards will be offset with tax credits, depreciation, chargeback to clients and customers and more income to Government of Guam. The investment will be fully amortized. The opponents to the code do not have proper financial data to support their high cost allegations. Initial capital investment will be needed but the positive paybacks have been documented in many cases.

Of course, inspectors will have to be properly trained to ensure proper enforcement of the code. This will need oversight to ensure it will be properly implemented.

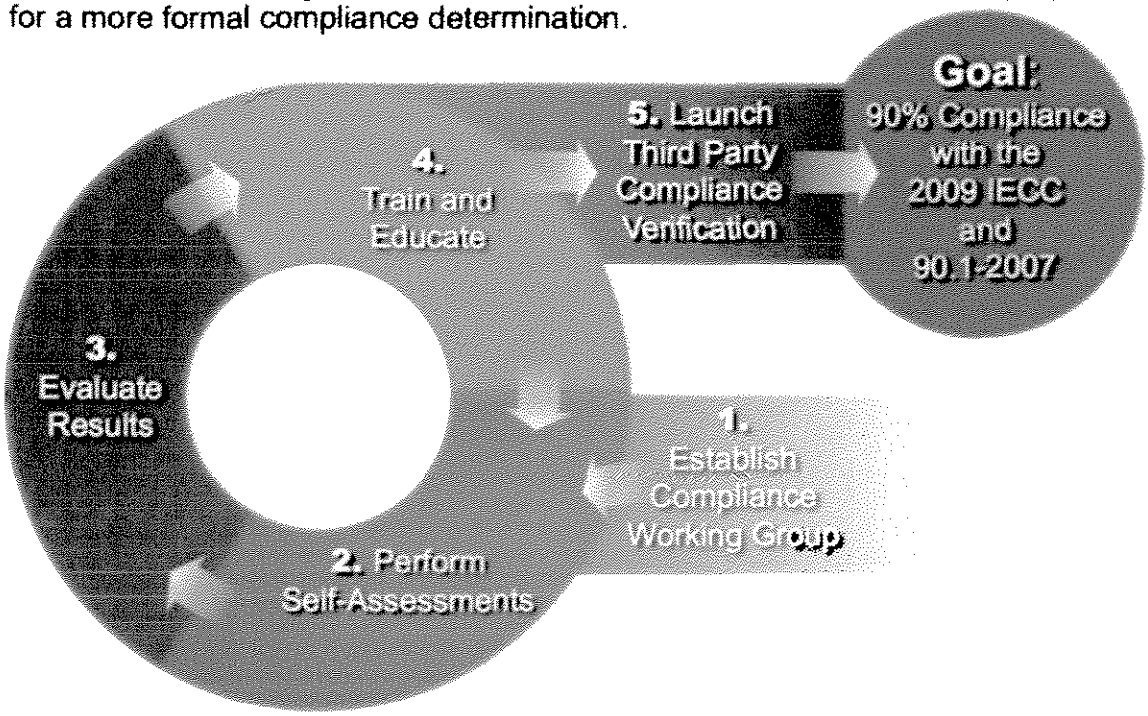
Senseramente,
My contact #s are below. If, no ANSWER, please send me email and I will get back to you ASAP.

Jose S. Servino
Jose (Joe) S. Servino, PE'77, CEM, QCP, CBCP(C), Professional Engineer, Certified Energy Manager, Building Commissionng Professional

President, Advanced Engineering Consulting Co.& Advanced Innovative Energy Solutions (URL aeccpacific.com)

Member: NSPE, IEEE, AEE, ASHRAE, GREA RI, GCC, SAME, AFCEA, JCI Senator
E'59, ET'60, FDMS'62VAL, BSEE'65, NuclearE'67, MBA'75, FacE'78, DCMS '86, DMCM'95
671-653-4316/670-235-6073 New cell #482-9919

By first assessing current compliance rates with the target codes, a state can determine the training and education needed to enforce the codes and prepare for a more formal compliance determination.



COMMITTEE ON RULES

I Mina'trentai Dos na Liheslaturan Guåhan • The 32nd Guam Legislature
155 Hesler Place, Hagåtña, Guam 96910 • *www.guamlegislature.com*
E-mail: *rorysforguam@gmail.com* • Tel: (671)472-7679 • Fax: (671)472-3547

March 29, 2013

Memorandum

To: **Rennae Meno**
Clerk of the Legislature

From: **Senator Rory J. Respicio**
Chairperson, Committee on Rules

Subject: **Fiscal Notes**

03:30 MAR 29 2013

Hafa Adai!

Attached please find the fiscal notes for the bill numbers listed below. Please note that the fiscal notes, or waivers, are issued on the bills as introduced.

FISCAL NOTES:
Bill Nos.: 03-32 (LS), 06-32 (LS), 30-32 (COR), 31-32 (COR), 54-32 (COR), 61-32 (COR), 56-32 (COR), and 66-32 (COR)

WAIVERS:
Bill Nos.: 46-32 (LS)

Please forward the same to MIS for posting on our website. Please contact our office should you have any questions regarding this matter.

Si Yu'os ma'åse'!

BUREAU OF BUDGET & MANAGEMENT RESEARCH

OFFICE OF THE GOVERNOR
Post Office Box 2950, Hagåtña Guam 96932

EDDIE BAZA CALVO
GOVERNOR

JOHN A. RIOS
DIRECTOR

RAY TENORIO
LIEUTENANT GOVERNOR

MAR 28 2013

Senator Rory J. Respicio
Chairperson, Committee on Rules
I Mina'trentai Unu na Liheslaturan Guåhan
The 31st Guam Legislature
155 Hesler Place
Hagåtna, Guam 96932

Hafa Adai Senator Respicio:

Transmitted herewith is Fiscal Note on the following Bill Nos.: **03-32(LS), 06-32(LS), 30-32(COR), 31-32(COR), 54-32(COR), 61-32(COR), 66-32(COR)** and Fiscal Note Waiver on the following Bill Nos.: **46-32(LS).**

If you have any question(s), please do not hesitate to call the office at 475-9412/9106.

JOHN A. RIOS
Director

Enclosures

cc: Senator Vicente (ben) Pangelinan

Bureau of Budget & Management Research
Fiscal Note of Bill No. 61-32

BILL NO. 61-32 IS AN ACT TO ADD NEW §67101.7 OF CHAPTER 67, TITLE 21, GUAM CODE ANNOTATED, RELATIVE TO ADOPTING THE GUAM TROPICAL ENERGY CODE (GTEC).

Department/Agency Appropriation Information		
Dept./Agency Affected: Guam Energy Office	Dept/Agency Head: Peter Calvo, Director	
Department's General Fund (GF) appropriation(s) to date:		-
Department's Other Fund (Specify) appropriation(s) to date: 100% Federal (Continuing and FY13 Appropriations)		655,854
Total Department/Agency Appropriation(s) to date:		$655,854

Fund Source Information of Proposed Appropriation	General Fund:	(Specify Special Fund):	Total:
FY 2012 Unreserved Fund Balance[1]		$0	$0
FY 2013 Adopted Revenues	$0	$0	$0
FY 2013 Appro. (P.L. 31-233)	$0	$0	$0
Sub-total:	$0	$0	$0
Less appropriation in Bill	$0	$0	$0
Total:	$0	$0	$0

Estimated Fiscal Impact of Bill	One Full Fiscal Year	For Remainder of FY 2013 (if applicable)	FY 2014	FY 2015	FY 2016	FY 2017
General Fund	$0	$0	$0	$0	$0	$0
(Specify Special Fund)	$0	$0	$0	$0	$0	$0
Total	$0	$0	$0	$0	$0	$0

1. Does the bill contain "revenue generating" provisions? / / Yes /x/ No
If Yes, see attachment
2. Is amount appropriated adequate to fund the intent of the appropriation? /x/ N/A / / Yes / / No
If no, what is the additional amount required? $ _____ /x/ N/A
3. Does the Bill establish a new program/agency? / / Yes /x/ No
If yes, will the program duplicate existing programs/agencies? /x/ N/A / / Yes / / No
Is there a federal mandate to establish the program/agency? / / Yes /x/ No
4. Will the enactment of this Bill require new physical facilities? / / Yes /x/ No
5. Was Fiscal Note coordinated with the affected dept/agency? If no, indicate reason: / / Yes /x/ No*
/ / Requested agency comments not received as of the due date / / Other:
*Due to other Budgetary priorities and impending deadline.

Analyst: _____ Date: 3/26/13 Director: _____ Date: _____
Dina P. Rivera John A. Rios, Director

Footnotes:
See attached comments.

COMMITTEE ON RULES

I Mina'trentai Dos na Liheslaturan Guåhan • The 32nd Guam Legislature
155 Hesler Place, Hagåtña, Guam 96910 • *www.guamlegislature.com*
E-mail: *roryforguam@gmail.com* • Tel: (671)472-7679 • Fax: (671)472-3547

March 4, 2013

MEMORANDUM

To: **Rennae Meno**
Clerk of the Legislature

Attorney Therese M. Terlaje
Legislative Legal Counsel

From: **Senator Rory J. Respicio**
Majority Leader & Rules Chair

Subject: **Referral of Bill No. 61-32(COR)**

As the Chairperson of the Committee on Rules, I am forwarding my referral of Bill No. **61-32(COR)**.

Please ensure that the subject bill is referred, in my name, to the respective committee, as shown on the attachment. I also request that the same be forwarded to all members of *I Mina'trentai Dos na Liheslaturan Guåhan.*

Should you have any questions, please feel free to contact our office at 472-7679.

Si Yu'os Ma'åse!

Attachment

I Mina'Trentai Dos Na Liheslaturan Guahan

Bill Log Sheet

BILL NO.	SPONSOR	TITLE	DATE INTRODUCED	DATE REFERRED	CMTE REFERRED	PUBLIC HEARING DATE	DATE COMMITTEE REPORT FILED	STATUS
61-32 (COR)	T.C. Ada	AN ACT TO ADD A NEW § 67101.7 OF CHAPTER 67, TITLE 21, GUAM CODE ANNOTATED, RELATIVE TO ADOPTING THE GUAM TROPICAL ENERGY CODE (GTEC)	3/4/2013 11:32 a.m.	**3/4/13**	Committee on Public Safety, Infrastructure, & Maritime Transportation.			

Senator Tom Ada

1st Notice - Public Hearing: October 22, 2013

William Brennan <will@senatorada.org> Tue, Oct 15, 2013 at 8:58 AM
To: phnotice@guamlegislature.org, Media <media@senatorada.org>
Cc: Cyrus Luhr <cyrus@senatorada.org>, Cody Freeman <cody@senatorada.org>, William Brennan <will@senatorada.org>

October 15, 2013

MEMORANDUM

To:

All Senators, Media, and Stakeholders

Fr: Senator Thomas C. Ada

Subject: **1st Notice - Public Hearing: October 22, 2013**

Please be advised that the Committee on Public Safety, Infrastructure, and Maritime Transportation is holding a public hearing on

Tuesday, October 22, 2013. This meeting will take place in the Public Hearing Room of *I Liheslatura*.

The agenda is as follows:

9:00 am

Bill 61-32 (COR): T.C.Ada

An act to add a new §6101.7 to Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC).

Bill 140-31 (COR): T.A.Morrison

An act to amend Section 2(c) of Public Law 25-55 relative to 911 surcharges.

1:00 pm

The **Executive Appointment** of Dr. Jeffrey C. Johnson to serve as a **Commissioner** to the **Guam Public Utilities Commission**.

The **Executive Appointment** of Mr. Francisco G.Santos to serve as a **Member** to the **Jose D. Leon Guerrero Commercial Port Authority of Guam's Board of Directors**.

Testimonies on any of the bills or appointments should be addressed to Senator Thomas C. Ada, Chairperson, and will be accepted via hand delivery to our office, our mailbox at the Main Legislature Building at 155 Hesler Place, Hagåtña, Guam 96932, via email to office@senatorada.org,

or via facsimile to (671) 473-3303 until **Wednesday, October 23, 2013 at 5:00 pm**. Individuals requiring special accommodations, auxiliary aids, or services should submit their request to William Brennan at 473-3301. Please feel free to contact my office should you have any questions or concerns.

Si Yu'os Ma'ase.

Thomas C. Ada

–
Office of Senator Thomas C. Ada
I Mina' Trentai Dos Na Liheslaturan Guåhan - 32nd Guam Legislature
Office (671) 473 - 3301

PH-1st Notice-Oct 22, 2013.pdf
518K

Senator Thomas C. Ada
Chairman - Committee on Public Safety, Infrastructure & Maritime Transportation
I Mina'trentai Dos Na Liheslaturan Guåhan • 32nd Guam Legislature

October 15, 2013

MEMORANDUM

To: All Senators, Media, and Stakeholders

Fr: Senator Thomas C. Ada

Subject: **1st Notice - Public Hearing: October 22, 2013**

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Si Yu'os Ma'ase.

Thomas C. Ada

Ada Plaza Center, Suite 207 • 173 Aspinall Ave. • Hagåtña, Guam 96910
(671) 473-3301 • Office@SenatorAda.org • www.SenatorAda.org

Senator Tom Ada

2nd Notice: Public Hearing - Tuesday October 22, 2013

William Brennan <will@senatorada.org> Fri, Oct 18, 2013 at 7:57 AM
To: phnotice@guamlegislature.org, Media <media@senatorada.org>
Cc: Cyrus Luhr <cyrus@senatorada.org>, William Brennan <will@senatorada.org>
Bcc: dleddy@guamchamber.com.gu, ccastro@guamchamber.com.gu, acorn@docomopacific.com, seanm@mcvguam.com, jennifer.badar@choicephonellc.com, carlos.camacho@ite.net, nmendiola@gta.net, john@pdsguam.com, jeffcharjohnson@hotmail.com, lpalomo@guampuc.com, horecky@ite.net, dfbrooks@guamopa.org, admin@guamopa.org, john.wusstig@gfd.guam.gov, edward.artero@gfd.guam.gov, philip.camacho@gdf.guam.gov, anita.arile@doa.guam.gov, Sheena Black <sheena.black@guam.gov>, info@ghra.org, dannysn@guamairport.net, rsablan@msa-guam.com, markf@bankpacific.com, kin.cook@bankofguam.com, ron.cannoles@boh.com, erlinda.alegre@boh.com, imafnas@fhb.com, esegura@fhb.com, donnalynn.camacho@anz.com, joleen.manglona@anz.com, johnm@bankpacific.com, edna.jasa@citi.com, mtuncap@communityfirstfcu.com, jatalig@coast360fcu.com, "Daniel J. Tydingco" <djtydingco@gta.net>, Christine Baleto <cbaleto@marketwholesale.com>, Shelly Gibson <sgibson@ite.net>, Mike Benito <MBenito@paylessmarkets.com>, "Margret N. Duenas" <mnduenas@portguam.com>, jbrown@portguam.com, Byron Valera <bvalera@msa-guam.com>, bvalencia@matson.com, gdavid@ambyth.guam.net, amiller@ambyth.guam.net, daniel.young@iss-shipping.com, ed_cruz@mariana-express-guam.com, ken_constantino@mariana-express-guam.com, plblas@seabridgeguam.com, fjsantos@seabridgeguam.com, greyes@nortonlilly.com, jlcruz@dimguam.net, Chuck Ada <chuck.ada@guamairport.net>, Eva Pangilinan <epangilinan@guamchamber.com.gu>

Hafa Adai,

I hope this message finds you safe and well during the inclement weather. In order to meet the requirements of the Open Government Law, please see the second notice for a public hearing to be held Tuesday (October 22, 2013) below:

October 18, 2013

MEMORANDUM

To:

All Senators, Media, and Stakeholders

Fr: Senator Thomas C. Ada

Subject: **2nd Notice - Public Hearing: October 22, 2013**

Please be advised that the Committee on Public Safety, Infrastructure, and Maritime Transportation is holding a public hearing on **Tuesday**, **October 22, 2013**. This meeting will take place in the Public Hearing Room of *I Liheslatura*. The agenda is as follows:

9:00 am

Bill 61-32 (COR): T.C.Ada

An act to add a new §6101.7 to Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC).

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Si Yu'os Ma'ase.

Thomas C. Ada

Office of Senator Thomas C. Ada
I Mina' Trentai Dos Na Liheslaturan Guåhan - 32nd Guam Legislature
Office (671) 473 - 3301

PH-2nd Notice-Oct 22, 2013.pdf
519K

Senator Thomas C. Ada
Chairman - Committee on Public Safety, Infrastructure & Maritime Transportation
I Mina'trentai Dos Na Liheslaturan Guåhan • 32nd Guam Legislature

October 18, 2013

MEMORANDUM

To: All Senators, Media, and Stakeholders

Fr: Senator Thomas C. Ada

Subject: **2nd Notice - Public Hearing: October 22, 2013**

Please be advised that the Committee on Public Safety, Infrastructure, and Maritime Transportation is holding a public hearing on **Tuesday, October 22, 2013**. This meeting will take place in the Public Hearing Room of *I Liheslatura*. The agenda is as follows:

9:00 am
Bill 61-32 (COR): T.C. Ada
An act to add a new §6101.7 to Chapter 67, Title 21, Guam Code Annotated, relative to adopting the Guam Tropical Energy Code (GTEC).

Bill 140-32 (COR): T.A. Morrison
An act to amend Section 2(c) of Public Law 25-55 relative to 911 surcharges.

1:00 pm
The **Executive Appointment** of **Dr. Jeffrey C. Johnson** to serve as a **Commissioner** to the **Guam Public Utilities Commission**.

The **Executive Appointment** of **Mr. Francisco G. Santos** to serve as a **Member** to the **Jose D. Leon Guerrero Commercial Port Authority of Guam's Board of Directors**.

Testimonies on any of the bills or appointments should be addressed to Senator Thomas C. Ada, Chairperson, and will be accepted via hand delivery to our office, our mailbox at the Main Legislature Building at 155 Hesler Place, Hagåtña, Guam 96932, via email to office@senatorada.org, or via facsimile to (671) 473-3303 until **Wednesday, October 23, 2013 at 5:00 pm**. Individuals requiring special accommodations, auxiliary aids, or services should submit their request to William Brennan at 473-3301. Please feel free to contact my office should you have any questions or concerns.

Si Yu'os Ma'ase.

Thomas C. Ada

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Media media@senatorada.org

Email addresses of all media contacts (for press releases)

Change group info | Delete group

Members | Roles and permissions | Nicknames

Add new members You can add both users and other groups.

Type names, usernames, email addresses

Add as Member

Remove members | More actions

1 - 30 Next ›

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Council nixes closure expansion near test site

By Mar-Vic Cagurangan
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Variety News Staff

THE Western Pacific Fishery Management Council has reiterated the concerns raised by fishermen in the Northern Mariana Islands, who are opposed to the Navy's plan to expand the closure around the Farallon de Medinilla testing range.

CNMI fishermen have expressed concern that the Navy's plan would cut their livelihood as the area planned to be closed is a prime bottom-fishing spot.

During the four-day meeting in Honolulu which concluded Friday, the fishery council noted that the military's plans for the expansion of activities around the islands of Tinian and Pagan may hurt fishing in those areas as well.

Farallon de Medinilla, which forms part of the Marianas Land-Based Operational Range Complex, is an uninhabited island that is approximately 1.7 miles long and 0.3 miles wide (approximately 206 acres). The island is part of the CNMI and is leased for use by the U.S. government.

The island is located approximately 50 miles north-northeast of Saipan and approximately 150 miles north of Guam. FDM's operational training activities generally consist of aerial bombardment, naval surface fire support, and raiding craft fire.

During the meeting, the fisheries council decided to conduct a review of the current CNMI bottom-fish fishery and its existing management regime and develop an options paper for council consideration that would remove the large vessel area closure for bottom-fish in the southern portion of the archipelago.

Man dead, woman shot in Yigo

By Gina Taboñares-Reilly
gina@mvguam.com
Variety News Staff

A MAN has died and a woman is now on life support at the hospital following an alleged domestic violence incident in Yigo on Saturday night.

The man, in his 60s, was found lifeless at a residence on Chalan Emsley, Yigo when officers from the Dededo Precinct responded to a reported shooting at around 8:06 p.m.

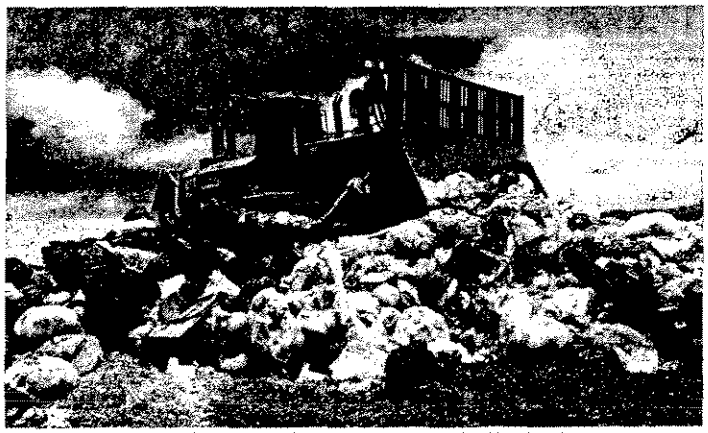
According to Officer A.J. Balajadia, Guam Police Department spokesperson, the woman was immediately rushed to Guam Memorial Hospital and was still in critical condition as of press time.

Both identities were withheld pending the notification of their relatives. They were both initially identified as Yapese. According to GPD, the woman is about 25 years old.

Initial findings by criminal investigation officers indicated the man died from a self-inflicted gunshot wound.

Balajadia said the scheduled autopsy this afternoon is expected to reveal more information on the cause of the man's death.

Little information can be made available to the public while police officers are still conducting a death investigation.



A court order has denied Adelup's motion to halt the procurement process of all solid waste projects. Variety file photo

Adelup files new appeal on solid waste

By Gina Taboñares-Reilly
gina@mvguam.com
Variety News Staff

THE legal counsel of the Office of the Governor has filed another appeal before the Ninth Circuit Court, asking the court to clarify the role of the Attorney General in the solid waste case.

Attorney Sandra Miller, the legal counsel of the Office of the Governor, is bringing the issue to the Court of Appeals while District Court Judge Frances Tydingco-Gatewood is still reviewing a July 1 court order denying Adelup's motion to halt the procurement process of all consent decree projects.

On Sept. 26, Adelup also filed an appeal before the Ninth Circuit regarding the May 16 order of the chief judge denying the substitution of the Office of the Attorney General with a private law firm and appealing the district court's denial of their motion for reconsideration dated Aug. 13.

Since April 26, the Office of the Governor has been attempting to remove the OAG as its counsel, raising several issues which include conflict of representation and differences in litigation strategy with respect to the payment of Layon land with Section 30 bond funds.

The court had denied the substitution of the OAG and only allowed the Cabot Mantanona LLP law firm to represent GovGuam on the issues raised in the former landowners' motion to intervene.

Motion for clarification

During her decision on the motion for clarification, Tydingco-Gatewood reaffirmed the OAG's role, explaining that although the OAG has cooperated and assisted the federal receiver with a variety of issues, the government of Guam remains the actual client.

The Office of the Governor repeatedly stated their loss of confidence in the OAG's legal representation, accusing the government attorneys of taking sides against GovGuam in favor of the U.S. government and the federal receiver.

Pending motion

In a separate filing, attorney Miller asked the court to decide on the motion to stay and for further relief which she filed on Sept. 13.

According to Miller, the first motion to stay is still pending and the decision of the court could avert the need for a stay pending before the Ninth Circuit.

Miller raised concerns over the lack of GovGuam representation by the counsel of its choice since the Cabot Mantanona law firm had no further role in the solid waste case with the court's denial of the former landowners' motion to intervene.

"Even if the chief legal counsel of the governor or Cabot Mantanona LLP were asked by the court to appear at the Oct. 25 hearing, their appearance would be on behalf of the Office of the Governor not the government and would be clearly inadequate given their uncertain status and role," Miller said.

On Friday, at 9:30 a.m., the court will hear a motion to unseal and a motion regarding the request for order directing the federal receiver to participate in a mediation process before the presentation by Gershman, Brickner & Bratton Inc. of its quarterly report.

Like a previous order, the court wants the attendance of Gov. Eddie Calvo (or Lt. Gov. Ray Tenorio), Speaker Judith Won Pat (or Vice Speaker Benjamin Cruz), Guam Environmental Protection Agency Administrator Eric Palacios, and all members of the Guam Solid Waste Authority board.

The court is also encouraging members of the 32nd Guam Legislature to attend the status conference.

Marianas Variety-Guam Edition is circulated by home and office delivery, consignments, and vending machines throughout Guam, as mail delivery to the Federated States of Micronesia, the Marshall Islands, South Pacific, Hawaii, Japan and the continental U.S. Daily coverage can also be read from our website **www.mvguam.com.**

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Velasquez defends UFC title

Dos Santos loses in 5th round via stoppage

HOUSTON (AP) — Cain Velasquez stopped Junior Dos Santos in the fifth round Saturday night at UFC 166 to retain the heavyweight title.

Dos Santos came out firing to start the final round, but Velasquez (13-1) worked him down to the mat only to have Dos Santos (16-3) get back up against the Octagon walls.

The two traded lefts before Velasquez landed a left and took Dos Santos down headfirst to the mat, causing referee Herb Dean to stop the bout at 3:09.

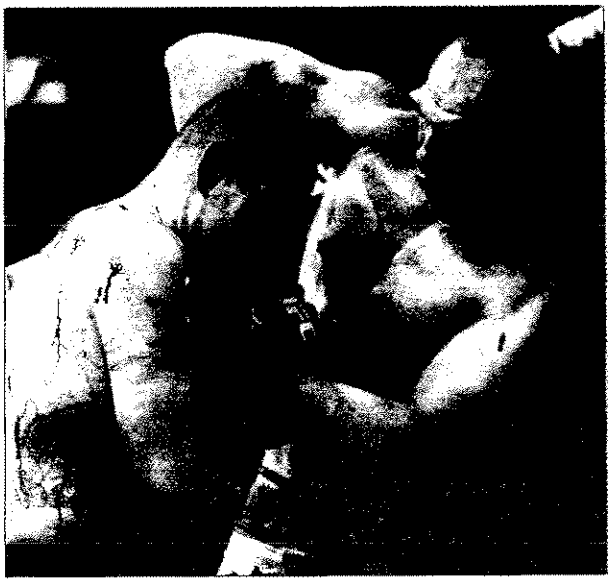
"It was a pretty tough fight," Velasquez said. "It was very difficult. It was a tough night. I give him a lot of credit, he is a tough fighter. We were ready for everything. We trained hard in camp and prepared for everything. I tried to get him down this time. I was trying to throw crisper punches this time. I love the competition."

The fight was third between the two. Dos Santos beat Velasquez in 1:04 in the first meeting in 2011, and Velasquez won the second by unanimous decision in 2012.

"I'm definitely satisfied," Velasquez said. "I just hope there are no more excuses on his part. That's it. We don't look for the finish. We just put more pressure on and when it happens, it happens."

In the co-main event, Daniel Cormier (13-0) unanimously outpointed Roy Nelson (20-9) in a heavyweight bout, with all three judges scoring it 30-27.

Velasquez took Dos Santos down twice in a row midway through the third round with several rights and pounced on him on the ground, but Dos Santos was able to make it to his feet.



Elbow to the face: UFC heavyweight champion Cain Velasquez and former heavyweight champion Junior Dos Santos fight for the UFC World Heavyweight title in Houston Oct. 19. Velasquez kept his title, beating Dos Santos with a TKO in the fifth round. The Associated Press

In the post-fight press conference Dana White said he thought the fight should have been stopped in the third round.

"I've been around this sport and boxing for a long time and seen men who are too tough for their own good," White said. "I think Junior Dos Santos is one of them in the last Cain fight and this Cain fight. I think that fight should have been stopped. I don't think he should have taken more punishment."

Velasquez remained on the attack, landing several rights with Dos Santos up against the wall, opening up cuts on Dos Santos' left ear and mouth.

Velasquez continued the attack to begin the fourth round, landing several combinations in the first 40 seconds of the fourth round, and he continued the assault up against the Octagon wall. Dos Santos was able to break free and land a left.

However, Velasquez landed more combinations, including a left that opened up a cut above Dos Santos' right eye that stopped the fight for a moment before it was determined he could continue. Following the restart, Velasquez continued to land combinations, with Dos Santos getting in a left once.

"He beat me up. What can I say?" Dos Santos said in the ring after the fight. "He's a great fighter. I just want to give a good fight to the fans."

Dos Santos was not in the post-fight press conference.

Velasquez landed several lefts to start the second round and a kick to the head as well, cutting Dos Santos on the bridge of his nose. Velasquez had Dos Santos locked up against the walls of the Octagon several times in the second round, but Dos Santos landed a right at the end of the second round.

Velasquez took Dos Santos to the mat midway through the first round, but was unable to land any hard shots, and Dos Santos got to his feet. The two went after it from the start, with Velasquez landing a couple lefts, and Dos Santos hitting an uppercut to go along with two lefts.

The crowd was firmly in Velasquez's corner throughout the fight, yelling "Si, se puede" numerous times for the Mexican.

In the co-main event, Cormier took Nelson down in each of the three rounds, including less than a minute into the bout, but he could not keep Nelson down. Cormier controlled the bout, landing more strikes than Nelson, but Cormier was not able to land combinations.

Gilbert Melendez (22-3) earned his first UFC win, defeating Diego Sanchez (26-6) by unanimous decision — 29-28, 29-28 and 30-27 — in a lightweight bout. Melendez opened up a cut over Sanchez's left eye with a right hook with two minutes left in the first round.

The referee stopped the fight midway through the second and third rounds when the cut reopened but in both instances, the fight was continued. Sanchez came back with an uppercut and a flurry in the third round as the sell-out crowd chanted "Diego! Diego!"

Soccer: Sidekick SC forces draw

Continued from page 26

Michael "Jake" Benito. Desmood Lai scored for the Strykers.

■ The Wolverines edged the Southern Cobras 4-3 behind two goals from Chris Mallada. Jestin Escobar and Jordan Rosario also scored for the Wolverines. Donovan Reyes, Napu Topasna and Joseph Quan scored for the Cobras.

■ In an all-Wings FC matchup, the Wings Red and Wings Black battled to a 3-3 draw. Isiah Lagutang struck twice and Wings Red teammate Brian Tsuji also scored. Shashikant Kotwal scored twice for the Wings Black and teammate Sean Evans scored the team's other goal.

■ In the U14 division, Clayton Mitchell and Vincent Cruz each scored twice in the Strykers' shut out win over the Islanders Asut. Anthony Moon and Jacob Herring also scored for the Strykers.

■ The Islanders Betde salvaged a 3-3 draw with last season's runner-up Community First Dededo Soccer Club. Todd Pangelinan scored twice for the Islanders Betde and Caylani Estoy also scored. Michael De Leon scored twice for Dededo and teammate Peter Garland also scored.

■ A brace by Giancarlo Abril helped the Sidekicks force a 2-2 draw with Quality Distributors. Alan Thomas and An Truong scored for Quality.

■ The Wings continued its winning ways with a 6-0 win over the Wolverines.

■ In the U12A division, the Wings defeated the Islanders Asut 5-1. Mark Iseke and Nichas Vavra each scored twice and Kyle Halchale also scored for the Wings. E.J. Reyes scored the Islanders Asut's lone goal.

■ A late goal from Luke Kim helped the Tigers salvage a 3-3 draw with Community First Dededo Soccer Club. Yu Chan and Matthew Park also scored for the Tigers. Dededo's Jericho Suser scored on a long-distance strike from near the center line and teammates Deanna Blas and Tyler Hilliard also scored for Dededo.

■ In other U12A matches, the Islanders Betde blanked Quality 3-0 and the Sidekicks edged the Wolverines 2-1.

Youth league matches continue Saturday.

Information was provided by Jill Espiritu, media and marketing office for the Guam Football Association.

Senator Thomas C. Ada
Chairman - Committee on Public Safety, Infrastructure & Maritime Transportation
I Mina'trentai Dos Na Liheslaturan Guåhan • 32nd Guam Legislature

AGENDA
PUBLIC HEARING
Tuesday, October 22, 2013
Public Hearing Room, *I Liheslaturan Guåhan*

The agenda is as follows:

9:00 am

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1:00 pm

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The **Executive Appointment** of **Mr. Francisco G. Santos** to serve as a **Member** to the **Jose D. Leon Guerrero Commercial Port Authority of Guam's Board of Directors.**

Testimonies on any of the bills or appointments should be addressed to Senator Thomas C. Ada, Chairperson, and will be accepted via hand delivery to our office or our mailbox at the Main Legislature Building at 155 Hesler Place, Hagåtña, Guam 96932, via email to office@senatorada.org, or via facsimile to (671) 473-3303 until **Wednesday October 23, 2013, at 5:00 pm**. Individuals requiring special accommodations, auxiliary aids, or services should submit their request to William Brennan. Please feel free to contact our office should you have any questions or concerns.

COMMITTEE ON RULES

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March 29, 2013

Memorandum

To: **Rennae Meno**
Clerk of the Legislature

From: **Senator Rory J. Respicio**
Chairperson, Committee on Rules

2013 APR -1 AM 8:30

Subject: **Fiscal Notes**

Hafa Adai!

Attached please find the fiscal notes for the bill numbers listed below. Please note that the fiscal notes, or waivers, are issued on the bills as introduced.

FISCAL NOTES:
Bill Nos.: 03-32 (LS), 06-32 (LS), 30-32 (COR), 31-32 (COR), 54-32 (COR), 61-32 (COR), 56-32 (COR), and 66-32 (COR)

WAIVERS:
Bill Nos.: 46-32 (LS)

Please forward the same to MIS for posting on our website. Please contact our office should you have any questions regarding this matter.

Si Yu'os ma'åse'!

BUREAU OF BUDGET & MANAGEMENT RESEARCH

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EDDIE BAZA CALVO
GOVERNOR

JOHN A. RIOS
DIRECTOR

RAY TENORIO
LIEUTENANT GOVERNOR

MAR 28 2013

Senator Rory J. Respicio
Chairperson, Committee on Rules
I Mina'trentai Unu na Liheslaturan Guåhan
The 31st Guam Legislature
155 Hesler Place
Hagåtna, Guam 96932

Hafa Adai Senator Respicio:

Transmitted herewith is Fiscal Note on the following Bill Nos.: **03-32(LS), 06-32(LS), 30-32(COR), 31-32(COR), 54-32(COR), 61-32(COR), 66-32(COR)** and Fiscal Note Waiver on the following Bill Nos.: **46-32(LS).**

If you have any question(s), please do not hesitate to call the office at 475-9412/9106.

JOHN A. RIOS
Director

Enclosures

cc: Senator Vicente (ben) Pangelinan

Bureau of Budget & Management Research
Fiscal Note of Bill No. 61-32

BILL NO. 61-32 IS AN ACT TO ADD NEW §67101.7 OF CHAPTER 67, TITLE 21, GUAM CODE ANNOTATED, RELATIVE TO ADOPTING THE GUAM TROPICAL ENERGY CODE (GTEC).

Department/Agency Appropriation Information	
Dept./Agency Affected: Guam Energy Office	Dept./Agency Head: Peter Calvo, Director
Department's General Fund (GF) appropriation(s) to date:	-
Department's Other Fund (Specify) appropriation(s) to date: 100% Federal (Continuing and FY13 Appropriations)	655,854
Total Department/Agency Appropriation(s) to date:	$655,854

Fund Source Information of Proposed Appropriation	General Fund:	(Specify Special Fund):	Total:
FY 2012 Unreserved Fund Balance[1]		$0	$0
FY 2013 Adopted Revenues	$0	$0	$0
FY 2013 Appro. (P.L. 31-233)	$0	$0	$0
Sub-total:	$0	$0	$0
Less appropriation in Bill	$0	$0	$0
Total:	$0	$0	$0

Estimated Fiscal Impact of Bill	One Full Fiscal Year	For Remainder of FY 2013 (if applicable)	FY 2014	FY 2015	FY 2016	FY 2017
General Fund	$0	$0	$0	$0	$0	$0
(Specify Special Fund)	$0	$0	$0	$0	$0	$0
Total	$0	$0	$0	$0	$0	$0

1. Does the bill contain "revenue generating" provisions? / / Yes /x/ No
   If Yes, see attachment
2. Is amount appropriated adequate to fund the intent of the appropriation? /x/ N/A / / Yes / / No
   If no, what is the additional amount required? $ _____ /x/ N/A
3. Does the Bill establish a new program/agency? / / Yes /x/ No
   If yes, will the program duplicate existing programs/agencies? /x/ N/A / / Yes / / No
   Is there a federal mandate to establish the program/agency? / / Yes /x/ No
4. Will the enactment of this Bill require new physical facilities? / / Yes /x/ No
5. Was Fiscal Note coordinated with the affected dept/agency? If no, indicate reason: / / Yes /x/ No*
   / / Requested agency comments not received as of the due date / / Other:

*Due to other Budgetary priorities and impending deadline.

Analyst: _____ Date: 3/26/13 Director: _____ Date: _____
Dina P. Rivera John A. Rios, Director

Footnotes:

See attached comments.

COMMITTEE ON RULES

I Mina'trentai Dos na Liheslaturan Guåhan • The 32nd Guam Legislature
155 Hesler Place, Hagåtña, Guam 96910 • *www.guamlegislature.com*
E-mail: *roryforguam@gmail.com* • Tel: (671)472-7679 • Fax: (671)472-3547

Senator
Rory J. Respicio
CHAIRPERSON
MAJORITY LEADER

Senator
Thomas C. Ada
VICE CHAIRPERSON
ASSISTANT MAJORITY LEADER

Senator
Vicente (Ben) C. Pangelinan
Member

Speaker
Judith T.P. Won Pat, Ed.D.
Member

Senator
Dennis G. Rodriguez, Jr.
Member

Vice-Speaker
Benjamin J.F. Cruz
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Legislative Secretary
Tina Rose Muña Barnes
Member

Senator
Frank Blas Aguon, Jr.
Member

Senator
Michael F.Q. San Nicolas
Member

Senator
V. Anthony Ada
Member
MINORITY LEADER

Senator
Aline Yamashita
Member

March 08, 2013

2013 MAR -8 AM 10:59

VIA FACSIMILE
(671) 472-2825

John A. Rios
Director
Bureau of Budget & Management Research
P.O. Box 2950
Hagåtña, Guam 96910

RE: Request for Fiscal Note – Bill Nos. 61-32 (COR) and 62-32 (COR)

Hafa Adai Mr. Rios:

Transmitted herewith is a listing of *I Mina'trentai Dos na Liheslaturan Guåhan's* most recently introduced bill. Pursuant to 2 GCA §9103, I respectfully request the preparation of fiscal notes for the referenced bill.

Si Yu'os ma'åse' for your attention to this matter.

Very Truly Yours,

Rory J. Respicio

Senator Rory J. Respicio
Chairperson, Committee on Rules

Attachments

Cc: Clerk of the Legislature

Request for Fiscal Note – Bill Nos. 61-32 (COR) and 62-32 (COR)

Bill No. 61-32 (COR) - T.C. Ada - AN ACT TO ADD A NEW §67101.7 OF CHAPTER 67, TITLE 21, GUAM CODE ANNOTATED, RELATIVE TO ADOPTING THE GUAM TROPICAL ENERGY CODE (GTEC)

Bill No. 62-32 (COR) - D.G. Rodriguez, Jr.. , Aline A. Yamashita, Ph.D., Brant McCreadie - AN ACT TO ESTABLISH THE GUAM COUNCIL ON CHILD DEATH REVIEW AND PREVENTION (CCDRP) BY ADDING A NEW ARTICLE 10 TO CHAPTER 3, DIVISION I OF TITLE 10, GUAM CODE ANNOTATED.

COMMITTEE ON RULES

I Mina'trentai Dos na Liheslaturan Guåhan • The 32nd Guam Legislature
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March 4, 2013

MEMORANDUM

To: **Rennae Meno**
Clerk of the Legislature

Attorney Therese M. Terlaje
Legislative Legal Counsel

From: **Senator Rory J. Respicio**
Majority Leader & Rules Chair

Subject: **Referral of Bill No. 61-32(COR)**

As the Chairperson of the Committee on Rules, I am forwarding my referral of Bill No. **61-32(COR)**.

Please ensure that the subject bill is referred, in my name, to the respective committee, as shown on the attachment. I also request that the same be forwarded to all members of *I Mina'trentai Dos na Liheslaturan Guåhan.*

Should you have any questions, please feel free to contact our office at 472-7679.

Si Yu'os Ma'åse!

Attachment

I MINA'TRENTAI DOS LIHESLATURAN GUÅHAN
2013 (First) Regular Session

Bill No. 61-32 (COR)

Introduced by: T.C. Ada

2013 MAR -4 AM 11:32

AN ACT TO ADD A NEW § 67101.7 OF CHAPTER 67, TITLE 21, GUAM CODE ANNOTATED, RELATIVE TO ADOPTING THE GUAM TROPICAL ENERGY CODE (GTEC)

BE IT ENACTED BY THE PEOPLE OF GUAM:

Section 1. Legislative Findings and Intent. *I Liheslaturan Guåhan* finds that building energy codes set an energy efficiency baseline that address the energy-efficiency requirements for the design, materials, and equipment used in nearly all new constructions and renovations. These requirements affect the overall energy efficiency of a building and can reduce the energy needed to maintain a healthy, comfortable, and fully functioning indoor environment.

I Liheslaturan Guåhan further finds that energy codes can play a key role in reducing the island's reliance on foreign oil, and carbon emissions. Finally, current industry techniques enable construction of buildings that comply with energy codes, at minimal increase in first cost. Ultimately, building owners benefit with reduced energy bills and a comfortable healthy home or business facility.

I Liheslatura further finds that in accordance with P.L. 30-199, the Guam Building Code Council met regularly and conducted public hearings to receive input and recommendations. The product of that effort is the 2012 Guam Tropical Energy Code (GTEC), an energy conservation code applicable to Guam's tropical environment and intended for implementation in conjunction with the current Guam Building Code that was previously adopted by P.L. 30-199. The Guam Building Code Council approved the GTEC on Jan 8, 2013, and now needs Legislative ratification.

I Liheslatura finds that the 2012 GTEC should be the standard used on new construction and renovations. It is therefore the intent of *I Liheslatura* to adopt the Guam

Tropical Energy Code into law, and to provide a six-month period before implementation in order to allow for a smooth transition.

Section 2. The existing §§ 67101.7 and 67101.8 of Chapter 67, Title 21, Guam Code Annotated, are hereby renumbered as §§ 67101.8 and 67101.9, respectively.

Section 3. A new § 67101.7 of Chapter 67, Title 21, Guam Code Annotated, is hereby added to read:

"**§ 67101.7. Guam Tropical Energy Code Adopted.** The *Guam Tropical Energy Code*, Attachment A, is hereby adopted."

Section 4. Applicability. This code shall apply to all Residential and Non-Residential construction as prescribed in the GTEC; however, Section 5 of this code shall not be applicable to:

1. Unconditioned Groups S & U Occupancy Buildings, or
2. Temporary Structures, as defined by the International Building Code.

Section 5. Severability. If any of the provisions of this law or its application to any person or circumstance is found to be invalid or contrary to law, such invalidity shall not affect other provisions or applications of this law which can be given effect without the invalid provisions or application, and to this end the provisions of this law are severable.

Section 6. Effective Date. This Act shall become effective six (6) months from the date of enactment.

GUAM BUILDING CODE COUNCIL

c/o Guam Contractors License Board
542 N. Marine Corps Drive, Building A (DPW), Tamuning, GU 96913
contact@guambcc.org
671-649-9676

32-13-167
Office of the Speaker
Judith T. Won Pat, Ed. D.
Date 3/4/13
Time 11:24AM
Received by

March 4, 2013

The Honorable Judith T. Won Pat, Ed. D
Speaker, 32nd Guam Legislature
155 Hessler Street
Hagåtña, Guam

Re: Guam Tropical Energy Code

Hafa Adai Speaker Won Pat,

Per the mandate of P.L. 30-199, the proposed *2012 Guam Tropical Energy Code* (GTEC) is hereby transmitted for adoption as part of the *Guam Building Code*. The GTEC was developed by the Guam Building Code Council (GBCC) with input from the community, and is consistent with industry standards.

Energy codes can play a key role in reducing the island's demand of foreign oil, and reducing carbon emissions. Additionally, current industry techniques enable construction of buildings that comply with energy codes, at minimal increase in first cost. Ultimately, building owners benefit with reduced energy bills and a comfortable healthy home or business facility.

The GTEC is a set of industry based construction standards promoting energy conservation. If adopted, the GTEC will be applicable to all new residential and non-residential construction and to existing structures undergoing substantial renovation. Additionally, the GTEC is intended to promote energy conservation in a cost-effective manner. Implementation of these standards is not expected to have a significant impact in the total cost of construction.

With the support of the Guam Energy Office, the GBCC conducted community outreach and public hearings, to include information workshops for technical and non-technical stakeholders. Input was received from contractors, real estate professionals, engineers, architects, and the general public. Articles have been written about the GTEC in the local media and five Public Hearings were held on the matter. Input that was received was evaluated and incorporated, and the resulting GTEC was adopted unanimously by the GBCC on January 8, 2013.

The Guam Building Code Council (GBCC) looks forward to the timely adoption of the *2012 Guam Tropical Energy Code* (GTEC).

Sincerely,

Brent Wiese, AIA NCARB LEED AP BD+C
Chairman, Guam Building Code Council

CC: Chairman, Committee on Public Safety, Infrastructure, and Maritime Transportation

2012 Guam Tropical Energy Code

Guam Building Code Council
As Approved on January 8, 2013

DEFINITIONS

GENERAL

Scope. Unless stated otherwise, the following words and terms in this code shall have the meanings indicated in this chapter.

Interchangeability. Words used in the present tense include the future; words in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural includes the singular.

Terms defined in other codes. Terms that are not defined in this code but are defined in the *International Building Code*, *International Fire Code*, *International Fuel Gas Code*, *International Mechanical Code*, *International Plumbing Code*, the *International Residential Code, or the International Energy Conservation Code* shall have the meanings ascribed to them in those codes.

Terms not defined. Terms not defined by this chapter shall have ordinarily accepted meanings such as the context implies.

GENERAL DEFINITIONS

ACCESSIBLE. Admitting close approach as a result of not being guarded by locked doors, elevation or other effective means (see "Readily *accessible*").

ADDITION. An extension or increase in the *conditioned space* floor area or height of a building or structure.

AIR BARRIER. Material(s) assembled and joined together to provide a barrier to air leakage through the building envelope. An air barrier may be a single material or a combination of materials.

ALTERATION. Any construction or renovation to an existing structure that requires a permit. Also, a change in a mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

APPROVED. Approval by the *code official* as a result of investigation conducted by him or her, or by reason of accepted principles or tests by nationally recognized organizations.

AUTOMATIC. Self-acting, operating by its own mechanism when actuated by some impersonal influence, as, for example, a change in current strength, pressure, temperature or mechanical configuration (see "Manual").

BASEMENT WALL. A wall 50 percent or more below grade and enclosing *conditioned space*.

BUILDING. Any structure used or intended for supporting or sheltering any use or occupancy.

BUILDING THERMAL ENVELOPE. The basement walls, exterior walls, floor, roof, and any other building element that enclose *conditioned space*. This boundary also includes the boundary between *conditioned space* and any exempt or unconditioned space.

***C*-FACTOR (THERMAL CONDUCTANCE).** The coefficient of heat transmission (surface to surface) through a building component or assembly, equal to the time rate of heat flow per unit area and the unit temperature difference between the warm side and cold side surfaces (Btu/h ft^2 x°F) [W/(m^2 xK)].

CODE OFFICIAL. The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative.

COMMERCIAL BUILDING. For this code, all buildings that are not included in the definition of "Residential buildings."

CONDITIONED FLOOR AREA. The horizontal projection of the floors associated with the *conditioned space*.

CONDITIONED SPACE. An area or room within a building being heated or cooled, containing uninsulated ducts, or with a fixed opening directly into an adjacent *conditioned space*.

CURTAIN WALL. Fenestration products used to create an external nonload-bearing wall that is designed to separate the exterior and interior environments.

DAYLIGHT ZONE.
1. Under skylights. The area under skylights whose horizontal dimension, in each direction, is equal to the skylight dimension in that direction plus either the floor-to ceiling height or the dimension to a ceiling height opaque partition, or one-half the distance to adjacent skylights or vertical fenestration, whichever is least.
2. Adjacent to vertical fenestration. The area adjacent to vertical fenestration receiving daylight through the fenestration. For purposes of this definition and unless more detailed analysis is provided, the daylight *zone* depth is assumed to extend into the space a distance of 15 feet (4572 mm) or to the nearest ceiling height opaque partition, whichever is less. The daylight *zone* width is assumed to be the width of the window plus 2 feet (610 mm) on each side, or the window width plus the distance to an opaque partition, or the window width plus one-half the distance to adjacent skylight or vertical fenestration, whichever is least.

DEMAND CONTROL VENTILATION (DCV). A ventilation system capability that provides for the automatic reduction of outdoor air intake below design rates when the actual occupancy of spaces served by the system is less than design occupancy.

DUCT. A tube or conduit utilized for conveying air. The air passages of self-contained systems are not to be construed as air ducts.

DUCT SYSTEM. A continuous passageway for the transmission of air that, in addition to ducts, includes duct fittings, dampers, plenums, fans and accessory air-handling equipment and appliances.

DWELLING UNIT. A single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

ENERGY ANALYSIS. A method for estimating the annual energy use of the *proposed design* and *standard reference design* based on estimates of energy use.

ENERGY COST. The total estimated annual cost for purchased energy for the building functions regulated by this code, including applicable demand charges.

ENERGY RECOVERY VENTILATION SYSTEM. Systems that employ air-to-air heat exchangers to recover energy from exhaust air for the purpose of preheating, precooling, humidifying or dehumidifying outdoor ventilation air prior to supplying the air to a space, either directly or as part of an HVAC system.

ENERGY SIMULATION TOOL. An *approved* software program or calculation-based methodology that projects the annual energy use of a building.

ENTRANCE DOOR. Fenestration products used for ingress, egress and access in nonresidential buildings, including, but not limited to, exterior entrances that utilize latching hardware and automatic closers and contain over 50-percent glass specifically designed to withstand heavy use and possibly abuse.

EXTERIOR WALL. Walls including both above-grade walls and basement walls.

FENESTRATION. Skylights, roof windows, vertical windows (fixed or moveable), opaque doors, glazed doors, glazed block and combination opaque/glazed doors. Fenestration includes products with glass or non-glass glazing materials.

***F*-FACTOR.** The perimeter heat loss factor for slab-on-grade floors (Btu/h xft x°F) [W/(m xK)].

HEAT CAPACITY (HC). The amount of heat necessary to raise the temperature of a given mass 1°F. Numerically, the mass expressed per unit of wall surface multiplied by the specific heat [BTU/ft^2 °F]

HEAT TRAP. An arrangement of piping and fittings, such as elbows, or a commercially available heat trap that prevents thermosyphoning of hot water during standby periods.

HIGH-EFFICACY LAMPS. Compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:
1. 60 lumens per watt for lamps over 40 watts,
2. 50 lumens per watt for lamps over 15 watts to 40 watts, and
3. 40 lumens per watt for lamps 15 watts or less.

HUMIDISTAT. A regulatory device, actuated by changes in humidity, used for automatic control of relative humidity.

INFILTRATION. The uncontrolled inward air leakage into a building caused by the pressure effects of wind or the effect of differences in the indoor and outdoor air density or both.

KNEE WALL (PONY WALL). A split wall with different wall types for the upper and lower portions.

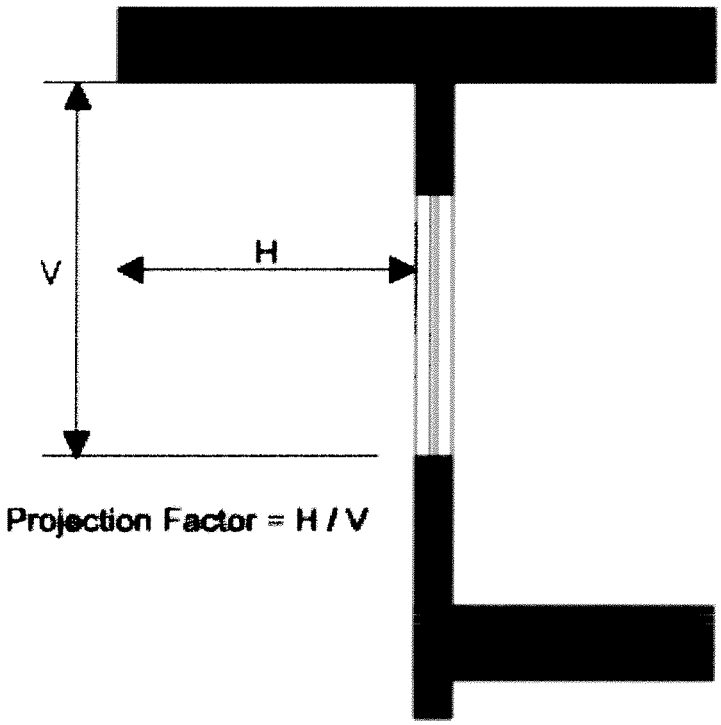
LABELED. Equipment, materials or products to which have been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the *code official* and concerned with evaluation of products or services that maintains periodic inspection of production of *listed* equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose.

LOW-RISE RESIDENTIAL. Single-family houses, multi-family structures of three stories or fewer above grade.

MANUAL. Capable of being operated by personal intervention (see "Automatic").

PROJECTION FACTOR (PF). The ratio of the horizontal depth of the external shading projection divided by the sum of the height of the fenestration and the distance from the top of the fenestration to the bottom of the farthest point of the external shading projection, in consistent units.



PROPOSED DESIGN. A description of the proposed building used to estimate annual energy use for determining compliance based on total building performance.

READILY ACCESSIBLE. Capable of being reached quickly for operation, renewal or inspection without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders or access equipment (see "*Accessible*").

REPAIR. The reconstruction or renewal of any part of an existing building.

RESIDENTIAL BUILDING. For this code, includes R-3 buildings, as well as R-2 and R-4 buildings three stories or less in height above grade.

ROOF ASSEMBLY. The upper portion of the building envelope, including opaque areas and fenestration, that is horizontal or tilted at an angle of less than 60° from horizontal. For the purposes of determining building envelope requirements, the classifications are defined as follows:

a. Mass roof: a roof with a heat capacity exceeding 7.5 or a weight greater than 40 lb/ft^2. Concrete roofs equal to or greater than four inches are considered mass roofs.
b. Metal building roof: a roof (1) that is not in the roof with insulation entirely above deck category and (2) whose structure consists simply of metal spanning members supported by metal structural members (i.e., does not include composite concrete and metal deck construction.)
c. Other roofs: all other roofs, including wood roofs, but excluding metal building roofs.

***R*-VALUE (THERMAL RESISTANCE).** The inverse of the time rate of heat flow through a body from one of its bounding surfaces to the other surface for a unit temperature difference between the two surfaces, under steady state conditions, per unit area (h xft^2 x°F/Btu) [(m^2 xK)/W].

SERVICE WATER HEATING. Supply of hot water for purposes other than comfort heating.

SKYLIGHT. Glass or other transparent or translucent glazing material installed at a slope of 15 degrees (0.26 rad) or more from vertical. Glazing material in skylights, including unit skylights, solariums, sunrooms, roofs and sloped walls is included in this definition.

SLEEPING UNIT. A room or space in which people sleep, which can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not *sleeping units*.

SOLAR HEAT GAIN COEFFICIENT (SHGC). The ratio of the solar heat gain entering the space through the fenestration assembly to the incident solar radiation. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation which is then reradiated, conducted or convected into the space.

THERMOSTAT. An automatic control device used to maintain temperature at a fixed or adjustable set point.

***U*-FACTOR (THERMAL TRANSMITTANCE).** The coefficient of heat transmission (air to air) through a building component or assembly, equal to the time rate of heat flow per unit area and unit temperature difference between the warm side and cold side air films (Btu/h xft^2 x°F) [W/(m^2 xK)].

VENTILATION. The natural or mechanical process of supplying conditioned or unconditioned air to, or removing such air from, any space.

VENTILATION AIR. That portion of supply air that comes from outside (outdoors) plus any recirculated air that has been treated to maintain the desired quality of air within a designated space.

ZONE. A space or group of spaces within a building with heating or cooling requirements that are sufficiently similar so that desired conditions can be maintained throughout using a single controlling device.

TABLE OF CONTENTS

1. Purpose

The purpose of this code is to provide minimum design requirements to achieve energy-efficiency in buildings constructed in Guam.

2. Scope

(A) This code shall apply to all non-residential and residential construction.

(B) This code provides minimum energy-efficiency requirements for the design and construction of any of the following:

(1) new buildings,

(2) additions, alterations, renovations, or repairs to existing buildings requiring a permit,

(3) new or replacement air conditioning, water heating, and lighting equipment in existing buildings, or

(4) replacement roofing.

(C) Where this code is found in conflict with the safety, health, or environmental codes, the safety, health or environmental codes shall govern.

(D) Historic Buildings Exemption. *Any building or structure that is listed in the National Register of Historic Places or the Guam Register of Historic Places*; designated as a historic property under local designation law or survey; certified as a contributing resource with a National Register listed or locally designated historic district; or with an opinion or certification that the property is eligible to be listed on the National Register of Historic Places either individually or as a contribution building to a historic district by the State Historic Preservation Officer or the Keeper of the National Register of Historic Places, are exempted from this code, insofar as complying with the code would compromise or damage the historic character of the building.

3. Administration and Enforcement

3.01 Compliance Requirements

(A) New Buildings

(1) Low-rise residential buildings shall comply with the provisions of Section 4 through Section 6 of this code.

(2) Other buildings shall comply with either Section 4 through Section 7 of this code or the International Energy Conservation Code 2009, Chapter 5, including §506 on Total Building Performance, as amended by Section 4.03(A)(2) of this code.

(B) **Additions, alterations, renovations or repairs.** Additions, alterations, renovations or repairs to those parts of an existing building that are affected by this code, or parts thereof, building systems or portions thereof shall conform to the provisions of this code. **Unaltered portion(s) of the existing building or building system shall not be required to comply with this code.** Additions, alterations, renovations, or repairs shall not create an unsafe or hazardous condition or overload existing building systems.

Note: Major alterations to a building, where the estimated cost of construction is more than 50% of the appraised value of the building, the entire building shall comply with the provisions of this code.

Exception: The following need not comply provided the energy use of the building is not increased by any of the following:

(1) Glass only replacements in an existing sash and frame.

(2) Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.

(3) Construction where the existing roof, wall or floor cavities are not exposed.

(4) Alterations that replace less than 50 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.

(5) Alterations that replace only the bulb and ballast within the existing luminaires in a space provided that the *alteration* does not increase the installed interior lighting power.

(C) **Change in occupancy.** Buildings undergoing a change in occupancy that would result in an increase in demand for either fossil fuel or electrical energy shall comply with this code.

(D) **Mixed occupancy.** Where a building includes both residential and other occupancies, each occupancy shall be separately considered and meet the applicable provisions for each occupancy.

(E) **Replacement Roofing.** Replacement roofing membranes shall comply with the roof requirements of Section 4.03(A)(2).

3.02 Administrative Requirements

Administrative requirements relating to permit requirements, enforcement, interpretations, claims of exemption, and calculation methods are specified by the Department of Public Works. Administrative requirements relating to rights of appeal are specified by the Guam Building Code Council.

3.03 Compliance Documents

(A) General: Plans, specifications, calculations, diagrams, reports, and other data shall constitute the compliance documents.

(B) Construction Details: Compliance documents shall show pertinent data and features of the building, equipment, and systems in sufficient detail to permit an evaluation by the Department of Public Works relative to this code.

(C) Supplemental Information: The Department of Public Works may require supplemental information necessary to verify compliance with this code, such as calculations, worksheets, compliance forms, vendor literature, or other data.

(D) Alternative method for prescriptive requirement compliance: The Energy Cost Budget Method, as defined by Chapter 11 of ASHRAE Standard 90.1-2007, may be used in place of prescriptive method outlined within this code. In such a case, evidence must be provided demonstrating that building performance is equal to or better than the energy conservation standards established within this code.

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4. Envelope

4.01 General

(A) Scope. The envelope requirements apply to all enclosed buildings, except unconditioned factories, storage spaces, and warehouses.

(B) Compliance. The building envelope shall comply with the mandatory provisions of Section 4.02 and either the prescriptive criteria of Section 4.03 or the building envelope trade-off procedures of Section 4.05. Low-rise residential buildings have the additional option of complying with the criteria for naturally ventilated buildings in Section 4.04.

4.02 Mandatory Provisions

(A) Insulation. Insulation materials shall be installed to achieve proper densities, maintain clearances, and maintain rated R-value of insulation. Exception: Insulation may be compressed at the structural support for draped applications in metal buildings.

(B) Moisture Control. The building envelope shall be designed to prevent moisture migration that leads to deterioration of the insulation or equipment and structural damage.

(C) U-factors. U-factors for opaque constructions shall be calculated using procedures consistent with the ASHRAE Fundamentals, 2009.

(D) Certification and labeling of cool roof products. The initial reflectance, aged reflectance, emittance, and the aged SRI of roofing products shall be determined by the Cool Roof Rating Council (CRRC) in accordance with the CRRC-1.

(E) Fenestration product rating. The solar heat gain coefficient (SHGC) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer. As an alternative, the center-of-glass SHGC from glass manufacturers may be used. Products lacking such a SHGC as described above shall be assigned a default SHGC from Table 4.1.

(F) Building Envelope Sealing:

(1) The building thermal envelope shall be durably sealed to limit air infiltration. The sealing methods between dissimilar materials shall allow for differential expansion and contraction. The following shall be caulked, gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material:

a) All joints, seams and penetrations.

b) Site-built windows, doors and skylights.

c) Openings between window and door assemblies and their respective jambs and framing.

d) Utility penetrations.

e) Dropped ceilings or chases adjacent to the thermal envelope.

f) Joints at knee walls.

g) Joints in walls and ceilings separating unconditioned spaces from conditioned spaces.

h) Behind tubs and showers on exterior walls.

i) Common walls between dwelling units.

j) Other sources of infiltration.

(2) Fenestration air leakage. Operable windows shall be capable of being tightly closed. Windows, skylights and sliding glass doors shall have an air infiltration rate of no more than 0.3 cfm per square foot (1.5 L/s/sq m), and swinging doors no more than 0.5 cfm per square foot (2.6 L/s/sq m), when tested according to NFRC 400 or

AAMA/WDMA/CSA101/I.S.2/A440 by an accredited, independent laboratory and listed or labeled by the manufacturer.

Exception to 4.02(F)(2): Windows, skylights and glass doors in naturally ventilated low-rise residential buildings that comply with Section 4.04.

(3) Non-Residential Building entrances enclosing conditioned space shall be revolving or self-closing doors, or be enclosed by other means as shall be approved by the Department of Public Works.

4.03 Prescriptive Building Envelope Requirements

(A) Roofs.

(1) Roofs shall meet the requirements of Table 4.2

(2) Low-slope roof membranes shall have an aged reflectance of at least 0.55 and a minimum thermal emittance of 0.75, or a minimum aged SRI of at least 64.

a) If only the new reflectance is known, the aged reflectance shall be calculated as follows:
Equation 4.03-1:

$$REFL_{Aged} = 0.60 + 0.70 \times Refl_{Initial}$$

b) If the SRI is not known, but the reflectance and emittance are known, then the SRI shall be calculated:
Equation 4.03-2:

$$SRI = -84 + 85 \times Emit + 203 \times Ref - 75 \times Refl \times Emit$$

c) Roof surfaces shall have a minimum slope of 1/4 inch per foot of run.

Exception to 4.03(A)(2)(c): Replacement roofing.

(B) Walls. Wall insulation shall meet the requirements of Table 4.3.

(C) Windows. Fenestration products shall meet the requirements of Table 4.4. The window wall ratio is limited to a maximum of 40% of the gross wall area.

(D) Skylights. Area is limited to a maximum of 3% of the gross roof area. The maximum SHGC for glass products is 0.40 and the maximum SHGC for plastic skylights is 0.35.

4.04 Prescriptive Building Envelope Requirements for Naturally Ventilated Low-Rise Residential Buildings

This section may be used as an alternative to 4.03 for low-rise residential buildings.

(A) Roofs shall meet the requirements of 4.03(A). Walls shall meet the requirements of 4.03(B). Windows shall meet the requirements of 4.03(C) and skylights shall meet the requirements of 4.03(D).

4.05 Building Envelope Trade-Off Option

A trade-off for the Mandatory Requirements shall be allowed if the envelope performance factor of the proposed building is less than or equal to the envelope performance factor of the budget building.

(A) The envelope performance factor shall be calculated using the following equations.

$$EPF_{Total} = EPF_{Roof} + EPF_{Wall} + EPF_{Fenest}$$

Where:

$$EPF_{Roof} = c_{Roof,Mass}\sum_{s=1}^{n} U_s A_s (1 - SRI)_s + c_{Roof,MtlBldg}\sum_{s=1}^{n} U_s A_s (1 - SRI)_s + c_{Roof,Other}\sum_{s=1}^{n} U_s A_s (1 - SRI)_s$$

$$EPF_{Wall} = c_{Wall,Mass}\sum_{s=1}^{n} U_s A_s + c_{Wall,MtlBldg}\sum_{s=1}^{n} U_s A_s + c_{Wall,MtlFrm}\sum_{s=1}^{n} U_s A_s + c_{Wall,Other}\sum_{s=1}^{n} U_s A_s$$

$$EPF_{Fenest} = c_{Fenest,North}\sum_{w=1}^{n} A_w SHGC_w M_w +$$
$$c_{Fenest,East}\sum_{w=1}^{n} A_w SHGC_w M_w +$$
$$c_{Fenest,South}\sum_{w=1}^{n} A_w SHGC_w M_w +$$
$$c_{Fenest,West}\sum_{w=1}^{n} A_w SHGC_w M_w +$$
$$c_{Fenest,Skylight}\sum_{s=1}^{n} A_s SHGC_s$$

Where:

EPF_{Roof}	Envelope performance factor for roofs. Other subscripts include walls and fenestration.
A_S, A_W	The area of a specific envelope component referenced by the subscript "s" or for windows the subscript "w".
$SHGC_W$	The solar heat gain coefficient for windows (w). $SHGC_S$ refers to skylights.
M_W	A multiplier for the window SHGC that depends on the projection factor of an overhang or side fin. These values are determined by the procedures in Section 4.05(B).
U_S	The U-factor for the envelope component referenced by the subscript "s".
SRI_S	The aged SRI shall be used. If the aged SRI is not known, it can be calculated from the aged reflectance and emittance using Equation 4.03-2. If the SRI is not known and cannot be calculated for a product, an SRI of 10 shall be used.
C_{Fenest}	The coefficients for use in the EPF equations are contained in

Table 4.5.

$C_{Roof,Mass}$ A coefficient for the "Roof, Mass" class of construction. Values of "C" are taken from Table 4.5 for each class of construction.

(B) Credits for fixed shading devices (M) such as overhangs, awnings, trellises, or side fins shall be calculated using the following equations:

(overhangs) $M = 0.16 \times PF^2 + -0.61 \times PF + 1$
(side fins) $M = 0.23 \times PF^2 + -0.74 \times PF + 1$

where: PF is Projection Factor (see definitions section)

(C) The following rules shall be used to define the budget building.

(1) The budget building shall have the same building floor area, gross wall area, and gross roof area as the proposed design. If the building has both 24-hour and daytime occupancies, the distribution between these shall be the same as the proposed design.

(2) The U-factor of each envelope component shall be equal to the criteria from Section 4.03 for each class of construction.

(3) The vertical fenestration area shall be equal to the proposed design or 40% of the gross exterior wall area, whichever is less. The skylight area shall be equal to the proposed design or 3% of the gross exterior roof area, whichever is less.

(4) The SHGC of each window or skylight component shall be equal to the criteria from Section 4.03.

(5) If the roof is low-sloped or metal, the SRI shall be 64. Otherwise, the SRI shall be 27.

Table 4.1 Default Glazed Fenestration SHGC

Single Glazed		Double Glazed		
Clear	Tinted	Clear	Tinted	Glazed Block
0.8	0.7	0.7	0.6	0.6

Table 4.2 Roof Assembly

	Non-Residential		Residential	
Class	Maximum U-factor	Or Minimum Insulation:	Maximum U-factor	Or Minimum Insulation:
Mass	0.072	R-13	0.072	R-13
Metal building	0.065	R-19	0.065	R-19
Other	0.034	R-30	0.034	R-30

See definitions section for definitions of these terms.

Table 4.3 Wall Assembly		
	All Building Types	
Class	Maximum U-factor	Or Minimum Insulation
Mass	None	None
Metal building	0.113	R-13
Steel-Framed	0.124	R-13
Wood-Framed and other	0.089	R-13
A mass wall has a Heat Capacity (HC) greater than 7.0 or a weight greater than 35 lb/ft2.		

Table 4.4 Window Heat Gain				
Building Type	Window Wall Ratio	Un-Shaded	Partially Shaded	Well Shaded or North Facing
Nonresidential or high-rise residential	Less than 15%	No Requirement	No Requirement	No Requirement
	15% - 25%	Special Coated Glass	Tinted Glass	No Requirement
	More than 25%	Special Coated Glass	Special Coated Glass	Tinted Glass
Low-rise residential	All	No Requirement	No Requirement	No Requirement

- Window wall ratio is the ratio of the total window area of the building, measured to the outside of the frame, to the gross exterior wall area.
- A north facing window is one that faces within 22.5 degrees of true north.
- Partially shaded windows are those that are protected from direct sun for the majority of the time. Shading can be provided by overhangs, side fins, mature trees, or other devices. Qualifying overhangs shall have a projection factor greater than or equal to 0.5 and the overhang shall extend past the window jambs a distance at least equal to the overhang projection. Qualifying side fins shall have a projection factor greater than or equal to 0.5 and the side fin shall extend above the window head a distance at least equal to the side fin projection.
- Well-shaded windows are those that are more completely protected from direct sun. Shading can be provided by overhangs, side fins, mature trees, or other devices. Qualifying overhangs shall have a projection factor greater than or equal to 1.0 and the overhang shall extend past the window jambs a distance at least equal to the overhang projection. Qualifying side fins shall have a projection factor greater than or equal to 1.0 and the side fin shall extend above the window head a distance at least equal to the side fin projection.
- Tinted glass includes all glazing products with a bronze, green, gray or blue integral tint; clear glass with a coating or film; or any other glazing product that has a solar heat gain coefficient (SHGC) equal to or less than 0.61.
- Special coated glass includes glass with reflective coatings or films that have a solar heat gain coefficient (SHGC) equal to or less than 0.30.

Table 4.5 Envelope Performance Factor Coefficients		
Component, Class	Daytime	24-Hour
Roofs, Mass	1.47	3.61
Roofs, MtlBldg	15.83	25.26
Roofs, Other	2.84	3.82
Wall, Mass	2.53	6.14
Wall, MtlBldg	6.36	9.28
Wall, MtlFrm	6.36	9.28
Wall, Other	6.36	9.28
Fenest, East	53	86
Fenest, North	31	51
Fenest, South	58	98
Fenest, West	50	85
Fenest, Skylights	101	163

5. Ventilation and Air Conditioning

5.01 General

All mechanical equipment and systems serving the building's cooling, dehumidification, or ventilation needs shall meet the requirements of this section.

5.02 Applicability of Mandatory Provisions[1]

The requirements of this section apply to ventilation and cooling systems that:

(A) use unitary packaged or split-system air conditioners that are either air-cooled or evaporatively cooled,

(B) serve a single thermal zone,

(C) have a cooling capacity less than 65,000 Btu/h, and do not have a humidistat.

Ventilation and air conditioning systems that do not satisfy the above requirements shall be designed in accordance with Section 503 of the IECC 2009.

5.03 Mandatory Provisions:

[1] Aluminum or copper condenser coils which are exposed to salty and humid marine conditions typical of the climates covered by this code will quickly corrode. Corrosion leads to rapid losses in capacity, reduced efficiency, and increased energy consumption. In seaside locations especially, the operating performance of unprotected condenser coils may decrease over 50% in a single year (Source: Coatings Can Help Condensers Live Longer, Joanna Turpin, February 13, 2002, HVACR Directory). For this reason, protective coatings are recommended, although not required by the code. Many manufacturers offer protective coatings that reduce corrosion. Coatings may also be field installed, but factory applied coatings are recommended, since it is difficult to maintain quality under field conditions.

(A) Each system shall be controlled by a thermostat.

(B) Each thermostat shall be provided with setback controls that are controlled by either an automatic time clock or programmable control system.

(1) Thermostat setback capabilities. Thermostat controls shall have the capability to set back or temporarily operate the system to maintain zone temperatures up to 85°F.

(2) Automatic setback and shutdown capabilities. Automatic time clock or programmable controls shall be capable of starting and stopping the system for a seven day schedule and retaining their programming and time setting during a loss of power for at least 10 hours. Additionally, the controls shall have a manual override that allows temporary operation of the system for up to 2 hours; a manually operated timer capable of being adjusted to operate the system for up to 2 hours; or an occupancy sensor.

(3) Exceptions to 5.03(B):

a) Zones that will be operated continuously.

b) Zones with a full HVAC load demand not exceeding 6,800 Btu/h and having a readily accessible manual shutoff switch.

(C) Hotel and motel rooms shall be equipped with a mechanism that shuts off the cooling mechanism for the room when exterior doors and/or windows to the room are open.

(D) All equipment installed in the building shall have the U.S. DOE Energy Guide Label.

(E) Refrigerant suction piping on split systems shall have at least 1/2 in. cellular foam, cellular glass, or fiberglass insulation. Insulation exposed to weather shall be protected by aluminum sheet metal, painted canvas, stainless steel, or plastic cover.

(F) Duct and plenum insulation. All supply and return air ducts and plenums shall be insulated with a minimum of R-5 insulation when located in unconditioned spaces and with a minimum of R-8 insulation when located outside the building. When located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by a minimum of R-8 insulation. Supply air ducts that transport chilled air at or below 55°F (13°C) that are located in spaces that are conditioned shall be insulated with a minimum of R-5 insulation with a vapor retarder jacket.

Exception to 5.03(F): When located within equipment.

(G) Duct and plenum sealing. All joints, longitudinal and transverse seams and connections in ductwork, shall comply with the International Mechanical Code, 2009 edition.

5.04 HVAC equipment performance requirements.

Equipment shall meet the minimum efficiency requirements of Tables 503.2.3(1), 503.2.3(2), 503.2.3(3), 503.2.3(5), 503.2.3(6) and 503.2.3(7) when tested and rated in accordance with the applicable test procedure. The efficiency shall be verified through certification under an approved certification program or, if no certification program exists, the equipment efficiency ratings shall be supported by data furnished by the manufacturer. Where multiple rating conditions or performance requirements are provided, the equipment shall satisfy all stated requirements. Where components, such as indoor or outdoor coils, from different manufacturers are used, calculations and supporting data shall be furnished by the designer that demonstrates that the combined efficiency of the specified components meets the requirements herein.

Exception: Water-cooled centrifugal water-chilling packages listed in Table 503.2.3(7) not designed for operation at ARHI Standard 550/590 test conditions of 44°F (7°C) leaving chilled water temperature and 85°F (29°C) entering condenser water temperature with 3 gpm/ton (0.054 l/s.kW) condenser water flow shall have maximum full load and NPLV ratings adjusted using the following equations:

Adjusted maximum full load kW/ton rating = [full load kW/ton from Table 503.2.3(7)]/K_{adj}

Adjusted maximum NPLV rating = [IPLV from Table 503.2.3(7)]/K_{adj}

where:

K_{adj} = $6.174722 - 0.303668(X) + 0.00629466(X)^2 - 0.000045780(X)^3$

X = DT_{std} + LIFT

DT_{std} = {24 + [full load kW/ton from Table 503.2.3(7)] x 6.83}/Flow

Flow = Condenser water flow (GPM)/Cooling Full Load Capacity (tons)

LIFT = CEWT = CLWT (°F)

CEWT = Full Load Condenser Entering Water Temperature (°F)

CLWT = Full Load Leaving Chilled Water Temperature (°F)

The adjusted full load and NPLV values are only applicable over the following full-load design ranges:

Minimum Leaving Chilled Water Temperature: 38°F (3.3°C)

Maximum Condenser Entering Water Temperature: 102°F (38.9°C)

Condensing Water Flow: 1 to 6 gpm/ton 0.018 to 0.1076 1/s · kW) and $X \geq 39$ and ≤ 60

Chillers designed to operate outside of these ranges or applications utilizing fluids or solutions with secondary coolants (e.g., glycol solutions or brines) with a freeze point of 27°F (-2.8°C) or lower for freeze protection are not covered by this code.

Table 503.2.3(1)
Unitary Air Conditioners and Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Air conditioners, Air cooled	< 65,000 Btu/h[d]	Split system	13.0 SEER	AHRI 210/240
		Single package	13.0 SEER	
	≥65,000 Btu/h and <135,000 Btu/h	Split system and single package	11.2 EER[c]	
	≥135,000 Btu/h and <240,000 Btu/h	Split system and single package	11.0 EER[c]	AHRI 340/360
	≥240,000 Btu/h and <760,000 Btu/h	Split system and single package	10.0 EER[c] 9.7 IPLV[g]	
	≥760,000 Btu/h	Split system and single package	9.7 EER[c] 9.4 IPLV[c]	
Through-the-wall, Air cooled	<30,000 Btu/h[d]	Split system	12.0 SEER	AHRI 210/240
		Single package	12.0 SEER	

(*continued*)

Table 503.2.3(1) (*continued*)
Unitary Air Conditioners and Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Air conditioners, Water and evaporatively cooled	<65,000 Btu/h	Split system and single package	12.1 EER	AHRI 210/240
	≥65,000 Btu/h and <135,000 Btu/h	Split system and single package	11.5 EER[c]	
	≥135,000 Btu/h and <240,000 Btu/h	Split system and single package	11.0 EER[c]	AHRI 340/360
	≥240,000 Btu/h	Split system and single package	11.5 EER[c]	

For SI: 1 British thermal unit per hour = 0.2931 W.
a. Chapter 6 of the 2009 International Energy Conservation Code contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
b. IPLVs are only applicable to equipment with capacity modulation.
c. Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.
d. Single-phase air-cooled air conditioners < 65,000 Btu/h are regulated by the National Appliance Energy Conservation Act of 1987 (NAECA); SEER values are those set by NAECA.

Table 503.2.3(2)
Unitary Air Conditioners and Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Air cooled, (Cooling mode)	< 65,000 Btu/h[d]	Split system	13.0 SEER	AHRI 210/240
		Single package	13.0 SEER	
	≥65,000 Btu/h and <135,000 Btu/h	Split system and single package	11.0 EER[c]	
	≥135,000 Btu/h and <240,000 Btu/h	Split system and single package	10.6 EER[c]	AHRI 340/360
	≥240,000 Btu/h	Split system and single package	9.5 EER[c] 9.2 IPLV[c]	
Through-the-wall (Air cooled, cooling mode)	<30,000 Btu/h[d]	Split system	12.0 SEER	AHRI 210/240
		Single package	12.0 SEER	
Water Source (Cooling mode)	<17,000 Btu/h	86°F entering water	11.2 EER	AHRI/ASHRAE 13256-1
	≥17,000 Btu/h and <135,000 Btu/h	86°F entering water	12.0 EER	AHRI/ASHRAE 13256-2
Groundwater Source (cooling mode)	<135,000 Btu/h	59°F entering water	16.2 EER	AHRI/ASHRAE 13256-5
Ground source (Cooling mode)	<135,000 Btu/h	77°F entering water	13.4 EER	AHRI/ASHRAE 13256-4

(*continued*)

Table 503.2.3(2) (*continued*)
Unitary Air Conditioners and Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Air cooled (Heating mode)	<65,000 Btu/h[d] (Cooling capacity)	Split system	7.7 HSPF	AHRI 210/240
		Single package	7.7 HSPF	
	≥65,000 Btu/h and <135,000 Btu/h (Cooling capacity)	47°F db/43° wb Outdoor air	3.3 COP	
	≥135,000 Btu/h (Cooling capacity)	47°F db/43° wb Outdoor air	3.2 COP	AHRI 340/360
Through-the-wall (Air cooled, heating mode)	<30,000 Btu/hd	Split system	7.4 HSPF	AHRI 210/240
		Single package	7.4 HSPF	
Water source (Heating mode)	<135,000 Btu/h (Cooling capacity)	68°F entering water	4.2 COP	AHRI/ASHRAE 13256-1

(*continued*)

Table 503.2.3(2) (*continued*)
Unitary Air Conditioners and Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Groundwater source (Heating mode)	<135,000 Btu/h (Cooling capacity)	50°F entering water	3.6 COP	AHRI/ASHRAE 13256-1
Ground source (Heating mode)	<135,000 Btu/h (Cooling capacity)	32°F entering water	3.1 COP	AHRI/ASHRAE 13256-1

For SI: °C=[(°F) - 32]/1.8, 1 British thermal unit per hour = 0.2931 W.
db = dry-bulb temperature, °F; wb = wet-bulb temperature, °F.
a. Chapter 6 of the 2009 International Energy Conservation Code contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
b. IPLVs and Part load rating conditions are only applicable to equipment with capacity modulation.
c. Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.
d. Single-phase air-cooled air conditioners < 65,000 Btu/h are regulated by the National Appliance Energy Conservation Act of 1987 (NAECA); SEER values are those set by NAECA.

Table 503.2.3(3)
Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
PTAC (Cooling mode) New Construction	All Capacities	95°F db outdoor air	12.5 - (0.213 Ÿ Cap/1000) EER	AHRI 310/380
PTAC (Cooling mode) Replacements[c]	All Capacities	95°F db outdoor air	10.9 - (0.213 Ÿ Cap/1000) EER	
PTHP (Cooling mode) New Construction	All Capacities	95°F db outdoor air	12.3 - (0.213 • Cap/1000) EER	
PTHP (Cooling mode) Replacements[c]	All Capacities	95°F db outdoor air	10.8 - (0.213 • Cap/1000) EER	
PTHP (Heating mode) New Construction	All Capacities	--	3.2 - (0.026 • Cap/1000) COP	
PTHP (Heating mode) Replacements[c]	All Capacities	--	2.9 - (0.026 • Cap/1000) COP	

For SI: °C=[(°F) - 32]/1.8, 1 British thermal unit per hour = 0.2931 W.
db = dry-bulb temperature, °F; wb = wet-bulb temperature, °F.
a. Chapter 6 of the 2009 International Energy Conservation Code contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. Cap means the rated cooling capacity of the product in Btu/h. If the unit's capacity is less than 7,000 Btu/h, use 7,000 Btu/h in the calculation. If the unit's capacity is greater than 15,000 Btu/h, use 15,000 Btu/h in the calculation.
c. Replacement units shall be factory labeled as follows: "MANUFACTURED FOR REPLACEMENT APPLICATIONS ONLY: NOT TO BE INSTALLED IN NEW CONSTRUCTION PROJECTS." Replacement efficiencies apply only to units with existing sleeves less than 16 inches (406 mm) high and less than 42 inches (1067 mm) wide.

Table 503.2.3(5)
Boilers, Gas- and Oil-fired, Minimum Efficiency Requirements

Equipment Type[f]	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Boilers, Gas-fired	<300,000 Btu/h	Hot water	80% AFUE	DOE 10 CFR Part 430
		Steam	75% AFUE	
	≥300,000 Btu/h and ≤2,500,000 Btu/h	Minimum capacity[b]	75% E_t and 80% E_c (See Note c, d)	DOE 10 CFR Part 431
	>2,500,000 Btu/h[f]	Hot water	80% E_c (See Note c, d)	
		Steam	80% E_c (See Note c, d)	
Boilers, Oil-fired	<300,000 Btu/h	--	80% AFUE	DOE 10 CFR Part 430
	≥300,000 Btu/h and ≤2,500,000 Btu/h	Minimum capacity[b]	78% E_t and 83% E_c (See Note c, d)	DOE 10 CFR Part 431
	>2,500,000 Btu/h[a]	Hot water	83% E_c (See Note c, d)	
		Steam	83% E_c (See Note c, d)	

(*continued*)

Table 503.2.3(5) (*continued*)
Boilers, Gas- and Oil-fired, Minimum Efficiency Requirements

Equipment Type[f]	Size Category	Subcategory or Rating Condition	Minimum Efficiency[b]	Test Procedure[a]
Boilers, Oil-fired (Residual)	≥300,000 Btu/h and ≤2,500,000 Btu/h	Minimum capacity[b]	78% E_t and 83% E_c (See Note c, d)	DOE 10 CFR Part 431
	>2,500,000 Btu/h[a]	Hot water	83% E_c (See Note c, d)	
		Steam	83% E_c (See Note c, d)	

For SI: 1 British thermal unit per hour = 0.2931 W.
a. Chapter 6 of the 2009 International Energy Conservation Code contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
b. Minimum ratings as provided for and allowed by the unit's controls.
c. E_c = Combustion efficiency (100 percent less flue losses). See reference document for detailed information.
d. E_t = Thermal efficiency. See reference document for detailed information.
e. Alternative test procedures used at the manufacturer's option are ASME PTC-4.1 for units greater than 5,000,000 Btu/h input, or ANSI Z21.13 for units greater than or equal to 300,000 Btu/h and less than or equal to 2,500,000 Btu/h input.
f. These requirements apply to boilers with rated input of 8,000,000 Btu/h or less that are not packaged boilers, and to all packaged boilers. Minimum efficiency requirements for boilers cover all capacities of packaged boilers.

Table 503.2.3(6)
Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Equipment Type	Size Category	Minimum Efficiency[b]	Test Procedure[a]
Condensing units, air cooled	≥135,000 Btu/h	10.1 EER	AHRI 365
		11.2 IPLV	
Condensing units, water or evaporatively cooled	≥135,000 Btu/h	13.1 EER	
		13.1 IPLV	

For SI: 1 British thermal unit per hour = 0.2931 W.

a. Chapter 6 of the 2009 International Energy Conservation Code contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. IPLVs are only applicable to equipment with capacity modulation.

Table 503.2.3(7)
Water Chilling Packages, Efficiency Requirements[a]

Equipment Type	Size Category	Units	As of 1/1/2010		As of 1/1/2010[c]				Test Procedure[b]
					Path A		Path B		
			Full Load	IPLV	Full Load	IPLV	Full Load	IPLV	
Air-cooled chillers	<150 tons	EER	≥9.562	≥10.416	≥9.562	≥12.500	NA[d]	NA[d]	AHRI 550/590
	≥150 tons	EER			≥9.562	≥12.750	NA[d]	NA[d]	
Air-cooled without condenser, electrical operated	All capacities	EER	≥10.586	≥11.782	Air-cooled chillers without condensers must be rated with matching condensers and comply with the air-cooled chiller efficiency requirements				
Water cooled, electrically operated, reciprocating	All capacities	kW/ton	≤0.837	≤0.696	Reciprocating units must comply with water cooled positive displacement efficiency requirements				
Water cooled, electrically operated, positive displacement	<75 tons	kW/ton	≤0.790	≤0.676	≤0.780	≤0.630	≤0.800	≤0.600	
	≥75 tons and <150 tons	kW/ton			≤0.775	≤0.615	≤0.790	≤0.586	
	≥150 tons and <300 tons	kW/ton	≤0.717	≤0.627	≤0.680	≤0.580	≤0.718	≤0.540	
	≥300 tons	kW/ton	≤0.639	≤0.571	≤0.620	≤0.540	≤0.639	≤0.490	

(*continued*)

Table 503.2.3(7) (*continued*)

Water Chilling Packages, Efficiency Requirements[a]

Water cooled, electrically operated, centrifugal	<150 tons	kW/ton	≤0.703	≤0.669	≤0.634	≤0.596	≤0.639	≤0.450	AHRI 550/ 590
	≥150 tons and <300 tons	kW/ton	≤0.634	≤0.596					
	≥300 tons and <600 tons	kW/ton	≤0.576	≤0.549	≤0.576	≤0.549	≤0.600	≤0.400	
	≥600 tons	kW/ton	≤0.576	≤0.549	≤0.570	≤0.539	≤0.590	≤0.400	
Air-cooled, absorption single effect	All capacities	COP	≥0.600	NR[e]	≥0.600	NR[e]	NA[d]	NA[d]	AHRI 560
Water-cooled, absorption single effect	All capacities	COP	≥0.700	NR[e]	≥0.700	NR[e]	NA[d]	NA[d]	
Absorption double effect, indirect-fired	All capacities	COP	≥1.000	≥1.050	≥1.000	≥1.050	NA[d]	NA[d]	
Absorption double effect, direct fired	All capacities	COP	≥1.000	≥1.000	≥1.000	≥1.000	NA[d]	NA[d]	

For SI: 1 ton = 3517 W, 1 British thermal unit per hour = 0.2931 W.

a. The chiller equipment requirements do not apply for chillers used in low-temperature applications where the design leaving fluid temperature is <40°F.

b. Section 12 of the 2009 International Energy Conservation Code contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

c. Compliance with this standard can be obtained by meeting the minimum requirements of Path A or B. However, both the full load and IPLV must be met to fulfill the requirements of Path A or B.

d. NA means that this requirement is not applicable and cannot be used for compliance.

e. NR means that there are no minimum requirements for this category.

6. Service Water Heating

6.01 General

This section covers the minimum efficiency of, and controls for, service water-heating equipment and insulation of service hot water piping. New service water heating systems and equipment shall meet the requirements of this section.

6.02 Mandatory Provisions

(A) **Service water-heating equipment performance efficiency.** Water-heating equipment and hot water storage tanks shall meet the requirements of Table 601. The efficiency shall be verified through data furnished by the manufacturer or through certification under an *approved* certification program.

(B) **Temperature controls.** Service water-heating equipment shall be provided with controls to allow a setpoint of 110°F (43°C) for equipment serving dwelling units and 90°F (32°C) for equipment serving other occupancies. The outlet temperature of lavatories in public facility rest rooms shall be limited to 110°F (43°C).

(C) All water heating systems shall be certified as Energy Star compliant.

(D) Heat traps. Water-heating equipment not supplied with integral heat traps and serving noncirculating systems shall be provided with heat traps on the supply and discharge piping associated with the equipment.

(E) Pipe insulation. For automatic-circulating hot water systems, piping shall be insulated with 1 inch (25 mm) of insulation having a conductivity not exceeding 0.27 Btu per inch/h x ft^2 x °F (1.53 W per 25 mm/m^2 x K). The first 8 feet (2438 mm) of piping in noncirculating systems served by equipment without integral heat traps shall be insulated with 0.5 inch (12.7 mm) of material having a conductivity not exceeding 0.27 Btu per inch/h x ft^2 x °F (1.53 W per 25 mm/m^2 x K).

(F) Hot water system controls. Automatic-circulating hot water system pumps or heat trace shall be arranged to be conveniently turned off automatically, or manually when the hot water system is not in operation.

(G) Water Conservation. Shower heads and lavatories shall be labeled as meeting the requirements of the International Plumbing Code, 2009 edition, Section 604.4.

Table 601
Minimum Performance of Water-Heating Equipment

Equipment Type	Size Category (input)	Subcategory or Rating Condition	Performance Required[a, b]	Test Procedure
Water heaters, Electric	≤12 kW	Resistance	0.97 - 0.00132*V*, EF	DOE 10 CFR Part 430
	>12 kW	Resistance	1.73*V* + 155 SL, Btu/h	ANSI Z21.10.3
	≤24 amps and ≤250 volts	Heat pump	0.93 - 0.00132*V*, EF	DOE 10 CFR Part 430
Storage water heaters, Gas	≤75,000 Btu/h	≥20 gal	.067 - 0.0019*V*, EF	DOE 10 CFR Part 430
	>75,000 Btu/h and ≤155,000 Btu/h	<4,000 Btu/h/gal	80% E_t (Q/800 + 110√*V*)SL, Btu/h	ANSI Z21.10.3
	>155,000 Btu/h	<4,000 Btu/h/gal	80% E_t (Q/800 + 110√*V*)SL, Btu/h	
Instantaneous water heaters, Gas	>50,000 Btu/h and <200,000 Btu/h[c]	≥4,000 (Btu/h)/gal and <2 gal	0.62 - 0.0019*V*, EF	ANSI Z21.10.3
	≥200,000 Btu/h	≥4,000 Btu/h/gal and <10 gal	80% E_t	
	≥200,000 Btu/h	≥4,000 Btu/h/gal and ≥10 gal	80% E_t (Q/800 + 110√*V*)SL, Btu/h	
Storage water heaters, Oil	≤105,000 Btu/h	≥20 gal	0.59 - 0.0019*V*, EF	DOE 10 CFR Part 430
	>105,000 Btu/h	<4,000 Btu/h/gal	78% E_t (Q/800 + 110√*V*)SL, Btu/h	ANSI Z21.10.3

(*continued*)

Table 601 (continued)
Minimum Performance of Water-Heating Equipment

Equipment Type	Size Category (input)	Subcategory or Rating Condition	Performance Required[a, b]	Test Procedure
Instantaneous water heaters, Oil	≤210,000 Btu/h	≥4,000 Btu/h/gal and <2 gal	0.59 - 0.0019*V*, EF	DOE 10 CFR Part 430
	>210,000 Btu/h	≥4,000 Btu/h/gal and <10 gal	80% E_t	ANSI Z21.10.3
	>210,000 Btu/h	≥4,000 Btu/h/gal and ≥10 gal	78% E_t (Q/800 + 110√*V*)SL, Btu/h	
Hot water supply boilers, Gas and Oil	≥300,000 Btu/h and <12,500,000 Btu/h	≥4,000 Btu/h/gal and <10 gal	80% E_t	ANSI Z21.10.3
Hot water supply boilers, Gas	≥300,000 Btu/h and <12,500,000 Btu/h	≥4,000 Btu/h/gal and ≥10 gal	80% E_t (Q/800 + 110√*V*)SL, Btu/h	
Hot water supply boilers, Oil	>300,000 Btu/h and <12,500,000 Btu/h	>4,000 Btu/h/gal and >10 gal	78% E_t (Q/800 + 110√*V*)SL, Btu/h	
Pool heaters, Gas and Oil	All	--	78% E_t	ASHRAE 146
Heat pump pool heaters	All	--	4.0 COP	AHRI 1160
Unfired storage tanks	All	--	Minimum insulation requirement R-12.5 (h • Ft2 • °F)/Btu	(none)

For SI: °C=[(°F) - 32]/1.8, 1 British thermal unit per hour = 0.2931 W, 1 gallon = 3.785 L, 1 British thermal unit per hour per gallon = 0.078 W/L.

a. Energy factor (EF) and thermal efficiency (E_t) are minimum requirements. In the EF equation, *V* is the rated volume in gallons.

b. Standby loss (SL) is the maximum Btu/h based on a nominal 70°F temperature difference between stored water and ambient requirements. In the SL equation, *Q* is the nameplate input rate in Btu/h. In the SL equation for electric water heaters, *V* is the rated volume in gallons. In the SL equation for oil and gas water heaters and boilers, *V* is the rated volume in gallons.

c. Instantaneous water heaters with input rates below 200,000 Btu/h must comply with these requirements if the water heater is designated to heat water to temperatures 180°F or higher.

7. Lighting

7.01 General

Lighting systems and equipment shall comply with this Chapter. The lighting requirements in this section shall apply to:

(A) interior spaces of buildings,

(B) exterior building features, including facades, illuminated roofs, architectural features, entrances, exits, loading docks, and illuminated canopies, and

(C) building grounds for lighting that is provided through the building's electrical service.

(D) Exceptions to Section 7.01:

(1) emergency lighting that is automatically off during normal building operation and is powered by battery, generator, or other alternate power source.

(2) residential dwelling units, provided that a minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps. For additions or extensions, unaltered portions of the existing residential dwelling unit shall not be required to comply with this requirement.

7.02 Mandatory Provisions

(A) Lighting Control

(1) Space Control. Each space enclosed by ceiling-height partitions shall have at least one control device to independently control the general lighting within the space. Each control device shall be activated either manually by an occupant or automatically by sensing an occupant. Each control device shall:

a) control a maximum of 2,500 ft^2 for a space less than 10,000 ft^2 and a maximum of 10,000 ft^2 for a space greater than 10,000 ft^2

b) be capable of overriding the automatic shutoff control required in Section 7.02(A)(l) for no more than 2 hours, and

c) be readily accessible and located so the occupant can see the controlled lighting.

Exception to Section 7.02(A)(l)(c). The required control device may be remotely installed if required for reasons of safety or security. A

remotely located device shall have a pilot light indicator as part of or next to the control device and is clearly labeled to identify the controlled lighting.

(2) Automatic Lighting Shutoff. Interior lighting systems serving more than 5,000 ft^2 shall be equipped with an automatic control device. This automatic control device shall function on either a scheduled basis at specific programmed times or on an unscheduled basis by occupant sensors. An independent program schedule shall be provided for areas of no more than 25,000 ft^2 but not more than one floor.

Exception: lighting systems designed for 24-hour use.

(3) Daylighted Area Control. Luminaires in daylighted areas greater than 250 ft^2 shall be equipped with an independent control device that: (a) is capable of reducing the light output of the luminaires in the day lighted areas by at least 50%, and (b) controls only the luminaires located entirely within the day lighted area.

(4) Exterior Lighting Control. Lighting for all exterior applications not exempted shall be controlled by a photosensor or astronomical time switch that is capable of automatically turning off the exterior lighting when daylight is available or the lighting is not required.

(5) Additional Control. The following lighting applications shall be equipped with a control device to control such lighting independently of general lighting:

a) Display/Accent Lighting. Display or accent lighting within a 3,000 ft^2 area shall have a separate control device.

b) Case Lighting. Lighting in cases used for display purposes within a 3,000 ft^2 area shall be equipped with a separate control device.

c) Hotel and Motel Guest Room Lighting. Hotel and motel guest rooms and guest suites shall have a master control device at the main room entry that controls all permanently installed luminaires and switched receptacles.

d) Task Lighting. supplemental task lighting including permanently installed undershelf or undercabinet lighting shall have a control device integral to the luminaire or be controlled by a wall-mounted control device provided the control device complies with Section 7.02(A)(l)(c).

e) Nonvisual Lighting. Lighting for nonvisual applications, such as plant growth and food-warming, shall be equipped with a separate control device.

f) Demonstration Lighting. Lighting equipment that is for sale or for demonstrations in lighting education shall be equipped with a separate control device accessible only to authorized personnel.

(B) Exit Signs. Exit sign luminaire power shall not exceed 5 watts for each exposed face.

(C) Installed Interior Lighting Power. The installed interior lighting power shall include the power of all the lighting indicated on the plans and specifications. The installed interior lighting power includes all power used by the luminaires, including lamps, ballasts, current regulators, and control devices except as specifically exempted in Section 7.01.

Exception to Section 7.02(C). If two or more independently operating lighting systems in a space are controlled to prevent simultaneous user operation, the installed interior lighting power shall be based solely on the lighting system with the highest power.

(D) Luminaire Wattage. Luminaire wattage incorporated into the installed interior lighting power shall be determined in accordance with the following criteria:

(1) The wattage of incandescent luminaires with medium screw base sockets and not containing permanently installed ballasts shall be the maximum labeled wattage of the luminaire.

(2) The wattage of luminaires containing permanently installed ballasts shall be the operating input wattage of the specified lamp/ballast combination based on values from manufacturers catalogs or values from independent testing laboratory reports.

(3) The wattage of all other miscellaneous luminaire types not described in (1) or (2) shall be the specified wattage of the luminaire.

(4) The wattage of lighting track, plug-in busway, and flexible-lighting systems that allow the addition and/or relocation of luminaires without altering the wiring of the system shall be the larger of the specified wattage of the luminaires included in the system or 30 W/lin ft. Systems with integral overload protection, such as fuses or circuit breakers, shall be rated at 100% of the maximum rated load of the limiting device.

(E) Exterior Building Grounds Lighting. Lighting for exterior building grounds luminaires which operate at greater than 100 W shall contain lamps having a minimum efficacy of 60 lm/W unless the luminaire is controlled by a motion sensor or exempt under Section 7.01.

7.03 Interior Lighting Power

(A) The installed interior lighting power for a building or a separately metered or permitted portion of a building shall be calculated in accordance with Section

7.02(D) and shall not exceed the interior lighting power allowance determined in accordance with either Section 7.03(B) or Section 7.03(C). Tradeoffs of interior lighting power allowance among portions of the building for which a different method of calculation has been used are not permitted.

(B) Building Area Method Determination of interior lighting power allowance (watts) by the building area method shall be in accordance with the following:

(1) Determine the appropriate building type from Table 7.1 and the allowed lighting power density. For building area types not listed, selection of a reasonably equivalent type shall be permitted.

(2) Determine the gross lighted floor area of the building.

(3) The interior lighting power allowance is the product of the lighted floor area of the building times the allowed lighting power density.

(4) If a building is comprised of different building area types, an allowance for each shall be computed separately. Trade-offs among building area types are permitted provided that the total installed interior lighting power does not exceed the interior lighting power allowance.

Exceptions to Section 7.03(B): The following lighting equipment and applications shall not be considered when determining the interior lighting power allowance, nor shall the wattage for such lighting be included in the installed interior lighting power identified in accordance with Section 7.02(D).

a) The connected power associated with the following lighting equipment is not included in calculating total connected lighting power.

i) Sports arena or playing field lighting.

ii) *Sleeping unit* lighting in hotels, motels, boarding houses or similar buildings.

iii) Emergency lighting automatically off during normal building operation.

iv) Lighting in spaces specifically designed for use by occupants with special lighting needs including the visually impaired and other medical and age-related issues.

v) Lighting in interior spaces that have been specifically designated as a registered historic structure.

b) Lighting equipment used for the following shall be exempt provided that it is in addition to general lighting and is controlled by an independent control device.

i) Lighting specifically designed for medical or dental procedures and lighting integral to medical equipment.

ii) Display or accent lighting that is an essential element for the function performed in galleries, museums, and monuments.

c) Lighting for theatrical purposes, including performance, stage, and film or video production.

d) Lighting for photographic processes.

e) Lighting that is integral to equipment or instrumentation and is installed by its manufacturer.

f) Lighting for plant growth or maintenance.

g) Lighting that is an integral part of advertising or directional signage.

h) Lighting integral to food warming and food preparation equipment.

i) Lighting that is for sale or lighting educational demonstration systems.

j) Lighting *approved* because of safety or emergency considerations, inclusive of exit lights.

k) Lighting integral to both open and glass-enclosed refrigerator and freezer cases.

l) Lighting in retail display windows, provided the display area is enclosed by ceiling-height partitions.

m) Furniture mounted supplemental task lighting that is controlled by automatic shutoff.

(C) Alternative Method: The interior lighting power may alternatively be calculated by using Section 7.04 Alternative Compliance Path: Space-by-Space Method.

Table 7.2 Interior Lighting Power Densities – Building Area Method			
Building Area Type	W/ft^2	Building Area Type	W/ft^2
Automotive Facility	0.9	Multi-Family	0.7
Convention Center	1.2	Museum	1.1
Court House	1.2	Office	1.0
Dining: Bar Lounge/Leisure	1.3	Parking Garage	0.3
Dining: Cafeteria/Fast Food	1.4	Penitentiary	1.0
Dining: Family	1.6	Performing Arts Theater	1.6
Dormitory	1.0	Police/Fire Station	1.0
Exercise Center	1.0	Post Office	1.1
Gymnasium	1.1	Religious Building	1.3
Health Care-Clinic	1.0	Retail	1.5
Hospital	1.2	School/University	1.2
Hotel	1.0	Sports Arena	1.1
Library	1.3	Town Hall	1.1
Manufacturing Facility	1.3	Transportation	1.0
Motel	1.0	Warehouse	0.8
Motion Picture Theater	1.2	Workshop	1.4
In cases where both general building type and a specific building area type are listed, the specific building area type shall apply. ASHRAE 90.1-2007.			

7.04 Alternative Compliance Path: Space-by-Space Method

Space-by-Space Method of Calculating Interior Lighting Power Allowance. Use the following steps to determine the interior lighting power allowance by the Space-by-Space Method:

(A) Determine the appropriate building type from Table 7.2. For building types not listed, selection of a reasonably equivalent type shall be permitted.

(B) For each space enclosed by partitions 80% or greater than ceiling height, determine the gross interior floor area by measuring to the center of the partition wall. Include the floor area of balconies or other projections. Retail spaces do not have to comply with the 80% partition height requirements.

(C) Determine the *interior lighting power allowance* by using the columns designated Space-by-Space Method in Table 7.2. Multiply the floor area(s) of the space(s) times the allowed *LPD* for the space type that most closely represents the proposed use of the space(s). The product is the *lighting power*

allowance for the space(s). For space types not listed, selection of a reasonable equivalent category shall be permitted.

(D) The interior *lighting power allowance* is the sum of *lighting power allowances* of all spaces. Trade-offs among spaces are permitted provided that the total *installed interior lighting power* does not exceed *the interior lighting power allowance*.

7.05 Additional Interior Lighting Power

When using the Space-by-Space Method, an increase in the *interior lighting power allowance* is allowed for specific lighting functions. Additional power shall be allowed only if the specified lighting is installed and automatically controlled, separately from the general lighting, to be turned off during non-business hours. This additional power shall be used only for the specified *luminaires* and shall not be used for any other purpose.

An increase in the *interior lighting power allowance* is permitted in the following cases:

(A) For spaces in which lighting is specified to be installed in addition to the general lighting for the purpose of decorative appearance, such as chandelier-type luminaries or sconces or for highlighting art or exhibits, provided that the additional lighting power shall not exceed 1.0 W/ft^2 of such spaces.

(B) For lighting equipment installed in sales areas and specifically designed and directed to highlight merchandise, calculate the additional lighting power as follows:

Additional Interior Lighting Power Allowance = 1000 watts + (Retail Area 1 x 1.0 W/ft^2) + (Retail Area 2 x 1.7 W/ft^2) + (Retail Area 3 x 2.6 W/ft^2) + (Retail Area 4 x 4.2 W/ft^2),

where
Retail Area 1 = the floor area for all products not listed in Retail Areas 2, 3, or 4;
Retail Area 2 = the floor area used for the sale of vehicles, sporting goods, and small electronics;
Retail Area 3 = the floor area used for the sale of furniture, clothing, cosmetics, and artwork; and
Retail Area 4 = the floor area used for the sale of jewelry, crystal, and china.

Exception: Other merchandise categories may be included in Retail Areas 2 through 4 above, provided that justification documenting the need for additional lighting power based on visual inspection, contrast, or other critical display is approved by the Department of Public Works.

Table 7.2 Lighting Power Densities Using the Space-by-Space Method

Common Space Types[a]	*LPD*, W/ft^2	Building-Specific Space Types	*LPD*, W/ft^2
Office--Enclosed	1.1	Gymnasium/Exercise Center	
Office--Open Plan	1.1	Playing Area	1.4
Conference/Meeting/Multipurpose	1.3	Exercise Area	0.9
Classroom/Lecture/Training	1.4	Courthouse/Police Station/Penitentiary	
For Penitentiary	1.3	Courtroom	1.9
Lobby	1.3	Confinement Cells	0.9
For Hotel	1.1	Judges' Chambers	1.3
For Performing Arts Theater	3.3	Fire Stations	
For Motion Picture Theater	1.1	Engine Room	0.8
Audience/Seating Area	0.9	Sleeping Quarters	0.3
For Gymnasium	0.4	Post Office--Sorting Area	1.2
For Exercise Center	0.3	Convention Center--Exhibit Space	1.3
For Convention Center	0.7	Library	
For Penitentiary	0.7	Card File and Cataloging	1.1
For Religious Buildings	1.7	Stacks	1.7
For Sports Arena	0.4	Reading Area	1.2
For Performing Arts Theater	2.6	Hospital	
For Motion Picture Theater	1.2	Emergency	2.7
For Transportation	0.5	Recovery	0.8
Atrium--First Three Floors	0.6	Nurses' Station	1.0
Atrium--Each Additional Floor	0.2	Exam/Treatment	1.5
Lounge/Recreation	1.2	Pharmacy	1.2
For Hospital	0.8	Patient Room	0.7
Dining Area	0.9	Operating Room	2.2
For Penitentiary	1.3	Nursery	0.6
For Hotel	1.3	Medical Supply	1.4
For Motel	1.2	Physical Therapy	0.9
For Bar Lounge/Leisure Dining	1.4	Radiology	0.4
For Family Dining	2.1	Laundry--Washing	0.6
Food Preparation	1.2	Automotive--Service/Repair	0.7
Laboratory	1.4	Manufacturing	
Restrooms	0.9	Low Bay (<25 ft Floor to Ceiling Height)	1.2
Dressing/Locker/Fitting Room	0.6	High Bay (≥25 ft Floor to Ceiling Height)	1.7
Corridor/Transition	0.5	Detailed Manufacturing	2.1
For Hospital	1.0	Equipment Room	1.2
For Manufacturing Facility	0.5	Control Room	0.5
Stairs--Active	0.6	Hotel/Motel Guest Rooms	1.1
Active Storage	0.8	Dormitory--Living Quarters	1.1
For Hospital	0.9	Museum	
Inactive Storage	0.3	General Exhibition	1.0
For Museum	0.8	Restoration	1.7
Electrical/Mechanical	1.5	Bank/Office--Banking Activity Area	1.5

(*continued*)

Table 7.2 Lighting Power Densities Using the Space-by-Space Method (continued)

Common Space Types[a]	*LPD*, W/ft^2	Building-Specific Space Types	*LPD*, W/ft^2
Workshop	1.9	Religious Buildings	
Sales Area[b]	1.7	Worship Pulpit, Choir	2.4
		Fellowship Hall	0.9
		Retail	
		Sales Area[c]	1.7
		Mall Concourse	1.7
		Sports Arena	
		Ring Sports Area	2.7
		Court Sports Area	2.3
		Indoor Playing Field Area	1.4
		Warehouse	
		Fine Material Storage	1.4
		Medium/Bulky Material Storage	0.9
		Parking Garage--Garage Area	0.2
		Transportation	
		Airport--Concourse	0.6
		Air/Train/Bus--Baggage Area	1.0
		Terminal--Ticket Counter	1.5

[a]In cases where both a common space type and a building-specific type are listed, the building specific type shall apply.

[b]For accent lighting, see Section 9.6.2(b) of the ANSI/ASHRAE/IESNA Standard 90.1-2007 (I-P Edition)

[c]For accent lighting, see Section 9.6.3(c) of the ANSI/ASHRAE/IESNA Standard 90.1-2007 (I-P Edition)

7.06 Exterior Building Lighting Power

The total exterior lighting power allowance for all exterior building applications is the sum of the individual lighting power densities permitted in Table 7.3 plus an additional allowance of up to 5% of that sum. Trade-offs are permitted only for those elements designated as "Tradeable Surfaces" in Table 7.3 All fixtures shall comply with Section 7.02(E).

Exceptions to Section 7.06: Lighting used for the following exterior applications is exempt when equipped with a control device independent of the control of the nonexempt lighting:

(A) Specialized signal, directional, and marker lighting associated with transportation.

(B) Advertising signage or directional signage.

(C) Lighting integral to equipment or instrumentation that is installed by its manufacturer.

(D) Lighting for theatrical purposes, including performance, stage, film production, and video production.

(E) Lighting for athletic playing areas.

(F) Temporary lighting.

(G) Lighting for industrial production, material handling, transportation sites, and associated storage areas.

(H) Theme elements in theme/amusement parks.

(I) Lighting used to highlight features of public monuments and registered historic landmark structures or buildings.

Table 7.3 - Exterior Lighting Power Densities		
Tradeable Surfaces: (Lighting power densities for uncovered parking areas, building grounds, building entrances and exits, canopies and overhangs, and outdoor sales areas may be traded)	**Uncovered Parking Areas**	
	Parking lots and drives	0.15 W/ft^2
	Building Grounds	
	Walkways less than 10 feet wide	1.0 W/linear foot
	Walkways 10 feet wide or greater	0.2 W/ft^2
	Plaza areas	0.2 W/ft^2
	Special feature areas	0.2 W/ft^2
	Stairways	1.0 W/ft^2
	Building Entrances and Exits	
	Main entries	30 W/linear foot of door width
	Other doors	20 W/linear foot of door width
	Canopies and Overhangs	
	Canopies (free standing and attached overhands)	1.25 W/ft^2
	Outdoor Sales	
	Open areas (including vehicle sales lots)	0.5 W/ft^2
	Street frontage for vehicle sales lots in addition to "open area" allowance	20 W/linear foot
Non-Tradeable Surfaces: (Lighting Power density calculations for these applications can be used only for the specific application and cannot be traded between surfaces or with other exterior lighting. The following allowances are in addition to any allowance otherwise permitted in the "Tradeable Surfaces" section of this table.)	**Building Facades**	0.2 W/ft^2 for each illuminated wall or surface or 5.0 W/linear foot for each illuminated wall or surface length
	Automate Teller Machines and Night Depositories	270 W per location plus 90W per additional ATM per location
	Entrances and Gatehouse Inspection Stations at Guarded Facilities	1.25 W/ft^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradeable Surfaces")
	Loading areas for law enforcement, fire, ambulance, and other emergency vehicles	0.5 W/ft^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradeable Surfaces")
	Drive-Up Windows at Fast Food Restaurants	400 W per drive-through
	Parking near 24-hour retail entrances	800 W per main entry