



EWG 01/2009T

Reducing barriers to trade through development of a common protocol for measuring the seasonal energy efficiency (SEER) of air conditioners

Chinese Taipei

2009/10/07



Objective of the project

The objective of this project aims to **develop an analytical platform to evaluate the SEER values** for room air conditioner (RACs) of APEC economies.

This objective will be met **based on the data of climate and building load characteristic collected from APEC economies.**

With the application of this program, it will help to reduce unnecessary duplicate test and administration process. Meanwhile, it also helps to reduce the cost and times of testing, and further affect the efficiency of trading among APEC economies.

Budget

The total approved budget for this study is **US\$60,000** from APEC funding.

The consultant will prepare an itemized budget (up to **US\$41,200**) and submit this with a proposal.



Scope of Work

- 1. Collect the weather data and the building load curve of the regions concerned.**
- 2. Develop a common code for performing Seasonal Energy Efficiency Ratio (SEER) of room air conditioners (RACs).**
- 3. Design and deliver one and a half days open workshop at Chinese Taipei on topic of air conditioning SEER to those experts or representatives mainly from APEC economies.**
- 4. Publish (consistent with APEC publication policy) and distribute 3 electronic copies of the outcome of workshop to workshop participants and others APEC Economies member.**
- 5. Provide an electronic copy of the above publications and the outcome of the development of SEER program to the APEC Secretariat for dissemination via the APEC Website.**



Timetable & Deliverables for tenders

Activities	Dates
Deadline for submission of proposals to the Project Overseer;	30 April 2009
Proposal evaluation and bid selection by Steering Committee of representatives from APEC Member Economies;	1-6 May 2009
Negotiation of contract details between the APEC Secretariat and the successful tender;	7-15 May 2009
Organization of workshop and invitation of speakers sent	17 July 2009
<i>Stage 1</i>	10 July 2009
<ul style="list-style-type: none"> •Planning overall SEER development structure •Collection of related APEC economies weather data, consumer's behavior of using air conditioner, building load characteristic and the existing regulation and standards 	
Finalized the details of workshop and complete lists of experts and participants	28 August 2009
<i>Stage 2</i>	25 September 2009
•Completion initial version of SEER program	
Execution of Workshop;	5-6 October 2009
Publish and distribute the outcome of workshop to participants and APEC Economies.	23 October 2009
<i>Stage 3</i>	20 November 2009
•Complete the final version of SEER program with verified result	
Collection result of workshop, SEER testing method and program	4 December 2009
Produce an electronic version of the above document for dissemination via the relevant APEC Websites.	11 December 2009



Progress

- **Complete the negotiation of contract details between the APEC Secretariat and the successful tender.**
- **Held the SEER Workshop. (Oct. 5-6)**
- **Complete initial version of SEER program.**



Workshop for the Development of SEER

First day – Seminar (5 th Oct., 2009 / Mon.)	
	Topic / Speaker
Venue	4F/CR-403, The Howard Plaza Hotel Taipei, Taipei
09:00 ~ 09:30	Registration
09:30 ~ 10:00	Opening Remarks <i>Chair:</i> Dr. Robert Yie-Zu Hu, Deputy General Director of Energy and Environment Research Laboratories, ITRI <i>Co-Chair:</i> Mr. Terry Collins, Chair of EGEE&C, APEC <i>VIP Speech:</i> Mr. Huey-Ching Yeh, Director General of the Bureau of Energy, MOEA, Chinese Taipei
10:00 ~ 10:40	Title: Policy and standards for the rational use of energy in Japan <i>Speaker:</i> Dr. Chaobin Dang, Assistant Professor <i>The University of Tokyo, Japan</i>
10:40 ~ 11:00	Break
11:00 ~ 11:40	Title: CSPF & HSPF for air-conditioner and heat pump in Korea <i>Speaker:</i> Dr. Jun-Young Choi, Chief Researcher <i>Korea Testing Laboratory/Energy Technology Center, Republic of Korea</i>
11:40 ~ 13:10	Lunch Break
13:10 ~ 13:50	Title: SEER for air conditioners in New Zealand <i>Speaker:</i> Mr. Edward Winter MSc., Technical & Standards Advisor (Heating & Refrigeration), Energy Efficiency and Conservation Authority, New Zealand
13:50 ~ 14:30	Title: The Seasonal Energy Efficiency (SEER) of air conditioners in China standards <i>Speaker:</i> Prof. Cheng Jianhong, Researcher <i>China National Institute of Standardization, China</i>
14:30 ~ 14:50	Break

14:50 ~ 15:30	Title: The role of SEER of air conditioner in energy efficiency management in Chinese Taipei <i>Speaker:</i> Mr. Shin-Hang Lo, Manager <i>Energy and Environment Research Laboratories, ITRI, Chinese Taipei</i>
15:30 ~ 16:10	Title: SEER testing method and standard development in US <i>Speaker:</i> Mr. Christopher G. Stone, General Manager <i>Intertek, USA</i>
16:10 ~ 16:50	Title: Establishment of the CNS national standards and development of SEER measuring method for air conditioners in Chinese Taipei <i>Speaker:</i> Mr. Chwan-Shing Huang, Vice General Manager <i>Research & Planning Department, Taiwan Electric Research & Testing Center, Chinese Taipei</i>
16:50 ~ 17:20	Panel Discussion
Second Day – Panel Discussion (6 th Oct., 2009 / Tue.)	
09:30 ~ 10:10	Title: The measures of promoting SEER for air conditioners from manufacturer's point of view <i>Speaker:</i> Mr. Steve, R.C. Chang <i>TRAEA, Chinese Taipei</i>
10:10 ~ 10:50	Title: Introduction of the development of an analytical platform for measuring the SEER of air conditioners of APEC member economies <i>Speaker:</i> Ms. Hsiao-Chi Hsu, Associate Researcher <i>Industrial Technology Research Institute, Chinese Taipei</i>
10:50 ~ 11:10	Break
11:10 ~ 11:40	Panel Discussion
End of Workshop	



Experts (invited)	From 5 different economies□ Japan□Korea□China□New Zealand□USA
Active participants (invited)	From 3 different economies□ Russia□Malaysia□Indonesia
Total participants	From * different economies□ Total number is **

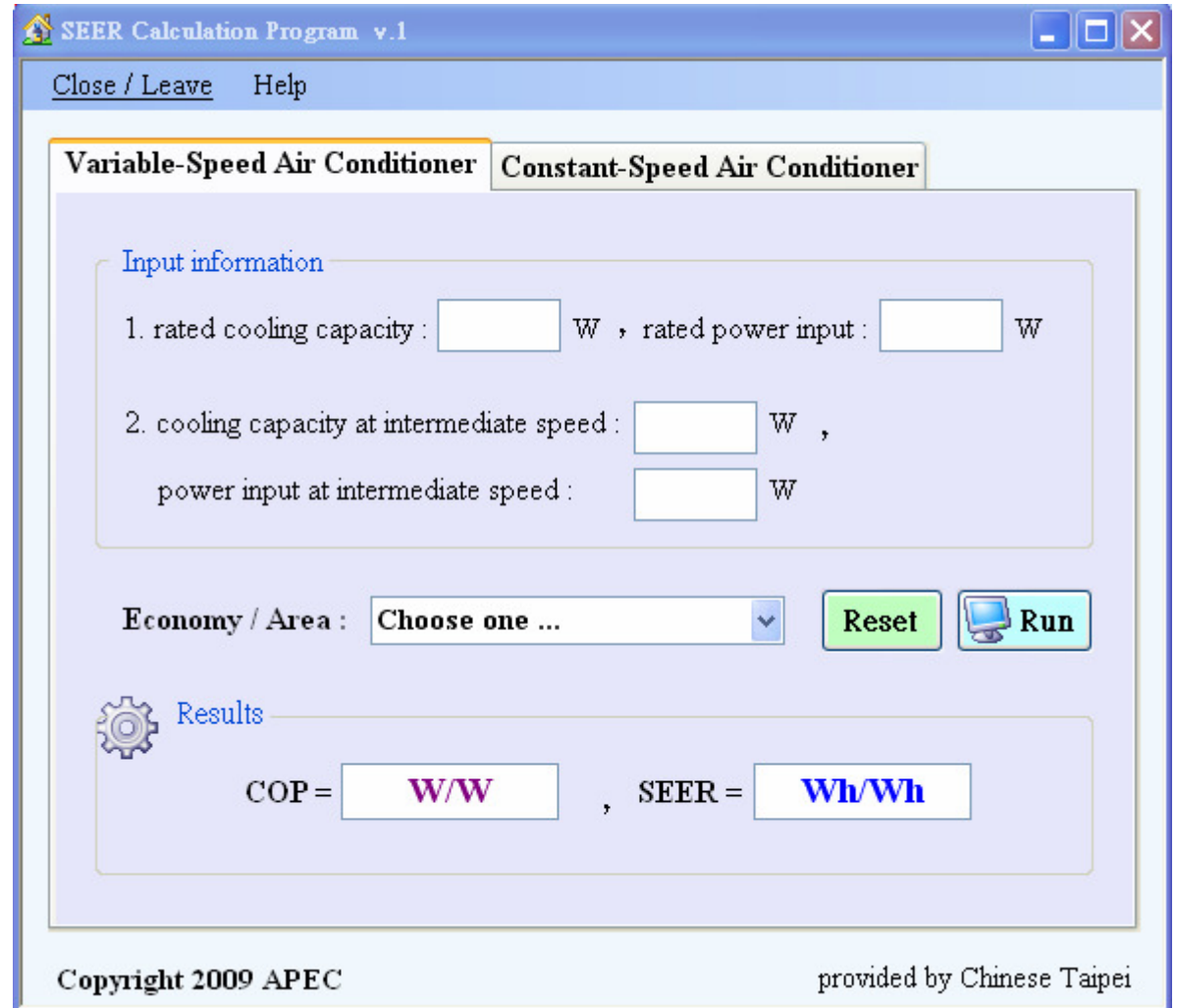
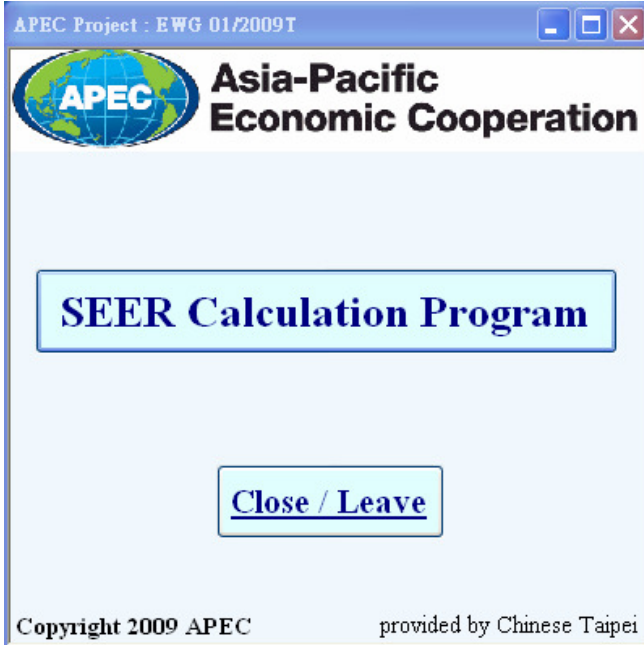
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SEER program

SEER Standards for APEC Economies

Economies	USA	Canada	Japan	China	Korea	Australia & New Zealand	Chinese Taipei
Standard	ASHARE 116-1995	CAN/CSA C656-M92	(1)JRA 4046 : 2004 (2)JIS C 9612 : 2005 Appendix 3	GB/T 7725-2004 Appendix E	KS C 9306-2007	AS/NZS 3823-2001	CNS 14464 & CNS 3615
Reference	ANSI/ASHRAE 116, Methods of testing for seasonal efficiency of unitary air-conditioners and heat pumps	(1) All types of central air conditioners are rated using SEER (2) test procedure for central air conditioners : ARI 210/240-89 & ASHRAE 37	(1) JRA 4046, Room air conditioners, 2004 (2) JIS C 9612, Room air conditioners, 2005	GB/T 7725-2004, Room Air Conditioners	KS C 9306-2007, Room air conditioners	Working on it	Draft





Steps to calculate SEER

1. Input the **cooling capacity** and **power input** of the AC.
2. The intermediate cooling capacity is usually about half value of the rated cooling capacity.
3. Choose the **Economy / Area** where the AC operates.
4. If choose **User Define**, then go to step 7.
5. Select **Run** to calculate COP & SEER.
6. Select **Reset** to clear all the input data.
7. For **User Define** :
 - 7.1. Set the **bin temp. V.S. bin hours**.
 - 7.2. Set the value of **Degradation Coefficient** (C_D).
 - 7.3. Select **Run** to calculate COP & SEER.
 - 7.4. Select **Reset** to clear all the input data.

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Input information

1. rated cooling capacity : W , rated power input : W
2. cooling capacity at intermediate speed : W ,
power input at intermediate speed : W

Economy / Area :

- Choose one ...
- Chinese Taipei - CNS 3615
 - Japan - JIS C 9612
 - China - GB/T 7725
 - USA - ANSI/ASHRAE 116
 - Korea - KS C 9306
 - New Zealand - Draft
 - User Define -

Reset

Run

Results

COP =

Results

COP = , SEER =



User Define

Bin Temperature	Bin Hours (hr)	Degradation Coefficient (CD) :
23 °C		0.25
24 °C		
25 °C		
26 °C		
27 °C		
28 °C		
29 °C		
30 °C		
31 °C		
32 °C		
33 °C		
34 °C		
35 °C		
36 °C		
37 °C		
38 °C		
39 °C		
40 °C		

Reset

Run

Results

COP = W/W

SEER = Wh/Wh

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This program so far includes 6 economies' standards (or drafts) about SEER.

The User Define function is currently under construction.

User can try different bin temp. V.S. bin hours to simulate the SEER value in different area.

An electronic copy of the above publications and the outcome of the development of SEER program will be provided to the APEC Secretariat for dissemination via the APEC Website.



Thank you !!